



**FORMAN  
CHRISTIAN  
COLLEGE**  
(A CHARTERED UNIVERSITY)

# 4-Year BACCALAUREATE

**DEGREE PROGRAM CATALOG  
2018-2019**

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Message from the  
**Rector**

Forman Christian College is a chartered university that offers an American-style 4-year Baccalaureate (Hons) degree program designed to meet world-class standards. As a private not-for-profit university, our focus is on providing the best possible education for our students. For over 150 years, FCCU has been providing quality education to young men and women of the region. We have produced graduates who have leadership positions in government, business, education, various professions, religion and arts.

Our high-quality faculty takes personal interest in each student and each student has a member of the faculty to serve as his or her academic advisor. Teaching standards are ensured with an up-to-date curriculum and by bringing in the latest developments in each field.

Located on a beautiful and safe campus with many academic buildings, sports grounds and a swimming pool, we have a rich tradition of providing co-curricular activities through various student societies and sports.

At FCCU, we are a community of concerned persons who try to live by the core values of the university: integrity, commitment to excellence, discipline, justice, respect and service to community. We are dedicated to living out the University motto, "By love serve one another".

We invite you to be part of the many opportunities for intellectual development and interactive learning; a safe and challenging environment which is conducive to personal growth; a warm and friendly community that makes education a joy; and an educational program that will prepare you well for your career and your role as a citizen.

Cordially

**Dr. James A. Tebbe**

# Preface

## Validity of the Catalog

A published catalog remains in force for seven academic years and is binding for students in terms of requirements for the major. If a student takes longer than seven years to graduate, s/he will have to change catalogs and complete all requirements in the new catalog. The rules/policies written in each catalog are effective unless changed by the administration. Academic/Administrative rules can change from time to time, and the student must stay in touch with such changes. These will be communicated through appropriate sources on campus/online.

The graduation requirements in the catalog will not be changed for the students entering in the year of the catalog's publication unless that student takes more than seven years to graduate. A student must fulfill all the requirements for graduation from one catalog. It will be assumed by the University that the student is choosing to graduate using the catalog published in the year he/she was admitted unless the student makes a change in writing.

# INTRODUCTION TO FCCU



## Brief History

Forman Christian College (A Chartered University) was founded in 1864 by Dr Charles W Forman, a Presbyterian missionary from the USA. The college was initially known as the Lahore Mission College, but in 1894 the name was officially changed to Forman Christian College in honor of the founder. In the early years, degrees were awarded through the Calcutta University. College level instruction was interrupted in 1869 due to the illness of key faculty members.

College classes resumed in 1886, with degrees being awarded through the University of the Punjab. In 2004, FCCU became a chartered University and from 2008 onwards has awarded its own degrees.

The early years of the college were marked by rapid growth in enrollment, and a constant struggle to find enough space to house the growing college. Enrollment grew from 18 students in 1886 to 130 in 1890, 311 in 1900, 426 in 1910 and 600 in 1915. Enrollment had reached 1,500 students by the time the college was nationalized in 1972. Enrollment in the University section alone stands at more than 3,000 students today.

The campus was located in the Anarkali (Nila Gumbad) area of Lahore for many years. Four major buildings were constructed by the college on that campus by 1916, and Ewing Hall, built in 1916, is still used as a hostel by the University. In 1940 the college moved to its present spacious campus of over 100 acres on the scenic banks of Lahore Canal.

FCCU has been served by a large number of distinguished educational leaders and teachers throughout its history. Dr CW Forman, Dr Sir JCR Ewing, Dr CH Rice, Dr ED Lucas, Dr SK Dutta, Dr HC Velte, Dr JH Orbison, Noble Laureate Dr Arthur Compton, Maulvi Muhammad Bakar, Dr HD Griswold, Prof JM Benade, Shamsul Ulema Maulavi Muhammad Hussain, Dr KC Chatterji, Dr P Carter Speers, Dr SL Sheets, Prof MS Bhatti, Maulana Farzand Ali, Dr RH Ewing, Dr EJ Sinclair, Dr Robert F Tebbe and Dr Carl Wheelless are among many who have impacted the lives of students and shaped the future of the institute through the years. Under their leadership, FCCU became widely regarded as one of the very best in the entire subcontinent.

For many decades, FCCU has been widely recognized for its meritorious work of nurturing and consolidating the social and intellectual capital of Pakistan. The University motto, "By love serve one another," has been a guiding principle for Formanites throughout its history. Among the graduates of FCCU are two Presidents of Pakistan, a Prime Minister of India, the first Chief Justice of Pakistan, a number of Governors and Chief Ministers of the Punjab and other provinces, an Attorney General of Pakistan, two Foreign Ministers of Pakistan, a President of the Security Council of the United Nations, numerous Ambassadors to other nations, a Chairman of the Atomic Energy Commission, a Chairman of the Agricultural Research Council, a Chairman of the Senate, several Speakers of the National Assembly, numerous Generals and Admirals and an equally impressive list of leaders in the fields of education, law, medicine, arts and entertainment.

FCCU has been a leader for the development of curriculum among the universities of Pakistan. Through the years the University introduced into the curriculum such subjects as the Sciences, Economics, Psychology, Geography, Technical Chemistry and Sociology. FCCU is the first college in the subcontinent in whose laboratories research work of Nobel Prize caliber was conducted and Dr Arthur Compton received the Nobel Prize in 1932 for research conducted, in large part, at FCCU. In 1902, the college was the first in the Punjab to admit women.

FCCU also has a distinguished record of performing service for the nation. At the time of Independence, it converted two hostels into a hospital for refugees seeking medical assistance and thus began United Christian Hospital. During the Kangra Valley earthquake disaster in 1905, Dr JCR Ewing organized and led the relief effort. Similarly, at the time of the Quetta earthquake in 1935, the college did devoted relief work, this time under the leadership of Prof Jagun Nath. Social service by students was made popular by Prof DJ Fleming many years ago.

In 1972 the college was nationalized by the government. It was returned to the present owners on 19 March 2003. In March 2004, the government granted University status to FCCU. The University embarked upon an exciting new stage in its history in September 2005 when it began a four-year Baccalaureate (Hons) program designed in accordance with world-class standards for accreditation.

## Mission

The mission of Forman Christian College (A Chartered University) is to impart, create and disseminate knowledge and to develop informed, ethical and responsible citizens who are prepared and committed to learn, lead and serve; persons who exemplify the FCCU motto, "By love serve one another".

## Vision

The vision of FCCU is to be recognized as one of the very best educational institutions in the entire subcontinent. This is in keeping with the distinguished reputation established during the first century in its life.

## Goals

The educational programs and the faculty approach to teaching are designed to graduate:

**Empowered learners** with strong written, oral and quantitative skills that they can use to evaluate a constant flood of information. The idea is to create in them the ability to think independently and critically, solve problems and continue a lifetime of self-directed learning.

**Informed learners** who understand global and cross-cultural relationships, value the philosophy and history underlying the nation of Pakistan, and are fluent in both their native language and English.

**Responsible learners** who understand the ethical consequences of actions and are well groomed to be active citizens who accept their public duty and participate in the decision-making process of a democracy.

## Our Commitments

### Commitment to Excellence

Forman Christian College (A Chartered University) operates all of its programs in accordance with the highest standards of excellence in education. The educational programs are designed and implemented in accordance with world-class standards of accreditation. The University has begun the process of seeking accreditation with one of the six regional accrediting associations in the USA.

### Commitment to Individual Development

FCCU is concerned with the development of the whole person, and therefore encourages the intellectual, spiritual, cultural, social, emotional and physical growth of each student. We seek to prepare students for the basic responsibilities of life, and especially for competent and humane leadership and service. The FCCU experience is designed to help students go beyond the limitations caused by ignorance, narrowness, conformity, self-centeredness and irresponsibility. Our goal is to help individuals achieve excellence in thought and conduct.

### Commitment to Core Values

The faculty and staff of FCCU seek to live by, and to teach students, its core values. In a variety of different settings, students are asked to learn and live by the following values beginning with signing a 'Shared Commitment' document that highlights the practice of the core values on a regular basis.

#### Integrity

I will speak the truth and keep my commitments. I will take my responsibilities seriously and fulfill them to the best of my ability.

#### Excellence

I will be steadfast in my pursuit of excellence. I will set high standards in my intellectual life, personal behavior and interpersonal relationships. I will honor the traditions of the University and preserve the beauty of the campus.

#### Respect for the Dignity of Each Human Being

I will treat others with respect, kindness, generosity of heart and compassion. I will accept and tolerate differences. I will handle disagreements with candor and civility.

#### Discipline and Accountability for My Actions

I will uphold the policies of the University and follow the rules and regulations. I understand that behavior has consequences. This understanding is an essential component in the development of my self-discipline.

#### Fairness and Justice

I will be fair in all of my decisions and work towards justice for others.

#### Service

I will live by the motto "By love serve one another", knowing that serving others is a way of life that will enrich the community and the nation in which I live.

#### Community

I will take the concerns of others in the University community to heart. Because we are bound together by common purpose, objectives and values, the welfare of all will be my concern.

### Commitment of Faculty to Students

The faculty of FCCU is committed to student learning and to helping students succeed in their studies and be well prepared for a meaningful and productive life after University. Students will form a close personal relationship with one or more members of the faculty, and this close student-faculty contact has been one of the strengths of FCCU throughout its history. Faculty members provide assistance to students, as needed, outside of the classroom, and they do not charge tuition for this help. Indeed, their contract with the University prohibits faculty members from charging tuition for extra assistance.

### **Commitment to General Education**

While FCCU is committed to helping students develop competence in a specific field, it is equally committed to general education. The general education program is designed to provide a foundation for lifelong learning by helping students to develop a love of learning. It prepares students for responsible citizenship by teaching them the lessons of history, by creating awareness of their cultural heritage, by helping them understand the causes of social and political unrest, and the conditions for stable governance and sustainable economic development. Through studies in the humanities, the general education program seeks to help students explore various perspectives on the central concerns of human existence. The general education program is designed to help students assume increased responsibility for their own growth, to master the skills that are necessary to understand and deal with a rapidly changing and increasingly complex world. The program requires students to take courses in each of the following areas of human knowledge: Humanities, Natural Sciences, Social and Behavioral Sciences, and Computer and Information Technology.

### **Commitment to Career Preparation**

Enriched with the enduring qualities of a liberal arts education, FCCU seeks to graduate students who are well-prepared for success in their careers. Through the major field of study selected by the student, he or she will receive a basic knowledge of a particular field in enough depth to be successful in entry level positions in a career and to advance successfully to increased levels of responsibility on the job. However, it is impossible to predict what a person will need to know for success on the job twenty years from now, but we do know that in most jobs new knowledge will have to be mastered that does not even exist today. Therefore, it is more important to learn how to learn, how to think, how to solve problems, and how to communicate effectively rather than just to focus narrowly on the content of an academic discipline. The educational program is designed to help students develop these skills.

### **Commitment to Coeducation**

The Baccalaureate (Hons) Degree Program of FCCU is co-educational. FCCU first admitted women in 1902, and it seeks to provide a learning environment in which both men and women can learn effectively and develop the character traits and personality that will enable them to succeed in later life. The core value of respect for the dignity of each human being is also an important consideration for creating a wholesome and positive atmosphere for learning for both men and women.

### **Commitment to Lifelong Learning**

FCCU seeks to prepare students for a lifetime of self-directed learning. This will be essential for success in a rapidly changing and increasingly complex world. The faculty models this commitment by constantly learning about new knowledge in their academic discipline, and by participation in a variety of professional development programs presented to them by the University management to help them learn new approaches to teaching and learning.

### **Commitment to Providing an American-style Education**

The preceding commitments reflect the commitment to provide an American-style education. The American system of higher education is widely recognized as the very best in the world and we seek no less than the best for Pakistan. This commitment is an approach to education rather than a statement about the specific content of the curriculum. At FCCU, the role of the faculty and the students, the balance between the breadth and the depth of learning (General Education and a major field of study) and the structure of the program reflect best practices in American higher education.

### **Commitment to Equality of Opportunity**

At FCCU, students, faculty and staff are free within the University from all forms of discrimination based upon gender, race, age, ethnicity, nationality, religion or physical disability. Decisions regarding employment and admission to the University are based upon merit. Grades in courses and graduation from the University are based upon the performance of the student in meeting course and graduation requirements.



## Financial Integrity

FCCU is a private, not-for-profit educational institution. All tuition and other fee income goes directly to the support of the educational program. Tuition and fees pay only a portion (approximately 69%) of the educational costs per student. Thanks to the support of donors, the balance of costs is paid from endowment and gift income from individuals, churches, corporations and foundations.

# CAMPUS



Forman Christian College (A Chartered University) has an impressive and well-maintained campus with all the facilities needed to create an environment that is truly academic and conducive to purposeful learning. Centrally located in a beautiful residential area of Lahore, the campus sprawls over 108 acres along the left bank of the canal.

There are two new purpose-built buildings for University students. Inaugurated in 2007, the Business and Social Sciences Building houses the Social Science disciplines including the Departments of Business Management and Economics. The Armacost Science Building is a modern state-of-the-art science building for the Departments of Biological Sciences, Chemistry, Physics and Computer Studies/Information Technology. It was inaugurated in February 2010.

The Ewing Memorial Library has been functioning since 1943 and now contains over 100,000 volumes. It has an automated Library Management System and state-of-the-art online and electronic reference services. Students can use the web-based Information Portal to search the library catalog and log in to their accounts to view their activity information. The Information Commons in the Armacost Science Building has computer and multimedia workstations, printers, study booths, an information literacy classroom and a research help desk. The Ahmad Saeed Administration Building (former N Block) houses administrative offices.

The Cafeteria, located near the back of campus, offers a setting for students to relax between classes. Basketball courts, a gymnasium, badminton and table tennis facilities are also located in Lucas Center as are the offices of the Health and Physical Education Department.

Sinclair Hall houses the largest auditorium – seating 740 people – of the University. This is where major events including the annual play and Christmas pageant, etc. are held.

FCCU has a large sports ground in the center of campus that includes facilities for cricket, football and hockey, plus a 400-meter oval shaped running track. A modern 25-meter swimming pool and six tennis courts are also located on campus.

Two hostels for University students are located on campus and an additional hostel, Ewing Hall, is located in the Anarkali (Nila Gumbad) area of Lahore. The hostels located on campus are Shirazi Hall for men and Hope Tower for women. Shirazi Hall provides rooms for approximately 140 men and Ewing Hall provides rooms for 90 male students. Both include a common room and a mess hall as well as ample outdoor recreational space. Hope Tower provides accommodation for approximately 385 women.

# STUDENT LIFE



Learning is not restricted to the classrooms and many of the most important lessons learned during the University years are learned through participation in co-curricular and sports programs. FCCU offers a great variety of programs that provide opportunities for students to participate in activities that contribute to their learning and enjoyment.

## Co-Curricular

FCCU is committed to providing a holistic education. Classroom learning is supplemented by opportunities for students' intellectual and moral growth through carefully planned literary, academic, cultural and recreational activities and programs. The Office of Student Affairs coordinates and promotes activities of all the student societies; almost every academic department has a student society. Each society plans and conducts programs during the year that enrich the learning experiences of students and provide opportunities for student leadership.

Student societies have their own website: [www.fccsocieties.org](http://www.fccsocieties.org). The following societies are currently functioning:

Armacost Psychological Society  
Art Junction  
Bazm-e-Fikr-o-Nazar  
Benade Physics Society  
Character Building Society  
Christian Life Program  
Dean Geography Society  
Earth Watch Society  
Ewing English Society  
FCC ACM Chapter  
Forman Biology Society  
Forman Dramatics Society  
Forman Model United Nations Society  
Forman Music Society  
Forman Pharmaceutical Society  
Forman Photographic Society  
Forman Political Science Society  
Forman Sociological Society  
Forman Sports Society

Forman Statistics Society  
Formanites Computing Society  
Formanites Debating Society  
Formanites Education Society  
Formanites Journalism Society  
Griswold History Society  
International Affairs Society  
Islamic Society  
Leadership Forum  
Lucas Economics Society  
Philosophy Society  
Red Crescent Youth Group  
Rotaract Club  
Speers Chemical Society  
Undergraduate Mathematics Society  
Women's Empowerment Society  
Young Entrepreneurial Platform

## Residential Life

University students who come from outside Lahore can avail the facilities of FCCU's three university hostels described previously. The hostels provide students with facilities for healthy and comfortable living, together with a common room in each hostel for recreation. Meals are served at fixed times in the dining hall of each hostel. The hostels have faculty members who serve as Guardians as well as senior students who serve as Residential Assistants, and who live in the hostel and supervise the quality of student life.

## Religious Life

As a University, we are concerned with teaching values and building strong positive character traits and discipline in our students. For Muslim students, there are two mosques on campus. Juma prayers are offered at the main mosque. We also convene Dars-e-Quran classes together with symposiums and discussions to which eminent Muslim scholars are invited to deliver talks and/or to engage students in discussions on important religious, social and moral issues. For Christian students a weekly chapel service is offered on Friday. In addition to regular chapel programs, we offer regular Bible study groups and opportunities for volunteer service. No classes are scheduled on Friday during Juma or Chapel time.

## Sports

FCCU has a Sports Society that organizes, promotes and conducts games. The Sports Society oversees a very active intramural sports program with competition in athletics, basketball, cricket, football, hockey, table tennis, wrestling, lawn tennis and swimming. Participation in intervarsity competitions in many of these sports is part of the sports program.

## Cafeterias

Student-faculty-staff social interaction in a more relaxed setting takes place in the Cafeteria. The faculty is available to assist students outside the class, and the Cafeteria is occasionally an appropriate setting for this interaction. More typically, it is simply a place for students to go for lunch or snacks between classes.

## On-Campus Health Services

The Mercy Health Center is an on-campus facility focused on promoting wellness and treating illness and injury for the campus community. There is a full time doctor as well as several fully certified nurses on staff. The Health Center has on-going relationships with several nearby hospitals and medical laboratories for cases that require specialized attention.

## Counseling

The Campus Counseling Center, located in the Mercy Health Center, is a facility to help students deal with problems that they may not want to discuss with family, friends or their teachers. The Center provides individual and confidential counseling and may refer students to other professionals, if needed. The Center does not deal with issues related to academic advising, but with personal and emotional issues that students face in their lives.

## Writing Center

FCCU's Writing Center is an establishment that primarily guides students in their writing and research needs. The demands of writing at University level are highly specialized and may require coaching outside the classroom. FCCU is one of the few universities in Pakistan to boast a functional writing center. The facility provides students one-to-one tutoring for their specific writing needs with trained tutors. Students may sign up for appointments or walk in to meet a tutor at their convenience. The Writing Center also arranges workshops run by experts on different aspects of university level writing and research.

## Discipline

All students are expected to act with dignity and self-respect, to be honest, considerate, well-behaved and courteous. Moreover, students must observe strict disciplinary standards. The decision of the Rector in all disciplinary matters shall be final and legally binding on all students. Proctors maintain discipline, enforce rules of good conduct and take disciplinary action against students wherever required:

- Students are required to observe the rules and regulations governing their studies (both theory and practical) as may be made from time to time
- Students are expected to attend every lecture and laboratory session and academic activity of the classes in which they are enrolled
- Acts of dishonesty and cheating, especially during examinations, are strictly prohibited, and subject to punitive action if proven
- Students are required to abstain from undesirable behavior that poses a threat to any fellow student, faculty or staff member or any other person working as an employee of the University
- Behavior that disrupts the normal flow of academic work or co-curricular activities is prohibited
- Destruction, defacement or damage caused to University property shall be severely dealt with

The following are strictly forbidden on the University campus:

- Possession or use of alcoholic beverages or drugs. This includes cigarettes and electronic cigarettes or vapes
- Weapons of any kind

## Dress Code

The purpose of the FCCU dress code is to ensure that our students are dressed in a dignified manner. This means that the clothing worn should be clean, neat, modest and reflective of the culture in which we are operating. The FCCU ID card must be visibly displayed at all times on campus.

## Sexual Harassment Policy

Sexual harassment is unacceptable behavior at Forman Christian College (A Chartered University) and such behavior will be subject to disciplinary action. Harassment refers to behaviors that are intended to be offensive, threatening or disturbing to the recipient. To harass is to persistently annoy, attack, or bother someone.

Sexual harassment is defined as any unwelcome sexual advance, request for sexual favors, or other verbal or physical conduct of a sexual nature that is offensive, embarrassing, intimidating or humiliating. This includes:

- Instances when the harassment has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile or offensive environment

- Instances when submission to the harassment is made either explicitly or implicitly a term or condition of fair treatment

Specific examples include, but are not limited to:

- Touching in an inappropriate way
- Staring or leering
- Requests for sex
- Subtle pressure for sexual activity or sexual innuendoes
- Display of sexually explicit pictures
- Repeated references to various parts of the body at inappropriate times
- Requests for dates when the other person has made it clear that she or he is not interested
- Hooting, whistles or other suggestive noises or gestures
- Suggestive comments or jokes
- Insults, name-calling or taunts based on a person's gender
- Derogatory graffiti referring to a person's character or making sexual implications
- Sexually explicit emails, text messages, social media communication, etc
- Spreading rumors about another person's sexual behavior
- Intrusive questions about a person's private life or body
- Any romantic or sexual behavior that you would consider to be inappropriate if directed at a member of your family

Sexual harassment does not refer to compliments or other behaviors that are considered to be socially appropriate.

There should be no relationships of a romantic or sexual nature between any faculty or staff member and a student. There is no exception to this. A student should not attempt to initiate such a relationship for any reason. There should be no attempt by a student to gain better grades or access to exams or assignments by encouraging or offering such relationships. Any pursuit of such relationships by a faculty or staff member should be immediately reported to the counselor or the Chief Student Affairs Officer.

All faculty and staff members are required to report instances of harassment if they are aware of any. Any faculty or staff member encouraging a student not to report such instances will be subject to disciplinary action.

**FCCU has adopted the Code of Conduct from the Protection against the Harassment of Women Act of 2010.**

The link to that full document can be found at [www.aasha.org.pk](http://www.aasha.org.pk).

# FEE STRUCTURE



Fees are expected to increase each year depending on inflation and other costs:

- Billing is done by semester
- Students taking between 12 to 18 credit hours are considered full-time and pay the full semester fees
- Fees are calculated according to credit hours for part-time students (11 credits or fewer), and students taking overload beyond 18 credits
- Students taking less than 12 credit hours will pay the per credit hour rate
- HEC and FCCU refund policies are carefully followed and no refund will be given for those who drop to part-time status
- All tuition and other fees must be paid by the date specified by the University
- Students whose dues remain in arrears will be put on business holds. Students preregistering for courses (usually in the previous semester) can lose those courses if fees for them are not paid by the last date of payment. This will happen before add/drop. Students can reregister during add/drop for any lost courses. All courses on a student's schedule at the end of add/drop will be charged. No courses will be deregistered but a business hold will be placed on the account and no further registrations will be done until all fees are cleared. A fine will be charged for fees paid after the stated deadline
- Tuition and other fees once paid are not refundable except in very unusual circumstances. (See fee refund policy)

## Notes:

- A Science charge per course will be applied for every 200-level or higher science course taken by students who are not from the PharmD and Biotechnology (Hons) programs
- Internships and Student Teaching Practice courses are charged at a different rate than other courses. More information regarding this can be found in the accounts and financial aid section of the University website
- Students are responsible for government and withholding taxes where applicable
- The cost for required course packs is not included in the per credit charges for a course
- For further information, see the FCCU website (Accounts and Financial Aid page)

## Tuition Refund Policy

Under the Higher Education Commission's National Level Refund Policy, tuition fees for the withdrawn semester will be prorated as:

- Withdrawing before the start of the semester or up to the 7th day of convening of classes ---> Full refund
- Withdrawing from the 8th to the 15th day of convening of classes ----> 50% refund
- Withdrawing from 16th day of convening of classes or later ----> No refund

## Hostel Dues and Charges

- These dues are paid in two installments, 50% at the time of admission and the remaining 50% three months later
- The first installment of hostel dues must be paid before the resident is allotted a room
- Mandatory Mess charges for the semester are paid in advance and voluntary (extra) meal charges are paid monthly
- The occupancy/mess fee is refundable if the student leaves during the academic year. (See hostel refund policy)
- All dues are to be paid in Habib Bank Limited

### Room Allocation

**Note:** Hostel allotment is done by the Hostel Office, however, room allotment is done by the Hostel Guardian.

- Most of the rooms are cubicles; however, some multiple accommodation rooms are available where residents share a room
- Allocation of the room will be at the sole discretion of the hostel administration. The Hostel Guardian/Residential Assistant intentionally place students of different academic, cultural, social and ethnic backgrounds together so that cross-cultural, academic, social, and national harmony is achieved

### Hostel Refund Policy

Hostel dues are charged in two categories: Occupancy Charges and Meal Charges.

The Hostel repayment/refund policy is:

<b>Hostel/Mess Security</b>	Full refund, less incidentals if any
<b>Meal Charges</b>	Refund of amount, less number of meals consumed/dues outstanding effective 24 hours after provision of proper notice to stop meals
<b>Occupancy Charges</b>	Full refund of current semester up to end of add/drop period. Pro rata refund calculated for number of remaining months if the student leaves the hostel officially before midterm (end of 8 weeks into the semester). No refund of hostel summer dues is applicable after add/drop


- All refunds, including security deposits, will lapse after one year of leaving the University (obtaining the degree or officially withdrawing)
- Applications for refund should be submitted to the Accounts Office, by the student seeking refund, through their respective hostel guardians
- The current month at the time of the refund will be treated on a fortnight basis
- Appeals against any award of refund by the Accounts Office can be made only on the grounds of disputing information on record, to the Financial Appeals committee



## Financial Appeals Committee

This committee is comprised of staff from all related departments and is responsible for hearing appeals involving issues with financial impact for students.

- Appeals on account of hardship do not fall under the purview of this committee but will be forwarded to the Financial Aid or other relevant offices
- The decision of this committee regarding the appeals will be deemed final and binding on both parties



# FINANCIAL AID AND MERIT SCHOLARSHIPS

## Merit Scholarship

A number of merit scholarships, amounting to a 70% fee waiver, are awarded to FCCU students entering as Freshmen in the Baccalaureate (Hons) programs according to the criteria below. Merit scholarships are awarded at the time of admission to students who secure a minimum of 70 T-score, which is an aggregate of their previous academic performance and their FEAT Accuplacer result.

## Need-Based Financial Aid

Forman Christian College (A Chartered University) believes that deserving, qualified students should not give up their dream of an education because of financial needs. FCCU, therefore, dedicates a significant portion of its budget each year to providing need-based financial aid to needy and academically eligible students. These financial aid awards are on a non-discriminatory, equal opportunity basis.

Admitted candidates may apply for financial aid by completing the financial aid form and attaching the required documents. This form is submitted to the Financial Aid Office. The Manager Financial Aid will award the financial aid to deserving students, in consultation with the Rector.

### Criteria for Continuation of Merit and Need-Based Financial Aid:

For merit scholarships the applicant must:


- Maintain a CGPA (cumulative grade point average) of at least 3.00 and enroll as a full time University student in each regular semester
- Ensure that no disciplinary action is taken against him/her during his/her academic stay at the University

### For need-based scholarships, the applicant must:

- Maintain the CGPA required for Good Academic Standing found in this catalog and enroll as a full-time university student in each regular semester
- Ensure that no disciplinary action is taken against him/her during his/her academic stay at the university

**Note:** Merit and Need-Based Financial Aid is awarded up to 8 regular semesters to meet the minimum graduation requirement.

- Summer and Winter semesters are not covered
- Science charge and course packs are not covered
- Students are responsible for government and withholding taxes where applicable



# ACADEMIC POLICIES AND PROCEDURES

## Medium of Instruction

At FCCU the medium of instruction is English. Students entering the Baccalaureate (Hons) program with deficiencies in English language skills will be required to enroll in pre-university English Language Program courses designed to help such student's transition into the Baccalaureate program.

## Standards of Academic Progress

Forman Christian College (A Chartered University) has high standards for student performance because we believe that performing at an excellent level in coursework is good preparation for leadership opportunities following University. We ask our students to do their very best and we will monitor students' performance to help them be aware if a problem is developing. Normal progress toward graduation is the completion of five courses (fifteen to eighteen credits) each semester with a grade of C or better.

## Class Attendance

Students are expected to attend all classes and laboratory sessions in the courses for which they are registered. Students who miss classes are far less likely to succeed in meeting the requirements of the course. The University's minimum accepted attendance is 67%. However, individual teachers may set higher requirements. Each teacher outlines his or her expectations for class attendance in the course syllabus. Teachers are expected to keep accurate records of student attendance. If a student does not attend the percentage set by the instructor on the course syllabus of the class and laboratory sessions, he/she will not be permitted to take the final examination in the course.

## Good Academic Standing; Probation; Drop

At the end of each semester, the Academic Review Committee reviews the progress of every student for "Good Academic Standing". To be in Good Academic Standing, a student must maintain the following:

Semester Hours Completed	Minimum CGPA Required for Good Standing
0-35	1.50
36-64	1.75
65 or MORE	2.00

In addition, students must have declared a major by no later than the end of the fourth semester and be taking courses toward the timely completion of the declared major. Students who fail a course, have numerous Withdrawals, Incompletes and/or “D” grades will also be reviewed.

## Academic Dismissal and Readmission

Students are expected to maintain good academic standing. Official notification concerning academic standing will be given to all full-time students whose performance does not meet the prescribed standards of the University. After each semester, the Academic Review Committee and the Vice Rector will determine whether students experiencing academic difficulty will be placed on Academic Probation, suspended on Probation or dismissed from the University. Academic Dismissal carries specific conditions (see below).

The designation “Academic Probation” will appear on the student’s transcript. It is used to alert students that the quality of their work is below that required for graduation. It is also a way of informing the student that, unless improvement is seen in the following semester, they may be dismissed.

Students with academic troubles who have been placed on probation must:

- Not take more than 5 courses
- Attend all class meetings of every course in which they are enrolled
- Schedule meetings with an academic Advisor at least once every two weeks
- Adhere to any other provisions established by the Academic Review Committee
- Any student who fails to observe the conditions of Academic Probation is subject to review at any time by the Academic Review Committee and/or the Vice Rector and may be dismissed from the University
- The Committee may Drop a student whose academic performance continuously falls below expected minimums, and who is on probation for more than one semester. In such a case, a student may request re-admission to continue their studies after a full, regular semester. (Students will not generally be allowed in for Summer or Winter semesters after being Dropped.)

Students requesting re-admission should meet with an Academic Adviser and submit a written letter. Note that a student who is dropped for a second time will not be eligible to return to continue their degree program, effectively terminating the opportunity to complete their degree at FCCU.

## Removal from Academic Probation

Probationary status remains in effect until the student’s CGPA reaches the requirement for good academic standing.

## Suspension from Co-Curricular and Sports Activities

A student placed on academic probation or subject to dismissal for a second consecutive semester is suspended from participation in co-curricular or sports activities so that the student may devote full time to studies. No student may compete in any officially sanctioned sports event (whether FCCU or HEC with a CGPA below 2.0)

## Academic Integrity Issues

The Academic Integrity Committee will review all cases where student breach of Academic Integrity has taken place. This includes but is not limited to cases of forgery (signing by students for advisors/faculty/staff), and plagiarism. All cases of forgery will entail a fine and an automatic report to the designated committee.

## Academic Advising (Academic Support for Forman Students)

Each student will be assigned to a faculty member who will serve as his/her Academic Advisor. The Advisor will work with the student to select courses and class schedule, and they will discuss career planning and personal growth. Once the student selects a major program of study, the advising will be done by a faculty member from that department. It is each student's responsibility to meet with his or her Advisor at least once each semester to review academic progress. Students will have as much guidance as they need and as much freedom as they can responsibly handle.

## Majors and Minors

Students must complete the requirements of a major field of study in order to graduate. The number of credit hours required for the major varies depending upon the degree selected by the student, but it will be no fewer than 36 credit hours.

24 different majors are offered at FCCU with three that offer specializations within the major. The specific courses required to complete a major are listed in the departmental sections of the catalogue.

Majors are offered in:

### Faculty of Education

- Education

### Faculty of Humanities

- English
- Mass Communication with specializations in:
  - Print and Electronic Media
  - Advertising and Public Relations
- Philosophy
- Religious Studies with majors in:
  - Islamic Studies
  - Christian Studies
- Urdu

### Faculty of Information Technology and Mathematics

- Computer Science
- Mathematics
- Statistics

### Faculty of Natural Sciences

- Bioinformatics
- Biological Sciences
- Biotechnology
- Chemistry
- Environmental Sciences
- PharmD
- Physics

### Faculty of Social Sciences

- Economics

- Geography
- History
- Political Science
- Psychology
- Sociology

#### **School of Management**

- Business with specializations in:
  - Accounting
  - Finance
  - Operations Management
  - Marketing and Sales
  - Human Resources

## **Change of Program (online form)**

Program will not be changed if the student's merit at the time of Admission was below the required merit of the program he/she is transferring to.

- A student's request to change his/her program of study will be reviewed by the department Chairperson of the program the student wishes to enter and the Academic Dean of the new program (Not required for transfer to BA/BS)
- Decisions made by the Academic Dean and department Chairperson are final
- A copy of the approval of change in program will also be forwarded to the Accounts Office to change the fee structure which will come into effect in the semester following the approval
- After the tuition structure has been changed, the Admissions Office will carry out the change at their end and the student transfer will be completed
- If the change of program has been denied, an enrolled student is not permitted to obtain new admission into the desired program

## **Degree Requirements**

### **Multiple Majors and Minors**

Students are permitted to pursue more than one major. However, students should be aware that the HEC only recognizes the first major on the transcript.

If a student intends to graduate with multiple majors or a combination of major and minor, all requirements must be met from the same catalogue.

### **BA (Hons) Degree**

The following requirements must be fulfilled by all students in order to qualify for formal recommendation by the faculty for the Bachelor of Arts (Honors) Degree:

- The satisfactory completion of 130 credit hours with a cumulative grade point average (CGPA) of 2.0 or better as well as a grade point average (GPA) of 2.0 in the major
- The completion of at least 12 upper level courses labeled at the 300 or 400 level
- The satisfactory completion of a major field of study from a list of those offered by the University and specific to one catalog only. For the BA (Hons) degree at least 36 credit hours (including core courses) must be completed as stated in the requirements of the selected major
- The satisfactory completion of the General Education requirements of the University
- The successful completion of the senior capstone courses in the major as required

### **BS (Hons) Degree**

The following requirements must be fulfilled by all students in order to qualify for formal recommendation by the faculty for the Bachelor of Science (Honors) Degree:

- The satisfactory completion of 130 credit hours with a cumulative grade point average (CGPA)

- of 2.0 or better as well as a grade point average (GPA) of 2.0 in the major
- The completion of at least 12 upper level courses labeled at the 300 or 400 level
- The satisfactory completion of a major field of study from a list of those offered by the University and specific to one catalog only. For the BS (Hons) degree at least 48 credit hours (including core courses) must be completed as stated in the requirements of the selected major
- The satisfactory completion of the General Education requirements of the University
- The successful completion of the senior capstone courses in the major as required

### **BS (Hons) Business Degree**

The following requirements must be fulfilled by all students in order to qualify for formal recommendation by the faculty for the Bachelor of Science (Honors) in Business Degree:

- The satisfactory completion of 130 credit hours with a cumulative grade point average (CGPA) of 2.0 or better as well as a grade point average (GPA) of 2.0 in the major
- The completion of at least 12 upper level courses labeled at the 300 or 400 level
- At least 72 credit hours (including core courses) of Business courses as specified in the catalog
- The satisfactory completion of the General Education requirements of the University
- The successful completion of the senior capstone courses in the major as required

### **BCS (Hons) Degree**

The following requirements must be fulfilled by all students in order to qualify for formal recommendation by the faculty for the BS (Honors) in Computing Degree:

- The satisfactory completion of at least 132 credit hours with accumulative grade point average (CGPA) of 2.0 or better as well as a grade point average (GPA) of 2.0 in the major
- The completion of at least 12 upper level courses labeled at the 300 or 400 level
- The satisfactory completion of the program as specifically stated in the catalog
- The satisfactory completion of the General Education requirements of the University

### **BS (Hons) Biotechnology Degree**

The following requirements must be fulfilled by all students in order to qualify for formal recommendation by the faculty for the Bachelor of Science (Honors) in Biotechnology Degree:

- The satisfactory completion of 130 credit hours with a cumulative grade point average (CGPA) of 2.0 or better as well as a grade point average (GPA) of 2.0 in the major
- The completion of at least 12 upper level courses labeled at the 300 or 400 level
- At least 64 credit hours (including core courses) of Biotechnology and Biology courses as specified in the catalog
- The satisfactory completion of the General Education requirements of the University
- The successful completion of the senior capstone courses in the major as required

### **Doctor of Pharmacy (PharmD) Degree**

The following requirements must be fulfilled by all students in order to qualify for formal recommendation by the faculty for the Doctor of Pharmacy (PharmD) Degree (A five-year professional degree)

- The satisfactory completion of 198 credit hours with a cumulative grade point average (CGPA) of 2.0 or better as well as a grade of 'C' or better in each course, as per curriculum approved by of the Pharmacy Council of Pakistan/Higher Education Commission of Pakistan
- The satisfactory completion of the General Education requirements of the University

### **Major GPA**

The GPA calculated by tabulating ALL courses in the major taken by the student.

### **Requirements for Minor**

An approved minor is stated in the department's portion of the catalog. In order to minor in a particular discipline, the student must generally complete half (½) of the credits required for a major in



that discipline. The specific courses required for a minor are determined by each department offering a minor and are available in the Baccalaureate catalog and from the Chairperson of the department.

If a department or program is started after the publishing of a student's applicable catalog, the student wishing to take the minor must switch catalogs so that both major and minor are from the same catalog.

A major and minor cannot be taken in the same department.

## General Education

Forman Christian College (A Chartered University) is a liberal arts university. The purpose of the General Education requirement is to introduce students to a broad range of intellectual pursuits, to provide sufficient breadth of knowledge to prepare them for their role as citizens, to equip them with communication and analytical skills, to help them to integrate knowledge that comes from different disciplines and to prepare them for a lifetime of self-directed learning.

## Distribution Requirement

There are two components of the General Education requirement. Demonstration of competency as determined by performance on University assessment examinations given as final exams in the general education course related to each of the following five areas:

- Written communication in Urdu (URDU 101)
- Written communication in English (ENGL 101)
- Oral communication in English (MCOM 100)
- Quantitative skills (MATH 100 or FEAT Maths score at the time of admission)
- Information Technology (CSCS 100)

### General Education Requirements

There are four categories of General Education. A total of 15 required courses fulfill General Education requirements. Further explanation is stated below.

**Any course of three credits or more, including Major courses, fulfill this requirement**

#### Humanities: 6 courses

All students must complete the following:

#### Religious Studies:

- Islamic Education 101 (required for all Muslim students) or Christian Ethics 152

#### Communication:

- ENGL 101: Basic Writing Skills
- ENGL 103: Advanced Writing Skills
- MCOM 100: Fundamentals of Speech
- URDU 101: Communicative Urdu

#### 6th Course from Humanities:

- The 6th course must be selected from English, History, Mass Communication, Philosophy, Religious Studies (Christian or Islamic Studies), Urdu, Arts, or Foreign Languages

#### Social and Behavioral Sciences: 3 Courses

**A student must take:**

- 1 Pakistan Studies course – PKST 101
- 2 courses from: Business, Economics, Education, Geography, Political Science, Psychology or Sociology

## Science and Mathematics: 5 Courses

### Students must take:

- 2-four credit Science courses with labs (from two different disciplines): Biological Sciences, Chemistry, Physics
- 1 Mathematics course
- 1 Computer Science course
- 1 other course in either Science, Mathematics, Statistics, Logic (PHIL 221) or Computer Science

### Foundations of University Education (UNIV 100): 1 Course

All University Freshmen students must take UNIV 100 during their first semester or after they have finished the ELP program. Transfer students with 60 or more credits are exempt from UNIV 100. See details for Transfer based exemption.

## Academic Credit

Credit towards a degree is awarded for satisfactory course completion, independent study or academic work certified by another accredited degree granting institution (covered in the Transfer Credit policy).

A credit hour identifies one contact hour in class per week, or two contact hours in the laboratory, studio or field work each week during a regular semester. Thus, a three credit course will meet for three hours per week, or two hours of lecture and two hours of laboratory per week.

Ordinarily credit is earned by course completion. A normal full-time academic load is five courses per semester. A student may take a minimum of 12 semester credit hours or a maximum of 18 semester credit hours and still be considered a full-time student. Additional payment is required for overloads above 18 credit hours.

If a student enrolls in fewer than 12 credit hours, he/she is considered to be a part-time student. Enrollment of more than 18 hours is very rare and requires the approval of the Advisor and the respective Dean of Faculty and payment of any additional fees, if applicable. Permission to carry an overload will be granted based on a CGPA of 3.0 or above. Senior students (over 90 completed credits) with a lower CGPA can take an overload (after they receive the proper permissions) if they require the overload in order to graduate on time.

## Exemptions and Credit

### Complete URDU Exemption:

Exemption for URDU 101 is granted by the Vice Rector for the following types of academic backgrounds:

- Students coming from American High School systems
- Foreign students from a different High School system than Pakistan
- Students who studied URDU as a second language/Easy Urdu in O Levels

An exemption of URDU 101 requires substitution of another course in the Humanities. It is the student's responsibility to have this course properly substituted by the Academic Office.

### Competency in Core Areas

Starting Fall 2018, there will no longer be separately administered Competency Exams at the end of the first year. Instead, competency in core areas will be assessed as a function of students' performance in their associated freshman level skills courses, which include the following: ENGL 101 (Written English), MCOM 100 (Spoken English), MATH 100 (Quantitative Skills), URDU 101 for (Urdu), CSCS 100 (IT skills).

## FEAT-Based Exemption

### MATH 100 and Mathematics Competency:

Students who achieve a score of 75 or higher on the Forman Entrance Admissions Test (FEAT) are exempt from the Mathematics Competency requirement as well as from studying Math 100. Exemption of Math 100 through FEAT requires that any course with a MATH prefix from the Science and Mathematics category course be studied to replace this general education requirement. In all 5 courses are required in the Science and Math category.

## Transfer-based Exemption

### UNIV 100

Students who transfer into FCCU with 60 or more credits are exempt from studying UNIV 100. This is given at the time of transfer and admission and is not credit based. The required credits must be earned through study of an additional course in the humanities category.

## Exemption Requiring Substitution

Exemptions made in the above manner require course substitution by appropriately replacing the exempted course for degree audit purposes. Replacement must be done in consultation with the academic advisor and notified to the Academic Office after grading in the replacement course appears on the transcript.

## A Level-based Credit

Students admitted with an A Level or an International Baccalaureate (IB) background can receive credit for the following list of courses provided they obtained a grade of 'C' or higher on the International Baccalaureate (IB) or A Level exam. A Level subsidiary results (AS) do not qualify for receipt of credit in this manner. This is subject to provision of the IBCC (Inter Board Committee of Chairman) equivalence certificate.

If students have not yet received their official A Level results, they are requested to refrain from registering the equivalent course during their first semester at FCCU. They should seek the help of their advisor in choosing an alternative and suitable general education course.

A Level Exam	Forman Equivalent Course Credit
Biological Science	BIOL 105
Chemistry	CHEM 100
Computer Science	CSCS 100
Economics	ECON 100
English	ENGL101
Geography	GEOG 101
History	HIST 102
Pure Mathematics 1 or 2	MATH 101
Pure Mathematics 3	MATH 102
Physics	PHYS 100
Psychology	PSYC 100
Islamic Studies	ISLM 101
Christian Studies	CRST 152
Sociology	SOCL 100
Urdu	URDU 103

Receiving credit differs from exemption in that replacing the course is not necessary. Credit hours associated with the course being given credit for are published on the transcript after the necessary procedures have been followed.

## Substitution for Research and Internship

Unless research (499) or internship (398/498) are core courses, students who do not qualify due to CGPA requirement need to take additional courses in their major, in lieu of, to substitute for Research and Internship to complete their credit requirement to graduate.

## Independent Study (online form)

Credit may be earned through independent study by advanced students who exhibit both the self-discipline and mastery of the methods demanded by the subject matter selected by the student. An independent study project is designed by a student in consultation with the Professor who is to supervise and evaluate the work. An academic contract, made in advance, specifies the subject and method of inquiry, the texts, the purpose of the project, and the basis of evaluation and credit. Each contract approved by the respective Dean of Faculty and the Vice Rector, should be deposited in the Academic Office for registration and record keeping. Independent study forms are available online.

FCCU recognizes that many experiences outside the classroom may contribute to a student's program. Internships, participation in community projects, and field experience may be accorded credit if closely coordinated with the student's academic program. Such experience ordinarily constitutes a part of a regular course or independent study project.

## Transfer Credit

Credit is earned by migration or transfer from another degree-granting institution recognized by the Higher Education Commission or accredited in the USA or UK, up to a limit of 64 credit hours. A student transferring to FCCU from another institution should request a transcript of work done in the other institution be sent to the Admissions Office. When the transcript has been evaluated, the applicant is notified of the credit acceptance by the Admissions Office.

## Course Credit that is Acceptable

An official request for transfer of credits takes place through:

- The Admissions Office prior to a new admission
- The Academic Office for students going on student exchange programs during their course of study at FCCU
- An official transcript is required for all transfer credits to be published on the FCCU transcript
- The transfer courses must come from an accredited institution
- The courses must be appropriate for FCCU's degree requirements
- The grade for each course must be a "C" or better to be accepted by FCCU
- The Chairperson of an individual department determines how transfer credits count toward the fulfillment of FCCU's Major Degree requirements
- Transfer of General Education requirements is determined by the Academic Office

## Course Credit that is Unacceptable

- Transfer credit request based on unofficial or photocopied transcripts

- Transfer credit request based on private conventional BA/BS or equivalent qualification while a regular student at FCCU
- Courses studied at non-accredited institutions

## Counting a Conventional Degree towards a 4-Year Baccalaureate

- A petition for conversion must be submitted to the Admissions Office
- The transcript or result of the accredited university's conventional BA/BSc degree must be submitted with this petition
- The Head of Academics will make a merit-based decision on the petition and communicate this in writing to the student
- If the petition is approved, the conditions of transfer apply
- A maximum of 30 credit hours can be achieved through transfer at FCCU at the time of admission

## Readmission to the University

Students who have not been enrolled for three consecutive semesters will be dropped from the University. They must seek readmission to the University to resume their studies by submitting a Request for Readmission to the Vice Rector for final approval. It is the student's responsibility to submit a copy of the readmission approval to:

- The Accounts Office (for Readmission fee and tuition) and
- The Academic Office (for Registration)
- Once readmitted, the student will apply for a new student ID card in room 017 of the Ahmad Saeed Administration Building

## Registration Policies

### Unofficial Presence in Class

Students are only allowed in class when they are officially registered for it. An instructor confirms official registration by checking the class roster. Students must attend all courses registered for in a particular semester. A student must study in the correct section to earn a grade. Switching sections unofficially is not allowed. An NS grade will be given to students who have officially registered for one section and then unofficially switched to another.

### Registration Timeframe

Registration dates are published in the academic calendar. All courses for which the student wishes to earn credit must be registered through student web services. The student is responsible for every course listed on his/her account schedule and can receive no credit for courses not listed here.

After registration, official changes in registration may be made only during official add/drop periods when access to registration is again available online. No course may be added after this deadline.

See 'Cancellation of Courses due to Low Enrollment' for that timeframe.

### Overloading Courses in a Semester (online form)

- In a normal course of study, students register for courses, up to a maximum of 18 credits online. They can however take a course overload with permission if their CGPA is 3.00 or above
- Senior students (90 completed credits), with lower CGPA can take overload if they require the course to graduate
- A student desiring an additional course over 18 credit hours must obtain the approval of their Advisor as well as the respective Dean of Faculty. Such approval is based on current CGPA of 3.00 or above or if they require the course to graduate on time

### No Seat in Selected Course (online form)

Sometimes, because of popular demand, seats become full in courses desired by a student. However, there is a process to enter such a class if it is necessary for the student to do so in the current term. This decision is at the discretion of the Instructor and department Chairperson in whose course the seat is desired.

When seeking a seat in a course that is already full:

- Print the Seat Exception Form from the FCCU website
- Obtain written permission on the form from the Instructor whose course is required
- The Instructor will determine if the student is a suitable candidate for increasing the seat and grant approval accordingly
- If a seat is approved, the student must ensure that this course does not conflict in time with other courses registered online
- The approved form must be ratified by the department Chairperson
- Once endorsed by the Chairperson, the form must be presented to the Academic Office for processing
- It is the student's responsibility to confirm that the form was processed by checking his/her schedule online. No form with time conflicts will be processed by the Academic Office
- Any discrepancy must be dealt within the applicable semester

### Prerequisite Waivers

Prior to registration in a course with prerequisite requirements, the student should have completed the prerequisite successfully. In the rare event that this has not happened, a student may petition the instructor for waiver of a required pre-req. Approvals endorsed by the Chairperson in writing can be submitted to the Academic Office for processing within the registration timeframe.

### Confirmation of Registration

Upon completion of the registration procedures as outlined in the registration post on the University website, the student's registration is approved and confirmed by the Accounts Office on payment of the estimated bill provided on the students web account. Payment must be made in entirety by the last date mentioned on the academic calendar.

### Business Holds

Students whose dues remain in arrears will be put on business holds. Students pre-registering for courses (usually in the previous semester) can lose those courses if fees for them are not paid by the last date of payment. This will happen before add/drop. Students can reregister during add/drop for any lost courses. All courses on a student's schedule at the end of add/drop will be charged. No courses will be deregistered but a business hold will be placed on the account and no further registrations will be done until all fees are cleared. A fine will be charged for fees paid after the stated deadline.

### Cancellation of Courses due to Low Enrollment

- After the close of add/drop, classes with low enrollment are likely to be closed, particularly lower level elective courses
- For Spring and Fall, low enrollment is 5 students for upper level (300/400) and 10 students for lower level (100/200) courses
- For Summer and Winter, low enrollment is 10 students for all courses
- The department's Chairperson will be informed of the closure of courses due to low enrollment

- All instructors teaching courses with low enrollment must inform students of the likelihood of closure, prior to the end of add/drop
- The Chairperson can make the decision to continue with such course(s) provided there is appropriate justification to do so
- If a registered course has been cancelled, students of that course can visit the Academic Office to arrange a satisfactory substitute preferably within the add/drop period or within 4 days of add/drop closure

## Grading Policies

Grades are final as given by an instructor unless a reason exists for change as stated below. All grades will be locked onto the transcript at the time of degree awarding and will not be changed subsequently. (See Grade Change Policy)

## Grading Legend

The grading system for undergraduate students is as follows:

Grade	Point Value	Numerical Value	Meaning
A+	4.00	93-100	Superior with Distinction
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	Good
B	3.00	83-86	
B-	2.70	80-82	
C+	2.30	77-79	Satisfactory
C	2.00	73-76	
C-	1.70	70-72	
D+	1.30	67-69	Passing
D	1.00	60-66	
F	0.00	59 or below	Failing
NS	0.00	0.00	Did not show up in Class
W	-	-	Officially Withdrawn
AW	-	-	Administrative Withdrawal/Dismissal
AU	-	-	Audit/Listener Status
I	-	-	Incomplete
T	-	-	Transferred credit

## Transcript Updates

It is the student's responsibility to check his/her transcript after grading each semester and apprise the Academic Office of errors resulting in incorrectly placed Academic Probation and incorrectly applied

Repeat to course credits.

Additionally, any course taken to replace an exempted course must be brought with proper approvals to the Academic Office for substitution immediately after grading. Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program since these will not be changed on the transcript after grading.

If a student registers for a cross-listed course twice (unless the first one is with a W, NS or F grade) under two different departments the credits shall count only once and the second course taken would be "Academically Withdrawn" and graded AW.

## Grade Change Policy

If an instructor of a student determines that a grade was issued incorrectly because of a clerical or procedural error (a calculation error or one in transcribing the grade), it can be corrected by submitting a grade change form to the Academic Office. The procedure is as follows:

- An original grade change form must be picked up from the Academic Office by the Instructor of the course for which the change is being made
- Forms will not be given to the student requesting the grade change or department administrative staff
- Grade Change forms must not be stored in excess by instructors/departments
- The Grade Change Form must be filled completely
- The reason for the change must be stated clearly
- The form must be signed and dated by the instructor
- If the instructor is no longer on faculty, the grade change form can be processed by the department Chairperson with approval from the respective Dean of Faculty
- All grade changes carry a time limit
- Incompletes in regular courses (due to typing errors and miscalculations) will continue to be accepted by the Academic Office up to 8 weeks into the following regular semester
- An Incomplete in Internship can remain unchanged for one semester
- Research should be awarded an "I" in the semester registered and changed within one Academic year for Baccalaureate
- A late grade change form can be submitted to the Academic Office after approval of the Dean of Faculty but final approval will be granted by the Vice Rector
- The grade change form must be submitted in person by the instructor within the stated time frame. Only original forms will be accepted for grade change. Photocopied grade change forms will not be approved

## Grade of 'I' (Incomplete)

A grade of "I" (Incomplete) indicates that, although a substantial proportion of the course requirements have been met, the student has not completed all course requirements by the end of the term. In the judgment of the instructor the student:

- Has been in good standing
- Is facing an emergency situation beyond his/her control
- A student must submit the work required within six (6) weeks into the following semester. If the work is not completed the grade of incomplete is automatically changed to an "F"
- An Incomplete should never be given to a student who has performed poorly during the entire semester and wants extra time to improve the grade
- An Incomplete in Internship can remain unchanged for one semester
- Research should be awarded an "I" in the semester registered and changed within one Academic year for Baccalaureate



## Retaking a Course

- If a student has received a letter grade of D or F in a course. In this situation he/she is allowed to retake that course. The second earned grade will count and be factored into the CGPA
- If a student is found to have repeated a course to earn a better grade outside of the first instance stated above, the second course will be withdrawn with 'AW' appearing on the transcript
- If repeating a course with a D grade has caused double credits to appear on a transcript, the student must apprise the Academic Office of this anomaly and get it corrected immediately to avoid untoward circumstances delaying graduation

## Withdrawal Policies

### Course Withdrawal (online form)

- Students are allowed to withdraw from a course until the end of the tenth week of the regular semester. Students who withdraw from a course by the withdrawal deadline will receive a grade of W by the instructor
- If a student does not officially drop a course or withdraws from a course after the deadline, he/she will receive a grade of F or NS
- In circumstances where Academic Policy has been breached or disciplinary action taken, the Vice Rector's office may award an AW (Administrative Withdrawal) to a student and withdraw the grade given for the applicable course
- In extreme circumstances beyond the student's control, such as illness, accident or death of a parent, permission will be granted to withdraw after the withdrawal deadline. In extenuating circumstances 'W' will be awarded by the Vice Rector's office

### Temporary Withdrawal/Leave of Absence (Discontinuing for one semester or year)

- A Temporary Withdrawal means the student has decided to discontinue one semester or one year of studies. Depending on the date of withdrawal, the student may be entitled to a refund. Please refer to the withdrawal refund policy in the catalog
- Students who need to withdraw should initiate the process by meeting first with their Academic Advisor and then with the Vice Rector, completing the withdrawal form and providing appropriate documentation to support their request to withdraw
- Students who are recipients of financial aid must consult the Office of Financial Aid to confirm if their withdrawal will have any impact on their financial aid eligibility
- The Vice Rector's Office will forward the withdrawal form along with documents to the Head of Academics as soon as the decision to withdraw has been made

### University Withdrawal (Online form)

A University Withdrawal is defined as leaving the University permanently. If a student decides to leave the University the procedure to be followed is given below:

- The University Withdrawal Clearance form must be downloaded from the website
- It is the student's responsibility to obtain clearance from the Library, Computer Lab, Chief Proctor, Accounts Office and Science Laboratories
- The University ID card must be returned to the Accounts Office
- On receiving the approved form with all clearances, the Academic Office will issue a Letter of Release
- The student must submit a copy of the Letter of Release to the Accounts Office in order to collect his/her security deposit
- If a student quits and fails to inform the University about the decision to discontinue at the university, he/she will receive failing grades for all courses. If the student does not cancel his/her registration prior to the drop deadline, he/she will be held financially responsible for applicable tuition fees

## Degree Audit

Degree Audits show progress towards a degree being earned at the University. It is mandatory that the student meet regularly with his/her advisor to keep a check on progress and plan for courses towards degree completion. The authority in degree audit is the published catalog which must be followed strictly.

In terms of credit, overall, the minimum requirement to graduate is 130 credits, depending upon programs. Of these some are earned in the Major Block and some in the General Education Block, which is further subdivided into Humanities, Social Sciences, Science and Mathematics etc.

One course can be counted in two applicable blocks e.g. BIOL 221 is counted once in the Major and helps towards total credits needed there. BIOL 221 can also be counted toward fulfilling General Education Science requirement for a lab course. In this way a course can count twice in two different blocks.

However, the credits will not be doubled up. Credit-wise the course will only be counted once in the 130 count check. General Education does not require a calculation of credits, only that, acceptable courses have been taken in the required categories.

This is an acceptable routine way of counting courses and is done in other universities that have General Education requirements for graduation apart from the Major.

### Independent Degree Audit

After students have completed all degree requirements from their catalog, and their Academic Advisor has signed off on their degree application form, an independent degree audit is done by the Academic Office to determine compliance with catalog requirements and eligibility for degree awarding.

All majors or minors added to the degree after the primary major has been declared must be fulfilled from one catalog to pass the independent degree audit.

The Academic Office will publish a listing online prior to commencement each year that reflects degree completion status and eligibility for participation in commencement. It is the student and advisors responsibility to ensure that the requirements for graduation have been met specifically as stated in the published catalog.

## Ineligibility for Commencement

If requirements have not been met, the student will need to report the matter to the Academic Advisor and Head of Academic Advising, as well as apprise his/her department Chairperson of the situation. The degree application will need to be cancelled at the Academic Office and participation in commencement will be withdrawn.

## Urgent Degree

A student can apply for an urgent degree any time before commencement provided the conditions for degree awarding have been fulfilled as stated above. Permission to walk in Commencement after receiving an urgent degree is granted by the Registrar's Office. If a student applied for Commencement, but his/her degree application was withdrawn for noncompliance, he/she can reapply for an urgent degree provided all requirements have been met at the time of application. A request for an urgent degree has to be given at the Registrar's Office. This process takes three weeks, and requires extra payment.

## Anomalies in Departmental Offerings and Catalog Requirements

If anomalies exist between semester offerings and catalog requirements, students, along with their advisors must immediately apprise the department Chairperson of the need to facilitate them by offering a course that is listed on their catalog whether this is a core or a required elective.

## One Course in Lieu of Another

If the department decides to change a core or required elective from a past catalog through deletion or dormancy, while the catalog is still active, the department Chairperson must:

- Acquire approval of the Dean of Faculty in regards to any exception being made in lieu of such a course, justifying its applicability to one or all students
- The Dean will communicate this in writing to the Academic Office

## Policy on Privacy

Forman Christian College (A Chartered University) guarantees both the privacy and the confidentiality of all student educational records and a student's right to access those records. The official custodian of student records is the Head of Academic Office. Processing of records is done through Academic Office staff as authorized.

Access to student records is limited to the student, but can with the student's written authorization and accompanied with the student ID, be granted to parents or guardian, current instructors, counseling and administrative staff with legitimate interests, or any party designated by the student.

Authorized officials of the government, accrediting agencies, as well as persons bearing a lawful judicial order or subpoena may also request access to student records by presenting proper documentation with a reason supporting such access.

A student or former student has the right of access to his or her records. However, the University may deny access if the student has unpaid financial obligations to the University. Requests for access or copies of records must be made in writing to the Head of Academic Office who will comply within seven business days. Following review, a student may request any portion of his or her record to be expunged or edited, provided that supporting documentation is produced or available.

# ACADEMIC SUPPORT FOR STUDENTS



## UNIV 100

*Prerequisite: exemption from or completion of the English Language Program.*

All entering students must take UNIV 100 during their first semester or after they have finished the ELP program. University 100 is a mandatory course that must be completed in the first year at FCCU. A student cannot drop UNIV 100 during the drop period. The instructor of the UNIV 100 course will be the student's academic advisor for the first two years until the student declares a major.

Transfer students with 60 or more credits are exempt from UNIV 100 and will be assigned an Advisor by the Head of Advising directly.

## Advising

Each student will be assigned to a faculty member who will serve as his/her Advisor. The Advisor will work with the student to select courses and class schedule, and they will discuss career planning and personal growth. Once the student selects a major program of study, the advising will be done by a faculty member from that department. It is each student's responsibility to meet with his or her Advisor at least once each semester to review their academic progress. Students will have as much guidance as they need and as much freedom as they can responsibly handle.

Students on Academic Probation must meet the Advisor as per the probation requirements. Students must contact the Head of Advising in the event that an Advisor is unavailable for an extended period of time.

# AWARDS



## Vice Rector's List

The Vice Rector's List is published following the Fall Semester and the Spring Semester and includes names of students who completed at least four courses with a grade point average of 3.75 or better. Students with incomplete grades at the time of publication are not eligible.

## Honors at Graduation

Latin Honors

FCCU awards diploma with Latin Honors to qualified students in each graduating class. The criteria and designation for graduation with Honors are:

Summa Cum Laude (Highest Honors)	3.90 or above CGPA
Magna Cum Laude (High Honors)	3.70 to 3.89 CGPA
Cum Laude (Honors)	3.50 to 3.69 CGPA

Migrated (transferred) students are eligible to graduate with Honors if they have completed more than half of their credit requirements for graduation at FCCU.

## Scholar Athlete Trophy

This trophy is awarded to the students who fulfill the following criteria:

- Senior standing (transfer students MUST have completed at least half the required credits to graduate at FCCU)
- CGPA at end of Junior year 3.00 or above
- No academic probations
- Involved in team sports/track and field/swimming
- Participated in a minimum of nine intervarsity competitions over the three years
- Won first or second place in a minimum of three intervarsity competitions
- Participated in intramurals
- Won intramurals
- Cleared the fitness test
- Participated and won a position in at least two events at the Annual Sports Gala for two years
- Consistently displays sportsmanship
- Clear of any disciplinary actions

### **Prof MS Bhatti**

Dedicated to a renowned former teacher; it is awarded to the student securing the highest CGPA amongst the University candidates in the Faculty of Humanities.

### **Sir Mian M Shafi**

Dedicated to a renowned former teacher; it is awarded to the student securing the highest CGPA amongst the University candidates in the Faculty of Social Sciences.

### **Sir Shaikh Abdul Qadir**

Dedicated to a renowned former teacher; it is awarded to the student securing the highest CGPA amongst the University candidates in the Faculty of Education.

### **Swami Ram Teerth**

Dedicated to a renowned former teacher and saint; it is awarded to the student securing the highest CGPA amongst the University candidates in the Faculty of Mathematics and Computer Science.

### **Dr JH Orbison**

Dedicated to a renowned former teacher and founder of the Biological Science Department; it is awarded to the student securing the highest CGPA amongst the University candidates in the Faculty of Sciences.

### **Dr ED Lucas**

Dedicated to a renowned former Principal and Economist; it is awarded to the student securing the highest CGPA amongst the University candidates in the Department of Economics.

### **Prof EJ Sinclair**

Dedicated to a renowned former Principal; it is awarded to the student securing the highest CGPA amongst the graduating class for the degree of Bachelor of Arts (Honors).

### **Khan Bahadur Muhammad Sanaullah**

Dedicated to a renowned alumnus; it is awarded to the student securing the highest CGPA amongst the graduating class for the degree of Bachelor of Science (Honors).

### **Professors'**

Sponsored by the faculty of the School of Management; these medals are awarded to the students securing the top three CGPAs amongst the University candidates in Bachelor of Science (Honors) Business.

### **Unilever**

Unilever is a globally recognized brand for fast-moving consumer goods; this medal is awarded to the student securing the highest CGPA amongst the University candidates in Bachelor of Science (Honors) Business specialization in Marketing and Sales.

### **Shezan**

Shezan is one of Pakistan's oldest brands in the food industry; this medal is awarded to the student securing the highest CGPA amongst the University candidates in Bachelor of Science (Honors) Business specialization in Operations Management.

### **Askari Investment**

Askari Investment Management is the asset management company of Askari Bank and is at the forefront of providing investment products for individuals and institutions; this medal is awarded to the student securing the highest CGPA amongst the University candidates in Bachelor of Science (Honors) Business specialization in Accounting and Finance.

### **Dr CM Hussain**

Dedicated to the father of Dr Wasiq Hussain (Professor in the Faculty of Information Technology and Mathematics), a renowned mathematician; this medal is awarded to the student securing the highest CGPA (at least 3.0) amongst the University candidates in the Department of Mathematics.

### **Dr Peter H Armacost**

In honor of Dr Peter H Armacost, whose decade of dedicated service to Forman Christian College (A Chartered University) as the Principal and Rector, transformed FCCU once again into a premier educational institution of Pakistan. This medal is awarded to the student securing the highest CGPA amongst the University candidates in the Department of Psychology.

### **Dr Robert F Tebbe**

In honor of Dr Robert F Tebbe, who served the cause of education in Pakistan for almost four decades as Professor of Chemistry at Gordon College, Rawalpindi and Professor and Principal at Forman Christian College. This medal is awarded to the student securing the highest CGPA amongst the university candidates in the Department of Chemistry.

### **Aziz and Shaheen Haque**

Dedicated to Col (r) Aziz-ul-Haque, a former alumnus of Forman Christian College, and Mrs Shaheen Haque, parents of Dr Saad ul Haq, an MD in USA. The medal is instituted to encourage a spirit of healthy competition and promotion of the discipline of Geography. This medal is awarded to the student securing the highest CGPA (3.7 or better) in BA/BS (Hons) amongst the University candidates in the Department of Geography.

### **A Karim**

Dedicated to the father of Zafar Iqbal Qureshi, former Dean, faculty of Business and Management Studies at FCCU from 2005 to 2010; this medal is awarded to the student securing the highest CGPA amongst the University candidates in Business strategy in MBA.

### **Shafqat**

Dedicated to the father of Dr Saeed Shafqat, Director Centre for Public Policy and Governance at Forman Christian College (A Chartered University); it is awarded to the student securing the highest CGPA amongst the graduating class amongst the University candidates in Masters of Public Policy and Governance.

### **Dr Myron Miller**

In honor of Dr Myron Miller who was founder chairperson, Department of Philosophy at Forman Christian College (A Chartered University). This medal is awarded to the student securing the highest CGPA amongst the university candidates in the Department of Philosophy.

### **Shanky Lal Sheets Sports Medal and College Color**

This medal and College Color is awarded to the student(s) who demonstrate outstanding performance in a specified category of a sport activity on the recommendations of the Societies' Board.

# LIBERAL ARTS



## A Liberal Arts Education

Forman Christian College (A Chartered University) is currently the only University in Pakistan offering a true liberal arts Baccalaureate education, which provides the students with a good balance of depth and breadth of learning. This is done by ensuring that in addition to their selected major, all Baccalaureate students take a minimum number of courses in Humanities, Natural Sciences, Mathematics and Information Technology and Social and Behavioral Sciences.

Depth of learning gives students the opportunity for career preparation; it teaches them to think critically, communicate effectively, solve problems and become lifelong learners, while breadth of learning provides the basis for students to understand modern issues as they develop, and to live a life of quality. It develops in them a healthy curiosity about the world and above all to be good citizens of their countries and the world.

The 4-year Baccalaureate program is designed to prepare graduates to succeed in a wide variety of occupations and to advance to positions with higher responsibilities. The program provides a world-class education at Pakistani prices. Our graduates are able to enter postgraduate programs abroad without taking further courses.

## Majors/Areas of Concentration/Minors

A liberal arts education gives students the opportunity to choose from a wide variety of majors, minors and specializations in a major in consultation with their academic Advisor. Students can also choose to do double majors, minors and more than one specialization after discussion with the relevant department and their Advisor.

## General Education

An important part of the program for each student is General Education. Students must take a total of 15 courses in the General Education program. This includes courses in each of the following areas of human knowledge: Humanities, Social and Behavioral Sciences and Science and Mathematics.



# CAREERS AND INTERNSHIPS



## Career Services Office

The Career Services Office (CSO) at Forman Christian College (A Chartered University) aims to provide comprehensive guidance and counseling to its students and graduates on career development. It provides consistent assistance to students in finding attractive jobs and internships.

### Career Services

The Career Services Office has strong linkages with national and multinational leading employers, industrialists, government officials and distinguished members of FCCU's alumni. Throughout the year, it organizes a wide range of on-campus activities such as career exploration lectures, recruitment drives, resume development and career-building workshops, employer-hosted information sessions, mock interviews and job fairs.

Job fairs facilitate students meeting prospective employers from leading companies and submitting their resumes for relevant job and internship opportunities. During such events, many recruiters conduct on-the-spot interviews and share information about their recruitment policies, company profiles and hiring procedures with the students.

The CSO also produces an Annual Employers' guide that is sent to numerous organizations in Pakistan. Each Guide consists of a brochure describing FCCU's programs, a list of graduates with their majors and specializations, and a CD of all the graduates' resumes.

All these activities are designed to assist FCCU's students in becoming self-sufficient as they build their own life-long career strategies. These strategies continue well beyond graduation.

## Internships

The Internships Department contributes to the students' personal and professional development by helping them with internship placements and career-related experiences that complement classroom learning. It provides:

- Assistance and guidance to students in receiving attractive internships
- Establishes healthy relationship with students and counsels them to excel in their professional careers
- Advice and training on proper job etiquette and skills needed to be excellent employees
- Opportunities for strengthening relationships with existing and potential employers

# THE INTERNATIONAL EDUCATION OFFICE



The International Education Office (IEO) at Forman Christian College (A Chartered University) is committed to providing inclusive counseling and advising for extensive opportunities in prestigious foreign universities. The Office has joint relations with the official representatives of international universities in Australia, Canada, Egypt, France, Germany, Kenya, Korea, Malaysia, Thailand, Turkey, UAE, UK, USA and other countries to explore admission, scholarship and semester exchange opportunities for FCCU's students. IEO organizes an extensive range of on-campus events/seminars with international University representatives throughout the year, including:

- Annual Education Fair
- Informative presentations and seminars
- One-on-one counseling sessions
- Mock interviews for admissions and scholarships
- Trainings and workshops on:
  - How to apply for admission and scholarships
  - Writing Statement of Purpose
  - Guideline for IELTS, GRE, TOEFL preparation, etc

# VISUAL AND PERFORMING ARTS



The importance of art in the present world cannot be overemphasized. The fact that it had existed since the first humans and continues to exist is the proof of its significance and its inseparable relation to life itself. It helps us understand the human experience by allowing us to put our emotions, perspectives and abstractions into more tangible forms. Most of all, it makes us dream. Today, when art has become knowledge, and knowledge is considered to be the human experience, it is necessary to have art as a discipline to be taught and studied.

At FCCU, the Faculty of Humanities offers art courses to Baccalaureate (Hons) students. Through these courses we aim to not just teach certain skills but also motivate students to be creative by encouraging them to come up with new ideas and by making connections with the other courses that they study, thus making art their immediate reaction or way of expression and more relevant to them. There is a lot of emphasis on students being aware of their creative process as to what inspires them to create or what compels them to make particular aesthetic decisions.

Students can choose a variety of art courses each semester including music, performance and visual art courses.

## **ARTS 100: History of Art (3 credits)**

The study of the history of art cultivates a deep understanding of humanity's fundamental need to create. It traces how artists across various time periods and regions responded to their environment, society, and religion, and thereby produced artworks of lasting resonance and insight into the cultural practices of the time. This course is like a time travel that constantly moves back and forth through the windows of time in order to understand the canonical works of art and as to why, when and where they were created furthermore making connections to the present. The aim of this course is to acquaint students with visual imagery from prehistoric and ancient civilizations, spanning about 40,000 years. It aims to instill in them the analytical approach needed to understand why and how things have shaped through the course of time. The course encourages students to compare periods, styles, materials and subjects etc. and to make connections. Within each chronologically set period, discussions will be thematic with particular attention to portraiture, religion, resistance, wars, technology, gender identities and the role of the

art(ist) in society. In addition, frequent connections will be made with contemporary art, with the aim that students will learn to not only stay linked to art being made today, but to also derive inspiration and relevance from the content studied in the course. The course will, through assignments, introduce students to not just writing about art, but also creative formalization of their ideas.

### **ARTS 101: Introduction to Art (3 credits)**

The course is an interesting mix of theory and practice. Where students will not only be introduced to practice of art but will also dive into the process of art making and the mapping and documentation of creative process. What is art? Can one define art? Why and how is it significant? Can one learn to read and create art? These are the questions that will be explored during this course. Students will learn to look at and define art through new perspectives such as art as expression (individual and art), art as depiction and celebration of beauty (art for the sake of art, art's function to beautify and embellish), art as the byproduct of fear (fear and creative process), art as resistance, Anything and everything is art (Marcel Duchamp), art as war (Isis and Taliban, Zizek), art is violence (Francis Bacon, Ann Bogart), art is a tool (socially engaged art, instrumentalization of art by development organizations and state institutions), art is memory (mythologies, culture, stories and documentation), art is labor of love (artivism, social engagement, art for social change), everyone is an artist (Joseph Buoy), art that can't be art, art works not created in the name of art). The course will focus on the design, context and means of art and art making by exposing students to the basic principles and elements of art as well as introducing them to different media such as painting, drawing, sculpture, performance, text, video, photography and installation.

### **ARTS 102: Painting I (3 credits)**

*Prerequisite: ARTS 100*

This is a studio course directed at teaching the fundamentals of painting. Students will learn to see color, shape, line and tone and to relate as well as use these elements together in a composition. The course will expose students to various media using traditional and experimental approaches in painting such as landscape, still life, figurative and non-objective. Students will understand the symbolic significance of certain colors and their use in translating ideas. Various methods and techniques of applying paints will also be explored. Students will be encouraged to find their own style of painting which is more comfortable and personal to them for materializing their ideas in the form of paintings.

### **ARTS 103: Sculpture I (3 credits)**

*Prerequisite: ARTS 100*

This basic level course will teach students the basic elements, techniques and history of Sculpture. In order to learn the additive and subtractive or reductive processes. Students will explore various media such as wood constructions, clay modeling, plaster casting and stone carving; thus will become familiar with the new method and technique specific to each material. Students will learn the handling and tools for each material and will explore the potential and limitations of the materials. The course focuses on the form whether representational or nonrepresentational and its relationship to the space and viewer as well as its design.

### **ARTS 104: Photography I (3 credits)**

Camera is by far the most radical invention that changed the course of history. Images now dominate our world and we make sense of this world in and through images. This course is a unique combination of practice and theory that aims to help students learn the basics of photography such as understanding the camera and its functions, learning how to see, composition and translating ideas into visuals. The course will explore the role of camera in contemporary world and the concept of curation and archiving - in visual culture. The course will focus on teaching students to dissect images in order to understand the power of an image and how and what makes a successful image successful. Students will be exposed to a variety of images from various genres in photography in order to understand the diversity of photography as a medium and also its agency as a medium by discussing canonical works as case studies through the course of time, thus being introduced to the history of photography as well.

### **ARTS 111: Drawing I - Fundamentals (3 credits)**

Drawing is the most essential tool for understanding the world as well as translating it in visual form. It remains the pivotal activity to the works of many artists. Drawing is the basis of it all, it is where exploration, development and refinement of ideas happen. This is a basic level course where students will learn the mark making through various media in drawing as well as learn the basic element and principles of image making such as line, shape, form, color, movement, perspective and composition. From drawing out of imagination and then gradually building on to drawing from observation the course will encourage the ways of looking such as various viewpoints and perspectives as well as the conscious use of all the elements and principles in drawing/designing a visual.

### **ARTS 121: Drawing II – Drawing Methods and Techniques (3 credits)**

*Prerequisite: ARTS 111*

This course will teach advanced drawing methods and techniques that enhance the observation as well as help students draw realistically. They will be taught drawing with measurements, starting with the objects/still life and proportions in relationship to space both negative and positive. Students will also experiment with different media in drawing they will be encouraged to find their choice of medium and also their style of drawing through extensive practical exercises and projects.

### **ARTS 160: Theatre I - Introduction (3 credits)**

This course is process oriented and participatory. It focuses on the creative learning process by exposing students with various theatre making methodologies and techniques through practical workshops and training. It addresses all the stages of theatre production from gaining the technical skills in acting to developing the script. Students learn to improvise and perform on stage, and get the basic knowhow in (production) design and artistic management. The course brings in acting techniques from diverse backgrounds, western (Boal, Stanislavsky, Brook) as well South Asian. Importantly, the course strengthens the practice with theoretical knowledge for the intellectual growth of the students. Majorly focusing the historic trends and developments in theatre tradition both global and local, the course also touches upon the theoretical perspectives of performance studies at the basic level.

### **ARTS 201: Theatre II: Improvisation and Devising (3 credits)**

*Prerequisite: ARTS 160*

The course focuses on exploring body as a tool for acting. The aim of this course is to have sufficient knowledge of body and to be able to improvise a performance with and without script. Students will warm up with yoga and theatre exercises. Students will be introduced to inhibition breaking and trust building exercises. The students will learn interpretative skills (devise a character in a situation and engage with other characters in that situation in order to create sense of reality), technical skills (voice, movement, speech etc.) and knowledge of the improvisation and devising process (to be able to improvise and devise scenes for both unscripted and scripted performance). The students will improvise solo and group performances in class in order to learn above skills and will have discussions about the performances. The course will expose and engage students in improvisation games to justify the character through performance to understand and show commitment to the imaginary circumstances in order to create convincing realities.

### **ARTS 211: Drawing III - Advanced Drawing (3 credits)**

*Prerequisite: ARTS 111/ARTS 121*

This course focuses on developing the skills to observe and draw the human figure, and may involve the study of nature, plants, animals and objects in their environment. It develops a better understanding of anatomical and muscular structure, proportion, and rendering of form. Students will learn the basic human anatomy, major joints to understand the form of human body in various poses and the role and engagement of muscles and joints. The course will focus on the realistic translation of the human form composed in different spaces with relation to various objects and architectural structures serving as backdrop. Emphasis is laid on developing observation, memory, perceptual skills, and individual style or way of expression.

## **ARTS 260: Images of Terror: Violence in Visual Culture (3 credits)**

The course focuses on performance and the discourse on the interplay of art and violence. It examines the inevitability of violence in our daily lives. We experience, talk, fear, consume and even produce violence unconsciously. We produce more violence even while trying to counter violence. Thus, the course creates a debate around questions that link human aesthetics to the experience of horror and terror: How and when violence became an integral part of our popular visual culture? Has the wave of terror changed our aesthetics? Do horror and violence together intrigue, thrill and entertain us? In order to answer these questions the course looks at the discourse between art and violence, and their interplay. It looks into the aesthetics of intimidation, fear and resistance by going through art projects such as the post-9/11 works of Pakistani artists, Marina Abramovich's Rhythm 0, Tania Bruguera's Self Sabotage, ISIS and Taliban's released videos and images, media coverage of bomb blasts, and political performances around the world after Arab Spring, Occupy Wall Street movement, hate graffiti and military parades, as well as Hollywood movies like *Saw* and Pakistani movies like *Maula Jutt* and *Waar*.

## **MUSIC COURSES**

### **MUSC 101: Music Practicum I – Vocal (3 credits)**

This performance based course focuses on developing vocal performance skills in learners. Students learn 12 Notes and 10 Thaats in two Vocal Performance I and II courses in two different semesters. The Vocal Performance I course focuses on the recognition and verbal reproduction of the twelve notes that constitute a scale/octave. The recognition includes the notes in the lower and upper octaves. Students first recognize the notes in the lower Tetra Chords and the upper Tetra Chords then learn to reproduce these notes verbally in a similar fashion. They get command over the notes by learning various combinations and permutation of the notes. They also learn to tune the Tanpura, which is an essential component of the course. Students are not allowed to take the Vocal Performance I course along with the Vocal Performance II course in the same semester.

### **MUSC 201: Music Practicum II – Vocal (3 credits)**

*Prerequisite: MUSC 101*

Definition of Nad, Shurti, Sarwa, Alankar, Rag, Vadi, Samvadi, Anuvadi, Vivadi, Pakar Taan, Meend, Andolan, Gamak, Kan, Alaap, Bol, Taan, Barhat, Dugan, Tigan, Chugan, Forms of Classical Music, Dhurpad, Khayal, Thumri, Hori, Lakshangeet, Sargam, Tarana, Taals - Ektaal, Jhaptal, Rupak Ragas - Bhairavi, Rageshveri, Kaushakhun Life Sketches - Amir Khusro and Sultan Hussain Sharqi.

### **MUSC 210: Music Practicum II – Instrumental (Sitar/Flute/Other) (3 credits)**

This hands-on performance-centered course familiarizes students to musical instruments like Sitar or Flute, its structure, tuning, sitting position and angle of approach, techniques and the performance of Tiver Notes, Alapand Gat of Raga Aimen.

### **MUSC 220: Music Practicum III – Instrumental (Tabla/Other) (3 credits)**

This hands-on course focuses on developing Tabla playing skills in students. They learn the Bols of Teen Tala along with the recitation of these with Talis, playing the Tala with their own hands.

### **MUSC 250: Music Appreciation (Introduction to Music, Theory and Terminologies) (3 credits)**

The course focuses on genres, terminologies, and forms of South Asian classical and semi classical music, and classifications, differences and improvisations of Ragas and Thatahs. The course exposes them to meanings, philosophies and role of music in history.

### **MUSC 301: Music Practicum III – Vocal (3 credits)**

*Prerequisite: MUSC 101 and MUSC 201*

Thaat System, Ten Thaats System, timetable of Ragas, process of evolving ragas from thaats, Sudh, Chaya and Sankeeran ragas Life Sketches - Ustad Amir Khan, Ustad Badr Ghulam Ali Khan Practical - revision of previous ragas, Raga Desh, Bhopali, Bindrabani, Sarang Taals - Ektaal Slow, Rupak, Dhamar.

### **MUSC 400: Musicology (3 credits)**

*Prerequisite: MUSC 250*

The Music Appreciation I course focuses on appreciation of the stylistic features of big six South Asian gharanas based on the following elements:

- Vocal Quality
- Use of Timber
- Use of Volume
- Treatment of Sawaras
- Treatment of Lai
- Selection of Ragas
- Style of Composition
- Method of Improvisation
- Treatment of Vilambitlai
- Treatment of Duratlai
- Types of Tanas
- Types of Tanas

### **MUSC 401: Music Practicum IV – Vocal (3 credits)**

*Prerequisite: MUSC 101, MUSC 201 and MUSC 301*

Confluence of all the previous ragas and theory with advance approach. This section of the course would add some ragas such as, Purya Dhanasiri, Mian ki, Todi, Marwa Life Sketches - Nazakat Ali Khan and Salamat Ali Khan, Amanat Ali Khan and Fateh Ali Khan, Roshan Ara Begum Taal - practice and mature previous taals along with Ada Chautala, Sul Fakhtah.



# DEPARTMENT OF BIOLOGICAL SCIENCES

## BS (Hons) in Biological Sciences

### Learning Objectives

The Department of Biological Sciences offers one of the broadest and most comprehensive undergraduate programs in Pakistan. It is designed to offer a broad and general training in plant and animal sciences with opportunity for research to meet the needs of students preparing for postgraduate work or the job market.

It will enable the students to

- Explain the key concepts and principles of biological sciences
- Plan and execute laboratory methods and procedures and be able to interpret scientific data
- Demonstrate ability of creative thinking to ethically solve real life problems
- Apply concepts and information related to biological sciences to real world
- Demonstrate consistent behavior to learn and work cooperatively in groups
- Integrate knowledge and skills necessary for the intelligent performance of major tasks required at the entry level of field
- Evaluate biological literature and use it to explore opportunities in the field of biology such as entrepreneurship, research and development, teaching and consultation

Department of Biological Sciences is part of the Faculty of Natural Sciences.

### Requirements for Major in Biological Sciences

A total of at least 48 credit hours in Biological Sciences divided as follows:

**Core:** 26 credit hours of BIOL 201, BIOL 203, BIOL 221, BIOL 222, BIOL 313, BIOL 315, and BIOL 323

Students doing major in Biological Sciences must take 8 credit hours of Chemistry courses in consultation with the faculty advisor.

**Electives:** Remaining 22 credit hours from 200 and above biological science courses offered by the department or BIOT 301, BIOT 313, BIOT 314 or BIOL 498\* (internship 6 credits) or BIOL 499\* (Research 6 credits).



*\* Students with CGPA 2.75 or above will be eligible for research/Internship. Research or Internship will be allotted to the students on the recommendation of the Departmental Committee.*

### Requirements for Minor in Biological Sciences

A minor in Biological Sciences is open to students in the following disciplines:

Chemistry and Physics with a minimum CGPA of 2.5

**Core Courses required for all Minors:** BIOL 201, BIOL 203, BIOL 221 and BIOL 222 and 3 courses of 300 or 400 level, from BIOL courses list available in the catalog.

## BS (Hons) Biotechnology

The Department of Biological Sciences offers a program which is learner-centered and job oriented in different specializations of Biotechnology. It will establish an environment of collaborative and reflective learning based on modern concepts of Biotechnology.

### Learning Objectives

- Master the key concepts and principles of life sciences
- Explain the basic techniques used in biotechnology
- Be able to analyze and interpret the experimental data
- Demonstrate the use of various biotechnological processes for economic development
- Be able to assess various biotechnologies from ethical point of view

### Requirements for the Biotechnology Program

A total of at least 64 credit hours in Biotechnology:

**Core:** 35 credit hours of BIOL 201, BIOL 203, BIOL 313, BIOL 315, BIOT 201, BIOT 202, BIOT 301, BIOT 302, BIOT 313, BIOT 314

**Electives:** Remaining credit hours from 200 and above level courses offered by the department, \*BIOT 498 (Internship 6 credits) or \*BIOT 499 (Research 6 credits).

Pre-Engineering and Arts students will have to take all of the following courses as prerequisites: BIOL 100, BIOL 102, BIOL 105.

Those who have not studied Chemistry at higher secondary school or A Level or equivalent must take CHEM 100.

Those who have not studied Physics at higher secondary school or A Level or equivalent must take PHYS 100

During their freshman and sophomore years, students are recommended to take the following courses which will prepare them for higher level courses:

- BIOL 100 (for those students who have not studied Biology in higher secondary school or A level or equivalent)
- BIOL 102 (for students who have studied Biology in higher secondary school or A level or equivalent)
- BIOL 105 (For students who have studied Biology in higher secondary level or A level or equivalent)
- Taking these courses at initial stages will prepare them for higher level courses

\* Students with CGPA 2.75 or above will be eligible for Research/Internship. Research or Internship will be allotted to the students on recommendation of the Departmental Committee.

## BS (Hons) Bioinformatics

The BS (Hons) Bioinformatics is designed to provide interdisciplinary training in the rapidly growing and evolving field of bioinformatics. This degree will prepare students for graduate studies in biological and biomedical sciences, and provide cutting-edge training for work in the biomedical,

pharmaceutical, biotechnology, and Bioinformatics industries. Specifically, the bioinformatics program is aimed at students interested in applying and developing tools of Bioinformatics for the study of biological systems. The courses offered in the program will provide necessary background in following areas:

- Computational Biology Research
- Biosystems Data analyses
- Large Scale Data Management and Programming
- Perform Integrative 'Omics' Data Analyses
- Bioinformatics for Translational Medicine
- Structural Bioinformatics

### Learning Objectives

At the time of completion, students will have insight and experience to:

- Evaluate quantitatively the performance of bioinformatics algorithms
- Understand and analyze qualitative and quantitative biological data
- Analyze large scale genomic, proteomic and metabolomics datasets
- Design and implement new computational methods to solve problems in bioinformatics e.g. creating models of biological networks
- Work collaboratively in interdisciplinary groups

### Requirements for Major

A degree in Bioinformatics requires a total of 68 credit hours of core and elective courses which are divided up as follows:

A total of 41 credit hours of core courses including BINF 101, BINF 201, BINF 203, BINF 204, BINF 205, BINF 206, BINF 222, BINF 300, BINF 301, BINF 302, BINF 303, BINF 308, BINF 497. These are offered as applicable through the department of Biological Science, Mathematics, Statistics and Computer Science.

A total of 27 hours of electives from among the following courses:

BINF 211, BINF 304, BINF 305, BINF 306, BINF 307, BINF 314, BINF 401, BINF 402, BINF 403, BINF 404, BINF 405, BINF 406, BINF 407, BINF 408, BINF 409, BINF 410, BINF 411, BINF 413.

All students have to take the following courses as part of their General Education requirements: CSCS 100, BIOL 100 (if not taken in A Level or Intermediate) MATH 100 (if not exempted); MATH 101, MATH 103 AND STAT 101.

\* Students with CGPA 2.75 or above will be eligible for research/Internship. Research or Internship will be allotted to the students on recommendation of the Departmental Committee.

## Course Descriptions

### BIOL 100: Introductory Biology (4 credits)

*Only for students who have not studied Biology in higher secondary school or A level or equivalent*

The course includes basic concepts of biology with cell as a building block, its function, reproduction, genetics, inheritance, principles of living systems, classification of plants and animals. The course is designed to provide to the non-science students and overview of modern biology and to elucidate its importance in everyday life. How human beings depend upon other organisms, which fundamental processes are essential for living organisms? How digestion, circulation takes place? How DNA controls heredity characters? This course will answer all such questions.

### BIOL 102: Introductory Plant Biology (4 credits)

*Only for students who have studied Biology in higher secondary school/A Level or equivalent*

This course covers the structure-function relationship of plants, basic principles of genetics and molecular genetics and Biotechnology as well as its use in modifying plants. Ecosystems, environmental issues and the relevance of flowering plants in human life are also examined.

### **BIOL 105: General Zoology (4 credits)**

*Only for students who have studied Biology in higher secondary school/A Level or equivalent*  
Classification, structure and function of all major animal groups including Protozoa, Porifera and Metazoa (invertebrates and chordates).

### **BIOL 201: Cell Biology (3 credits)**

Introduction to the course, applications of cell biology, research in cell biology, Evolution of cell, comparison of plant and animal cells, Biological molecules (carbohydrates), structure and function of plant cell wall, its comparison with prokaryotic cell wall, Biological molecules (lipids and protein), ultra structure of cell: plasma membrane, movement across cell membrane and its significance, structure and function of chloroplast and mitochondria – comparison, the cytoplasm: endoplasmic reticulum, Golgi complex, lysosomes and vacuoles. Peroxisomes and glyoxysomes, the cytoskeleton, significance of cytoskeleton the Nucleus: structure and function of nucleus, nuclear material, cell cycle, cell division and its control, apoptosis – programmed cell death, comparison to necrosis, introduction to cellular communications, types of cellular secretions, cellular communication – properties of receptors, cell signaling pathways, G coupled protein, tyrosin kinase and adhesion receptors.

### **BIOL 203: General Genetics (3 credits)**

Introduction, Mendelian genetics, incomplete dominance, co-dominance, over dominance, multiple alleles, blood group system, gene interaction, lethality, environmental factors effecting phenotypes, sex determination mechanisms, sex-linked inheritance, dosage compensation, non-disjunction phenomenon, linkage and crossing over, cytoplasmic inheritance, quantitative inheritance, variation in chromosome number, variation in chromosome structure, population genetics, problems related to the theoretical course.

### **BIOL 207: Applied Botany (3 credits)**

This course will cover the study of plants from their economic point of view. The improvement of plants for better yield of their economic products and the strategies for the domestication and preservation of economic plants. Plants as a source of food; beverage, herbs and spices; medicinal plants, psychoactive plants, poisonous and allergy plants, fibers, dyes, tannins, hydrogel, latexes and resins, wood cork and bamboo. Cultural and molecular approaches to improvement of economic products and domestication and preservation of economic plants.

### **BIOL 208: Applied Zoology (3 credits)**

Pests of public health importance, parasites of human and animals, mites and ticks and their control, household insects, insect pests of cash crops, industrial aspects including apiculture (honey bee culture), lac culture, sericulture (silk-worm culture), aquaculture, snake venom, poultry industry, economic importance of mammals, leather industry, dairy industry, wool industry, pharmaceuticals from animals, bioactive substances from animals, pearl culture, wildlife and its management with values, conservational approaches.

### **BIOL 212/ENVR 212\*: Research Design and Biostatistics (3 credits)**

Stages of research, selection of research topic, hypothesis formation, selecting the right materials and methods for the research being performed, experimental design and its significance, controls, data collection and analysis, hypothesis testing. Training on statistical software (e.g. SPSS, MINITAB).

### **BIOL 221: Plant Form and Function (4 credits)**

This course is intended as an introduction to plant structure and function. It deals with a general survey of plant kingdom and evolutionary trends in plants. It then introduces the student to morphology, anatomy, and physiology of plants. The aim of the course is to emphasize how structural Botany is integrated with other modern fields. This course provides knowledge and understanding in plant science for future employment in Biotechnology, agriculture, horticulture, and environmental areas.

### **BIOL 222: Animal Form and Function (4 credits)**

Comparison of animals with one another: Similarities and differences among the major phyla of animal kingdom, challenges in animal form and function, external and internal variations in organs and systems; integumentary, reproductive diversity among animal groups, digestive, sensory, cardiac systems and adaptations that enable them to live successfully in their respective environments.

### **BIOL 306: Integrated Pest Management (4 credits)**

*Prerequisite: BIOL 222*

People, plants and pests, dynamics of pest populations, intensive agriculture, pest problems, concepts of IPM, cultural control, host plant resistance, parasitoids and predators, microbial control, botanical pest control, synthetic organic insecticides biotechnology approaches, bio-rational and other innovative approaches, IPM achievements, potential and challenges.

### **BIOL 313: Biochemistry (4 credits)**

*Prerequisite for non-science students: CHEM 160*

This course is designed to provide solid understanding of organic structure of living systems. The topics include Chemistry, structure, specific roles of carbohydrates, lipids, amino acids, proteins and nucleic acids. General characteristics and properties of enzymes including enzyme kinetics will also be covered.

### **BIOL 315: Fundamentals of Microbiology (4 credits)**

This course deals with history of microbiology, study of microbial life including bacteria, fungi, virus, protozoa, algae; comparison of prokaryotic and eukaryotic cells; pure culture techniques, microscopy, bacterial morphology, bacterial growth in different environments and on different media, control of microbes by using different methods including chemicals, heat, etc.; Sterilization, BSL labs; bacterial genetics, transformation, conjugation and transduction; mutation and its types, mutagens, transcription and translation in eukaryotes and prokaryotes; anti-microbial resistance; mechanisms microbes use for their protection; antimicrobial drugs and their mode of action; Microbial products, applications of microbes in food industry, Biotechnology, Environmental Science, waste water treatment, biofuels. Lab work will include use of microscope, the isolation of bacteria, fungi, cultivation of these microbes including protozoa, identification of bacteria based on morphological and biochemical tests, gram staining, antibiotic resistance, growth on different media and study of their plant growth promoting activities, including antifungal activity, quantification of bacterial growth by plate count and spectrophotometer.

### **BIOL 319: Mycology (4 credits)**

This course will deal with the study of structural specialization, diversity, and economic importance of fungi. The lab work shall encompass maintenance of pure cultures and isolation of fungi from various sources and their identification.

### **BIOL 323/ENVR 323\*: Ecology and Evolution (4 credits)**

Introduction to ecology, climate and habitats, light, temperature, and water; Populations, distribution, species interaction, competition; Communities, their nature, species diversity, Ecosystems, flow of energy, nutrient cycle, and food webs; succession and stability in communities. Evolution and society, Darwinian natural selection, genetic variation and natural selection, mutation and migration, speciation; Interrelationships between ecology and evolution, evolution as an ongoing process.

### **BIOL 325: Human Physiology (3 credits)**

This course is designed to provide students with an understanding of the human system physiology course content shall include: Cell physiology and membrane permeability; gastrointestinal system; muscle physiology; cardiovascular system; respiratory system; excretory system; nervous system; sensory organs; endocrine system; homeostasis; reproductive system.

### **BIOL 327: The Molecular Biology of Cancer (3 credits)**

*Prerequisites: BIOT 313: Molecular Biology*

This course will review the field of cancer research, in depth. The molecular mechanisms and factors that invoke a normal cell to develop into a cancerous cell and the mechanisms that help cells avoid and fight cancer will be methodically surveyed. These mechanisms include DNA damage and repair mechanisms, the regulation of gene expression in eukaryotes, tumor causing viruses, proto-oncogenes, oncogenes and tumor suppressor genes/proteins in cancer development. The course will also investigate different therapies for cancer. During this course the students will study the cellular and genetic basis of carcinogenesis, tumor growth and metastasis, and the genetic alterations that result in development of cancer in a practical manner. The course will discuss the underpinning molecular mechanisms and the biological principles that are a result of the above described alterations and the methodologies relevant to measure the extent and examine different cancer types.

### **BIOL 328: Taxonomy and Dendrology (3 credits)**

This course is for students who are interested to learn about biology of woody plants (trees and shrubs), their identification of morphological, ecological, and molecular aspects. It will introduce them with many economically important woody plants which are widely distributed in areas of Punjab. DNA barcoding techniques, various molecular techniques used in identification and preservation of important trees along with different strategies including conservation of local flora will be taught. It also includes role of important trees in phytoremediation. Students will also be introduced to science of dendrochronology and dendroecology.

### **BIOL 403: Plant Physiology (3 credits)**

*Prerequisite for non-science students: BIOL 221*

Application of physical and biological principles to the understanding of plant processes involved in assimilation, metabolism and regulation of growth and development.

### **BIOL 404/ENVR 405\*: Conservation Biology (4 credits)**

The objective of this course is to familiarize the students with different forms of biodiversity, threats to biodiversity and an overview of different strategies for its conservation.

### **BIOL 408: Applied Entomology (4 credits)**

*Prerequisite: BIOL 222*

This course will cover all applied aspects of entomology in a broader perspective and will focus on following topics; Insects in the service of man, Insects as enemies of man, causes of success of insects, collection and preservation of insects, classification and considerations for life histories, agricultural entomology, veterinary entomology, medical entomology, arthropods borne diseases including dengue, industrial entomology, forest entomology, forensic entomology and nutritional entomology.

### **BIOL 411/ENVR 411\*: Environmental Microbiology (3 credits)**

*Open to all programs under Biological Sciences*

This course will provide an awareness and understanding to the students about the role of microorganisms in the environment. After completion of this course, students will be able to understand the significance, role and application of microorganisms in the environment.

### **BIOL 412: Neurobiology (3 credits)**

*Prerequisite: BIOL 201*

Introduction, basic anatomy of nervous system, cellular organization of brain, Neuronal Morphology, synapses and spines, different neuronal types: Inhibitory and excitatory neurons, neuromodulatory neurons, neuroglial cells, astrocytes, cerebral vasculature. Modes of neuronal communication, catecholamines, serotonin, GABA neurotransmitters, biosynthesis, roles and release. Classical and non-classical neurotransmitters, excitatory and inhibitory amino acid transmitters, unconventional transmitters. Neurotransmitters receptors: Ionotropic receptors, nAcCR, 5HT3, GABA receptors, glycinergic and glutamate receptors. NMDA and non-NMDA receptors, G-protein coupled receptor,

adrenergic, purinergic and dopamine receptors. Quantal release of neurotransmitters: Excitation-secretion coupling, short term synaptic plasticity.

### **BIOL 413: Developmental and Regenerative Biology (4 credits)**

*Prerequisite: BIOL 201 and BIOT 313*

Focused on animals and human beings, this course provides current knowledge of the processes involved in, and phases of, development and differentiation from embryo to adulthood. There is an emphasis on molecular mechanisms using examples from current studies. This course also includes the complex process of development of behavior, the underlying principles of regeneration in invertebrates and vertebrates, and discussion of medical implications.

### **BIOL 414: Plant Growth Regulation (4 credits)**

*Prerequisite: BIOL 221*

This course focuses on recent developments related to plant growth regulation; it covers hormones, senescence, abscission, phytochromes, photomorphogenesis, phototropic and gravitropic responses with emphasis on molecular mechanism of hormones and signal transduction.

### **BIOL 469: Plant Pathology (4 credits)**

*Students are recommended to have studied BIOL 221 or equivalent prior to registering for this course*

This course deals with basic principles of plant pathology, disease symptoms, groups of plant pathogens and plant diseases; diseases of economically important plants; methods of plant disease control.

### **BIOL 473: Industrial Microbiology (3 credits)**

*Prerequisite: BIOL 315*

This subject is designed to extend the student's understanding and appreciation of the attributes of microorganisms and the applications of modern techniques in the applied areas of industrial and environmental microbiology. It will also develop an advanced understanding of the applications of microorganisms in the industrial production of foods and other useful products.

### **BIOL 474: Molecular and Clinical Endocrinology (3 credits)**

*Prerequisite: BIOT 313*

This course is designed to provide students an understanding of the molecular and clinical aspects of endocrinology. Course contents will include an overview of endocrine systems, molecular evolution of endocrine system, classical and non-classical endocrinology, hormone biosynthesis and metabolism, hormone chemistry, mechanisms of hormone action, hormone receptors and transducers, transduction in endocrine systems, gene regulation by hormones, interactions among hormones and clinical disorders associated with endocrine glands and hormones. Clinical case studies will also be included with emphasis on diagnosis and treatment.

### **BIOL X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

Taught by multiple faculty members including guest and foreign faculty.

Advanced students in the life sciences explore exciting topics in modern biology. Covering several topics over a semester expand the breadth and depth of student learning. The format will be review and journal articles. Topic possibilities are numerous and might include: biological rhythms, epigenetics in development, inheritance, and disease, emerging diseases, and co-evolution of species

### **BIOL 495: Human Genetics (2 credits)**

*Prerequisites: BIOT 313*

It will cover different inheritance patterns and molecular genetics in humans. Students will be taught

to identify and characterize the genetic basis, diversity of the normal human traits and genes involved in human diseases. The course can be modified so that current issues relevant to human and medical genetics are included

### **BIOL 495: RNA Structure, Function and Metabolism (2 credits)**

*Prerequisites: BIOT 313*

Introduction to RNA Biology, RNase P and RNase MRP RNA in tRNA and rRNA processing, snoRNAs, Signal Recognition particles (SRP) and Telomerase RNA, Trans splicing, RNA processing and its regulation: Alternative splicing and alternative poly adenylation, RNA splicing couples to NMD, mRNA export from the nucleus to the cytoplasm, mRNA quality control, RNA modifications, the power of 5'UTR and 3'UTR on translational regulation, internal ribosomal entry sites, diverse roles of nuclear non-coding RNAs in eukaryotic gene expression, role of RNAi splicing.

### **BIOL 498: Internship (6 credits)**

Students with CGPA of 2.75 or above will be eligible for internship. Internship will be allotted to the students on recommendation of the Departmental Committee. Duration of internship is from 6 to 8 weeks and it is usually offered in summer to juniors.

### **BIOL 499: Research (6 credits)**

Students with CGPA 2.75 or above will be eligible for research. Research will be allotted to the students on recommendation of the Departmental Committee. It is usually offered in summer to juniors.

### **BIOT 201: Introduction to Biotechnology (3 credits)**

Biotechnology - definition and history; tools of Biotechnology, foundations of Biotechnology and interdisciplinary pursuit; branches and/or applications of Biotechnology in medicine, industry, environment, agriculture (food, livestock, fisheries, algae, fungi, etc.); protection of biotechnological products; safety in Biotechnology; public perception of Biotechnology; Biotechnology and ethics; Biotechnology and the developing world.

### **BIOT 202: Protoplast, Cell and Tissue Culture (4 credits)**

A brief history of tissue culture technique, plant growth regulators, culture media, microbial contamination and prevention procedures. Plant cell, tissue and organ culture. Animal cell culture. Multiplication and differentiation of cells. Callus, suspension, and cell line culture. Isolation, culture and fusion of protoplasts. Application of tissue culture techniques.

### **BIOT 211/BINF 211\*: Biosafety and Biosecurity (3 credits)**

*Prerequisite: BIOL 102 or BIOL 105 or FSc Premedical*

This course provides an overview of biosecurity/ biosafety, and practices, equipment and facilities for the safe and secure handling of dangerous pathogens in a laboratory setting. Students attending this course will be able to have knowledge about operation or maintenance of laboratories handling infectious agents.

### **BIOT 301: Analytical Techniques in Biology (3 credits)**

Introduction, microscopy, different types of microscopes; Centrifugation; Types of centrifuges, principle, Significance and applications; Flow Cytometry, Spectroscopy: UV-visible, FTIR; Electrophoretic Separation, types of electrophoresis, SDS PAGE, DNA gel Electrophoresis; Western Southern and Northern blotting; Immunochemical techniques, ELISA; Types of ELISA, principles and applications of ELISA, Chromatography: gel filtration, HPLC, FPLC, TLC, ion exchange; Spectrometry: LC-MS, GC-MS, ESI-MS, MS-MS, MALDI-TOF-MS, applications; Microtomy; Bioanalytical techniques, Types of PCR; RT-PCR, Real time PCR, Gradient PCR; Overview of Sequencing Techniques.

### **BIOT 302: Fundamentals of Enzymology (4 credits)**

*Prerequisites: BIOL 313*

The course covers a brief history of enzymes, the enzyme structure, an introduction to the amino acids that make up protein structure and determine function relationships, specificity of enzyme action,

physical organization of enzymes (multienzyme complex), chemical and enzymatic kinetics, enzyme-substrate interaction and the roles that enzymes play as the fountain of life.

### **BIOT 305: Commercialization of Biotechnology Products (3 credits)**

An overview of commercial products and services that Biotechnology offers. General aspects related to the quality control and criterion for industrially important bioprocesses; their management and impact on the present day market. Resource planning and management of bio-inoculant; antimicrobial agents; metabolites, enzymes and therapeutic proteins. Biotechnology and intellectual property right. Industry interaction and technology transfer. Basics of effective marketing and promotion of Biotechnology products. Steps involved in commercialization of biotechnological merchandise.

### **BIOT 307: Molecular Immunology (3 credits)**

*Prerequisites: BIOL 201*

Introduction to immunology; the basic processes involved in triggering the immune system and rendering it resistance or susceptibility to different infections. The study of molecular and biochemical events that influence immune responses. This course also includes: Innate (Non-specific) and adaptive (Specific) immunity, immunoglobulins: structure and functions, antigens, antibody formation and hypersensitivity.

### **BIOT 309: Microbial Biochemistry (3 credits)**

*Prerequisites: BIOL 313*

Microbial growth: mathematical expression of growth, growth curve, measurement of growth and growth yields; synchronous growth and continuous culture. Metabolic diversity among microorganisms, metabolism of carbohydrates, lipids, amino acid, purines and pyrimidines in prokaryotes. Antimicrobial agents: mode of action and resistance to antibiotics.

### **BIOT 313: Molecular Biology (4 credits)**

*Prerequisite: BIOL 201*

History, structure and function of DNA, DNA replication in prokaryotes and eukaryotes, structure, function and types of RNA, transcription, post transcriptional processing, translation, post translation processing in prokaryotes and eukaryotes, control of gene regulation in prokaryotes and eukaryotes, mutation and mutagens, DNA damage and repair, recombination and transposable elements.

### **BIOT 314/BINF 314\*: Bioenergetics and Metabolism (3 credits)**

*Prerequisite: BIOL 102 or BIOL 105 or FSc*

*Prerequisite: BIOL 313*

This course covers intermediate metabolism in biological systems. Pathways of breakdown and synthesis of biological molecules such as carbohydrates, lipids and nitrogenous compounds will be examined. Emphasis will be placed on the thermodynamics of the reactions and the regulatory mechanism of pathways.

### **BIOT 315: Genomics and Tools of Bioinformatics (4 credits)**

*Prerequisite: BIOT 313*

Introduction to Genomics, techniques involved in studying of genomes i.e. manual and automated DNA sequencing, genotyping, mapping and assembling a genome, an introduction to pharmacogenomics, personal genomics, SNP, RFPL, microsatellite DNA Markers, brief history and introduction of bioinformatics, use of online data banks for nucleic acid and protein analysis, prediction of attributes of proteins and nucleic acids on the basis of tabulated data, DNA microarray, proteomics and survey of a genome of a model organism using bioinformatics tools.

### **BIOT 316: Fundamentals of Virology (4 credits)**

*Prerequisites: BIOL 315*

Origin and nature of viruses, taxonomy and classification, ultra structure of viruses, virus isolation, purification and identification, models of viral replication, viral genome analysis, chemotherapy of



viral infections, virus host interaction, immunity to viral infections, important viral families of human importance; family characteristics, transmission, epidemiology and pathogenicity.

#### **BIOT 407: Aquaculture Technology (4 credits)**

*Prerequisites: BIOL 222*

Introduction, sources and quality of water, culture systems (open, semi-closed and closed system). Water flow and pumps, filtration and water treatment, culture methods for seaweed, molluscs, crustacean fishes and higher vertebrates, natural food and artificial feed harvesting techniques. Policies on leasing.

#### **BIOT 408: Recombinant DNA Technology (4 credits)**

*Prerequisites: BIOT 313*

This course includes the central dogma of molecular biology and structural aspects of gene expression in prokaryotes and eukaryotes which introduces a good knowledge of promoter, cds and terminator sequences; the laboratory bacterial strains and their genotypes, maintenance of genotypes and preservation of modified bacterial strains; isolation of DNA from different types of tissues and isolation of synthetic and natural plasmids from bacteria; different types of plasmid vectors for bacterial, animal and plant systems; restriction enzymes, their types and utilization in recombinant DNA technology, other DNA modifying enzymes and their uses with particular emphasis on gene cloning; transformation systems for bacteria, animal cells and plant tissues; screening of transgenics through various technologies, e.g., Southern hybridization, PCR and RT-PCR.

#### **BIOT 409: Food and Dairy Technology (4 credits)**

Status of food industry in Pakistan and abroad; Classification of foods: Perishable, semi perishable and foods with longer shelf life. Processing of milk and dairy products: Pasteurization, UHT for milk, cream, butter and concentrated dried milk. Fermented dairy products: Microbiology of starter cultures, cheese technology, yogurt, acidophilus milk etc. Nutritional and therapeutic benefits of fermented milk products. Food preservation by chemical and physical methods, food spoilage, food packaging, recent trends in food technology, Use of genetically modified foods, food safety; Concept of Hazard Analysis Critical Control Points (HACCP).

#### **BIOT 411: Agriculture Biotechnology (4 credits)**

*Prerequisite: BIOT 201*

Introduction and origin of Biotechnology; Soil biotechnology; microbial interactions in agriculture, microbial control of fungal plant pathogens and importance of micro-organisms for soil fertility, plant growth promoting rhizobacteria, secondary metabolites with antifungal activities, methods to produce transgenic plants with biotic and abiotic resistance, genetic manipulation of fruit ripening, engineering plant protein composition for improved nutrition, genetic manipulation of crop yield by enhancement of photosynthesis, production of high value proteins in plants, vaccines from plants and biofuels.

#### **BIOT 412: Medical Biotechnology (4 credits)**

*Prerequisites: BIOT 313*

Nano-biotechnology, cancer immunotherapy, gene therapy, stem cell biotechnology, knockout mice and gene inserts, siRNA, genetically engineered animals, infectious diseases, diagnostics and antibiotic resistance, biomaterials in regenerative medicine, vaccine technology, novel antimicrobial agents, their design and other future medical biotechnologies.

#### **BIOT 498: Internship (6 credits)**

Students with CGPA 2.75 or above will be eligible for internship. Internship will be allotted to the students on recommendation of the Departmental Committee. Duration of internship is from 6 to 8 weeks and this is usually offered in the summer to juniors.

#### **BIOT 499: Research (6 credits)**

Student with CGPA 2.75 or above will be eligible for research. Research will be allotted to the students

on recommendation of the Departmental Committee. Research is usually offered in summer to juniors.

### **BINF 101: Introduction to Programming (3 credits)**

This course introduces fundamentals of problem solving and programming for bioinformatics using a high-level object-oriented language such as Python. Elements of good algorithm design, programming style and debugging are also introduced. Students will learn productive use of the Unix environment, focusing on Unix utilities that are particularly useful in bioinformatics.

### **BINF 201: Programming for Bioinformatics (3 credits)**

*Prerequisite: BINF 101 and MATH 101/A Level/Intermediate Mathematics*

This is a continuation of Introduction to Programming course. It will introduce students to advanced data structures and object-oriented features. The course will also introduce students to elements of web programming and graphical user interface development.

### **BINF 203: Statistics for Biologists (3 credits)**

*Prerequisite: STAT 101*

Probability distribution (normal, binomial); simple and multiple regression; simple, partial and multiple correlation; sampling, sample size and sample distribution; Statistical inference, estimation and confidence interval; average, difference between averages; proportions, difference between proportions, variance, correlation coefficient; z-statistics, t-statistics; Testing of hypothesis, Chi square, independence tests, contingency tables; one-way and two-way ANOVA, non-parametric tests.

### **BINF 204: Applied Calculus (3 credits)**

*Prerequisite: MATH 101*

Functions, Graph of functions, Limit, Continuity, basic rules of differentiation, differentiation of algebraic and transcendental functions with applications, Indeterminate forms, L-Hopital's rule, Integration and its techniques, Introduction to definite integral.

### **BINF 205: Applications of Bioinformatics in Biological Sciences (2 credits)**

Applications of Bioinformatics in Biology and the software tools for molecular analysis. Introduction to databases, data search and utilities including translation, multiple alignment, identification of specific motifs, signal peptides, protein structure and functional characterization.

### **BINF 206: Cell Biology, Genetics and Biotechnology (3 credits)**

Ultrastructure of cell, the cell membrane, cytoskeleton, nucleus, mitochondria, chloroplast, ribosome, dictyosome, vacuole, microbodies and cell surface. Protein synthesis and secretion. Concept of gene, Mendelian inheritance, sex-linked inheritance, linkage and crossing over and cytoplasmic inheritance. Operon model, transposable elements, genetic code, variation in chromosome number and structure, population genetics and problems related to the theoretical course. Brief history of biotechnology, different aspects of biotechnology and its future developments.

### **BINF 211/BIOT 211\*: Biosafety and Biosecurity (3 credits)**

Overview of biosecurity/biosafety and the practices, equipment and facilities for the safe and secure handling of dangerous pathogens in a laboratory setting.

### **BINF 222: Discrete Structures (3 credits)**

*Prerequisite: BINF 204 and BINF 201*

The course contains topics on elementary set theory, number theory, logic and proof techniques, counting techniques, recurrence relations, graph theory and algorithms, including space and time complexities using the Big-O notation. Applications of discrete mathematics to Bioinformatics will be emphasized.

### **BINF 300: Differential Equations (3 credits)**

*Prerequisite: BINF 204*

Differential equations of first order, initial conditions, methods of solution of differential equation

of first order, separable equations, homogeneous equations, linear equations, Bernoulli equations, applications of first order differential equations, higher order linear differential equations, homogeneous linear equations.

### **BINF 301: Bioinformatics Algorithms (3 credits)**

*Prerequisite: BINF 222*

The course explores some key biological problems and discusses algorithms to solve these problems. This course builds on the notions developed in the Discrete Mathematics course and introduces more advanced data structures, e.g. binary search trees, suffix trees, priority queues and hash tables, and different algorithmic paradigms such as exhaustive search, combinatorial pattern matching, greedy algorithms, dynamic programming, divide and conquer, including paths in graphs. Most of the interesting problems are intractable, so the course also looks at heuristics. Most importantly, the course covers the important bioinformatics-related algorithms such as sequence similarity, genome alignment, multiple sequence alignment, genome rearrangement, phylogeny reconstruction etc. within and outside the algorithmic paradigms studied.

### **BINF 302: Biological Database Systems (3 credits)**

*Prerequisite: BINF 301*

This course introduces the fundamentals of database modeling as used in bioinformatics. Describes relational data models and database management systems. Teaches the theories and techniques of constructing relational databases with emphasis on those aspects needed for various biological data, including sequences, structures, genetic linkages and maps, and signal pathways. Introduces relational database query language SQL and security and sharing of data by using tools such as XML. Summarizes currently existing biological and ontological databases and the Web-based programming tools for their access. Object-oriented modelling is introduced primarily as a design aid for dealing with the particular complexities of biological information in standard RDB design.

### **BINF 303: Biochemistry for Bioinformatics (3 credits)**

*Open to Juniors*

Understanding the organic structure of the living systems including lipids, carbohydrates, amino acids, proteins and nucleic acids. Metabolism in biological systems, pathways of breakdown and synthesis of the molecules

### **BINF 304: Experimental Design (3 credits)**

*Prerequisite: BINF 203*

Principles of design of experiments, ANOVA, Covariance and underlying assumptions, model and analysis of CR, RCB and Latin Square designs, fixed, random and mixed effect models.

### **BINF 305: Survival Data Analysis (3 credits)**

*Prerequisite: BINF 203*

Survival Functions, Non-Parametric Methods for Comparing Survival Distributions, Some Well-Known Survival Distributions and their Introduction: Basic Concepts, Censoring, Types of Censoring, Survival Functions, Relationship between Survival, Hazard and Density Functions, Survival Curves, Estimation of Survivorship Functions for Different Parametric Distributions. Non-Parametric Methods of Estimating Applications, Estimation Procedure for Parametric Survival Distributions without Covariates, Graphical Method for Survival Distribution Fitting, Test of Goodness of Fit and Distribution Selection, Parametric Methods of Comparing Two Survival Distributions, Parametric Methods for Regression Model Fitting and Identification of Prognostic Factors, Identification of Prognostic Factors related to Survival Time: Cox Proportional Hazard Model, Identification of Prognostic Factors related to Survival Time: Non Proportional Hazard.

### **BINF 306: Analytical Geometry (3 credits)**

*Prerequisite: BINF 204*

Introduction to plane analytical geometry, The line, The circle, Conic section, Transformation of

coordinates, curve sketching, Polar coordinates, and parametric equations.

### **BINF 307: Vector Analysis (3 credits)**

*Prerequisite:* BINF 204

Scalar and vector, product of two vectors, scalar and vector triple product, vector differentiation, gradient of a scalar field, divergence and curl of a vector field, vector integration, divergence and Stokes theorem.

### **BINF 308: Molecular and Recombinant DNA Technology (3 credits)**

*Prerequisite:* BINF 206

This course includes the central dogma of molecular biology and structural aspects of gene expression in prokaryotes and eukaryotes which introduces a good knowledge of promoter, cds and terminator sequences; the laboratory bacterial strains and their genotypes, maintenance of genotypes and preservation of modified bacterial strains; isolation of DNA from different types of tissues and isolation of synthetic and natural plasmids from bacteria; different types of plasmid vectors for bacterial, animal and plant systems; restriction enzymes, their types and utilization in recombinant DNA technology, other DNA modifying enzymes and their uses with particular emphasis on gene cloning; transformation systems for bacteria, animal cells and plant tissues; screening of transgenics through various technologies, e.g. Southern hybridization, PCR and RT-PCR.

### **BINF 314/BINF 314\*: Bioenergetics and Metabolism (3 credits)**

*Open to Juniors*

Intermediate metabolism in biological systems, pathways of breakdown and synthesis of biological molecules such as carbohydrates, lipids, and nitrogenous compounds, thermodynamics of the reactions and the regulatory mechanism of pathways.

### **BINF 401: Computer Graphics (3 credits)**

*Prerequisite:* MATH 103 and BINF 201

Computer Graphics is a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modelling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms.

### **BINF 402: Artificial Intelligence for Bioinformatics (3 credits)**

*Prerequisite:* BINF 301

Introduction to artificial intelligence (AI) focusing on the basics of AI and on those modules pertinent to applications in bioinformatics. Sample topics include machine learning, search, game playing, Markov decision processes, constraint satisfaction, neural networks, graphical models, knowledge representation and logic.

### **BINF 403: Advanced Web and Database Programming (3 credits)**

*Prerequisite:* BINF 302

PHP and/or ASP.NET development with database development to build interactive, data driven dynamic websites, concept of maintaining state in web applications, cookies, data tiers and backend database support, database interfacing, searching in web applications.

### **BINF 404: Data Mining and Data Warehousing (3 credits)**

*Prerequisite:* BINF 302

Database concepts, different data models, data storage and retrieval techniques and database design techniques, data warehousing and data mining, emerging database technologies and applications.

### **BINF 405: Bioinformatics Software and Web Application Design (3 credits)**

*Prerequisite:* BINF 301

Introduction to software design fundamentals, software design paradigms, patterns, and architecture

design elements, computer aided software engineering, standards for usability and interaction design for web sites, formulation of design for web applications and translating design into working code.

### **BINF 406: Introduction to Graph Theory (3 credits)**

*Prerequisite: BINF 301*

Graphs, sub graphs, isomerisms, trees, connectivity, Euler and Hamiltonian properties, matching, vertex, and edge colorings and planarity.

### **BINF 407: Decision Trees (3 credits)**

*Prerequisite: BINF 203*

Meaning of classification, classifier and an overview of classification techniques. Difference between supervised and un-supervised learning/classifiers. What are decision trees and how these trees can be generated (tree growing process); Role of evaluation functions to split parent node into two sub-nodes. Various node splitting evaluation functions (impurity-based and non-impurity-based) including Gini index, Twoing rule and Entropy function. Properties of impurity-based evaluation functions. Selection criterion to split a node. Estimation of error rates and right sized classification trees. Construction of classification trees. Evaluating the performance of a classifier: Holdout Method, Random Sub-Sampling, Cross-Validation and Bootstrap Samples.

**Note:** For the construction of classification trees any software can be used e.g. CART, R (An open source software that can be downloaded from <http://cran.r-project.org/>) and SPSS etc.

### **BINF 408: Statistics for Clinical Trials (3 credits)**

*Prerequisite: BINF 203*

Introduction, phases of experimentation, historical development of clinical trials, conduct of clinical trials, analysis of clinical trials data, cross over trials, Koch's non-parametric approach, interim analysis and sequential clinical trials.

### **BINF 409: Numerical Analysis for Bioinformatics (3 credits)**

*Prerequisite: BINF 204*

Solution of system of linear equations, solution of non-linear equations, error analysis, interpolation by polynomials, Lagrangian interpolation, numerical differentiation, numerical integration, and computer programming (MATLAB, subject to availability of software).

### **BINF 410: Linear Algebra for Bioinformatics (3 credits)**

*Prerequisite: MATH 103*

Review of vector spaces, subspaces and basis, row space, column space, rank, nullity, inner product spaces, orthogonal basis, Gram Schmidt process, orthogonal matrices, Eigenvalues and Eigenvectors, diagonalization.

### **BINF 411: Molecular Diagnosis and Drug Development (3 credits)**

*Prerequisite: BINF 308*

A comprehensive introduction to basic principles of the rapidly growing field of molecular diagnostics. Beginning with an overview of essentials and unique terminology, the course addresses many direct and amplified nucleic acid test methods. Specimen handling, and the clinical applications, advantages, and disadvantages of molecular diagnostics are also covered. Most importantly, the principles behind molecular diagnostics are presented in detail, building a strong foundation for future exploration and study in molecular diagnostics. Introduction, the use of ELISA, DNA hybridization, PCR, RAPD and DNA fingerprinting, bacterial biosensors, PCR/OLA, and restriction digest, in molecular diagnostics. Infectious agents and point mutations with prognostic significance will be used when discussing specific applications.

### **BINF 413: DNA Analysis and Forensics (3 credits)**

*Prerequisite: BINF 308*

Review of basic DNA analysis techniques, DNA testing for chromosomal abnormalities and genetic

diseases, DNA fingerprinting in forensic analysis and kinship testing, microbial identification, DNA analysis in food and agriculture.

### **BINF 497: Senior Project (6 credits)**

*Open to Seniors*

Senior Project I and Senior Project II (3 credits each) constitute a capstone project undertaken one after the other in the two semesters of the final year. The project, under the guidance of a faculty member, is an individual or group software development project that has to be relevant to Bioinformatics. Projects have to be approved by the Department before their commencement. Senior Project I also has a taught component in which software engineering principles and best software design practices are taught in a lecture format. Of the total 3 credit hours for Senior Project I, 2 credit hours are dedicated to class lectures and 1 credit hour is meant for developing the software requirement specification (SRS). In Senior Project II, there is no taught component and the students develop the software they proposed.

**\* Cross-listed Courses:**

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program to be counted towards the degree.



## DEPARTMENT OF BUSINESS

School of Management at Forman Christian College (A Chartered University) was established in 2005 and has already gained a reputation for the quality and diversity of its programs. SOM's mission is to provide students with modern holistic business education with a strong experiential component blended in with the latest learning technologies. The programs have been designed by a team that has a rich experience of developing and leading high quality management programs in the country at undergraduate, graduate, and at Executive levels. Department of Business is part of the School of Management.

### **BS (Hons) Business**

The 4-year degree has a strong emphasis on developing skill and confidence and currently offers specializations in Accounting and Finance, Operations Management, Marketing and Sales Management, and Human Resource Management. The program has been designed to ensure that students understand best practice in business and function effectively in the practical world. The course content intends to provide the right balance between academics and real world applications.

Students take core (required) courses throughout the four years of the program and begin to take courses in their areas of specialization from the third year. Business students are expected to maintain a minimum CGPA of 2.0 during the program. However, business students are expected to maintain a higher CGPA in their major. Students take 72 credit hours in their business major (66 in taught courses and six in the mandatory Internship) as well as 51 credit hours in General Education and 9 in free electives. The choice of specialization is made in the second year.

#### **Learning Objectives**

- Describe key concepts and theory of best practice in management, finance, and marketing
- Demonstrate technical rigor for analysis and decision making in business
- Apply leadership skills for effective future business management
- Analyze the demands of the local environment and apply business skills and tools to the real world

- Consistently use values and ethics in a business environment
- Describe entrepreneurial career opportunities that serve the needs of Pakistan and the international community

## Course Descriptions

**Note:** All students must ensure they only register for courses corresponding to their academic year, i.e. 100 level for Freshmen, 200 level for Sophomores, 300 level for Junior and 400 level for Senior year students.

### Core Courses

#### **BUSN 101: Principles of Accounting (3 credits)**

Understanding accounting records, entering transactions, applying accounting concepts, principles and practices and reading financial statements.

#### **BUSN 121: Microeconomics (3 credits)**

Fundamentals of economics including price theory and applications, industry and market structure, equilibrium analysis and welfare economics.

#### **BUSN 160: Management Communications (3 credits)**

Introduction to verbal and written communication theory and practice, with focus on individual oral and written skills in letter and memo writing, use of emails, presentations and preparing reports.

#### **BUSN 170: Principles of Management (3 credits)**

Basic management concept tools, techniques for improving organizational efficiency and effectiveness, management process consisting of planning, organizing, staffing, directing, coordinating, reporting and budgeting (POSDCORB).

#### **BUSN 201: Intermediate Accounting 1 (3 credits)**

*Prerequisite: BUSN 101*

Concepts, standards and principles underlying various accounting practices and techniques, reporting requirements, group accounts and corporate financing.

#### **BUSN 206: Management Accounting and Control (3 credits)**

*Prerequisite: BUSN 101*

Using accounting information, especially costs, to make management decisions, cost accounting information and the role of budgeting to facilitate rational decision-making, introduction of structures and systems for control.

#### **BUSN 225: Economic Applications for Business (3 credits)**

*Prerequisite: BUSN 121*

Fiscal, monetary and regulatory policy frameworks including deregulation and liberalization from a perspective of application of theory to real world practices.

#### **BUSN 230: Entrepreneurship (3 credits)**

*Prerequisite: BUSN 170*

Entrepreneurial skills for successful formation and growth of companies including topics like team formation, concept generation, design thinking, marketing mix, etc.

#### **BUSN 250: Individual and Group Dynamics (3 credits)**

*Prerequisite: BUSN 170*

Impact of individuals, groups and structures on behavior within a formal organizational context and applying knowledge to improve the effectiveness of the organization. Concepts include leadership skills, team structures, managing interpersonal relationships and conflicts.



### **BUSN 280: Marketing and Selling Skills (3 credits)**

*Prerequisite: BUSN 170*

Basic tools and skills to develop an effective marketing orientation for developing and marketing products and services, identifying problems and solutions, as well as application of concepts, development of selling skills.

### **BUSN 321: Financial Management I (3 credits)**

*Prerequisite: BUSN 201*

Tools, techniques and concepts of finance, such as financial analysis, financing options, capital budgeting, risk analysis and the role of financial markets and intermediaries.

### **BUSN 360: Operations and Project Management I (3 credits)**

*Prerequisite: BUSN 170*

Evaluation and implementation of projects within organizations, management of operational structures and systems to achieve organizational goals and objectives.

### **BUSN 370: Management Information Systems (3 credits)**

*For Junior and Senior year students only*

*Prerequisite: BUSN 170*

Business and accounting applications of MIS, techniques for evaluating and implementing various management information systems in an organization.

### **BUSN 398: Summer Internship (6 credits)**

All business students must undertake the internship in the summer after the Junior year.

### **BUSN 460: Business Law (3 credits)**

Laws pertaining to the functioning of business with strong emphasis on theory and practice in Pakistan, tax law and labor law.

### **BUSN 490: Analysis of Institutions (3 credits)**

Analysis of institutions in the public, private and not-for-profit sectors which have shaped the economic and corporate environment of Pakistan, economic history, public policy and interaction of different institutions that has shaped Pakistan as a country.

### **BUSN X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **BUSN 498: Business Strategy (3 credits)**

*For Senior year Business students only*

This is the capstone course in the program: theories and concepts of strategy, real world problems and application of theory to practice through projects.

## **Specializations**

The Business department offers 4 specializations whose requirements are listed below.

### **Specialization in Operations Management:**

#### **BUSN 361: Operational Excellence (3 credits)**

*Prerequisite: BUSN 360*

Application of concepts and skills in a production-related environment resulting in better work flow.

**BUSN 364: Production, Planning and Control (3 credits)**

*Must be taken at the same time as BUSN 360 for students specializing in Operations Management*  
Critical operational processes: manufacturing, scheduling and factory loading, and their role in meeting production targets, supervision and monitoring.

**BUSN 368: Productivity Management (3 credits)**

*Prerequisite: BUSN 360*

Improvement in efficiency of manufacturing processes, optimal utilization of plant and equipment with the objective of improving profitability.

**BUSN 461: New Product Development (3 credits)**

*Prerequisite: BUSN 361*

New productions, satisfying customer needs, importance of technological and management challenges.

**BUSN 464: Total Quality Management (3 credits)**

*Prerequisite: BUSN 361*

Philosophy of TQM, its key principles and concepts focusing on continuous improvements for customer satisfaction.

**BUSN 469: Project Management Processes (3 credits)**

*Prerequisite: BUSN 361*

Tools required to co-ordinate different activities that result in timely completion of projects.

## Specialization in Marketing and Sales:

**BUSN 382: Marketing Communications (3 credits)**

*Prerequisite: BUSN 280*

Marketing channels, such as advertising and promotion management, and means to promote and project products and brands.

**BUSN 383: Sales Management (3 credits)**

*Prerequisite: BUSN 280*

This course introduces students to the concepts and practice of managing sales including strategies, managing sales teams, and the role of sales in the marketing effort.

**BUSN 385: Consumer Behavior (3 credits)**

*Prerequisite: BUSN 280*

Current trends in real world marketing, its challenges and analysis, development of effective marketing programs and strategies, understanding consumers and markets for effective marketing and brand development.

**BUSN 480: Marketing Research (3 credits)**

*Prerequisite: BUSN 383*

Qualitative and quantitative research methods used in marketing, application of technical and conceptual tools to real world situations through projects and studies.

**BUSN 484: Brand Management (3 credits)**

*Prerequisite: BUSN 383, BUSN 385*

Creating and sustaining brands, tools and concepts of marketing and their application to analyze the evolution of brands.

### **BUSN 485: E-Business (3 credits)**

*Prerequisite:* BUSN 370

Application of technology in the business world, electronic media and new channels for developing businesses, promotion of products and services.

## **Specialization in Accounting and Finance:**

### **BUSN 301: Financial Reporting (3 credits)**

*Prerequisite:* BUSN 201

Generation of accounting information needed by different stakeholders, leasing, stakeholder's equity, earnings per share and financial instruments such as government issues.

### **BUSN 305: Corporate Governance (3 credits)**

*Prerequisite:* BUSN 201

Governance in corporations, spanning issues related to regulation, fiduciary responsibilities, agency problems and the structures and systems used to improve governance in organizations.

### **BUSN 322: Financial Management II (3 credits)**

*Prerequisite:* BUSN 321

Corporate finance, dividend policy, capital structure, international financial instruments, debt and equity valuation and the role of hybrid securities.

### **BUSN 401: Principles of Auditing (3 credits)**

*Prerequisite:* BUSN 301

Fundamentals of auditing, issues of ethics, role of audit firms in conducting audits.

### **BUSN 404: Taxation (3 credits)**

*Prerequisite:* BUSN 301

Analysis of laws pertaining to taxation, tax structure, corporate taxation and related issues.

### **BUSN 410: Accounting Information Systems (3 credits)**

*Prerequisite:* BUSN 301

Complementarity and application of information technology to accounting, development of systems and software for the profession.

## **Specialization in Human Resource Management:**

### **BUSN 350: Human Resource Management**

*Prerequisite:* BUSN 170

This course introduces students to the subject of HRM. It looks at the role of managing human activity (work and people) in organizational context towards desired outcomes. It covers both theory and practice.

### **BUSN 353: Human Resource Practice**

*Prerequisite:* BUSN 350

This course provides students with an opportunity to see human resource design in practice in unique situations both in Pakistan and abroad. Case studies will be used extensively.

### **BUSN 354: Performance Management**

*Prerequisite:* BUSN 350

This course looks at how organizations evaluate the performance of staff and employees. It introduces

students to topics like staff appraisals; APRs, the link between performance and rewards, and the systems necessary to ensure adequate performance through a systematic outlining of tasks.

### **BUSN 450: Labor Law**

*Prerequisite: BUSN 350*

This course introduces students to certain key aspects of labor law with special reference to Pakistan. Topics include law of contract, employment rules and procedures, incentive schemes, pension and provident fund rules, laws on minimum wages, etc.

### **BUSN 451: Strategic HRM**

*Prerequisite: BUSN 350*

Strategic HRM focuses on the definition of organizational intentions and plans on how business goals should be achieved through people, where people are treated as human capital.

### **BUSN 453: Change Management**

*Prerequisite: BUSN 350*

This course focuses on change management is one of the most challenging aspects facing organizations at present. Change management can be forced upon stagnant companies or can be driven from within. This course also links change management to issues of leadership, team building, motivation and results.



## DEPARTMENT OF CHEMISTRY

The Department of Chemistry is one of the oldest at Forman Christian College (A Chartered University). Its rich tradition as a leading institution of chemical knowledge is reflected by eminent scholars of chemistry who served it. Special mention must be made of Prof Dr Carter Speers (1940-1951), who was Head of the Department and Professor of Technical Chemistry at the University of the Punjab; Dr RF Tebbe, an eminent Organic Chemist and learned scholar, who served the Department as Professor and later as Principal of the College for twelve years; and Prof Khairat M Ibne Rasa, an internationally known chemist, who was Professor of Organic Chemistry and Head of the Department.

Chemistry is an important discipline of scientific knowledge that plays a central role in our daily life. It is vital to our understanding of molecular transformations that are important to the production of food, medicines, fuel and countless other manufactured and extracted products. Chemistry helps to sustain the natural resource base for life, and contributes to environmental protection and economic development. Design and synthesis of new organic and inorganic molecules, new methods of synthesis via microwave or ultrasonic irradiation, isolation and structural elucidation of novel natural products, development of biopolymers for targeted drug delivery, use of electroanalytical techniques for studying molecular interaction, computer aided drug design and discovery, and design and synthesis of catalysts for photocatalytic degradation of textile and other waste molecules are some of the areas where the faculty of the department are currently involved in research. Career opportunities for Chemistry graduates are available in education, R&D organisations, research, and a wide range of industries such as pharmaceutical, fertilizers, cement, leather, textile, paints and dyes, petroleum, sugar, soap and detergents, food and beverages, cosmetics and many more.

The Department of Chemistry at FCCU currently offers BS (4-year), MPhil (2-year) and PhD (3-year) programs. The main objective is to train students intellectually and professionally to work in a variety of capacities in their future life providing informed and skilled human resource for national and international needs. It offers a wide range of courses in analytical, inorganic, organic, physical, applied, biochemistry, and other interdisciplinary areas. The teaching/research equipment available in the department include GC-MS, HPLC, CHNSO Analyser, Atomic Absorption

Spectrophotometer, Flame Emission spectrophotometer, TGA-DSC, FT-IR spectrometer, Cyclic Voltammetry, 60 MHz Benchtop NMR (1H, 13C, DEPT, COSY), Magnetic Susceptibility Balance, Digital Polarimeter, Freeze Drier, Plate Reader among others.

Department of Chemistry is part of the Faculty of Natural Sciences.

## BS (Hons) Chemistry

The program prepares the students to demonstrate the ability to understand, analyze and address the real world problems, from academia to industry, using Chemistry; and provides them with plenty of opportunities to excel both in the diverse job market, and in future learning.

### Learning Objectives

A graduate in Chemistry from FCCU is expected to have, at the time of his/her graduation, the ability to:

- Explain major concepts of chemistry
- Think critically and be able to apply chemistry concepts to the real world
- Describe the range of career possibilities with training in chemistry
- Use library resources and technology efficiently to gather information and solve problems
- Apply ethical principles in the domain of chemistry

### Requirements for Major

A student majoring in chemistry is required to complete at least 48 credit hours in courses of chemistry including core/mandatory courses: CHEM 250, CHEM 261, CHEM 270, CHEM 311, CHEM 320, CHEM 330, CHEM 350, CHEM 361, CHEM 370 and any three 400 level Chemistry courses.

### Recommendations:

During their Freshman and Sophomore years, students are recommended to take the following courses which will prepare them for higher level courses: CHEM 150, CHEM 160, CHEM 170, CHEM 173, CHEM 250, CHEM 260, CHEM 261 and CHEM 262. Taking these courses at the initial stages will help them to complete the degree on time with sufficient number of courses in their desired specializations.

Recommended Elective Courses: In order to gain sufficient mastery of the subject, a student majoring in chemistry is advised to take as many elective courses as he/she can, giving special attention to his/her desired area of specialization, and selecting at least one course from each of the following categories.

### Inorganic-Analytical Chemistry

CHEM 413: Instrumental Methods of Analysis

CHEM 450: Advanced Inorganic Chemistry

CHEM 453: Chemical Applications of Group Theory

CHEM 454: Inorganic Electronic Spectroscopy

CHEM 455: Inorganic Reactions Mechanism

### Organic-Biochemistry

CHEM 260: Principles of Organic Chemistry

CHEM 331: Principles of Biological Chemistry

CHEM 462: Spectroscopy of Organic Compounds

CHEM 464: Advanced Organic Chemistry

CHEM 465: Natural Products and Medicinal Chemistry

### Physical Chemistry

CHEM 271: Quantum Chemistry

CHEM 470: Polymer Chemistry

CHEM 471: Advanced Physical Chemistry  
CHEM 473: Surface and Solid State Chemistry

### Requirements for Minor

Minor in Chemistry is open to students having basic science background at Intermediate and A Levels. Students are required to take course of at least 24 credit hours of 200 level or above by selecting at least one course from each area of chemistry (organic, inorganic and physical).

## Course Descriptions

### CHEM 100: Introduction to Chemistry (4 credits)

*Open for those students who have not taken chemistry at Intermediate or A Level*

Chemistry as a basic science, matter and states of matter, elements and periodicity, atomic structure, concept of mole and elementary stoichiometric calculations, acids and basis, elementary redox reactions and electrochemical cells, organic functional groups and major classes of organic compounds and their importance, and environmental aspects of chemistry.

### CHEM 150: Introduction to Inorganic Chemistry (4 credits)

*Prerequisite: Intermediate or A Level Chemistry*

Various theories of bonding including valence bond theory, molecular orbital theory, Werner's theory, crystal/ligand field theory, three center bonds, bonding theory of metals and intermetallic compounds, bonding in electron deficient compounds, hydrogen bonding, shapes of molecules (VSEPR model).

### CHEM 160: Introduction to Organic and Biochemistry (4 credits)

*Prerequisite: Intermediate or A Level Chemistry or CHEM 100*

Bonding and structure of organic compounds, study of hydrocarbons including additions to multiple bonds and substitution reactions of benzene, petroleum products, chemistry of food and its components including carbohydrates, proteins, lipids, nutrition, and caloric intake.

### CHEM 170: Introductory Physical Chemistry (4 credits)

*Prerequisite: Intermediate or A Level Chemistry*

Physical states of matter: structure and physical properties of gases, liquids, and solids, Bragg's Law, intermolecular forces. Kinetic Theory of Gases: deviation from ideal behavior, Van der Waals equation, distribution of velocities, Boltzmann Distribution Law. Chemical Kinetics: rate of reaction, reaction velocity, rate laws, integrated rate law, half life of reaction, determination of order of reaction. Chemical Thermodynamics: First Law of Thermodynamics and Thermochemistry. Quantum Chemistry: development of quantum theory, wave mechanics, Schrodinger equation, wave function.

### CHEM 173: Introductory Nuclear Chemistry (3 credits)

The course focuses on structure and properties of atomic nuclei and related phenomena; nuclear structure, nucleons, binding energy and decay processes; fission and fusion; isotopes and isotopic labeling; nuclear transmutation; applications in the field of medicine and energy; nuclear power reactors; future prospects.

### CHEM 180: Introduction to Forensic Chemistry (2 credits)

*Prerequisite: Science Background*

Introduction to forensic chemistry, chemical analysis in forensic science, time of death; blood, DNA in forensic, fingerprinting; polymers and fibers; firearms, narcotics, toxicology; case studies.

### CHEM 181: Introduction to Food Chemistry (2 credits)

*Prerequisite: Science background*

Introduction to food science and technology, food components, food processing, commercially important fats and oils, manufacture of regular and calorie-reduced margarines, fat replacers, flavor

enhancers, hydrolyzed vegetable protein, browning reactions, fluid milk and pasteurization, yogurt and cheese, vegetable pigments and flavoring compounds, and food preservatives.

### **CHEM 182: Fundamentals of Textile Chemistry (2 credits)**

*Prerequisite: Science Background*

Chemistry of natural and synthetic fibres, mercerization, decorative fabrics, textile dyeing and printing, sizing, bleaching and pretreatment of fibres, fashion designing, textile raw materials and environmental issues of Textile Industry,

### **CHEM 250: Chemistry of Main Groups Elements (4 credits)**

*Prerequisite: Intermediate or A Level Chemistry*

Structural characteristics, reactivities, simple compounds, coordination compounds, metal crowns, organometallic compounds of s and p block elements, noble gases and their compounds, interhalogens, pseudohalogens and polyhalides. Anomalies in periodicity, the use of d-orbitals by non-metals, reactivity and d-orbital participation,  $\sigma$ - $\pi$ - $\pi$  bonds, multicenter bonding in electron deficient molecules, three-centre-two electron and three-center four-electron bonds.

### **CHEM 260: Principles of Organic Chemistry (4 credits)**

*Prerequisite: Intermediate or A Level Chemistry*

Basic concepts of organic chemistry like resonance, inductive effect, isomerism including stereochemistry, geometric isomerism, acids and bases, their relative strength and factors affecting acidity and basicity, significance of pH, pKa and pKb, chemistry of alcohols, phenols, thiols and ethers and their industrial applications.

### **CHEM 261: Organic Chemistry I (4 credits)**

*Prerequisite: Intermediate or A Level Chemistry*

Reaction mechanisms with full emphasis including free radical, electrophilic and nucleophilic substitution, addition and elimination reactions; chemistry of alkyl halides, amines and organometallic compounds, catalytic reactions and their importance.

### **CHEM 262: Physical Organic Chemistry (3 credit)**

*Prerequisites: CHEM 150 or CHEM 160 or CHEM 170*

The course attempts to explain physical aspects of organic molecules and their reactions. It includes an overview of the theories of chemical bonding, energy changes during chemical reactions and energy profiles, thermodynamic properties, concept of stability and spontaneity, equilibria and reversibility, transition state, energy of activation and Hammond postulate, solvation and solvation effects, and catalysis. It will also cover charge transfer complexes, quantitative structure-activity relationship and computational chemistry and its applications.

### **CHEM 270: Thermodynamics and Equilibrium (4 credits)**

*Prerequisite: Intermediate or A Level Chemistry*

Chemical Thermodynamics: Second and third laws of thermodynamics, concept of entropy, Helmholtz and Gibbs Energy functions, Spontaneity and equilibrium, chemical potential, system of variable composition, interrelationship of thermodynamic functions. Phase equilibrium: Clapeyron equation, solid-liquid, liquid-gas, solid-gas equilibria, Phase diagrams, Phase rule. Solutions: Ideal and non-ideal solutions, Raoult's law, Colligative properties, Osmotic pressure, depression of freezing point, elevation of boiling point.

### **CHEM 271: Quantum Chemistry (3 credits)**

*Prerequisite: CHEM 150 or CHEM 170 or CHEM 270*

Postulates of quantum mechanics, quantum mechanical operators, Schrodinger equation, wave, functions and their properties. Quantum mechanical systems: Particle in a 1 – D box, Harmonic oscillator, Rigid rotator, Hydrogen atom, Variation principle, Huckel method.



### **CHEM 311/ENVR 311\*: Fundamental Analytical Chemistry (4 credits)**

*Open to Sophomores and Above*

Gravimetric and volumetric methods of analysis including buffers, complexometric titrations, redox titrations, non-aqueous titrations, Karl-Fischer titrations, UV/VIS spectroscopic analysis, IR Spectroscopy, treatment of measurement errors; usage and handling of standards, sampling, precision, accuracy, signal-to-noise ratio, limits of detection and quantitation, statistical evaluation of data; quality control and quality assurance.

### **CHEM 320: Industrial Chemistry (4 credits)**

*Open to Sophomores and Above*

Efficiency and yield, common chemical industries with special reference to Pakistan including cement, surfactants, paper and pulp, glass and ceramics, leather, metallurgies of important metals, liquid crystals and inorganic polymers. Environmental industrial impacts and industrial environmental management.

### **CHEM 330: Biochemistry (4 credits)**

*Prerequisite: CHEM 160 or CHEM 261 or equivalent*

Detailed structure and physiological function of primary metabolites including carbohydrates, proteins, lipids and nucleic acids, nature and role of enzymes and coenzymes, metallo-proteins and enzymes, mechanism of enzyme action, kinetics and regulation of enzymes and their industrial applications.

### **CHEM 331: Principles of Biological Chemistry (3 credits)**

*Prerequisite: CHEM 330*

Interconnections between chemistry, biology and underlying chemical logic of biomolecules and metabolic pathways, genes and genomics.

### **CHEM 340/ENVR 340\*: Environmental Chemistry Fundamentals (3 credits)**

*Prerequisite: CHEM 100 or Chemistry at Intermediate/A Level*

Viewing the earth as five integrating systems i.e. the hydrosphere, the atmosphere, the geosphere, the astrosphere and the biosphere. The course deals with the chemical phenomenon involved in these systems and how the human activities are affecting them. With a strong emphasis on the chemical aspects of Environmental Science, the course covers such topics as Water Chemistry; Oxidation/Reduction; Phase Interaction; chemical pollutants: origin, fate and hazards; Atmospheric Chemistry; Chemicals and other air pollutants; Photochemical smog; and hazardous waste Chemistry.

### **CHEM 342: Green Chemistry Applications (3 credits)**

*Prerequisite: Open to Sophomores and Above*

The course focuses on the environmental issues related to products and processes of chemical and related industries, and exploring their environmentally benign alternatives; green and sustainable chemistry, its principles and their applications in various chemical and pharmaceutical industries and research; new trends, environment friendly new materials, processes, and green methods in organic/inorganic synthesis and green solvents and catalysis; various chemical strategies to remove inorganic and organic pollutants from water, soil and air.

### **CHEM 350: Coordination Chemistry (4 credits)**

*Prerequisite: CHEM 150 or CHEM 250*

Historical background of coordination compounds, nomenclature and stability, geometry of complexes having coordination number 2 to 9, explanation of optical and magnetic properties of coordination compounds, Jahn-Teller effect, isomerism and stereochemistry, stabilities of coordination compounds, characterization and applications of coordination compounds, metal based drugs, organic reagents used in inorganic analyses.

### **CHEM 361: Organic Chemistry II (4 credits)**

*Prerequisite: CHEM 260 or CHEM 261*

Study of carbonyl compounds including aldehydes, ketones, carboxylic acids, esters, amides, enolates and conjugate additions. Chemistry of vegetable oils and waxes.

### **CHEM 370: Kinetics and Mechanism (4 credits)**

*Prerequisite: CHEM 170 or CHEM 270*

Chemical Kinetics: first and second order reactions, reaction mechanism, unimolecular reactions, complex and chain reactions, theories of reaction rates, fast reactions, reaction in solutions. Electrochemistry: electrode potential, ion selective electrodes, electrochemical cells, measurement of electrode potential, electrical work, temperature dependence of cell potential, electrolysis, polarography, cyclic voltammetry, impedance. Surface chemistry: adsorption, chemisorption, heterogeneous catalysis.

### **CHEM 372: Chemistry and Energy (3 credits)**

*Prerequisites: CHEM 250 or CHEM 261 or CHEM 270*

The course attempts to explain the diverse role of chemistry in solving the energy problem. It covers the broad areas of electrochemistry, solar energy, biofuels, and chemical and biochemical processes. Fossil Fuels and need for alternate energy sources, electrode potential and its measurement, galvanic cells, cell potential and free energy change, Nernst equation, various types of fuel cells and their thermodynamic and electrochemical aspects, nature of solar radiation and its use as source of energy, photovoltaic converters, dye-sensitized solar cells, biofuels, biomass as fuel, ethanol production, fermentation, and anaerobic digestion. Recent research and future prospects.

### **CHEM 413: Instrumental Methods of Analysis (4 credits)**

*Prerequisite: CHEM 311 or CHEM 370*

Atomic spectroscopic techniques: atomic absorption and emission techniques. Thermal analysis: TGA, DTA, DSC. Chromatography: introduction to separation techniques, solvent extraction, chromatography (paper, TLC, HPLC, GC, GPC) and electrophoresis. Hyphenated techniques: gas chromatography-mass spectrometry (GC-MS), liquid chromatography-mass spectrometry (LC-MS), MS-MS, LC-FTIR; inductively coupled plasma-mass spectrometry, matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry, tandem mass spectrometry, ion trap mass spectrometry, other topics of interest. Nuclear techniques: Neutron activation analysis, nuclear quadrupole resonance, isotope dilution method, isotope ratio mass spectrometry, mössbauer spectroscopy, radio-immuno assay, x-ray techniques.

### **CHEM 421: Pharmaceutical Chemistry (3 credits)**

*Prerequisite: CHEM 260 or CHEM 261 or CHEM 330*

Types and physicochemical properties of drugs and pharmacologically active products, structure and activity relationship, drug design, metal ions as information carriers, chemistry and mode of action of some common drugs.

### **CHEM 450: Advanced Inorganic Chemistry (4 credits)**

*Prerequisite: CHEM 250 or CHEM 351*

Non-aqueous solvents, chemistry of carbonyl and nitrosyl compounds, lanthanides and actinides.

### **CHEM 453: Chemical Applications of Group Theory (3 credits)**

*Prerequisite: CHEM 250 or CHEM 350*

Symmetry; symmetry elements and operations; point groups; matrices and transformation matrices, group representations, character tables; reducible and irreducible representations; applications of group theory to bonding theories, infrared and Raman spectroscopy, crystal field theory, optical activity.

### **CHEM 454: Inorganic Electronic Spectroscopy (3 credits)**

*Prerequisite: CHEM 250 or CHEM 350*

Electronic spectroscopy of coordination compounds, Russell-Sanders coupling scheme, derivation of term symbols of for p1-p6 and d1-d10 systems, pigeon holes diagram, magnetism, magnetic susceptibility, magnetic moments, Faraday's and Gouy's methods, orbital contribution to magnetic moment, effect of temperature on magnetic properties of complexes.

### **CHEM 455: Inorganic Reactions Mechanism (4 credits)**

*Prerequisite: CHEM 250 or CHEM 350*

Classification of reaction mechanisms, rate laws, steady state approximation, inert and labile complexes, substitution reactions, octahedral complexes, acid hydrolysis, acid catalyzed reaction, base hydrolysis, attack on ligands, steric effects of inert ligands, square planar complexes, nucleophilic reactivity, trans-effect, cis-effect, effect of leaving group, mechanism of substitution, and racemization reactions, reactions in non-aqueous inorganic solvents, classification of solvents, types of reactions in solvents, effect of physical and chemical properties of solvent, detailed study of liquid NH<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, HF, SO<sub>2</sub>, BrF<sub>3</sub> and supercritical fluid (water and CO<sub>2</sub>), reactions in molten salts and ionic liquids.

### **CHEM 462: Spectroscopy of Organic Compounds (4 credits)**

*Prerequisite: CHEM 260 or CHEM 261 or CHEM 361*

Study of IR, Mass and NMR spectroscopy as tools of structure elucidation, functional groups identification by IR spectroscopy, fragmentation pattern of main classes of organic compounds, 1-D proton and C-13 NMR spectroscopy and fundamental 2-D NMR techniques.

### **CHEM 464: Advanced Organic Chemistry (4 credits)**

*Prerequisite: CHEM 260 or CHEM 261 or CHEM 361*

Study of reactive intermediates, pericyclic reactions, rearrangement reactions and oxidation-reduction reactions, retro-synthesis and disconnections approach, design and synthesis of organic compounds of industrial importance.

### **CHEM 465: Natural Products and Medicinal Chemistry (4 credits)**

*Prerequisite: CHEM 330 or CHEM 361 or equivalent*

Introduction to natural products and their medicinal importance, biosynthesis of terpenoids, alkaloids, flavonoids and steroids, total and partial synthesis of some representative natural products, chemistry of perfumes and aromatherapy, drug discovery.

### **CHEM 470: Polymer Chemistry (3 credits)**

*Prerequisite: CHEM 261 or CHEM 270*

Introduction to polymers, step-growth, chain polymerization, copolymerization, kinetics of polymerization. Physical aspects of polymers: molecular weight, distribution, averages, and methods of determination, characterization of polymers.

### **CHEM 471 Advanced Physical Chemistry (3 credits)**

*Prerequisite: CHEM 271 or CHEM 370*

Angular momentum, approximate methods, perturbation theory, multi-electron atoms, rotational, vibrational and rotational-vibrational spectroscopy, symmetry and group theory, molecular orbital calculations, recent developments in physical chemistry, computational chemistry.

### **CHEM 473: Surface and Solid State Chemistry (4 credits)**

*Prerequisite: CHEM 270 or CHEM 370*

Crystal structures, unit cells and Miller indices, X-ray diffraction, adsorption and desorption, Langmuir and BET isotherms, surface reactions and reactivity, ultrathin films and interfaces, techniques for the study of surfaces.

### **CHEM X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **CHEM 498: Industrial Training (6 credits)**

*Open to Junior year students intending to major in Chemistry*

Junior and Senior students with a minimum 2.50 CGPA can register for this course. Registered students will take an off-campus Industrial Training for 6-8 weeks in a reputed organization. At the end of the training, student will submit a report on his/her internship. The internship will be evaluated by the department.

### **CHEM 499: Research Project (6 credits)**

*Open to Junior year students intending to major in Chemistry*

Junior and Senior students with minimum 2.50 CGPA can register for this course. Project must be completed and research thesis submitted within 6-7 months. Viva voce will be conducted after submission of the research thesis.

# DEPARTMENT OF COMPUTER SCIENCES



The Department of Computer Science is part of the Faculty of Information Technology and Mathematics. It offers a rigorous undergraduate program for able and motivated students who are excited by the influence of computing in our lives and who want to tackle the challenges of tomorrow. Computer Science is a fast-changing field and our program aims to equip students with the fundamental knowledge that enables them to keep abreast of the latest developments and to contribute.

The Department offers the degree of Bachelor of Computer Science (Honors) and MS Computer Science.

## BS (Hons) in Computer Science

The 4-year BCS degree program at Forman Christian College (A Chartered University) is accredited by NCEAC (National Computing Education Accreditation Council) of HEC with the highest ranking of 'W'. The program provides a solid understanding of the theory and techniques of Computer Science so that upon graduation the students can enter various industries or pursue graduate studies. The curriculum offers a holistic view of the discipline. It emphasizes both the state of the art and the essential skills of modeling, abstraction and problem solving that open up a wide range of industries to the students. Our courses are a mix from various areas that reflect the excitement and joy of computing, e.g. physics, mathematics, electronics, algorithms, programming languages, theoretical CS, artificial intelligence, game development, software engineering, networks, operating systems, databases, computer vision, human-computer interaction.

### Learning Objectives

- Apply knowledge and skills to the real world
- Engage in self-directed learning to update their own knowledge
- Work collaboratively in teams and demonstrate appropriate leadership
- Display core values on moral, ethical, legal and professional issues
- Communicate effectively about computing
- Solve problems effectively

## Requirements for Major

A BCS degree requires the completion of 132 credits in all as specified in the table below.

Core Courses	Supporting Courses	Computing Electives	General Education	University Electives	Total
58 credits 19 courses	22 credits 7 courses	12 credits	47 credits	6 credits	132* credits

\*Total is 132 credits (and not 145 credits) because General Education's Science and Mathematics category's requirement of 1 lab course (4 credits), 1 Mathematics course (3 credits), 1 Computer Science course (3 credits), and one course from any domain (3 credits) will be fulfilled from the Core, Supporting and Elective courses of Computer Science. This means 13 credits from these different streams of Computer Science will simultaneously satisfy General Education's 13 credits. These credit hours will only be counted once.

### Credit Hours per Course:

*All courses are 3 credits unless otherwise stated.*

Lab courses are also 3 credits, unless otherwise stated, and are indicated as (2+1), meaning 2 hours of lectures + 2 hours of lab per week. Please note that 2 hours of lab work are counted as one credit hour.

Core and Supporting courses are shown in the following tables. Supporting courses are also compulsory to take, but the term 'Supporting' is used to indicate that they are from other disciplines that support Computer Science curriculum:

#### Core Courses

- 1 COMP 102 Programming I (lab course)
- 2 COMP 111 Programming II (lab course)
- 3 COMP 113 Discrete Mathematics
- 4 COMP 200 Data Structures and Algorithms (lab course)
- 5 COMP 206 Digital Logic Design (lab course)
- 6 COMP 213 Database Systems (lab course)
- 7 COMP 220 Software Engineering
- 8 COMP 300 Computer Organization with Assembly Language (lab course)
- 9 COMP 301 Operating Systems (lab course)
- 10 COMP 302 Theory of Automata
- 11 COMP 303 Design and Analysis of Algorithms
- 12 COMP 311 Computer Networks (lab course)
- 13 COMP 360 Introduction to Artificial Intelligence (lab course)
- 14 COMP 401 Ethics for Computing Professionals (1 credit)
- 15 COMP 405 Human-Computer Interaction (lab course)
- 16 COMP 421 Information Security
- 17 COMP 451 Compiler Construction (lab course)
- 18 COMP 452 Computer Architecture
- 19 COMP 497 Senior Project (6 credits) (in two parts A and B in two semesters)

#### Supporting Courses (these are also compulsory)

- 1 MATH 111 Calculus and Analytic Geometry
- 2 STAT 115 Probability and Statistics
- 3 CSCS 105 Basic Electronics (4-credits lab course) (3+1)
- 4 CSCS 201 Multivariate Calculus
- 5 CSCS 202 Computational Linear Algebra
- 6 CSCS 203 Differential Equations
- 7 CSCS 320 Numerical Computing (lab course)

## General Education Notes

CSCS 105 Basic Electronics (4 credits) is cross-listed with PHYS 102 General Physics II (4 credits) and will fulfill the requirement of one of the two lab courses that must be completed in the Science and Mathematics category of General Education.

CSCS 100 Introduction to Computing course can be taken by BCS students only in their Freshman year, and not afterwards, as part of their General Education requirement (and not Computing Electives requirement) to establish a basic level of skill in the use of computer based tools (like word processing, presentation and spreadsheet software) and for an understanding of basic computing concepts.

### Transfer to BS (Hons) Computer Science Degree

If you are not admitted to Computer Science at the time of admission, do not assume that you would be able to transfer to Computer Science later. Any student who wishes to transfer from any other degree program to BS (Hons) Computer Science must:

- Have the required T-Score at the time of admission
- Have a good previous academic and achievement record relevant to Computer Science
- Minimum 3.0 CGPA at the time of request to transfer if it is not the student's first semester
- Attain a grade of B in any Computer Science course(s) given to the student to gauge ability with the permission of the Chairperson
- The decision is also subject to the availability of seats in the department. Chairperson of the Computer Science Department reserves the right to accept or reject any application

## Students from other Majors

- Students from other majors can only take the following course from the computing domain: CSCS 100 – Introduction to Computing
- For registration in a course other than CSCS 100, students from other majors must take written permission from the Chairperson of the Computer Science Department. Such students will only be accommodated if seats are available after registration by BS Computer Science students.

## Course Descriptions

### Core Courses

#### COMP 102: Programming I (3 credits)

*Lab course*

*Prerequisite: None*

Basic skills of problem solving and programming, problem analysis, algorithm design, program development and testing, structured design techniques, object-oriented thought process and basic tools.

#### COMP 111: Programming II (3 credits)

*Lab course*

*Prerequisite: COMP 102*

The course includes the concepts and practical applications of classes, inheritance, class hierarchy, polymorphism, basic data structures, basic searching and sorting techniques.

#### COMP 113: Discrete Mathematics (3 credits)

*Prerequisite: MATH 111 or STAT 115*

*Similar to MATH 106 and MATH 303*

Foundations of discrete mathematics as they apply to Computer Science, understanding and appreciation of the finite nature inherent in most Computer Science problems and structures through

study of logic, set theory, functions, recursive relations, combinatorial reasoning, iterative procedures, predicate calculus, tree and graph structures.

### **COMP 200: Data Structures and Algorithms (3 credits)**

*Lab course*

*Prerequisites: COMP 111, COMP 113*

More sophisticated data structures and algorithms required to manipulate them, selection or construction of suitable data structures for a wide range of problems, analysis of the efficiency of chosen solutions, standard problems such as sorting and searching, time and space complexity of computer programs.

### **COMP 206: Digital Logic Design (3 credits)**

*Lab course*

*Prerequisite: MATH 101 or A Level Mathematics or Intermediate Mathematics*

Fundamentals of hardware system design, beginning at the digital logic level with bits, binary representations, and basic binary operations, minimization techniques, combinational and sequential logic circuits and gates, basic functional units, higher level computing functions, hardware description languages, basic elements of some real life architectures.

### **COMP 213: Database Systems (3 credits)**

*Lab course*

*Prerequisite: COMP 200*

Databases, various data models, data storage and retrieval techniques and database design techniques, relational data model, relational algebra as a basis for queries in SQL and normalization techniques to optimize database structures.

### **COMP 220: Software Engineering (3 credits)**

*Prerequisite: COMP 200*

Basics of Software Engineering, the terminologies involved and various principles, methods, tools and techniques used to produce quality software, two fundamental approaches of software engineering: structural and object-oriented. Various techniques used for requirements engineering, system/software design, implementation, and testing, fundamental issues of software measurement and project management.

### **COMP 300: Computer Organization with Assembly Language (3 credits)**

*Lab course*

*Prerequisites: COMP 111, COMP 206*

Introduction to computer systems and architectures, CPU operations, busses, memory, instruction sets, machine code, use of assembly language for optimization and control, low-level logic employed for problem solving while using assembly language as a tool, trace low level code of instruction, interrupt handling and multi-tasking systems, writing moderately complex assembly language subroutines and interfacing them to any high level language.

### **COMP 301: Operating Systems (3 credits)**

*Lab course*

*Prerequisites: COMP 200, COMP 300*

Construction and working of operating systems, understanding management and sharing of the computer resources communication and concurrency, developing effective and efficient applications, problems and issues regarding multi-user, multi-tasking, and distributed systems.

### **COMP 302: Theory of Automata (3 credits)**

*Prerequisite: COMP 200*

Mathematical models of computation, definition and properties of formal languages and grammars, finite automata, regular languages and regular expressions, pushdown automata and context free languages, pumping lemmas and normal forms, Turing machines, Church's Thesis, Halting Problem and undecidability, overview of the theory of computational complexity.



### **COMP 303: Design and Analysis of Algorithms (3 credits)**

*Prerequisite: COMP 200*

Basic notions of the design of algorithms and the underlying data structures, analysis of complexity of algorithms, number-theoretic and graph algorithms, basic algorithmic paradigms e.g. divide-and-conquer, dynamic programming, greedy algorithms, and introduction to computability theory.

### **COMP 311: Computer Networks (3 credits)**

*Lab course*

*Prerequisites: COMP 301*

Engineering concepts underlying computer communication, including analog and digital transmission, circuit switching and packet switching, logical network structure and operation including network layers, network models (OSI, TCP/IP) and protocol standards, understanding of modern network concepts.

### **COMP 360: Introduction to Artificial Intelligence (3 credits)**

*Lab course*

*Prerequisite: COMP 200*

This course introduces principles and practices of Artificial Intelligence, elements of intelligent behavior, techniques of knowledge representations, optimal solutions and complexities with heuristics, production systems and expert systems, introduction to machine learning, languages and their usage for implementation of intelligent behavior.

### **COMP 401: Ethics for Computing Professionals (1 credit)**

*Prerequisite: COMP 220*

Introduction to ethical questions faced by designers, developers, managers and users of information systems including intellectual property rights, privacy concerns, professional responsibilities and deliberate harmful use of IT resources.

### **COMP 405: Human-Computer Interaction (3 credits)**

*Lab course*

*Prerequisite: COMP 220*

Exploration of the differences in information processing by humans and machines using insights from psychology and cognitive science, design of human-computer interfaces and systems involving both human and computer components.

### **COMP 421: Information Security (3 credits)**

*Prerequisite: COMP 311, STAT 115*

Introduction to information security from a theoretical and practical perspective, details of different security vulnerabilities of information systems and computer networks, methods to defend against the attacks for vulnerabilities exploited by adversaries and hackers, cryptographic techniques and protocols, network security protocols and practices, digital signatures and authentication protocols and wireless network security.

### **COMP 451: Compiler Construction (3 credits)**

*Lab Course*

*Prerequisite: COMP 302*

Organization of compilers, different types of translators, lexical and syntax analysis, parsing techniques, object code generation and optimization, detection and recovery from errors.

### **COMP 452: Computer Architecture (3 credits)**

*Prerequisites: COMP 301*

This course provides an understanding of design issues of computer systems from the perspective of performance measures and cost-performance tradeoffs. The course covers fundamentals of modern processor design. Topics include instruction set design, RISC vs. CISC architectures, memory

management, caches, memory hierarchies, interrupts, I/O structures, pipelining, parallelism, and multiprocessor systems.

### **COMP 497: Senior Project (6 credits, 2 semesters, 3 credits each semester)**

*Prerequisites: COMP 213, COMP 220, Senior standing*

*COMP 497A is the prerequisite of COMP 497B*

Requires students to research, conceive, plan and develop a real and substantial project related to computer science over the course of two semesters. It provides an opportunity to students to realize their acquired professional competence in the form of a demonstrable software product or other tangible result. The students must also submit a written report as per guidelines and make an oral presentation.

### **Supporting Courses**

These courses are also compulsory and belong to disciplines that support Computer Science.

### **Similar Courses**

Some courses in the supporting category are similar to courses from other departments. These are stated below. Computer Science majors must strictly study the course as specified in their catalog and cannot study a similar course at any time.

### **MATH 111: Calculus and Analytic Geometry (3 credits)**

*Prerequisite: MATH 101 or A Level Mathematics or Intermediate Mathematics*

*This course is open only to Computer Science majors unless it is cross-listed*

*Similar to MATH 102, MATH 201*

The focus of this course is the study of the inverse relationship that exists between differential and integral calculus. Students will learn the fundamentals of calculus along with its application to interesting problems in science and engineering. Topics include: limits, derivative, problem solving using differentiation, Fundamental Theorem of Calculus, integrations techniques, computation of areas and volumes by slicing, volumes of revolution and surface areas of revolution, infinite series and convergence tests and Taylor's series. Demonstration of various ideas will use mathematical software package(s).

### **STAT 115: Probability and Statistics (3 credits)**

*Prerequisite: MATH 111 or A Level Mathematics or Intermediate Mathematics*

*This course is open only to Computer Science majors unless it is cross-listed*

*Similar to STAT 100, STAT 101, STAT 102, MATH 105, MATH 107*

This course will introduce fundamental concepts of statistics and probability to Computer Science students. It includes a firm understanding of concepts like descriptive statistics, measures of central tendency, dispersion, moments etc. Different ways and laws of probability, random variable, conditional probability, independence Bayes' Theorem, some standard discrete and continuous probability distributions, concept of regression and correlation, along with exposure to statistical package(s).

### **CSCS 105: Basic Electronics\*/PHYS 102 General Physics II\* (4 credits) (3+1 hrs)**

*Prerequisite: PHYS 100 or A Level Physics or Intermediate Physics*

This course also fulfils one of the "science lab course" requirement for Computer Science students. Fundamental ideas of current and voltage are taught, augmented with basic circuit theorems to develop an understanding of circuit design and analysis. An introduction to the working and characteristics of diodes and BJTs equips students with the essential skill set to better understand digital and analogue circuits.

### **CSCS 201: Multivariate Calculus (3 credits)**

*Prerequisite: MATH 111*

*Similar to MATH 301*

The course studies the fundamental topics from single variable calculus, like limits and continuity, in

the context of several variables. Topics of study include: vector valued functions, partial derivatives, multiple integrals, integration in vector fields, and Green's, Stokes' and Gauss' theorems.

### **CSCS 202: Computational Linear Algebra (3 credits)**

*Prerequisite: MATH 111*

*Similar to MATH 103, MATH 209*

The course teaches concepts that are crucial to many areas of Computer Science, including computer graphics, image processing, computer vision and quantum computation. Topics include: matrices, vectors, vector spaces, linear independence, linear transformations, eigenvalues and eigenvectors, solution of system of linear systems and singular value decomposition. Student will use ideas from linear algebra and apply them to data to perform tasks such as: 2D graphics transformations, image transformations and error-correcting codes. Software packages such as Mathematics or MATLAB will be used to implement various algorithms.

### **CSCS 203: Differential Equations (3 credits)**

*Prerequisite: MATH 111*

*Similar to MATH 202*

This course introduces ordinary differential equations. Emphasis is on concepts and applications of first-order and higher-order differential equations, systems of differential equations, numerical methods, series solutions, and Laplace transforms.

### **CSCS 320: Numerical Computing (3 credits)**

*Lab course*

*Prerequisite: MATH 111*

*Similar to CSCS 310, MATH 310*

Introduction to computer representation of numbers, error analysis, finite differences, interpolation, splines, numerical differentiation and integration, numerical solution of linear and nonlinear systems of equations.

### **Computing Electives:**

#### **CSCS 210: Introduction to Multimedia (3 credits)**

*Lab course*

*Prerequisite: COMP 111, COMP 113*

Overview of multimedia systems concepts and their techniques, media fundamentals and formats, digital signal processing of multimedia data, compression and communication of multimedia data.

#### **CSCS 306: Embedded Systems (3 credits)**

*Lab Course*

*Prerequisite: COMP 111, COMP 206*

An embedded system is centered around an embedded processor, usually a microcontroller, performing control related activities with minimum electronic component count. This course is focused on how to program and interface an embedded processor. Students will learn how to acquire data from analog as well as digital sensors, perform processing and take real time decisions to implement switching of motors/actuators.

#### **CSCS 310/MATH 310\*: Numerical Analysis (3 credits)**

*Prerequisite: MATH 102 or MATH 103*

*Similar to CSCS 320*

Introduction to computer representation of numbers, error analysis, roots of equations, nonlinear and linear simultaneous equations, matrices, determinants, numerical integration, solutions of ordinary differential equations, interpolation and curve-fitting, implementation using a suitable computer language.

### **CSCS 313: Software Requirements Engineering (3 credits)**

*Prerequisite: COMP 220*

Role of requirements engineering within the software life cycle, comparison, contrast and evaluation of structured, object-oriented, data-oriented and formal approaches to requirements analysis, gathering necessary requirements from a customer to develop specifications and software.

### **CSCS 324: Database Administration (3 credits)**

*Prerequisite: COMP 213*

Installation and configuration of database systems, database backup and maintenance, performance analysis, monitoring and tuning, access control and user management, management of competing applications.

### **CSCS 342: Web Application Development (3 credits)**

*Lab course*

*Prerequisites: COMP 213, COMP 220*

Concepts, methods, technologies, and techniques of developing web applications that collect, organize and expose information resources, web application architectures, design methods and technologies, interface design, usability of web applications, security, accessibility, testing metrics, operation, deployment and maintenance of web applications, current and future web technologies.

### **CSCS 351: Software Quality Assurance (3 credits)**

*Prerequisite: COMP 220*

Quality assurance and verification, avoidance of errors and other quality problems, inspections and reviews, testing, verification and validation techniques, process assurance versus product assurance, quality process standards, product and process assurance, problem analysis and reporting, statistical approaches to quality control.

### **CSCS 352: Object-Oriented Analysis and Design (3 credits)**

*Prerequisite: COMP 220*

Exploitation of the rich object-oriented modeling provided by Unified Modeling Language (UML), adaptation to changing requirements with iterative techniques and component-based design, design solutions optimized for modern object-oriented languages and platforms, application of proven design patterns, design heuristics, anti-patterns and refactoring techniques to refine analysis and design models, construction of unit and system tests to verify implemented designs.

### **CSCS 403/MATH 403\*: Graph Theory (4 credits)**

*Prerequisite: COMP 113/MATH 106\**

Graphs, sub graphs, isomorphism, trees, connectivity, Euler and Hamiltonian properties, matching, vertex and edge colorings and planarity.

### **CSCS 405: Software Projects Management (3 credits)**

*Prerequisite: CSCS 351*

This course describes the basic principles and informs about the application of activities involved in Software Projects Management. It provides an opportunity to develop the ability to plan and manage software development projects successfully and maximizing the return from each stage.

### **CSCS 440: Systems Programming (3 credits)**

*Lab course*

*Prerequisites: COMP 301*

Internal operation of system software including assemblers, loaders, macro-processors, interpreters and inter-process communication.

### **CSCS 450: Technology Management (3 credits)**

*Prerequisite: COMP 220*

Introduction to technology strategy, corporate strategy, technology transfer, technology strategy development, product development strategy and innovation process.

### **CSCS 453: Computer Graphics (3 credits)**

*Prerequisites: COMP 200, CSCS 202*

Graphics hardware including display devices, applications of computer graphics, development of graphics software, interactive graphics programming, Raster scan, conversion algorithms for line segments, circles, ellipses and general curves, 2D transformations, windowing and clipping including panning and zooming, line clipping and area clipping algorithms, region filling algorithms, 3D objects display techniques, 3D representations, 3D transformations, curve and surface design and representations, rendering, shading and animation.

### **CSCS 455: Data Mining and Data Warehousing (3 credits)**

*Prerequisites: COMP 213, STAT 115*

Database concepts, different data models, data storage and retrieval techniques and database design techniques, data warehousing and data mining, emerging database technologies and applications.

### **CSCS 457: Computer Vision (3 credits)**

*Prerequisites: COMP 200, CSCS 202*

Introduction of theory and applications of computer vision and current problems, techniques and applications, computer vision systems, interaction of different components in a complete system, writing programs to solve computer vision problems through the use of several programming assignments and examples.

### **CSCS 461: Principles of Programming Languages (3 credits)**

*Prerequisite: COMP 303*

Theory and practice of programming language translation, languages, grammar and parsing, lexical, syntactic and semantic analysis, compiler-time error handling, organization of programming languages including language processors, syntax data types and sequence control, storage management, comparison of language features from the functional, imperative, logical and object-oriented paradigms.

### **CSCS 464: Visual Programming (3 credits)**

*Lab course*

*Prerequisite: COMP 200*

Introduction to graphical user interface (GUI) based programming and event driven paradigm, X language foundation classes/framework, application wizard and application studio, user interface controls, developing custom controls, graphics device interface, application architecture, files and serialization.

### **CSCS 466: Wireless Networks (3 credits)**

*Prerequisite: COMP 311*

Techniques in design and operation of first, second and third generation wireless networks: cellular systems, medium access techniques, radio propagation models, error control techniques, handoff, power control, common air protocols, radio resource and network management.

### **CSCS 468: Mobile Application Development (3 credits)**

*Lab course*

*Prerequisites: COMP 301*

Programming of applications for mobile phones and mobile devices such as tablets in a popular mobile device platform and programming language.

### **COMP 295/495: Special Topics in Computing/Themes (1-3 credits)**

*Prerequisites: As appropriate for the material*

These courses allow the presentation of new or emerging areas of study in the computing domain not present in the current catalog.

## University Elective for Computer Science Freshmen

### CSCS 100: Introduction to Computing (3 credits)

*Computer Science students can take this elective course only in their Freshmen year, and not afterwards, as part of their General Education requirements only*

Introduction to computing environments, general application software, computing hardware, operating systems, desktop publishing, internet, software applications and tools and computer usage concepts, introduction to software engineering and information technology within the broader domain of computing.

#### **\*Cross-listed Courses:**

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program and requirement. Students may earn credit in only one of the two cross-listed courses.



## DEPARTMENT OF ECONOMICS

The Department of Economics at Forman Christian College (A Chartered University) has been offering the undergraduate program since 1915. The Department has evolved over time, bringing it up to par with contemporary needs by building resources, introducing wide range of courses, upgrading curricula and adding new scholars. Currently there are 400 Baccalaureate students majoring in Economics and it is rated as one of the most popular degrees at FCCU. Department of Economics is part of Faculty of Social Sciences.

### **BS (Hons) Economics**

The program provides a thorough understanding of economic theories pertaining to global economic issues with special focus on Pakistan's economy. It also enables the students to perform both quantitative and qualitative analyses in research and present the findings effectively. The degree enhances the students' personal and professional decision-making capacities. Further, it encourages them to contribute in policy formulation and participate in the economic development of Pakistan.

#### **Learning Objectives**

- Demonstrate understanding of microeconomics, macroeconomics and econometrics
- Perform quantitative research skills to critically analyze economic issues
- Apply economic theory in wide range of real life problems and suggest policy changes
- Effectively communicate economic ideas in oral and written form
- Use their knowledge and abilities for the welfare of the people
- Practice ethical and moral values in their professional and personal lives
- Describe careers that apply economics in public, private, and international institutions

#### **Requirements for Major**

A minimum CGPA of 2.30 is required to declare Economics as a major. Students have to complete 24 credit hours of core courses and 24 credit hours of elective courses. Minimum six elective courses of 300 or 400 levels are required for majoring in Economics.

**Core Courses:** ECON 101, ECON 102, ECON 103, ECON 201, ECON 202, ECON 203, ECON 300, ECON 302.

**Elective Courses:** ECON 206, ECON 303, ECON 304, ECON 305, ECON 307, ECON 309, ECON 311, ECON 313, ECON 315, ECON 400, ECON 402, ECON 403, ECON 406, ECON 411, ECON 413, ECON 417, ECON 421, ECON 422, ECON 498, ECON 499.

## Course Descriptions

### **ECON 100: Basic Economics (3 credits)**

*This course is counted towards General Education credits. Students who have not studied Economics at Intermediate or A Level should register this course before ECON 101, ECON 102 and ECON 103. The course cannot be registered simultaneously or after ECON 101, BUSN 121 and/or ECON 102, BUSN 225*

Basic concepts of Economics such as demand, supply, allocation of resources, opportunity cost, national income, inflation, unemployment, international trade and development economics.

### **ECON 101: Microeconomics I (3 credits)**

*Prerequisite: A Level Economics or Intermediate Economics or ECON 100*  
*Students cannot register this course with or before ECON 100*

Basic method and subject matter of microeconomics, consumer behavior theory, producer theory, cost theory, output and price strategies under perfect and imperfect competition market structure.

### **ECON 102: Macroeconomics I (3 credits)**

*Prerequisite: A Level Economics or Intermediate Economics or ECON 100*  
*Students cannot register this course with or before ECON 100*

Key macroeconomic concepts, national income accounting, productivity, standard of living, growth and public policy issues, introduction to consumption, saving and capital formation, inflation, unemployment, monetary system, quantity theory of money, introduction to monetary and fiscal policies.

### **ECON 103: Mathematics for Economists (3 credits)**

*Prerequisite: A Level Economics or Intermediate Economics or ECON 100*  
*Students cannot register this course with or before ECON 100*

Basic tools of mathematical economics and their application to economic analysis, nature of mathematical economics, real number system, set theory and economics, comparative static analysis, linear models and matrix algebra, tools of algebra and calculus, application of calculus in economics, optimization of one and multivariable functions, optimization with constraints, and economic application of optimization.

### **ECON 201: Microeconomics II (3 credits)**

*Prerequisite: ECON 101, ECON 103*

Continuation of Microeconomics I using mathematical models to analyze consumer theory, producer theory, firm behavior under perfect and imperfect market structure, input markets with both perfect and imperfect competition.

### **ECON 202: Macroeconomics II (3 credits)**

*Prerequisite: ECON 102, ECON 103*

Classical and Keynesian economic theory policy, derivation of AD and AS models and their implication for stabilization policies, short term and long term inflation-unemployment relationship, consumption and investment theories and economic growth, growth accounting and convergence.

### **ECON 203: Statistics for Economists (3 credits)**

Application of statistics tools in economics, basic concepts and terminology of statistics, presentation of data, measures of central tendency, dispersion, shape and relationship, probability and probability



distributions, random variables, probability density function of discrete and continuous random variables, marginal and conditional probability density functions, bernoulli binomial, poisson, normal,  $\chi^2$ , t, F, definitions, properties and their relationship, sampling and sampling distributions, statistical inference, estimation and testing of hypothesis.

### **ECON 206: Banking and Finance (3 credits)**

*Prerequisite: ECON 102*

Concepts of conventional and interest free banking, financial system, credit creation, financial institutions and instruments, interest-free Islamic banking and finance, principles of Islamic banking and finance, financial contracts, modes of financing, and contractual mechanisms.

### **ECON 300: Fundamentals of Econometrics (3 credits)**

*Prerequisite: ECON 201, ECON 202, ECON 203*

Regression analysis and ordinary least squares, dummy variable regression models, relaxing the assumption of classical model, multicollinearity, heteroskedasticity, autocorrelation, right hand-side endogenous variables, weighted least square and generalized least square model specification and diagnostic testing.

### **ECON 302: Research Methods and Computer Applications (3 credits)**

*Prerequisite: ECON 300*

Methods and methodologies of research used in economics, techniques of investigation, data collection methods, research design, sampling, report writing and use of econometric software.

### **ECON 303/ENVR 306\*: Environmental Economics (3 credits)**

*Prerequisite: ECON 101*

Introduction to the economic and ecological principles essential for a clear understanding of contemporary environmental and natural resource management issues, integrated understanding of the field combining economic, legal and ecological perspectives to better understand the causes and solutions to market failure and environmental degradation, economic efficiency and market failure, property rights, externality, measuring social welfare and welfare improvements, demand for environmental goods, environmental valuation methodologies, environmental benefit-cost analysis and other making criteria, environmental policy and environmental regulations, common pool resource management, depleteable resource management.

### **ECON 304: Managerial Economics (3 credits)**

*Prerequisite: ECON 201, ECON 203*

The purpose of this course is to provide basic understanding of the economic theory and analytical tools that can be used in decision-making problems. It covers demand analysis, estimation and forecasting, production and cost theory and their estimation, decision making under risk and uncertainty, and managerial theories and models of the firm.

### **ECON 305: Public Sector Economics (3 credits)**

*Prerequisite: ECON 201, ECON 202*

This course covers the theory of public sector economics, that is, the role of the government in the functioning of the economic system. The course focuses on the topics, such as role of public sector, theories of public good, externalities, distribution equity and economic welfare, concepts used in taxation, types of taxes, their shifting and incidence, resource mobilization, public expenditure evaluation, public debt, external debt modeling, budget deficit, cost benefit analysis of development finance.

### **ECON 307: International Trade Theory and Policy (3 credits)**

*Prerequisite: ECON 201*

Evaluation of international trade, Mercantilists' views on trade, theories like absolute and comparative advantage, standard theory of international trade, neo-classical trade theory, offer curve and terms of trade, factor endowments and Heckscher-Ohlin model, factor price equalization and Stolper-

Samuelson theorems, HO Model and new trade theories, trade based on economies of scale, product differentiation, technological gap and product cycle models, impact of economic growth on international trade, impact of international trade policies on nation welfare like tariff and its effects, quota and its effects, nontariff trade barriers, and new protectionism, economic integration, customs unions, and free trade areas.

### **ECON 309: Econometric Methods (3 credits)**

*Prerequisite: ECON 300*

Econometric models and estimation problems that often arise in economic application, nonlinear regression models, approaches to estimating nonlinear models, qualitative response regression models, LPM, logit, probit, panel data regression models, fixed effect approach and random effect approach, simultaneous-equation models, simultaneous equation bias, identification problem, approaches to estimation (ILS, 2SLS).

### **ECON 311: Development and Growth Economics (3 credits)**

*Prerequisite: ECON 202*

Theory and history of economic growth and development, economic institutions and development, diverse structures and common characteristics, measurement of classic and modern economic development models, economic development and issues of poverty, inequality, population, urbanization, education and health, agriculture and rural development, growth models of Harrod-Domer, Solow-Swan, Kaldor and Joan Robinson, and new growth theories.

### **ECON 313: Monetary Theory (3 credits)**

*Prerequisite: ECON 202*

Determinants of demand and supply of money and role of financial institutions, nature of monetary economics, money supply process and definition of monetary aggregates, theories of money demand, microeconomic determinants of demand for money, testing the demand for money, weakness of the link between the theory of the demand for money and the testing of it, monetary transmission mechanism, price surprises, central banking and the money supply.

### **ECON 315: Advanced Mathematical Economics (3 credits)**

*Prerequisite: ECON 103*

Homogeneous and homothetic functions, application of linear homogeneity, Cobb-Douglas production functions, dynamic and integral calculus, definite and indefinite integral, proper and improper integral, economic application of integration, dynamic economic models, solving differential and difference equations of various types, plotting phase diagram and trace phase trajectories, second order differential and difference equations, dynamic economic models of first order and second order, linear programming with varying techniques, non-linear programming, Kuhn-Tucker conditions, application of linear and non-linear programming, and optimal control theory.

### **ECON 400: Issues in Pakistan Economy (3 credits)**

*Prerequisite: ECON 202*

Leading issues in the Pakistan economy, political economy, growth, income distribution and poverty, state of inflation and unemployment, growth and development issues of major sectors, fiscal and monetary policy, balance of payments and budget deficit, foreign trade and aid, internal and external debt, money and capital markets, and human resource development.

### **ECON 402: Project Planning and Appraisal (3 credits)**

*Prerequisite: ECON 201*

Project planning, its process, appraisal and evaluation with special reference to Pakistan, technical, social, financial and economic analysis of projects, discounted measures of project worth i.e. BC ratio, IRR, NPV etc., techniques used in time and resource management like CPM, PERT and WBS, project monitoring and sensitivity analysis, analysis of mega projects in Pakistan like Gawader Deep Water Port, Lahore Islamabad Motorway etc.

### **ECON 403: Time Series Econometrics (3 credits)**

*Prerequisite: ECON 300*

Time series techniques in economics, dynamic econometric models, autoregressive and distributive lag models, estimation of autoregressive, causality in economics, approaches to economic forecasting, ARMA and ARIMA modeling and estimation, measuring the volatility in financial time series, ARCH and GARCH models, vector auto-regression (VAR), co-integration and error correction modeling.

### **ECON 406: Introduction to Game Theory (3 credits)**

*Prerequisite: ECON 201*

Analytical tools to understand consequently predict behavior in multi-person decision settings, definitions and rules of games, games with perfect certain, symmetric and complete information, mixed and continuous strategies, dynamic games with symmetric and asymmetric information, moral hazard and adverse selection, principal agent models, cooperative and non-cooperative games.

### **ECON 411: Development Policy (3 credits)**

*Prerequisite: ECON 311*

International debt, aid and assistance, debt crises and balance of payment, resource mobilization and industrialization, rural development and migration, agricultural vs. industrial development, human capital and its development, development and crises, poverty and income distribution, environment and development.

### **ECON 413: Monetary Policy (3 credits)**

*Prerequisite ECON 313*

Introduction to monetary policy, policy goals and instruments, monetary policy and macroeconomic models, monetary policy coordination, Tobin tax, market constraints and policy analysis in Keynesian models, monetary policy rules, price targeting vs. inflation targeting, optimal policy with endogenous contracts.

### **ECON 417: International Finance (3 credits)**

*Prerequisite: ECON 202*

Balance of payments, foreign exchange markets, exchange rates, purchasing power parity theory, monetary approach to the BOP and exchange rates, elasticity approach to BOP, asset market model of exchange rates, macroeconomics of open economy and international monetary system, adjustments in BOP under fixed and flexible exchange rate systems, various adjustment policies to remove internal and external balances, impact of different policies (fiscal and monetary) on open economy through aggregate demand and aggregate supply curves under different exchange rate systems, evaluation of European monetary and international monetary systems.

### **ECON 421: General Equilibrium and Welfare Economics (3 credits)**

*Prerequisite: ECON 201 and CGPA  $\geq 3.00$*

The nature of general equilibrium analysis, Walrasian model, general equilibrium and disequilibrium models, economic efficiency and Pareto principle, social welfare function; Arrow's Impossibility Theorem, income distribution and compensation principles, imperfect competition and efficiency, market based and Pareto solutions to public goods and externalities, market failure and theory of second best.

### **ECON 422: Macroeconomics Analysis (3 credits)**

*Prerequisite: ECON 202*

New-keynesian, new-classical foundations and debate, open economy, Mundell-Fleming model rational exceptions, economic fluctuations and its sources in open economy, fiscal-monetary policy and economic stability, catastrophe theory, random walk, real business cycle theory, dynamic consumption, investment, government debt and Ricardian equivalence.

### **ECON X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **ECON 498: Internship (6 credits)**

*The Internship is offered to the juniors/seniors with CGPA  $\geq 2.75$*

Credit will be granted for a full time internship of at least six weeks during summer vacations.

Internship credit is not retroactive and must be prearranged with the Chairperson of the Department.

The students must provide verification of the completion of internship on institution's letterhead from the head of the institution not later than one week after such completion. The grading for internship will be done by the Chairperson on the basis of the written report by the student.

### **ECON 499: Research Project and Paper Writing (6 credits spread over two semesters)**

*Prerequisite: ECON 302 and CGPA  $\geq 3.3$*

This course will be registered as 499A in fall and 499B in spring semester-one after the other in two semester of final year. The projects have to be approved by the department before their commencement. Students will conduct a research project under the prearranged supervision of a faculty member of the department on a topic of economic significance. The student will have a viva-voce examination before a committee.

# DEPARTMENT OF EDUCATION



FCCU's Department of Education was revamped in 2003 when the College returned to private ownership. It is gaining a reputation for being one of the finest Education departments in the country. It offers 4-year BS (Hons) degree in Elementary and Secondary Education as well as a Certificate in English Language Teaching and an Advanced Diploma in English Language Teaching.

Our mission is to send out into the field teachers who are fully prepared to meet the challenges of teaching in a constantly changing 21st century.

Department of Education is part of Faculty of Education.

## BS (Hons) Education

The BS (Hons) degree follows a liberal arts education framework. This provides every student the opportunity to explore the breadth of knowledge by taking courses in varied disciplines to fulfill the general education requirements and be better prepared to face the world. In addition, it provides every student the opportunity to explore in depth the field of education as their area of concentration.

Graduates from this program are well prepared to face the challenges of the real classroom and impact young lives as they teach. A unique feature of this program is a full semester of teaching practice during the final year which provides the student-teacher with a real-world classroom experience. The student-teacher works in close association with the cooperating teacher at the school and the advisor from FCCU. It helps the prospective teacher visualize his/her career. Our education graduates make a difference: they TEACH!

### Learning Objectives

- Explain and critique the teacher's role in the progress of a nation
- Develop and use appropriate teaching approaches, strategies, and skills depending on grade level and content area
- Cater to the learning needs of all students in mixed ability classrooms

- Interact ethically with students, parents, administrators, colleagues, and the wider community
- Practice core values in varied academic and other situations
- Evaluate education literature in order to explore opportunities in the field: teaching, research, counseling, administration

#### **Requirements for Major**

**For a BS (Hons) Ed-** A total of 48 credits are required: 18 credits in the core courses, 18 credits in the Education electives and 12 credits of Student Teaching Experience.

**Core courses:** EDUC 110, EDUC 120, EDUC 240, EDUC 300, EDUC 350, EDUC 496 and EDUC 498 (Student Teaching Experience 12 credits).

**Minor in Education:** A Minor in education requires a total of 24 credits including: EDUC 110 or EDUC 120, EDUC 240, EDUC 300, EDUC 350 and EDUC 498 (Student Teaching Experience 12 credits).

## Course Descriptions

### **EDUC 110: Foundations of Education (3 credits)**

Perspectives on economic, cultural, political, ideological, philosophical, aesthetic and psychological foundations of education, history of education in Pakistan.

### **EDUC 120: Educational Psychology (3 credits)**

Principles of Psychology as applied to the educational process, characteristics of the individual learner, the teacher, the classroom, methods and other relevant factors in the learning process, various stages of growth and development, brief introduction to psychological measurements and creativity in children.

### **EDUC 210: Education Policies of Pakistan (3 credits)**

*Prerequisite: EDUC 110*

Various educational policies of Pakistan, analyses of the successes and failures of each with identification of probable causes, analysis of policies at the preschool, elementary, secondary, higher education and teacher education levels.

### **EDUC 240: Technology in Education (3 credits)**

Hands-on experience with computers and other technological applications in education, ways of integrating technology and the use of the internet with classroom teaching procedures in the content areas will be explored.

### **EDUC 260: Teaching Exceptional Children (3 credits)**

*Prerequisite: EDUC 120 or PSYC 100*

Introduction to the teaching of exceptional children either exceptionally intelligent or with difficulties, strategies for use in a regular classroom setting, methods of identifying disabilities and giftedness, ways of finding available resources to facilitate the learning process.

### **EDUC 300: Instructional Methods and Strategies (3 credits)**

Types of instructional methods and assessment strategies and best uses of each, discussions and practice in choosing and planning for the appropriate instructional methods, classroom arrangements and management for each instructional method.

### **EDUC 310: Curriculum Development (3 credits)**

*Prerequisite: EDUC 110*

A perception of what curriculum is as a progressive activity in the student's and teacher's lives, an international vision of curriculum and its wider application in global society.

**EDUC 315: Learning Theories (3 credits)**

*Prerequisite: EDUC 110*

Cognitive development, learning facilitation, social perspectives and intelligence, works of Maslow, Pavlov, Skinner, Erikson, Piaget, Vygotsky, Bruner, Wiener, Gagne and Gardner.

**EDUC 320: Introduction to Research Methods in Education (3 credits)**

*Prerequisite: EDUC 110, STAT 100/101/102*

Concepts and methods in research as applied to education, quantitative and qualitative research, criteria and procedures for selecting a problem, research methodologies with application for real life.

**EDUC 330: Educational Measurement and Evaluation (3 credits)**

*Prerequisite: EDUC 110, STAT 100/101/102*

Concepts of measurement as they apply to testing and to the construction and evaluation of testing instruments, an understanding of how to participate competently in educational decisions related to measurement and testing.

**EDUC 340: Early Childhood Education (3 credits)**

*Prerequisite: EDUC 110, EDUC 315*

Areas of early childhood development including theories of development, discipline and guidance, instructional methodologies for pre-school children.

**EDUC 350: Classroom Management (3 credits)**

Understanding of the dual roles of the teacher as an instructor and manager, strategies from various approaches in order to provide a rich repertoire of management choices, proactive, responsive and supportive classroom management strategies.

**EDUC 360: Teaching Science at the Elementary Level (3 credits)**

*Prerequisite: EDUC 110, four credit hours of laboratory based science courses*

Curriculum concepts, methods and materials for teaching science, the discovery or constructivist approach of teaching science.

**EDUC 365: Teaching Science at the Secondary Level (3 credits)**

*Prerequisite: EDUC 110, four credit hours of laboratory based science courses*

Methods and techniques specific to teaching Biology, Chemistry and Physics to the secondary grades, a hands-on approach.

**EDUC 370: Teaching Language Arts at the Elementary Level (3 credits)**

*Prerequisite: EDUC 110*

Development of skills in reading, writing, speaking and listening from Class 1 through Class 8, standards for each area in each year, planning classroom management and methods for incorporating language arts across the curriculum and the use of workshops for teaching language arts.

**EDUC 373: Teaching Reading (3 credits)**

*Prerequisite: EDUC 110*

Methods of teaching reading, classroom management for teaching individuals and small groups, methods of assessment for determining reading levels and progress of students, flexible grouping and scheduling for a variety of school situations and age groups.

**EDUC 375: Teaching, Writing and Listening (3 credits)**

*Prerequisite: EDUC 110*

Methods and techniques with an integrated approach to reading, writing, listening and speaking.

**EDUC 380: Teaching of Mathematics at the Elementary Level (3 credits)**

*Prerequisite: EDUC 110, three credit hours of Mathematics courses*

Preparation in the teaching of Mathematics and components of Mathematics at the elementary level, organizing content, methodology and preparation of support materials.

**EDUC 385: Teaching Mathematics at the Secondary Level (3 credits)**

*Prerequisite: EDUC 110, three credit hours of Mathematics courses*

Teaching Algebra, Geometry and Trigonometry, useful training in the subject content, instructional methodology and preparation of support materials.

**EDUC 390: Teaching Social Studies at the Elementary Level (3 credits)**

*Prerequisite: EDUC 110, PKST 101*

Conceptual frameworks and insights into the effective teaching of History and Geography at elementary level.

**EDUC 395: Teaching Social Studies at the Secondary Level (3 credits)**

*Prerequisite: EDUC 110, PKST 101*

Conceptual frameworks and insights into the effective teaching of History and Geography at secondary level.

**EDUC X95: Themes in Education (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

The course explores themes in education keeping the current trends and practices in mind. It is more of exploratory and experiential learning than simply listening to the instructor. Field visits and surveys will be conducted.

**EDUC 496: Senior Seminar in Education (3 credits)**

*Prerequisite: EDUC 110, EDUC 120, EDUC 240, EDUC 300, EDUC 350*

Discussion-based course for education majors who are completing their student-teaching experience. Discussion to be based on current trends in education and questions arising from their teaching experience. Current trends in education and questions and concerns arising from student-teaching experiences.

**EDUC 498: Student Teaching Experience (12 credits)**

*Prerequisite: For MAJORS: EDUC 110, EDUC 120, EDUC 240, EDUC 300, and EDUC 350*

*Prerequisite: For MINORS: EDUC 110 or EDUC 120, and EDUC 240, EDUC 300, and EDUC 350*

An extended field-based course with real-life experience in the classroom. All aspects of the teaching-learning process will be looked at from a practical perspective.

**EDUC 499: Senior Research Project (3 credits)**

*Prerequisite: EDUC 110, EDUC 320*

Students will select a problem from the field of education and go through the process of educational research under the guidance of a mentor. Research findings will be applied to actual scenarios.



# DEPARTMENT OF ENGLISH



The Department of English was established in 1901. Renowned scholars like Prof Rev HD Griswold, his son, Dr Griswold, Dr FM Velte, Dr EJ Sinclair, Dr SL Sheets, Prof Eric Cyprian, Prof Z Bede, Prof Talat Mehmood and Prof Gillani Kamran have been associated with this Department. The graduates of the English Department have distinguished themselves in the public life of the Indo-Pak subcontinent as civil servants, judges, lawyers, diplomats, writers, poets, politicians and entrepreneurs.

The Department offers a BA (Hons) degree in English and is part of the Faculty of Humanities.

## BA (Hons) English

The Baccalaureate (Hons) program trains the students for lifelong effective communication in English. It teaches them to connect literature with history, theology, culture, and civilization and interpret them in the perspective of liberal education. The main objectives are to broaden the vision of students, to enlighten their minds, and to give them deep insight into literature. This program opens various options for English majors and prepares them for pursuing postgraduate research in language and literature within and outside Pakistan. They also have the option of joining various careers such as, news-casting, teaching, civil services, law, journalism, editing, creative writing and publishing.

### Learning Objectives

- Reading: students as active readers will express their appreciation for ambiguity and interpret multiple perspectives
- Writing skills and process: students will write for a variety of professional and social settings. They will revise for content and edit for grammatical and stylistic clarity
- Culture and history: students will appraise the diversity of literary and social voices within – and sometimes marginalized by – major traditions of literature
- Critical approaches: students will read works of literary, rhetorical, and cultural criticism, and apply ideas from these texts in their own reading and writing
- Research skills: students will identify topics, formulate questions for productive inquiry, use

appropriate methods and sources for research, evaluate critically the sources they find, and employ their chosen sources effectively in their own writing

- Values: students will demonstrate integrity by writing plagiarism-free academic papers, and will also abide by the FCCU core values
- Oral communication skills: students will design, organize, and deliver an engaging oral presentation

### Requirements for Major

A total of 36 credit hours

Major Core Courses	ENGL 201	ENGL 217	ENGL 301	ENGL 307	ENGL 315	ENGL 403
	ENGL 499					

The remaining courses will be chosen depending on personal interests and career goals.

### Requirements for Minor in English Literature

A minor in English is open to students from all disciplines that have a minimum CGPA of 2.50.

Minor Core Courses	ENGL 201	ENGL 301	ENGL 307	ENGL 315
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### Requirements for Minor in Linguistics

A Minor in Linguistics is open to students majoring in English or any other subject.

A student takes 6 of the following courses:

ENGL 150	ENGL 170	ENGL 205	ENGL 217	ENGL 290	ENGL 293
ENGL 294	ENGL 303	ENGL 309	ENGL 312	ENGL 313	

## Course Descriptions

#### ENGL 101: Basic Writing Skills (3 credits)

This course focuses on teaching of English language through integrated skills (reading, writing, listening, speaking); training students to write coherent paragraphs by practicing short narrative, descriptive, expository and argumentative essay writing.

**Note:** Only students who have A, B or C grade in A Level English are exempted from ENGL 101.

#### ENGL 103: Advanced Writing Skills (3 credits)

*Prerequisite:* ENGL 101

The main focus of this course is to achieve proficiency in academic writing through research; development of a well-argued and well-documented academic paper with clear thesis statement, critical thinking, argumentation and synthesis of information; using citations and bibliography.

#### ENGL 110: Contemporary Short Story (3 credits)

*Prerequisites:* ENGL 101, ENGL 103

This course is an introduction to major short story writers in English and American literature; emphasis on familiarity with composition, technique, style and thought process; understanding the elements of a short story that make it different from other forms of prose fiction.

#### ENGL 150: Structure of the English Language (3 credits)

*Prerequisites:* ENGL 101, ENGL 103

The emphasis of this course is to familiarize students with the concepts of language universals in understanding grammatical structure of languages focusing on the structure of the English language in particular. It focuses on the inflectional forms of words, types of phrases, types of clauses and principles of sentence construction; construction of tree diagrams at the phrase and simple sentence level; developing more sound concepts of grammar for further study in the field of Linguistics.

### **ENGL 170: History of English Language (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

Built around the notion of “all languages change over time”, this course surveys the development of English language from its Germanic origins in the Anglo-Saxon period till today; emphasis on tracking some of the linguistic changes English has undergone from its origin, including changes in words, spellings, sentence structure, meaning, and sound system; major periods in the history of English language from old English to Middle English and Early Modern English to Modern Standard English; keeping to the central notion of language variation and change, the present English accents and dialects, “World Englishes”, will also be briefly considered and their implications discussed for Future English.

### **ENGL 175: Critical Thinking and Reading (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

This foundational course serves as an introduction to a wide range of methods for literary, critical and textual reading. This course aims to provide the students with a set of interpretive tools which they can use to analyze and critique texts in English classes and beyond. This course has a special emphasis on developing close reading and critical analysis of the text through close reading. Emphasis will be on speed reading, previewing, skimming, scanning, brainstorming and developing extensive reading habits in the students.

### **ENGL 201: Introduction to English Literature (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

This course revolves around the basic questions on the nature and function of literature, interpretation, discussion and evaluation of literary texts through a diverse and rich variety of selections from English and American literature.

**Note:** This course is a prerequisite for all 200-300 level literature courses.

### **ENGL 204: English Prose (3 credits)**

*Prerequisites: ENGL 201*

This course will give an overview of English non-fiction prose. It is a selective survey of representative works of (non-fiction) prose in order to create a critical understanding of what distinguishes one form of writing from another; the impact of the times and movements that bring about change in a writer's form, thought, and style. In fact students will be exploring the development of philosophical and critical thoughts of the English nation in this course.

### **ENGL 205: Phonetics and Phonology (3 credits)**

*Prerequisites: ENGL 101, ENGL 103, ENGL 217*

The main aim of this course is to provide awareness of the sound system in English in order to acquire mastery of spoken English; speech-sounds and how they differ; pattern-formation, changes in sounds according to context, stress and intonation affecting meaning; introduction to the system of phonetic transcription.

### **ENGL 207/MCOM 207\*: Media and Literature (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

This course centers around the role of media as a means of understanding literature; importance of language and literature with reference to specific social and cultural issues.

### **ENGL 214: 18th Century Novel (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

This course provides an overview of prominent English novelists; literary criticism; appreciation of the themes of different English novels both in their historic milieu and from the perspective of current language philosophies.

### **ENGL 217: Introduction to Linguistics (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

This course will help and guide students to understand the theoretical concepts and empirical findings of modern linguistics on a non-technical level. It also highlights the connection between linguistics and other disciplines.

### **ENGL 220: Partition Fiction (3 credits)**

*Prerequisites: ENGL 201*

This course aims to introduce students specifically to short stories and novella about Partition. These fictional works record the trauma of this historic moment witnessing the mass migrations, brutality and psychological trauma of the division. The authors studied during this phase will include Manto, Khushwant Singh, Bapsi Sidhwa, Joginder Paul, Jahanara Shah Nawaz. This will include stories written in English and translated into English from other languages.

### **ENGL 250: Creative Writing (3 credits)**

*Prerequisites: ENGL 101, ENGL 103. In addition, students will have to present their writing portfolios to the instructor before they are allowed to register for this course*

This course is taught in a workshop format. Students will bring original works of poetry and fiction to be critiqued by the workshop facilitator and fellow peers. The works will be produced and revised based on the critical analysis of relevant poetry and fiction texts, discussions, and lecture by guest speakers on literary craft. As part of the course requirements, the students will attend a certain number of literary events and activities. They will be assessed for attendance and participation in these events.

### **ENGL 290: Language and Gender (3 credits)**

*Prerequisites: ENGL 217*

This course explores the relationship between language and society, with particular reference to the differences in linguistic behavior between women and men, from a cross-cultural perspective. Topics include a historical overview of linguistic stereotyping and discrimination, a sociolinguistic analysis of sex differentiation and conventions of politeness. Sex differences reflected in discourse and their social consequences are also examined. In addition, the course will consider issues concerning language structure and ideology, including sexism in English and the relative success of gender-based language reform efforts.

### **ENGL 293: Discourse Analysis (3 credits)**

*Prerequisites: ENGL 217*

This course provides an introduction to discourse analysis and the different approaches used in the analysis of discourse. Discourse here is defined as the study of the organization of language above the sentence level, but also as any manifestation of language in context. The course will offer a general overview of the phenomena included in the study of discourse, and the approaches of a variety of schools to analyze discourse through the theoretical assumptions, using different methodological tools. Discourses from written texts, recorded conversations, a movie transcript, a blog, twitter posts, lyrics of songs or any other linguistic material will be studied.

### **ENGL 294: Translation Studies (3 credits)**

*Prerequisites: ENGL 217*

The course introduces some of the major concepts in translation theory and focuses on their application to translation practice. It deals with the issues of equivalence, formal properties of texts as objects for analysis at linguistic, semantic, discourse, and pragmatic levels, and emphasizes the importance of adopting a functional approach to translation practice, and a descriptive and sociological approach to translation research. Students will be provided with a comprehensive overview of the discipline of translation studies, making them aware of both the diversity of possible approaches to translation and the relationships between these approaches.

### **ENGL 301: The 19th Century English Novel (3 credits)**

*Prerequisites: ENGL 201*

This course introduces and explores the characteristics of Victorian culture, literature and history; exploring ambition, enlightenment, social, moral and economic issues of 19th century.

### **ENGL 303: Language Acquisition (3 credits)**

*Prerequisites: ENGL 217*

The course introduces students to the principal findings, concepts, and models in the field of first language acquisition. The pivotal question addressed is: how (healthy) children acquire the grammar (including structure of sounds, words, and sentences) of their native language in a relatively short period of time apparently without extensive external assistance? Emphasizing primarily on phonetics, phonology, morphology, and syntax, the course surveys and examines theories that have been proposed to explain the observed developmental phenomena in these domains. Issues related to second language acquisition, particularly the ways it differs from first language acquisition, shall also be briefly discussed.

### **ENGL 307: Classical Drama (3 credits)**

*Prerequisites: ENGL 201*

This course brings a critical awareness of Drama as a genre or a tradition with focus on its origin in Greece and onwards. The course aims to review and analyze the nature and function of ancient Greek and Roman drama in its theatrical, historical and social context. The texts will be selected from the major dramatists such as Aeschylus, Sophocles, Euripides, Aristophanes, Seneca and others from classical antiquity whose works are preserved. Through all of this, our goal will be to reconstruct as fully as possible the evolution of ancient play-making. The main objective will be to integrate, as broadly as possible, the picture we receive of classical drama into that of ancient history, society and thought.

### **ENGL 308: Elizabethan Drama (3 credits)**

*Prerequisites: ENGL 201*

This course explores English drama from the Elizabethan to Jacobean Age, with attention to such playwrights as Lyly, Kyd, Marlowe, Ben Jonson, and Shakespeare. Plays will be selected from these playwrights to create a critical awareness in the students regarding the questions of genre, tradition, innovation and elements of universality in these Elizabethan plays.

### **ENGL 309: Teaching English as a Second Language (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

This course focuses on teaching reading and writing to students using English as a second language; the course explores the language theories; makes connections to first language/literacy models, techniques, materials and tasks that facilitate the acquisition of second language literacy.

### **ENGL 310: British Romantic Poetry (3 credits)**

*Prerequisites: ENGL 201*

This course especially covers a critical survey of the Romantic Movement and prominent romantic poets. It will describe the distinctive position that the English Romantic poets celebrate in this movement. This course may include selected poems by the romantic poets such as William Blake, William Wordsworth, ST Coleridge, John Keats, PB Shelley and others.

### **ENGL 312: Language Culture and Identity (3 credits)**

*Prerequisites: ENGL 217*

The course aims at developing an understanding of what constitutes identity and how it is related to or shaped by language and culture. The course also seeks to conceptualize views of language, literacy and cultural practices in different contexts. Some topics that will be discussed include: types of identity (religious, ethnic, linguistic, cultural, and national), the issue of identity in multicultural societies, identity crisis, language attitudes, ethnic conflicts, linguistic conflicts, linguistic inequality, linguistic imposition, cross-cultural communication and culture shock.

**ENGL 313: Sociolinguistics (3 credits)**

*Prerequisites: ENGL 217*

Interdependence of language and culture in various sociological contexts; specific terminological and theoretical preliminaries necessary for the understanding of this subject; role of English and other languages in South Asian cultures.

**ENGL 315: Poetry I (3 credits)**

*Prerequisite: ENGL 201*

In this course, students will explore the history of English poetry, looking at its changing forms in the Elizabethan, Jacobean, Restoration, Neo-Classical, Reflective, Pre-Romantic, Romantic and Victorian ages.

**ENGL 322: American Prose and Fiction (3 credits)**

*Prerequisites: ENGL 201*

This course is designed to conduct an in-depth survey and exploration of leading developments in fiction and non-fiction prose in the United States in various ages.

**ENGL 323: American Poetry (3 credits)**

*Prerequisites: ENGL 201*

The course offers a general survey of American poetry representing various poets such as Whitman, Emily Dickenson, Robert Frost, Sylvia Plath, Adrienne Rich and others.

**ENGL 325: American Drama (3 credits)**

*Prerequisites: ENGL 201*

This course offers a selective study of the cross section of American playwrights. The idea is to develop a taste and understanding for the American Drama in particular. This course aims to include selected plays from the works of playwrights such as Arthur Miller, Tennessee Williams, Eugene O'Neill, Edward Albee, Sam Shepherd, August Wilson, Thornton Wilder and others.

**ENGL 331: Research Methods for English Literature and Language (3 credits)**

*Prerequisites: ENGL 201*

This course focuses on the techniques of writing professional abstracts or proposals; thesis statement and contention; finding appropriate topics for research papers; preparation and annotation of bibliographies; writing reviews from critical and analytical perspectives; using theoretical framework, getting into the process of writing the first or later drafts; editing research according to academic requirements. For those students who are interested in pursuing thesis, this course creates a foundation for them for preparing and submitting a proposal for a research paper, which is the final requirement for ENGL499: Thesis.

**ENGL 400: Re-Contextualizing Shakespearean Drama (3 credits)**

*Prerequisites: ENGL 201, ENGL 308*

This course offers our students to review and critically approach selected Shakespearean plays. The course focuses on understanding the socio-political context of the plays and their relevance to the local context and influences on local literature. The course will include selected well acknowledged Shakespearean plays (both, tragedy and comedy).

**ENGL 403: Contemporary Literary Criticism (3 credits)**

*Prerequisites: ENGL 201*

This course explores the latest trends in literary criticism and theory to trace influence and interaction of contemporary literary criticism within the diverse range of literary genres.

**ENGL 404: Poetry II – Contemporary Poetry in English (3 credits)**

*Prerequisites: ENGL 201*

In this course students will study Modern poetry, Post-Modern poetry, and Poetry written in the 21st century. The course will not confine only to English poetry written by American and British poets. It

will cover the poets of other English speaking countries like Canada, Australia, and New Zealand etc. It will also include the poetry in English by poets from non-English speaking nations and translated works in English.

### **ENGL 405: Modern and Post Modern Drama (3 credits)**

*Prerequisites: ENGL 201*

This course will be taught as a series of seminars exploring the shift from modernist to postmodernist theatre from the early 20th to the 21st century. It examines a number of plays that address important issues of modernity and postmodernity, both in their form and content. This course will explore the contribution and response of drama to social and cultural debates around the role of art, gender and sexuality, the family, the state and the nation. The students will study a different play each week, give a short presentation in one of the seminars and engage fully in the discussion of all the texts. The activities include study of plays by such dramatists as Beckett, Chekov, Ibsen, Bond, Miller, Williams, Pinter, Soyinka with background readings from other dramatic literatures.

### **ENGL 406: Literature, Gender, Sexuality (3 credits)**

*Prerequisites: ENGL 201*

"Literature, Gender, Sexuality" aims to practice reading of some renowned and popular literary works from gender diversity perspective (feminist, queer, trans, etc. studies). Following any acknowledged yet debatable definition/ description of gender (man-masculine, woman-feminine, transgender-androgynous, etc) and sexuality (hetero, homo, bi, trans, etc), the course highlights historical and socio-cultural constructs along with discursive [mis]conceptions that tend to multiply marginalization and increase psychological complexities. In a way, the course foregrounds literary representation of complex and at times tabooed gender identifications that are commonly blocked by dominant mindsets in a society. Introductory in spirit, critical readings selected for this course enhance debate around the fore mentioned controversy related to literary representation of gender and sexuality.

### **ENGL 407: Pakistani Literature: Contemporary Political Context (3 credits)**

*Prerequisites: ENGL 220*

This course will focus on the Pakistani Literature produced in the past three decades. The overlapping themes and concerns related to diaspora, hybridity culture, and gender will be discussed. Emerging political issues such as the Kashmir crises, post-9/11 responses from Pakistan, neo-colonialism within the independent states, and marginalization of minorities will be explored. Some of the authors discussed in this course will include, Basharat Peer, Wajahat Ali, Mohammad Hanif, Mohsin Hamid and Kamila Shamsie and others.

### **ENGL 430: Postcolonial Literature and Theories (3 credits)**

*Prerequisites: ENGL 201*

The main focus of this course is the analysis of literature produced in the former colonies of the European Empire including Africa, South Asia, Australia and Canada. The literature produced in these countries reflects on theorizing the issues related to power and domination, native/settler tussle, identity issues, conceptualizing diaspora, mimicry, ambivalence and hybridity. Literary analysis of fiction and poetry from postcolonial nations within the broader theoretical framework offered by postcolonial theorists.

### **ENGL 440/PHIL 440\*: Literature and Philosophy (3 credits)**

*Prerequisites: ENGL 201*

The main focus of this course is to trace the connections between two disciplines: Literature and Philosophy; students survey how writers make use of philosophical ideas, themes, vocabulary and language; study of how literary texts can focus on important philosophical issues; emphasis on both Philosophy in literature and Philosophy as literature.

### **ENGL 496: Research Seminar Series (3 credits)**

*Prerequisites: ENGL 201, ENGL 331*

The course intends to prepare students for conducting research independently and being able to

learn from and participating in academic discussions. Weekly seminars led by faculty, varying in topical content and scope according to faculty interest. A graduate student tutor will be assigned to each research seminar to assist in writing the weekly review, every phase of the research and writing process. The faculty member will also be responsible for preparing the students for writing one academic paper as a final assignment at the end of this course. The assessment of this course will be based on attending 90% of the seminars, preparing one page brief for each seminar (graded), preparing a set of questions and writing one term paper based on the experience of each seminar attended and presenting it in front of the entire group. The research seminar culminates in the writing of a major research paper by each student enrolled. The faculty instructor will grade students' research papers. The seminars organized each semester will revolve around a single theme related to the literary, socio-political and critical debates surrounding one topic.

### **ENGL 499: Thesis (3 credits)**

*Mandatory final Assessment for English Majors*

*Prerequisites: ENGL 331, ENGL 403*

The students majoring in Literature will presents a well-thought thesis, using primary and secondary sources to develop a critical, well thought and well-argued, theoretically apt 11,000-word research paper (following the latest MLA style bibliography) under the supervision of the assigned instructor. The assessment will also include viva assessed by external examiner. The department will conduct an Internal Examination/entry test to select the students who can opt for English as Major. This examination will be conducted once every semester. The students who fail this exam will have the option of doing English Minor or re-appearing in the departmental exam for achieving the required assessment standard of the department.

### **ENGL X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

\*Linguistics courses can also be taken by students majoring in English.

### **LING 207: History of English Language (3 credits)**

*Prerequisites: ENGL 103*

Built around the notion of 'all languages change over time', this course surveys the development of English language from its Germanic origins in the Anglo-Saxon period till today; emphasis is on tracking some of the linguistic changes English has undergone from its origin, including changes in words, spellings, sentence structure, meaning, and sound system; major periods in the history of English language from old English to Middle English and Early Modern English to Modern Standard English; keeping to the central notion of language variation and change, the present English accents and dialects, 'World Englishes', will also be briefly considered and their implications discussed for Future English.

### **LING 217: Introduction to Linguistics (3 credits)**

*Prerequisites: ENGL 103*

Theoretical concepts and empirical findings of modern linguistics on a non-technical level; highlights of the connection between linguistics and other disciplines; study of language, understanding of related disciplines.

### **LING 301: Phonetics and Phonology (3 credits)**

*Prerequisites: LING 217*

Awareness of the sound system of languages with particular emphasis on English; speech-sounds and how they differ; pattern-formation, changes in sounds according to context, stress and intonation affecting meaning; introduction to the system of phonetic transcription.



### **LING 302: Morphology and Syntax (3 credits)**

*Prerequisites: LING 217*

This course covers the basic concepts of morphology and syntax. Though an overview of other approaches is provided, this course takes a functional approach in the analysis of the structure of words, phrases, and sentences. Morpho-syntactic structures, such as affixation, cliticization, simple and complex constructions, and information structure, are examined from a wide variety of languages to provide students with the skills they will need for the linguistic description and analysis of any language.

### **LING 304: Semantics (3 credits)**

*Prerequisites: LING 217*

This course is a study of word meaning in human languages, especially English, and introduces students to the subtlety and richness of the cognitive capacities and explains how a cognitive system computes the meanings of complex linguistic expressions in an infinite variety of thoughts and experiences. Various theoretical approaches of meaning formation within semantics, including an analysis of the relation between words in a language system, words and concepts/objects, parts of words and sentences, approaches to context and inference, modality, componential analysis, reference, sense, mental images/representations, prototypes, dictionary definitions and lexical relations will be discussed in this course.

### **LING 308: Translation Studies (3 credits)**

*Prerequisites: LING 217*

The course introduces some of the major concepts in translation theory and focuses on their application to translation practice. It deals with the issues of equivalence, formal properties of texts as objects for analysis at linguistic, semantic, discourse, and pragmatic levels, and emphasizes the importance of adopting a functional approach to translation practice, and a descriptive and sociological approach to translation research. Students will be provided with a comprehensive overview of the discipline of translation studies, making them aware of both the diversity of possible approaches to translation and the relationships between these approaches.

### **LING 309: Teaching English as a Second Language (3 credits)**

*Prerequisites: LING 217*

Teaching reading and writing to second language students; research and theory; connections to first language/literacy models, techniques, materials and tasks that facilitate the acquisition of second language literacy.

### **LING 315: World Englishes (3 credits)**

*Prerequisites: LING 217*

This course provides in-depth analysis of various varieties of English. The similarities and differences of multiple linguistic elements such as phonetic, phonological, semantic, syntactic, pragmatic and social among various varieties of English besides unparalleled growth of English as a language form the crux of this course.

### **LING 319: Pragmatics (3 credits)**

*Prerequisites: LING 217*

Pragmatics helps us gain insight into inter and intra-cultural communication. This course studies conversations and different genres through the theories of pragmatics (strategies, routines, politeness, turn-taking patterns, speech acts and motivations). The intended meaning will be broken down into speaker meaning, contextual meaning, extra-linguistic communication and relative distance. This course also helps to individual cultural nuances, experiences, and worldviews.

### **LING 320: Historical Linguistics (3 credits)**

*Prerequisites: LING 217*

Historical Linguistics is a diachronic exploration of language change in terms of phonology,

morphology, syntax, semantics and discourse. This course will focus on the theoretical frameworks which address why and how languages change within themselves and cross-linguistically in the aforementioned areas of any language and the sociolinguistic influences which cause creole, convergence and language death.

### **LING 333: Bilingualism and Multilingualism (3 credits)**

*Prerequisites: LING 217*

Bilingualism or multilingualism is an undeniable socio-psychological phenomenon which is accepted in every society. This course aims at introducing the role of socio-psychological aspects in being a bilingual/multilingual and exploring theories, processes and issues involved in bilingualism and multilingualism. The concept of bilingualism and multilingualism will be viewed at three levels: individual, community and state. The students will learn about the process of code switching and mixing language in oral communication at individual level, the intervening factors which make a group give up its ancestral language and shift to a new one at community level and the language planning and policies at government level which support or hinder bi/multilingualism.

### **LING 340: Language and Gender (3 credits)**

*Prerequisites: LING 217*

This course explores the relationship between language and society, with particular reference to the differences in linguistic behavior between women and men, from a cross-cultural perspective. Topics include a historical overview of linguistic stereotyping and discrimination, a sociolinguistic analysis of sex differentiation and conventions of politeness. Sex differences reflected in discourse and their social consequences are also examined. In addition, the course will consider issues concerning language structure and ideology, including sexism in English and the relative success of gender-based language reform efforts.

### **LING 343: Language Variation and Change (3 credits)**

*Prerequisites: LING 217*

This course combines aspects of historical linguistics and sociolinguistics. The social factors driving language change as well as the typological constraints limiting language change are discussed and exemplified through real-world case studies. Other topics include dialects, pidgins and creoles, language maintenance, and quantitative analysis techniques.

### **LING 353: Second Language Acquisition (3 credits)**

*Prerequisites: LING 217*

The course introduces students to the principal findings, concepts, and models in the field of first and second language acquisition. The pivotal question addressed is: how (healthy) children acquire grammar (including structure of sounds, words, and sentences) of their native language in a relatively short period of time apparently without extensive external assistance; emphasizing primarily on phonetics, phonology, morphology, and syntax, the course surveys and examines theories that have been proposed to explain the observed developmental phenomena in these domains. Issues related to second language acquisition, particularly the ways it differs from first language acquisition, shall also be briefly discussed.

### **LING 370: Language, Culture and Identity (3 credits)**

*Prerequisites: LING 217*

The course aims at developing an understanding of what constitutes identity and how it is related to or shaped by language and culture. The course also seeks to conceptualize views of language, literacy and cultural practices in different contexts. Some topics that will be discussed include: types of identity (religious, ethnic, linguistic, cultural, and national), the issue of identity in multicultural societies, identity crisis, language attitudes, ethnic conflicts, linguistic conflicts, linguistic inequality, linguistic imposition, cross-cultural communication and culture shock.

### **LING 379: Language Planning and Policy (3 credits)**

*Prerequisites: LING 217*

This course explores the main theories and issues of language planning and policy, a field that continues to grow in importance due to migration, greater recognition of minorities, and technological advances. It examines the ideologies behind language planning and policy as well as their social, political, educational, and historical consequences. This course also delves into how the spread of English has affected the language policy of various countries around the world. In addition, students will receive insight into language maintenance and revitalization. While examples from around the world are discussed in this course, special focus is given to the policies and planning related to the languages of Pakistan.

### **LING 410: Critical Discourse Analysis (3 credits)**

*Prerequisites: LING 217*

This course aims to determine critical discourse analysis, its aims, special methods, and theoretical foundation. CDA mainly focuses on the study of power, dominance and social inequality using theoretical and empirical approaches in texts and non-verbal communications, while providing information as to how they are constructed through social relations, identity, knowledge and power in any written and spoken text in communities, cultures and literature. This makes it highly trans-disciplinary course which helps to critically analyze both talk and text.

### **LING 413: Sociolinguistics (3 credits)**

*Prerequisites: LING 217*

This course addresses the interdependence of language and culture in various sociological contexts and covers basic sociolinguistic theoretical models and methodologies including social network theory and ethnography. It also focuses on various aspects of human behavior and sociocultural interaction that affect language use, and explores diversity in language in relation to age, gender, region, social class, ethnicity and national origin. An exploration of attitudes and ideologies about the language varieties and choices with an emphasis on speech community, dialect and vernacular will be of particular importance to understanding this relationship in diverse cultures.

### **LING 414: Psycholinguistics (3 credits)**

*Prerequisites: LING 217*

This course focuses on the psychological components of English language. It covers areas such as lexical ambiguity, language comprehension, language production, language acquisition and methodology to understand and help change human behavioral patterns. Students will learn about the nature of language, how it is used, how it illuminates understanding of the properties of the mind and brain and has an influence on human language.

### **LING 415: Forensic Linguistics (3 credits)**

*Prerequisites: LING 217*

This course prepares students to examine the complex relationship between language and law through a multidisciplinary investigation of spoken and written texts, linguistic behavior, forensic phonetics and legal issues/scenarios as they relate to detective investigations, criminal or civil disputes. The course content will be composed of theories, techniques and observations which are necessary to analyze linguistic evidence and understand characteristics of legal language based on a range of topically relevant areas, including dispute of meaning and utterance, speaker/author profiling, authorship analysis and attribution, voice/text comparison, plagiarism detection, forgery, language/behavioral crimes, and courtroom discourse analysis.

### **LING 422: Corpus Linguistics (3 credits)**

*Prerequisites: LING 217*

This course aims to provide a general introduction to corpus based language study by analyzing large digital collections of text (corpora). Students will explore the use and manipulation of language in society by analyzing and transcribing electronic texts used in conjunction with computer tools to

uncover, quantify and exploit the patterns of linguistic variation by mainly looking at concordances, collocations and frequency lists within various genres.

### **LING 429: Assessment in Second Language Acquisition (3 credits)**

*Prerequisites: LING 217*

This course explores the theories and practices of language assessment and testing. Students will examine, present and evaluate classroom activities and create various assessment tools in different contexts to understand the theoretical and practical implications of the construction, interpretation and utilization of tests of second/foreign languages.

### **LING 441: Language Documentation (3 credits)**

*Prerequisites: LING 217*

This course covers the basic principles of language and culture documentation, including issues such as how to collect data, choose proper equipment and use linguistic software. In this course, students learn how to properly plan, archive, and manage language data. This course also explores the different ethical and ideological issues related to documentation of endangered languages.

### **LING 442: Statistics for Linguistics (3 credits)**

*Prerequisites: LING 217*

As usage-based approaches to linguistic analysis spread, it is increasingly important for linguists to be aware of the principles of statistics and be able to statistically model language data. This course provides students with the basic principles of descriptive and inferential statistics and focuses on the methods necessary for quantitative linguistic analysis, such as ANOVA, correlation analysis, linear and logistic regression, conditional inference trees, and principal components analysis. These methods are demonstrated with real linguistic data and the programming language R.

### **LING 450: Stylistics (3 credits)**

*Prerequisites: LING 217*

This course helps in equipping students critically appreciate literary and non-literary texts using literary stylistics. By studying the language of the text, the course helps students to determine the communicative strategies, linguistic style and the purpose of the writer. The course will inform how the language used in texts differs from everyday language in purpose and function by studying the patterns of lexis, phonetic and metrical organization.

### **LING 494: Research Methods in Linguistics (3 credits)**

*Prerequisites: LING 217*

This course prepares students for their final thesis. It covers methods of linguistic analysis, appropriate research questions in linguistics, as well as data-collection techniques. In addition, students learn how to create literature reviews, how to use a linguistic theoretical framework in their data description, and how to organize and draft a linguistic research paper. This course also addresses ethical concerns in linguistic research as well as IRB processes.

### **LING 499: Thesis (6 credits)**

*Prerequisites: LING 217, LING 494*

Presenting a well-thought-out thesis, using primary and secondary sources, synthesizing and analyzing these sources to develop a critical, well-thought-out, well-argued and theoretically apt 8,000-10,000 word research paper (following the latest APA style of referencing and bibliography) under the supervision of the instructor.



## DEPARTMENT OF ENVIRONMENTAL SCIENCES

Environmental Science is an interdisciplinary subject that draws upon knowledge from the Biological, Physical, Earth and Social Sciences. Study of the subject gives students the opportunity to find out how we, as people, through our use of water, land and energy resources, are affecting our surroundings and the globe at large. Information is also gained about the actions that could be taken to reduce, control and, in some case, reverse the damage caused by us to the environment. A degree in Environmental Sciences from FCCU will not only make the graduate a very well-informed person about some of the greatest challenges faced by humanity today, but also point to a number of avenues for higher studies or gainful employment, both locally and overseas, as worldwide demand for such professionals is growing, at an ever increasing rate. Department of Environmental Sciences is part of Faculty of Natural Sciences.

### **BS (Hons) Environmental Sciences**

BS (Hons) in Environmental Sciences at FCCU is focused around Core Courses that strengthen the student's understanding about the subject. Students can then broaden their conceptual knowledge by selecting a few optional courses from an exhaustive list of Elective Courses. At the end of six semesters, students meeting the minimum requirements can either opt for an Internship or a Research Project while others have to take two additional courses from the electives.

The Core Courses, offered within the department and as cross-listed courses from other departments at FCCU, begin with an introduction to the subject and the Sources of Energy, after which the student is exposed to the Earth's Physical Realism and the Statistical Techniques used for data collection and analysis. The remainder of the courses focus on Environmental Analysis, Ecology and Evolution, and Environmental Impact Assessment. The final group of courses covers the issues of Environmental Chemistry, Microbiology, and Toxicology. The Elective Courses are similarly available in the Departments of Chemistry, Economics, Environmental Sciences, Geography, and Physics.

The Department of Environmental Sciences has a well-qualified and highly experienced, local and

foreign faculty to support students academically and more specifically, with their research projects.

## Program Objectives

A graduate of this program will:

- Develop an understanding of environmental (air, water, soil), chemical, waste management, energy resource, ecological and sustainability concepts
- Develop an understanding of land-based renewable resources including forests, rangeland, agriculture, outdoor recreation, and wildlife
- Develop an understanding of the institutional framework regarding the formulation and implementation of environmental laws and regulations
- Develop an understanding of the tools used for environmental risk assessment and evaluation of the environmental impacts
- Be able to evaluate the impact of the removal of mineral and energy resources
- Be able to gain entry into renowned national and international postgraduate (MS or PhD) degree programs in Environmental Sciences

## Learning Outcomes

After going through the Environmental Sciences courses, students should be able to:

- Understand the natural environment and its relationships with human activities
- Characterize and analyze human impacts on the environment
- Apply the interdisciplinary knowledge to addressing environmental problems
- Understand the methodologies involved in collection, management, evaluation, and interpretation of environmental data
- Design and evaluate strategies, and identify the methods and technologies, for sustainable management of environmental systems and for the remediation or restoration of degraded environments

## Requirements for Major

Students wishing to major in Environmental Sciences should take Core Courses as given below and must, in addition to ENVR 498 or ENVR 499 (for students attaining a CGPA of 2.75 or more), take a sufficient number of courses from the Elective Courses to meet the degree requirements of the University. Students with CGPA of less than 2.75 should take two more 300 or 400 level courses from the Electives.

### Core Courses (Major)

ENVR 151/ PHYS 151*	ENVR 201	ENVR 210/ GEOG 210*	ENVR 212/ BIOL 212*	ENVR 303
ENVR 323/ BIOL 323*	ENVR 345 GEOG 345*	ENVR 411	ENVR 413	ENVR 340/ CHEM 340*

### Elective Courses (Major)

ENVR 160/ CHEM 160*	ENVR 221/ PHYS 221*	ENVR 240/ GEOG 240*	ENVR 252	ENVR 255/ PHYS 255*
ENVR 304	ENVR 305	ENVR 306/ ECON 303*	ENVR 308	ENVR 309
ENVR 311/ CHEM 311*	ENVR 314/ GEOG 314*	ENVR 320/ CHEM 320*	ENVR 330/ CHEM 330*	ENVR 351/ PHYS 351*
ENVR 402	ENVR 403	ENVR 405	ENVR 406	ENVR 414
ENVR 415	ENVR 416	ENVR 417/ GEOG 416*	ENVR 442/ CHEM 442*	ENVR 451/ PHYS 451*

ENVR 452/ PHYS 452*	ENVR 474/ GEOG 474*	ENVR 498	ENVR 499	
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### Requirements for Minor

Students wishing to take Environmental Sciences as a Minor should take Core Courses as given below and, a minimum of three (3) Elective Courses of 300 or 400 level.

### Core Courses (Minor)

ENVR 201	ENVR 303	ENVR 323/ BIOL 323*	ENVR 411	ENVR 340/ CHEM 340*
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### Elective Courses (Minor)

ENVR 304	ENVR 305	ENVR 306/ ECON 303*	ENVR 308	ENVR 309
ENVR 311/ CHEM 311*	ENVR 314/ GEOG 314*	ENVR 320/ CHEM 320*	ENVR 330/ CHEM 330*	ENVR 351/ PHYS 351*
ENVR 415	ENVR 416	ENVR 417/ GEOG 416*	ENVR 442/ CHEM 442*	ENVR 451/ PHYS 451*
ENVR 452/ PHYS 452*	ENVR 474/ GEOG 474*	ENVR 498	ENVR 499	

### Theme Courses

#### ENVR X95: Themes (1-3 credits)

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

#### \* Cross-listed Courses:

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program to be counted towards the degree.

**Courses that are cross-listed with lab courses of BIOL, CHEM and PHYS will be counted towards the fulfillment of the General Education requirements.**

## Course Descriptions

### ENVR 151/PHYS 151\*: Introduction to Sources of Energy and Environment (3 credits)

*Not recommended for first semester Freshmen*

Conventional energy resources, fossil fuels including petroleum, natural gas, coal and tar sands, the promise and problems of nuclear energy, alternative energy sources, wind, solar, biogas, tidal etc., energy conservation, environmental pollution and its global effects.

### ENVR 160/CHEM 160\*: Introduction to Organic and Biochemistry (4 credits)

*Prerequisite: Intermediate or A Level Chemistry*

Bonding and structure of organic compounds, study of hydrocarbons including additions to multiple bonds and substitution reactions of benzene, petroleum products, chemistry of food and its components including carbohydrates, proteins, lipids, nutrition and caloric intake.

### ENVR 201: Introduction to Environmental Sciences (4 credits)

*Prerequisite: Instructor's approval required*

Biological and physical environmental problems focusing on geological hazards, water quality, water supply, solid waste, introduced and endangered species, preservation of wetland ecosystem, social and political approaches to environmental management.

**ENVR 210/GEOG 210\*: Earth's Physical Realms (3 credits)**

Spatial and functional dynamics of major physical phenomena relating to the planet Earth – its evolution, interior state, atmosphere, lithosphere, hydrosphere and ecosphere, physical phenomena and related cycles and man-environment interactions.

**ENVR 212/BIOL 212\*: Research Design and Biostatistics (3 credits)**

Introduction to statistics including mean, mode, median, standard error and standard deviation, probability and test of significance, correlation, analysis of variance, regression and experimental design.

**ENVR 221/PHYS 221\*: Electricity and Magnetism (4 credits)**

*Prerequisite: PHYS 103*

Electrostatics, magneto-statics, electric current, laws of magnetism, Maxwell's Equations, electromagnetic energy and electromagnetic wave equations, laboratory.

**ENVR 240/GEOG 240\*: Global Environmental Issues (3 credits)**

Earth's ecosystems, major issues relating to the human use and misuse of environmental resources and possible courses of action for their conservation.

**ENVR 252: Environmental Pollution (3 credits)**

This course deals with major problems related with pollution of air, soil and water resources. It covers processes responsible for the occurrence and release of pollutants in the environment, dispersion mechanisms, the hazards associated with different types of pollutants, problems of accumulation of toxic substances, and procedures for the reduction of emissions and remediation of contaminated environments.

**ENVR 255/PHYS 255\*: Introduction to Meteorology (3 credits)**

*Prerequisite: PHYS 100 or PHYS 102*

Study of the physical processes of condensation, precipitation, radiation and radiative transfer, solar radiation, atmospheric motion measuring properties of the atmosphere, ionosphere and magnetosphere, Earth's magnetic field and charge density movement in the atmosphere.

**ENVR 303: Environmental Analytical Techniques (3 credits)**

Instrumental methods of chemical analysis in an overall context of sampling and evaluating sources of pollution. Sample collection, preparation and storage; analysis of contaminants in air, water, soil or plant materials. Data interpretation and reporting. Instrumentation: EC meter, Potentiometry, Spectrophotometry, Emission spectroscopy, Absorption spectroscopy; Introduction to chromatography.

**ENVR 304: Environment and Biodiversity of Pakistan (3 credits)**

This course provides the students with comprehensive knowledge about the environmental resource base of Pakistan including geography, demography, economy and agriculture in order to learn its efficient utilization for sustainable development. Major ecological zones, ecosystems and wetlands, biomes, biodiversity, water resources, urbanization and concept of pollution with special reference to Pakistan.

**ENVR 305: Population Dynamics and Urbanization (4 credits)**

Relationship of population, resources and sustainability, factors affecting human population size, population age structure, consequences of increase or decrease in population, population projections, population growth models and methods of controlling population, population growth in relation to resource utilization and sustainability, history and future trends of population in Pakistan integrated with the economic realities.



### **ENVR 306/ECON 303\*: Environmental Economics (3 credits)**

*Prerequisite: ECON 101*

Introduction to the economic and ecological principles essential for a clear understanding of contemporary environmental and natural resource management issues, integrated understanding of the field combining economic, legal and ecological perspectives to better understand the causes and solutions to market failure and environmental degradation, economic efficiency and market failure, property rights, externality, measuring social welfare and welfare improvements, demand for environmental goods, environmental valuation methodologies, environmental benefit-cost analysis and other making criteria, environmental policy and environmental regulations, common pool resource management, depletable resource management.

### **ENVR 308: Environmental Laws and Policies (3 credits)**

This course covers federal laws and acts concerning environmental quality standards and the use of resources, legal procedures for enforcing laws, and problems concerning enforcement. This course offers a review of the National Conservation Strategy, Agenda 21, and the Pakistan Environmental Protection Act 1997.

### **ENVR 309: Introduction to Environmental Modeling (3 credits)**

Models and computer simulations are increasingly important in understanding environmental science, in designing solutions to problems in natural resource management and environmental monitoring, and in predicting future environments under changing climates. The emphasis of this course will be on the application and development of models in the context of terrestrial ecosystems.

### **ENVR 311/CHEM 311\*: Fundamental Analytical Chemistry (4 credits)**

*Open to Juniors and Seniors*

Gravimetric and volumetric methods of analysis including buffers, complexometric titrations, redox titrations, non-aqueous titrations, Karl-Fischer titrations, UV/VIS spectroscopic analysis, IR Spectroscopy, treatment of measurement errors; usage and handling of standards, sampling, precision, accuracy, signal-to-noise ratio, limits of detection and quantitation, statistical evaluation of data; quality control and quality assurance.

### **ENVR 314/GEOG 314\*: Hydrosphere Resources (4 credits)**

*Prerequisite: GEOG 101 or GEOG 210*

Origin, structure and shape of the ocean basins, composition, thermodynamics, circulation and oscillations of marine water, maritime resources and their use by humans, water resources on land, their origin, distribution, availability and quality, use and conservation as a resource for mankind.

### **ENVR 320/CHEM 320\*: Industrial Chemistry (4 credits)**

*Open to Juniors and Seniors*

Efficiency and yield, common chemical industries with special reference to Pakistan including cement, surfactants, paper and pulp, glass and ceramics, leather, metallurgies of important metals, liquid crystals and inorganic polymers. Environmental industrial impacts and industrial environmental management.

### **ENVR 323/BIOL 323\*: Ecology and Evolution (4 credits)**

Basic principles of Ecology such as interaction of organisms with their environment, species and population dynamics, principles of evolution, community structure and human interactions with natural populations and ecosystems. Application of ecological knowledge in solving environmental issues; Sustainable agricultural practices, pollution control through Ecology: Phyto-remediation and bio-remediation; Conservation and management of forests and rangelands in Pakistan; Ecological restoration.

### **ENVR 330/CHEM 330\*: Biochemistry (4 credits)**

*Prerequisite: CHEM 160 or equivalent*

Detailed structure and physiological function of primary metabolites including carbohydrates,

proteins, lipids and nucleic acids, nature and role of enzymes and coenzymes, metallo-proteins and enzymes, mechanism of enzyme action, kinetics and regulation of enzymes and their industrial applications.

### **ENVR 340/CHEM 340\*: Environmental Chemistry Fundamentals (3 credits)**

*Prerequisite: CHEM 100 or Chemistry at Intermediate/A Level*

Viewing the earth as five integrating systems i.e. the hydrosphere, the atmosphere, the geosphere, the astrosphere and the biosphere, the course deals with the chemical phenomenon involved in these systems and how the human activities are affecting these. With a strong emphasis on the chemical aspects of Environmental Science, the course covers such topics as Water Chemistry; Oxidation/Reduction; Phase Interaction; Chemicals Pollutants: Origin, Fate and Hazards; Atmospheric Chemistry; Chemicals and other Air Pollutants; Photochemical Smog; and Hazardous Waste Chemistry.

### **ENVR 345/GEOG 345\*: Environment Impact Assessment (3 credits)**

The aim of this course is to ensure that environmental factors are considered in the decision-making process of a development project, possible adverse environmental impacts are identified and avoided or minimized, and the public is informed about the project proposal.

### **ENVR 351/PHYS 351\*: Environmental Physics (3 credits)**

*Prerequisite: PHYS 221*

Introduction to environmental physics, radiation, radiation balance, heat and mass transfer, micrometeorology of crops.

### **ENVR 402: Solid Waste Management (3 credits)**

Sources, classification, generations, onsite handling and storage, collection, transfer recycling and disposal techniques of municipal solid waste (MSW), land filling, thermal conservation, composting, concept of integrated solid waste management, existing practices and their hazards, economic evaluation of the systems, hospital waste management.

### **ENVR 403: Occupational Health and Safety (3 credits)**

Principles of occupational health at work, values system for industrial workers, OHS systems in different industrial sectors, components of OHS plan related to different activities such as industry, municipality etc., industrial hygiene and safety, accident prevention and elimination, safety equipment, pollution due to petroleum industry.

### **ENVR 405/BIOL 404\*: Conservation Biology (4 credits)**

The objective of this course is to familiarize the students with different forms of biodiversity, threats to biodiversity and an overview of different strategies for its conservation.

### **ENVR 406: Climate, Past, Present and Future (3 credits)**

Climate-definition, early climates, factors controlling the climates, major climatic turnovers during Paleozoic, Mesozoic and Cenozoic eras, Pleistocene ice age, sub recent and recent climate, tropical, temperate and arctic climates, Palaeomagnetic calendar, role of climatic factors in shaping, generating and controlling evolutionary forces, major climatic upheavals in the subcontinent and their signatures in the out crops, future climatic trends.

### **ENVR 411/BIOL 411\*: Environmental Microbiology (3 credits)**

*Open to all programs under Biological Sciences*

This course will provide an awareness and understanding to the students about the role of microorganisms in the environment. After completing this course, students will be able to understand the significance, role and application of microorganisms in the environment.

### **ENVR 413: Environmental Toxicology (3 credits)**

The course will introduce the concepts of adverse effects of environmental chemicals, from natural and anthropogenic sources, on human and other living organisms. It is focused on providing

knowledge related to dose response relationship, acute and chronic effects on organ system, their containment and control strategies; Toxicokinetics; Immunological considerations in toxicology; Toxicant testing techniques: In vitro and in vivo; Risk assessment and management.

#### **ENVR 414: Sustainable Development (3 credits)**

This course includes the ideological and political underpinnings of development and environment that are prevalent and practiced in the modern world. It will further investigate the patterns and impacts of geographically uneven development and the role factors that have shaped the present sustainability concerns. The concept of Green Economy to inculcate understanding and its linkages with the sustainable practices.

#### **ENVR 415: Environmental Management Systems (3 credits)**

This course will deliver understanding about the Environmental Management Systems (EMS) and how EMS lead to environmental benefits to industries. Introduction of ISO 14000 series of standards and their role in environmental management; Certification of EMS; Principles of cleaner production, tools of sustainable consumption and production (eco label, eco-design, cleaner technologies, etc.), corporate social responsibility (CSR).

#### **ENVR 416: Wastewater Treatment (4 credits)**

*Prerequisites: CHEM 100 or CHEM 160*

This course is introduced as a new elective course and highlights different techniques for the treatment of waste water and effluents. The course will also enable the students to understand various types of methods and technologies employed in wastewater treatment. Students will learn about urban water services, focusing on basic drinking water and wastewater treatment technologies.

#### **ENVR 417/GEOG 416\*: Natural Hazards and Management Issues (3 credits)**

*Prerequisite: ENVR 240/GEOG 240*

The course analyses the natural phenomenon causing hazards, related issues and problems; means and techniques of ascertaining their distribution, impact on human life and possibilities of recurrences; options for disaster preparation and loss mitigation.

#### **ENVR 442/CHEM 442\*: Green Chemistry (4 credits)**

*Open to Juniors and Seniors*

Green chemistry, principles, evaluating materials, feed stocks and starting materials, types of reactions in chemical transformation, evaluation of methods to design safer chemicals, green chemistry and future trends.

#### **ENVR 451/PHYS 451\*: Sources of Energy (3 credits)**

*Prerequisite: PHYS 222*

Study of the different sources of energy, including thermal, hydroelectric, solar, nuclear and thermo-nuclear.

#### **ENVR 452/PHYS 452\*: Atmospheric Physics (3 credits)**

*Prerequisite: PHYS 322*

General description of the atmosphere, atmospheric thermodynamics, solar and terrestrial radiation, atmospheric aerosol and cloud microphysical processes, atmospheric electricity and dynamics.

#### **ENVR 474/GEOG 474\*: Geographical Information Science (4 credits)**

*Prerequisite: GEOG 371 or GEOG 374*

Principles of geographical information science, functions of geographic information systems, relationship between GIS and remote sensing.

#### **ENVR 498: Internship (6 credits)**

*Students with CGPA 2.75 or above will be eligible for Internship*

The duration of the Internship, in a reputed industry or environment related organization, is 6 to 8

weeks and is usually offered to Juniors in Summer.

**ENVR 499: Project/Research (6 credits)**

Students with a CGPA 2.75 or above will be eligible for this research project. Students with CGPA less than 2.75 will have to take two additional courses from electives of their concentration.

# FORMAN LANGUAGE CENTER



Based on the awareness of the necessity of a foreign language program, FCCU initiated language courses in Fall 2017. This is truly a revival of FCCU's rich tradition and is a valuable asset to its status as a liberal arts University and to students who will benefit through language programs. The Forman Language Center at FCCU is unique and comprehensive and aims to meet standard benchmarks in the field. French and German courses have been offered already by the FLC. From Fall Semester 2018, the FLC will additionally offer Chinese and Korean courses to meet the rapidly rising need of those languages. The FLC will make an effort to offer exemplary language courses to FCCU's students who are aware of the importance of language acquisition for their future.

## Program Objectives

FCCU offers foreign language courses in French, German and Korean. In these courses, students will learn to understand and use familiar and everyday expressions and very simple sentences which relate to the satisfying concrete needs at the beginner's level. In the higher level course, they will learn to communicate in the languages. Communication skills will be taught through four competences of writing, reading, listening and speaking. The courses can be taken by students who are interested in different languages as they open the barriers of communication.

### **FREN 101: French I (3 credits)**

This basic level course will teach students about understanding and using familiar, everyday expressions and very simple sentences, which relate to the satisfying concrete needs such as information about yourself and your family or shopping and your immediate surroundings. This course is designed to present essential vocabulary and grammar, and to develop the pronunciation, listening, reading, and writing skills necessary for basic communication and comprehension. At the end of the course, students will be able to communicate about basic everyday tasks including asking questions, counting numbers, giving directions, expressing needs, and making requests in a simple manner.

### **FREN 102: French II (3 credits)**

*Prerequisite: FREN 101*

This course focuses on teaching how to communicate in a simple manner if the person they are speaking to speaks slowly and clearly and is willing to help. The communication skills will be taught through the four competences, i.e. writing, reading, listening and speaking. At the end of the course, students will be able to talk about their tastes and interests, express preferences and desires and justify their choices, accept and refuse invitations, use the near future tenses, talk about their past activities.

### **GRMN 101: German I (3 credits)**

This basic level course focuses on understanding and using familiar, everyday expressions and very simple sentences, which relate to the satisfying of concrete needs such as presenting information about yourself and your family or about shopping and your immediate surroundings. This course is designed to present essential vocabulary and grammar and to develop the pronunciation, listening, reading, and writing skills necessary for basic communication and comprehension. At the end of this course, students will be able to communicate about basic everyday tasks including asking questions, counting numbers, giving directions, expressing needs, and making requests in a simple manner.

### **GRMN 102: German II (3 credits)**

*Prerequisite: GRMN 101*

This course will teach students how to communicate in a simple manner if the person they are speaking to speaks slowly and clearly. The communication skills will be taught through the four competences, i.e. writing, reading, listening and speaking. At the end of the course, students will be able to introduce themselves and others as well as ask others about them and answer questions, for instance where they live, whom they know and what they own.

### **CHIN 101: Chinese I (3 credits)**

This basic level course will teach students about how to recognize the (Mandarin) Chinese language in Pinyin and also basic character set, and its pronunciation. The course will also introduce students to the Chinese culture to gain knowledge and understanding of the Chinese-speaking world. At the end of this course, students will be able to communicate about basic everyday tasks including self-introduction, asking questions, counting numbers, giving directions, expressing needs, and making requests in a simple manner

### **CHIN 102: Chinese II (3 credits)**

*Prerequisite: CHIN 101*

This course will teach students about communication in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. This course will enable students to describe in simple terms aspects of their background, immediate environment and matters in areas of immediate need (i.e. basic personal, family information, shopping etc). At the end of this course, students will be able to understand the main ideas and supporting ideas when people talk about familiar topics and will know how to carry on a conversation on a variety of topics that are familiar to them including understanding short, simple readings on familiar topics. They will also be able to write a series of simple sentences on topics of interest.

### **KORN 101: Korean I (3 credits)**

This basic level course will teach students how to read and write the Korean alphabet and its pronunciation. The course will also introduce the Korean culture to allow students to gain knowledge and understanding of Korea. At the end of this course, students will be able to communicate with Korean native speakers about basic everyday tasks such as introducing him/herself and express needs, asking questions and make requests in a simple manner, counting numbers and giving directions.

### **KORN 102: Korean II (3 credits)**

*Prerequisite: KORN 101*

This course will teach students how to communicate in simple and routine tasks requiring a simple

and direct exchange of information on familiar and routine matters. The course will also teach students how to describe, in simple terms, aspects of their background, immediate environment and matters in areas of immediate need and introduce the Korean culture to allow students to gain knowledge and understanding of Korea. At the end of this course, students will be able to understand the main and supporting ideas when people talk about familiar topics and will know how to carry on a conversation on a variety of topics that are familiar to them including understanding short, simple readings on familiar topics. They will also be able to write a series of simple sentences on topics of interest.

# DEPARTMENT OF GEOGRAPHY



The Department of Geography has the distinction of being a pioneer in the subject in this part of the subcontinent, with glorious traditions and over 90 years of distinctive history. Geography is a systematic discipline that studies the spatial and temporal interactions between people and their environment and explores the means to synthesize them for the benefit of the society.

## Learning Objectives

The Department's mission is to groom students as contributing persons for humanity and as inspiring leaders in the nation building process. The department also aims to focus on developing students' intellectual acumen and to equip them to take on the labyrinthine challenges of today and the future. Its vision is to earn acknowledgement as an innovative and versatile community that can be looked upon to foster scholastic partnerships in emerging horizons of knowledge. A graduate of this program will:

- Analyze and synthesize in-depth knowledge of different concepts and processes of physical, human and regional geography
- Demonstrate competency in the use of fundamental geographic tools/techniques for data collection, display and analysis
- Become productive individuals in the service of humanity and develop themselves into becoming inspiring leaders in the progress and uplift of the country
- Design an independent research project with competence to build a spatiotemporal profile of the phenomena under investigation that helps in reaching at recommendations for development
- Employ knowledge and skills that help in an advanced study in the discipline for job placement

Department of Geography is part of Faculty of Social Sciences.

## Courses Recommended for General Education Requirement

Students can take any open course in the lower or upper divisions. Options for other, upper division course(s) may be considered by the department's Chairperson on recommendation by the Instructor.



### Requirements for Major:

**BA (Hons) Major (Geography/GIS):** A minimum of **36 credits** are required to complete the degree. The coursework includes (core courses): GEOG 101, GEOG 201, GEOG 274, GEOG 301, GEOG 311, GEOG 313, GEOG 471 and a Senior Project (GEOG 499) for six credits; a minimum of three elective courses at the 300/400 level from Human Geography with at least one of them relating to GIS.

**BS (Hons) Major (Geography/GIS):** A minimum of **48 credits** are required to complete the degree. The coursework includes (core courses): GEOG 101, GEOG 201, GEOG 274, GEOG 301, GEOG 311, GEOG 313, GEOG 471 and a Senior Project (GEOG 499) for six (6) credits; a minimum of seven elective courses at the 300/400 level from Physical Geography with at least three of them relating to GIS.

### Requirements for Minor:

24 credits; courses including (core courses): GEOG 210, GEOG 220 and GEOG 270; a minimum of two electives in upper division courses.

**Free Electives:** Students can take any open in lower or upper division. Options for the upper division course(s) may be considered by the department's Chairperson on recommendation by the Instructor. Students are expected to maintain a cumulative GPA of 2.0 to earn a standing in Geography with at least 18 credit hours of upper division Geography courses from FCCU for BA (Hons) major. For BS (Hons) major, the requirement is a GPA of 2.0 and 24 credit hours in upper division Geography courses at FCCU. Mere pass/fail courses' grades shall not be counted.

For a Minor in Geography, a minimum of 2.0 cumulative GPA in the 18-24 credits must be earned.

Course Categories				
General	Physical Geography	Human Geography	Regional Geography	Geographical Techniques and Methods
101	210	220	133	201
301	240	221	232	202
495	311	222	233	203
	312	322		270
	313	323		274
	314	324		371
	396	325		372
	411	326		374
	416	421		471
		422		474
		426		498
				499

## Course Descriptions

### GEOG 101: Fundamentals of Geography (3 credits)

#### *General*

Builds perspective about geography as a discipline; familiarizes its thematic domains and fundamental concepts.

### **GEOG 133: Geographical Profile of Pakistan (3 credits)**

#### *Regional Geography*

It relates to major features of the physical environment, resources, culture, communications and trade of Pakistan. Analyses the major problems confronted by Pakistan relating to cross cultural relationships, socioeconomic viability, environmental conservation, resource sustainability and development.

### **GEOG 191: ArcGis I (2 credits)**

Familiarizes with the essential skills needed to navigate and operate ArcGIS at a basic level using hands-on practices; how to utilize GIS notions, approaches and procedures in conjunction with problem solving techniques to accomplish assigned real world examples.

### **GEOG 192: Remote Sensing Data Acquisition and Processing (2 credits)**

A set of comprehensive practical hands-on approaches to navigate, search, acquire, integrate and process remote sensing data including satellite imageries, Digital Elevation Models (DEMs) and environmental parameters datasets.

### **GEOG 201: Introduction to Geospatial Information Science and Technology (3 credits) (2+2)**

#### *Geographical Techniques and Methods*

The course brings the use of geo-technologies, such as Global Positioning System (GPS), Remote Sensing (RS), and Geographic Information Systems (GIS) to think about problems spatially without being encumbered by overlay complex software.

### **GEOG 202: Fundamentals of Remote Sensing (3 credits) (2+2)**

#### *Geographical Techniques and Methods*

The course describes basic concepts in Remote Sensing and discusses how Remote Sensing tools may be used to study the Earth's environments and solve real world problems.

### **GEOG 203: Spatial Databases (3 credits) (2+2)**

#### *Geographical Techniques and Methods*

Geospatial database design, implementation, management, and access course in organizing spatial and non-spatial data in geospatially enabled enterprise, Database Management Systems (DBMS). Student will gain practical database experience utilizing commercial database management system software and geographic information systems software to design and use spatial and non-spatial data.

### **GEOG 210: Earth's Physical Realms (3 credits)**

#### *Physical Geography*

This course teaches about the spatial and functional dynamics of major physical phenomena relating to the planet Earth - its evolution, interior state, atmosphere, lithosphere, hydrosphere and ecosphere. It further explores physical phenomena and related cycles, and man-environment interactions.

### **GEOG 220: Human Domains of Geography (3 credits)**

#### *Human Geography*

The course focuses on concepts relating to the spatial and systematic organization of economic, cultural, political, demographic and occupancy milieu, arising out of human use of the earth's environment. It also deals with the importance of human attitudes and values in resource use and shaping of the patterns.

### **GEOG 221: Geography of Tourism (3 credits)**

#### *Human Geography*

Focus is on physical and cultural factors affecting the location and relative importance of recreational areas and tourist attractions; spatial analysis of tourist flows, modes of transportation, effects on regional economies, and impacts on environments.

**GEOG 222: Globalization – An Introduction (3 credits)***Human Geography*

Focus is on evolution and the dynamics of globalization and its impact on spatiotemporal patterns of human culture.

**GEOG 232: World Regional Geography (3 credits)***Regional Geography*

The emphasis in this course is placed on the location, spatial distribution and interaction of human activities and resource patterns in a global context.

**GEOG 233: Geography of South Asia (3 credits)***Regional Geography*

The course examines South Asia's physiography, climate, settlement, population, historical geography, economic activities, and cultural landscape. It will also give an understanding of the major geographical patterns, processes, issues and problems of the region.

**GEOG 240: Global Environmental Issues (3 credits)***Physical Geography*

This course describes the earth's ecosystems; major issues relating to the human use and misuse of environmental resources, and possible courses of action for their conservation.

**GEOG 270: Maps and their Interpretation (3 credits)***Geographical Techniques and Methods*

The course builds up capability to understand and interpret different types of maps and their applications.

**GEOG 274: Fundamentals of Cartography and Field Surveying (3 credits)***Geographical Techniques and Methods**Lab Course*

The course develops basic skills of map making, their use and contemplation techniques. It also trains students in collection and processing field data. It also includes basic training in field surveying for map making.

**GEOG 301: Workshop on Geographical Thought and Concepts (2 credits)***General*

The course analyzes the current philosophical themes in geography, as well as the systematic doctrines and concepts in the mainstreams of the discipline. Implications of the current strides on cognitive domains are assessed and their impact on the future course of geographical avenues is envisaged

**GEOG 311: Principles of Atmospheric and Hydrospheric Dynamics (3 credits)***Physical Geography**Prerequisite: GEOG 101 or 210*

The course examines elements and forces generating weather phenomena, their dynamics and impact; climatic system and their classification. Features and dynamics of marine masses are also discussed; and a generalized appraisal of the water resources on land is reviewed.

**GEOG 312: Meteorology and Climatology (4 credits)***Physical Geography**Prerequisite: GEOG 210 or 311*

The course focuses on the elements and forces producing lower atmosphere phenomena; the dynamics of heat flows, air movements, pressure changes, mass density, volume relationships and vaporization, release of moisture as applied to the changing state of the atmosphere, and production of disturbances and storms. It also examines the evolution of climatic systems, their spatial and temporal transformations and impact.

**GEOG 313: Geodynamics and Geomorphology (3 credits)**

*Physical Geography*

*Prerequisite: GEOG 101 or 210*

This course provides comprehension about ge structuring, isostatic balancing, geotectonics and modulation; processes, agencies and cycles of landscape sculpturing and evolution, including their temporal and spatial variations.

**GEOG 314/ENVR 314\*: Hydrosphere Resources (4 credits)**

*Physical Geography*

*Prerequisite: GEOG 101 or 210*

This course examines origin, structure and shape of the ocean basins; composition, thermodynamics, circulation and oscillations of marine water; maritime resources and their use by humans; water resources on land, their origin, distribution, availability and quality; use and conservation as a resource for mankind.

**GEOG 322: Economic Geography (3 credits)**

*Human Geography*

This course focuses on principles governing multivariate interactions underlying the evolution and distribution of various economic activities and functions; the role of temporal and spatial variables responsible for changes in the economic systems and regions.

**GEOG 323: Population Geography (3 credits)**

*Human Geography*

This course deals with spatial, temporal and structural aspects of population characteristics including growth, distribution, density, composition and migration; the relationship of demographic variables to cultural, economic and environmental factors.

**GEOG 324: Settlement Patterns and Processes (3 credits)**

*Human Geography*

This course deals with human settlement patterns: location, evolution, size, spacing, shapes and functional systems produced by interactive multivariate processes, forms and structures. It also includes problems relating to growth, congestion and evolution of ghettos.

**GEOG 325: Political Geography (3 credits)**

*Human Geography*

The course emphasizes the comparative study of global political regions and related systems. Varied approaches are explored such as power analysis, genetic analysis, functional analysis, thematic analysis and ethnic analysis of political units.

**GEOG 326: Urban Environmental Issues (3 credits)**

*Human Geography*

The course deals with the dynamics of urban environment degradation and analysis of rectification mechanisms and policies. It focuses upon current environmental issues of urban centers in Pakistan.

**GEOG 371: Digital Cartography (3 credits)**

*Geographical Techniques and Methods*

*Prerequisite: GEOG 201*

*Knowledge of computer software applications is preferred*

The course completely focuses on skill development in computerized map making and interpretation/analysis.

**GEOG 372: Web GIS (4 credits)**

*Geographical Techniques and Methods*

*Prerequisite: GEOG 203*

*Knowledge of computer software applications is preferred*

The primary purpose of this course is to examine web-based technologies and to help students develop the knowledge and skills necessary to plan, design, develop and publish a web-based GIS solution. Students will learn how GIS on the internet differs from the desktop experience, and how to adequately prepare spatial information for the web.

### **GEOG 374: Aerial and Satellite Imaging (3 credits)**

*Geographical Techniques and Methods*

*Prerequisite: GEOG 202*

*Knowledge of computer software applications is preferred*

It includes the elements and interpretation processes pertaining to aerial photographs, remote sensing of earth's resources and occupancy patterns; global positioning system (GPS); geographic information science and systems (GIS); digital image processing (DIP).

### **GEOG 396: Physical Geography Seminar (2 credits)**

*Physical Geography*

*Prerequisite: GEOG 210*

It comprises of a departmental seminar investigating a selected field of Physical Geography. (The topic will be announced by the department's chairperson prior to registration.)

### **GEOG 411: Sustainable Management of Natural Resources (3 credits)**

*Physical Geography*

*Prerequisite: GEOG 240 or instructor's permission*

It analyses the parameters and principles governing sustainability of the Earth's resources. International and regional efforts to achieve sustainability are also taught.

### **GEOG 416: Natural Hazards and Management Issues (3 credits)**

*Physical Geography*

*Prerequisite: GEOG 240 or instructor's permission*

The course analyses the natural phenomena causing hazards, related issues and problems; means and techniques of ascertaining their distribution, impact on human life and possibilities of recurrences; options for disaster preparation and loss mitigation.

### **GEOG 421: Cultural Geography (3 credits)**

*Human Geography*

*Prerequisite: GEOG 220 or instructor's permission*

It deals with the patterns and processes of the world's cultural realms such as language, religion, social traits and ethnicity serving as the focus for an in-depth understanding of the world and its people and cross-cultural interactions.

### **GEOG 422: Spatial Planning for Economic Development (3 credits)**

*Human Geography*

*Prerequisite: GEOG 322 or instructor's permission*

Theories of location and systematic modeling in describing nodes and hierarchy of economic clusters in terms of multivariate functional analysis and synthesis examined at evolving developmental modes.

### **GEOG 426: Spatio-Temporal Dynamics of Global Power Politics (3 credits)**

*Human Geography*

*Prerequisite: GEOG 325 or instructor's permission*

The course provides an in depth appraisal about the global power-politics patterns through times, their dynamics, evolution, exigencies, impact and fate.

### **GEOG 471: Qualitative and Quantitative Techniques in Geography (4 credits)**

*Geographical Techniques and Methods*

*Prerequisite: Basic knowledge of computer software applications or instructor's permission*

The course provides information on qualitative methodologies and quantitative techniques used

by geographers in analysis and synthesis of systematic spatial phenomena; application of statistical methods and thematic models for geographical analysis including the use of computer software and hands-on experience.

**GEOG 474/ENVR 474\*: Geographical Information Science (4 credits)**

*Geographical Techniques and Methods*

*Prerequisite: GEOG 371*

The course relates to principles of Geographical Information Science, functions of geographic information systems, and relationship between GIS and remote sensing.

**GEOG X95: Themes (1-3 credits)**

*General*

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

**GEOG 498: Internship (3 credits)**

*Geographical Techniques and Methods*

*Prerequisite: Open to the juniors/seniors with CGPA > 2.75 and 90 completed credit hours with at least 9 upper division credit hours from Geography/GIS courses*

An internship must be undertaken in a related industry, while working with a private or public sector organization for six to eight weeks during the summers. After the successful completion of the internship, the student will have to submit a comprehensive report about the tasks done for his/her evaluation.

**GEOG 499: Directed Project (A & B) (3+3 credits)**

*Geographical Techniques and Methods*

*Prerequisite: Knowledge of computer software applications or instructor's permission*

A session on orientation/hands-on training in techniques of project planning, designing, operational management, report preparation and presentation after Junior Year followed by independent/participated research in field, laboratory, or library under the direction of a faculty member from the Department of Geography (appointed by the chairperson) and preparation and presentation of research report/thesis.

# DEPARTMENT OF HEALTH AND PHYSICAL EDUCATION



The Health and Physical Education Department at FCCU provides a range of sports activities to students for the total development of their personality. It focuses on the following areas, which are indispensable for growth and strength of sports in the University:

- Sports culture
- FCCU Sports Association activities and administration
- Coaching
- Officiating
- Competition opportunities and organization
- Facilities and equipment
- Scientific support

FCCU has a very comprehensive sports program. Its sports facilities include an 8-lane standard 400m grass track and a short course; 25m swimming pool, five tennis courts and playing field for cricket, football, hockey and handball. The Lucas Center has a well-equipped gymnasium, table tennis hall, basketball and badminton courts and offices for sports faculty and staff. Intramural competitions in the above mentioned sports take place all year round. Deserving sportsmen are awarded Medals of Distinction, College Colors and Certificates of Merit.

## Learning Objectives

Students will be able to:

- Demonstrate, during play, the rules and regulations by which various games/sports are played
- Demonstrate skills in sports and athletics
- Apply the techniques and skills needed to pursue positions in both academic and commercial settings
- Demonstrate ethical sportsmanship while competing in individual and team sports

Department of Health and Physical Education is part of Faculty of Education.

## Course Descriptions

Entry into any course requires students to pass a physical fitness test.

### **HPED 101: Cricket (1 credit)**

Techniques of running, batting, bowling and fielding, working together both in offense or defense.

### **HPED 102: Football (1 credit)**

Techniques of running, passing, kicking, tackling, blocking, heading and dribbling, coordination for offensive and defensive teamwork.

### **HPED 103: Hockey (1 credit)**

Techniques of passing, dribbling, dodging, pushing with agility, speed and endurance.

### **HPED 104 (i): Swimming (1 credit)**

Basics of freestyle swimming.

### **HPED 104 (ii): Swimming (1 credit)**

Basics of the backstroke in swimming.

### **HPED 104 (iii): Swimming (1 credit)**

Basics of the breaststroke in swimming.

### **HPED 105: Volleyball (1 credit)**

Techniques for passing, blocking and smashing.

### **HPED 106: Physical Exercises (1 credit)**

General physical exercises, benefits of physical activities.

### **HPED 107 (i): Athletics (1 credit)**

Techniques for sprints and javelin throw.

### **HPED 108: Table Tennis (1 credit)**

Techniques to play table tennis for recreation or competition.

### **HPED 109: Badminton (1 credit)**

Techniques to play badminton for recreation or competition.

### **HPED 110: Basketball (1 credit)**

Skills of ball holding, dribbling, passing and shooting.

### **HPED 111: Tennis (1 credit)**

Fundamental skills of playing tennis for recreation or competition.

### **HPED 112: Handball (1 credit)**

Skills and knowledge of the game: ball holding, handling, dribbling, passing and shooting.

### **HPED 150: Advanced First Aid (4 credits)**

First aid is vital in emergency circumstances. Knowing what action needs to be taken to regulate an emergency can make the difference between life and death. First aid training can enable anyone around the wounded person to reduce the danger posed by the mishap. First aid training is used in emergency situations. This course is envisioned to generate understanding amongst the participating students about key conceptions related to first aid and emergency response to medical, fire and disaster emergencies. First aid has been proven to save many lives. Learning first aid will help students to save a life in an emergency.



# DEPARTMENT OF HISTORY



The Department of History is one of the oldest departments in FCCU. It has produced many luminaries who have been associated with it as members of the learned faculty, such as Professor Griswold, Professor Brush and Dr ZH Zaidi. The Department, through its courses, aims to develop in the students an analytical, critical, scientific, argumentative and methodical thinking for assessing the past occurrences in order to draw conclusions which help to broaden their mental horizons, enrich their vision and enhance their knowledge.

Department of History is part of Faculty of Social Sciences.

## Requirements for Major

At least 36 credit hours including core courses: HIST 101, HIST 102, HIST 201, HIST 301, HIST 400, HIST 496, HIST 499. In addition, electives from the categories defined below must be studied:

- One course in Mughal or pre-Mughal South Asia: HIST 250, HIST 255, HIST 302, HIST 305, HIST 308
- One course in Post-Mughal South Asia: HIST 308, HIST 310, HIST 311, HIST 313, HIST 315, HIST 410
- Two courses in either US/British/European History: HIST 202, HIST 204, HIST 207, HIST 320
- Two electives from: HIST 306, HIST 303, HIST 312, and any other elective offered by the department

## Requirements for Minor

A minimum of 18 credits including: HIST 101, HIST 102, HIST 201 and:

- One course in Post-Mughal South Asia: HIST 308, HIST 310, HIST 311, HIST 313, HIST 315, HIST 410
- One course in non-South Asia: HIST 202, HIST 204, HIST 207, HIST 306, HIST 312, HIST 320
- One elective is also required: HIST 303, HIST 306, HIST 312 or any other elective offered by the department

## Course Descriptions

### **PKST 101: Pakistan Studies (3 credits)**

Beginning from an examination of the idea of Pakistan, this interdisciplinary course will cover the history, geography, economy, politics, and society of Pakistan through an identification of major themes, personalities, and events which have affected and continue to have an impact on the development of the country.

### **HIST 101: Survey of South Asia (3 credits)**

The course gives students a basic understanding of the general history of South Asia from the Indus Valley Civilization to modern times. The study of this course, which will be a prerequisite for all courses on South Asia in the department, will allow the students to become familiar with the broad periods of South Asian history, so that an in-depth analysis of historical periods and themes can be undertaken in upper level courses.

### **HIST 102: Survey of Western Civilization (3 credits)**

This course is a general survey of Western Civilization from Ancient Greece and Rome to the French Revolution in 1789. The aim of the course is to familiarize students with the broad periods and themes which have shaped Western Civilization, including an understanding of the scholarly debate on the issues. This course will be the basic prerequisite course for all upper level courses on the West.

### **HIST 103: Introduction to Archaeology (3 credits)**

This is an introduction to the methods, goals, and theoretical concepts of archaeology. Archaeology analyzes the physical remains of the past, from million-year-old fossilized remains of our earliest human ancestors to 20th century buildings in South Asia, in pursuit of a broad and comprehensive understanding of human culture. Archaeology offers a unique perspective on human history and culture and helps us understand not only where and when people lived on the earth, but also why and how they have lived, examining the changes and causes of changes that have occurred in human cultures over time, seeking patterns and explanations of patterns to explain everything from how and when people first came to inhabit the South Asia, to the origins of agriculture and complex societies. Unlike history, which relies primarily upon written records and documents to interpret great lives and events, archaeology allows us to delve far back into the time before written languages existed and to glimpse the lives of everyday people through analysis of things they made and left behind.

### **HIST 201: Research Methods (3 credits)**

This course teaches steps in the research process and the tools and techniques of data collection. It is oriented towards Social Sciences research and will not include historiography, which, being a specialized field, will be taken up in the higher-level course.

### **HIST 202: Survey of Modern Europe (3 credits)**

This course is a general survey of Europe from the French Revolution, and will concentrate on major events, such as revolutions in Europe, the unification of Italy and Germany, the high noon of imperialism, the Russian Revolution, the two world wars and the Cold War. The course also discusses the key personalities and themes which shaped these developments.

### **HIST 204: History of the United States (3 credits)**

This course is a survey of the United States since the American Revolution, concentrating on issues like the early development of the nation, the civil war, reconstruction, westward expansion, international relations, participation in the two world wars, and the emergence of the US as the super power.

### **HIST 207: British History: From the Restoration to the Present (3 credits)**

This course introduces students to basic themes, ideas, and influences in British history, from the restoration of the monarchy in 1660 to the present. The course will examine how Britain was transformed both at home and in its international role through the two world wars, imperial decline,

Cold War, and in the present post-Cold War era in the twenty-first century. The purpose will be to situate the development of Britain internally and internationally up to the present times.

### **HIST 250: History of the Delhi Sultanate (3 credits)**

This course studies the Sultanate period in Delhi (1206-1526), its origins, main features, and causes of its decline. The course will enable the students to analyze the development of art, culture, and architecture of the age, along with the evolution of state and society under the rule of the Sultans.

### **HIST 255: The Indus Valley Civilization (3 credits)**

This course focuses on the inception, life, and eventual decline of the Indus Valley Civilization. The course will utilize current and early research and debates on the subject as well as visits to relevant sites to understand the period.

### **HIST 301/PHIL 304\*: Philosophy of History (3 credits)**

This course studies in depth the ideas behind the study of history, the different schools of thought in history, and the underlying theories. Special attention will be given to the development of South Asian and Muslim philosophy of history.

### **HIST 302: Mughal Rule in India (1526-1857) (3 credits)**

*Prerequisite: HIST 101*

This course is a thorough study of the Mughal Empire from its inception to its decline and fall. Topics covered will include the condition of India before the Mughals, the rule of the great Mughals, their social, economic, religious, and political policies, and the development of art and culture during the period. The reasons for the fall of the empire as well as the rise of regional kingdoms will also be examined.

### **HIST 303: International Relations and Diplomacy (3 credits)**

*Prerequisites: HIST 102 or PLSC 101*

This course focuses on the international system from the start of the First World War. The study begins with an examination of the key concepts in international relations, theory and practice, followed by an in-depth analysis of the relations between the great powers till the end of the Cold War.

### **HIST 305: Ancient History of the Subcontinent (3 credits)**

This course will focus on a hugely diverse and dynamic span of the history of ancient India. This will provide a systematic framework of the socio-political map of the ancient subcontinent starting from Indus valley and culminating in Gupta period. This will include the fundamental themes of polity, economy, philosophy and society. The times of glory, invasion, anarchy, factions and frictions will be discussed, highlighting Indus Valley Civilization, Epic Age, Buddhism and class structures. Culture and spiritual leanings throughout this span of time will be the focus of historical inquiry, exhibited in political ambition and philosophical thinking, art and literature that gave depth to one of the earliest periods of human history.

### **HIST 306: Islamic History (3 credits)**

This survey course on the Caliphate, Ummayyad and Abassid periods, examines their central and provincial administrations, expansion and conquests, religious policy, fiscal policy, foreign relations, the development of art and culture, and the causes of their downfall.

### **HIST 308: History of Lahore (3 credits)**

*Prerequisite: HIST 101*

This course traces the history of Lahore from its origin to the present day. Topics like the importance of Lahore in different ages, its contribution to the development of art, architecture and culture, and its urban and rural dimensions are studied.

### **HIST 310: Issues in Pakistan's History (3 credits)**

*Prerequisites: HIST 101, HIST 201*

This junior year seminar course focuses on a particular issue in Pakistani history such as, but not limited to, the bureaucracy, army, judiciary, parliament, Kashmir issue, provincial autonomy, East Pakistan debacle, ethnicity and human rights.

### **HIST 311: India since Independence (3 credits)**

*Prerequisite: HIST 101*

This course introduces students to themes in Modern India from independence to the beginning of the liberalization period in 1991. This course will provide students knowledge of themes like nationalism, the Nehruvian system, domestic politics in India and the rise of Hindutva.

### **HIST 312/PLSC 310\*: Modern Muslim World (3 credits)**

*Prerequisites: PLSC 101*

This course explores the post- Second World War history of the Middle East with a special emphasis on the rise of Arab nationalism, Muslim solidarity, Israeli-Palestinian issue, the creation of modern states, and developments in state, society, religion and economy of the region.

### **HIST 313: British Rule in India (1757-1947) (3 credits)**

*Prerequisite: HIST 101*

This course focuses on the political rise of the East India Company in 1757, the expansion of British influence through treaties and conquests, the Revolt of 1857 and the coming of the Raj, its policies, and its effect on the society, politics, economy and religious life of India.

### **HIST 315: Freedom and the Nationalist Movement in the Subcontinent (1857-1947) (3 credits)**

*Prerequisite: HIST 101*

This course charts the start of the nationalist movement in South Asia with a focus on the key events and personalities which shaped the society, politics and economy of the region during the period. The rise of Muslim separatism and the creation of Pakistan will also be studied.

### **HIST 320: Reformation and Renaissance (3 credits)**

*Prerequisite: HIST 102*

This course focuses on Europe from the advent of the Protestant Reformation, to the Catholic Counter Reformation, religious wars, the rise of the nation state, and the Enlightenment period. Special attention will be given to the renaissance in art, science, literature and culture during the period, up till the French Revolution.

### **HIST 400: Research Methodology (3 credits)**

*Prerequisite: HIST 201*

This higher level course shall build on the 200 level course on Research Methods to familiarize students with qualitative research and to introduce them to Historiography, its major traditions and debates. It will also focus on the use of sources in historical research.

### **HIST 410: Colonial Punjab, 1848-1947 (3 credits)**

*Prerequisites: HIST 101, HIST 201*

This thematic course examines Punjab's history during colonial rule with a focus on several themes which shaped the period. The focus will be on the geography of the Punjab in historical perspective, the support of local elites for colonial rule, the growth of the agrarian economy, and the political, social, and economic effects of these developments on the province.

### **HIST X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **HIST 496: Senior Seminar in History (3 credits)**

*Prerequisites: HIST 101, HIST 201*

This seminar course comprises of extensive readings on a selected topic (varying each semester) under the leadership of a faculty member who will facilitate in-depth analysis and discussion. The course will prepare students for independent research through a series of short papers and a final term paper on the course topic.

### **HIST 499: Independent Research (3 credits)**

*Prerequisites: HIST 400, HIST 496*

In this course the student will articulate a question to be investigated, draw up a plan of research, glean information from primary and secondary sources, analyze the material, and present his or her arguments and conclusion in a 10,000 word count paper. The paper should integrate the methods learned in prior classes about historical analysis and research. Students will conduct their research under the guidance of a member of the History faculty or any other person approved by the Chairperson of the Department.

# DEPARTMENT OF MASS COMMUNICATION



The Department of Mass Communication was established in 2003. It aims to equip its students with all the tools that are required to secure a job or pursue higher research degrees. This is made possible by a dedicated faculty as well as links with the media industry. Particular attention is paid to the topics of research offered by the Department to ensure that the new researchers learn and properly implement research methodologies suiting their projects. Students get the individual attention of research supervisors at every stage of their research. The Department offers a BA (Hons) degree and is a part of the Faculty of Humanities.

## Learning Objectives

By the end of 4-year program students will:

- Explain the nature and working of print and electronic media
- Demonstrate skills for employment in advertising, public relations, print and electronic media
- Describe important mass communication roles of media managers, administrators and researchers
- Analyze principles and strategies of communication
- Analyze areas of media's effect on individuals and society
- Evaluate media laws and ethics

The Department of Mass Communication offers specializations in the following:

- Print and Electronic Media
- Advertising and Public Relations

However, students may opt for a simple Major in Mass Communications without specializations.

Major in Mass Communication WITHOUT Specialization		
5 Core courses 15 credits	7 Elective courses 21 credits	Total 12 courses 36 credits

Major in Mass Communication WITH Specialization			
5 core courses 15 credits	5 Specialization courses 15 credits	2 Electives 6 credits	Total 12 courses 36 credits

#### Requirements for Major

36 credit hours including the core courses mentioned below (5 core + 7 electives)  
MCOM 201, MCOM 301, MCOM 306, MCOM 409, MCOM 498/MCOM 499

#### Additional courses required for specializations in Mass Communication:

5 core courses (mentioned above) + specialization courses (mentioned against respective specializations)

**Print and Electronic Media** specialization requires the additional study of the following courses:

MCOM 202, MCOM 302, MCOM 401, MCOM 402, MCOM 410

**Advertising and Public Relations** specialization requires the additional study of the following courses:

MCOM 200, MCOM 304, MCOM 303, MCOM 400, MCOM 415

**Courses recommended for Major in Mass Communication:** ECON 100, PLSC 320, URDU 207, URDU 208, SOCL 100, CSCS 210, ENGL 207, and SOCL 355

#### Requirements for Minor

18 credit hours including MCOM 101, MCOM 201, MCOM 301 and MCOM 310.

## Course Descriptions

### MCOM 100: Fundamentals of Speech (3 credits)

The course is a study of the basic principles and practices of good vocal production and oral communication. It examines texts, verse and prose in terms of vocal delivery. The course also explores the basic components of communication through analysis and practice in a variety of oral presentations. Primary focus is on English speaking skills.

### MCOM 101: Introduction to Communication Studies (3 credits)

The course gives a brief introduction to print, electronic, online journalism as well as advertising and public relations. It encompasses functions of news organizations, introduces students to the basics of news writing, reporting and editing. The students are also exposed to the content of various media.

### MCOM 110: English Writing for Journalists (3 credits)

The course deals with the use of English for specific purposes i.e., Mass Communication with a special focus on jargon used specifically in media content.

### MCOM 150: Media and Human Conflict (1 credit)

This course discusses how media reports and presents human conflict. It also explores the relationship of social, cultural, political conflicts with media. The main focus of the course is to discuss role of media in war and conflict sensitive situations. Students will analyze various aspects about global challenges posed by war and threat of war and will make proposals for conflict resolution.

### MCOM 195: Media and Human Conflict (1 credit)

This course discusses how media reports and presents human conflict. It also explores the relationship of social, cultural, political conflicts with media. The main focus of the course is to discuss the role of media in war and conflict-sensitive situations. Students will analyze various aspects about global challenges posed by war and threat of war and will make proposals for conflict resolution.

### **MCOM 200: Copy Writing (3 credits)**

*Prerequisite: MCOM 101*

The course introduces copy designing and copy management skills required for the advertising and public relations industry. It also covers copy writing techniques for public relations and advertising media including print, electronic, outdoor and digital.

### **MCOM 201: News Reporting (3 credits)**

*Prerequisite: MCOM 101*

The course explores the mechanics, elements, value and structure of stories for print and electronic media. It also introduces news sources for print and electronic media, as well as qualifications and functions of a reporter. The course introduces the basics of camera and microphone reporting, interpretative and investigative reporting, reporting beats and interview techniques.

### **MCOM 202: Sub-Editing (3 credits)**

*Prerequisite: MCOM 101*

This course incorporates introduction, importance and process of sub-editing. It also covers functions and qualifications of a sub-editor, source of news, types and trends in headline making, techniques of news editing and caption writing for pictorial display.

### **MCOM 203: Media and Peace Building (3 credits)**

*Prerequisite: MCOM 101*

The course introduces interactive communication approach and tools of Mass Communication in conflict resolution. It also explores tools for conflict analysis, analyzes the role of theater and music in peace-building process, and further elaborates art for peace, vision and framework for social justice.

### **MCOM 207/ENGL 207\*: Media and Literature (3 credits)**

*Prerequisites: ENGL 101, ENGL 103*

This course centers around the role of media as a means of understanding literature; the importance of language and literature with reference to specific social and cultural issues.

### **MCOM 290: Fundamentals of Research Methods (3 credits)**

This course is designed to develop the basic understanding of students about the social-scientific process of research used in the field of Mass Communication. This course will give an insight into the concepts, processes, elements, measurements and methods of Mass Communication research. It will also enable students to explore the mass media phenomenon in the society, gauge the effects and impacts of mass communication by using the basic understanding of research. The prospective students of this course are those who have already taken the prerequisites of Mass Communication course.

### **MCOM 301: Press Laws and Ethics (3 credits)**

*Prerequisite: MCOM 201*

The course traces the evolution of press laws with special reference to the subcontinent and Pakistan. It critically analyzes the current press and publication regulations, PEMRA laws pertaining to the electronic media in Pakistan, freedom of expression, defamation laws, contempt of court, contemporary trends in copyright law and the concept of intellectual property rights, code of ethics for journalists from Western and Islamic perspectives.

### **MCOM 302: Opinion Writing (3 credits)**

*Prerequisite: MCOM 201*

This course covers the various aspects of the newspaper content. It elaborates on the importance of editorial page, editorial writing, and qualification of editorial writers. It also deals with techniques of newspaper column, feature, article and weblog writing.



### **MCOM 303: Principles of Public Relations (3 credits)**

*Prerequisite: MCOM 200*

It covers various aspects of public relations in Pakistan including corporate/organizational public relations, consumer public relations, media management, and conflict management. The students are also introduced to press release, press note, handout, press communiqué writing.

### **MCOM 304: Principles of Advertising (3 credits)**

*Prerequisite: MCOM 200*

The course introduces scope, function, and socio economic aspects of advertising. It also looks at advertising research, functions of advertising agencies, designing and evaluation of advertising campaigns.

### **MCOM 306: Research Methodology (3 credits)**

*Prerequisite: MCOM 290 and only for students majoring in Mass Communication*

This course explores the advanced components of Mass Communication research that have academic and industry implications. Students in this course will learn about the significance of qualitative and quantitative research and understand the process, types, methods and techniques employed in experimental research, descriptive research, content analysis and case studies. Students will also be trained on how to generate sound research results using the techniques of reliability and validity and appropriate statistical analysis for testing the hypotheses. Awareness about the current trends on communication research will also develop the interest of students to explore their research education in the field of mass media and communication.

### **MCOM 309: Media History (3 credits)**

A brief introduction to the beginnings of the press, a brief view of the growth of the Muslim press in the subcontinent, the role of the press in the War of Independence in 1857, journalistic achievements of Sir Syed Ahmad Khan, Maulana Muhammad Ali Johar and Maulana Zafar Ali Khan and the role of press in the Pakistan Movement.

### **MCOM 310: Mass Communication Studies (3 credits)**

*Prerequisite: MCOM 301*

The course introduces models of communication and mass communication, media literacy, public opinion and propaganda, two-step flow of communication, gate-keeping and information control.

### **MCOM 315: Media and Crime (3 credits)**

*Prerequisite: MCOM 201*

This course provides an overview of coverage and portrayal of crime and social justice on news media and popular culture. This aims to critically assess the role of media in selection and portrayal of crime content and how it influences the public's attitude towards social justice and criminal law. It further discusses the ethical issues of conflict and crime reporting. The course also entails discussion on George Gerbner's contribution to the field of media, crime and violence.

### **MCOM 350: Risk and Crisis Communication (3 credits)**

*Prerequisite: MCOM 303*

This course focuses on two vital activities of public relations: risk and crisis communication. It also provides a profound understanding of trends and developments that could have a significant impact on an organization or society.

### **MCOM 400: Media Management in Ad and PR (3 credits)**

*Prerequisite: MCOM 304 and MCOM 303*

This course covers the media management areas including managing media relations, media buying, media selling, media monitoring and audience analysis for the advertising and public relations industry. This course will involve the application of strategic management principles to the development of public relation and advertising plans and programs.

### **MCOM 401: Radio Broadcasting: A Theoretical Introduction (3 credits)**

*Prerequisite: MCOM 301*

This course introduces the origin and development of radio, functions of a broadcasting house, distinctive features of radio news, interviewing for radio programs, duties of a radio producer, trends in FM radio in public and private sectors in Pakistan.

### **MCOM 402: Television Production (3 credits)**

*Prerequisite: MCOM 301*

This course focuses on the set-up and working of television programming, duties of a TV producer, program shooting and editing. It also includes program research and script writing, and details of different phases of TV production.

### **MCOM 404: Community Journalism (3 credits)**

*Prerequisite: MCOM 201*

This course analyzes the status and issues regarding women, children, minorities and human rights in the local community with special emphasis on Pakistan. It also covers media coverage, role of NGOs and mass awareness campaigns in Pakistan, as well as the role of mass media in reporting human rights events.

### **MCOM 409: Theories of Mass Communication (3 credits)**

*Prerequisite: MCOM 310*

Extensive as well as intensive study of theories of Mass Communication is covered in this course. Awareness is given about how theories have evolved with the passage of time and how media and society have adapted according to these theories and propositions made by theorists.

### **MCOM 410: Documentary Making (3 credits)**

*Prerequisite: MCOM 402*

The course explores the various types and modes of documentary making. It also provides a comparative analysis of national as well as international documentaries. Technical skills of script writing, cinematography and editing are also taught in this course.

### **MCOM 412: International Communication (3 credits)**

*Prerequisite: MCOM 310*

This course evaluates the different approaches of international communication, with special reference to global media and its influence on different regions. It also discusses issues of free flow of information, foreign policy and trans-border data flow.

### **MCOM 413: Media, Society and Culture (3 credits)**

*Prerequisite: MCOM 409*

This course aims at understanding the relationship between media, society and culture. It explores the processes of cultural socialization, homogenization, acculturation, cultural diversity, pluralism and relativism.

### **MCOM 415: Communication Campaign Design (3 credits)**

*Prerequisite: MCOM 304 and MCOM 303*

This course will cover designing of different campaigns including health communication, political communication, public awareness, capacity building and media advocacy campaigns. It will also encompass the evaluations of campaigns by international organizations like WHO, UNDP, USAID and CIDA.

### **MCOM 430: Media Lab (4 credits)**

*Prerequisite: MCOM 202, MCOM 304, MCOM 402*

MCOM 430 is a specialized lab course, which will cover essential media skills including layout designing for magazines and circulars as well as video editing through professional software. Students will be provided with knowledge about camera specifications, camera handling, support equipment,

and techniques of videography. In addition, students will be provided with the opportunity to practice through field assignments.

**MCOM X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

**MCOM 498: Internship (3 credits)**

*Prerequisite for Internship: CGPA 2.75*

An internship will allow students to experience first-hand functioning of media organizations.

**MCOM 499: Research Thesis/Project (3 credits)**

*Only for students majoring in Mass Communication*

*Prerequisite: MCOM 306*

Students are required to submit one research Thesis/Project on any assigned topic at the end of the 8th semester.



# DEPARTMENT OF MATHEMATICS

The Department of Mathematics offers a dynamic and supportive environment for both staff and students. It is acknowledged for teaching and for its student support and offers an extensive range of undergraduate courses according to international standards.

The Department offers a Baccalaureate (Hons) degree in Mathematics and belongs to the Faculty of Information Technology and Mathematics.

## BS (Hons) Mathematics

The 4-year degree program in Mathematics was launched in 2005. Students majoring in Mathematics take 48 credit hours in their major as well as 47 or 48 in general education and 35 or 34 respectively as free electives. Students majoring in Mathematics take courses as free electives from the Mathematics department or cross-listed courses with the other departments. A degree in Mathematics develops clear logical thinking. The coursework looks at topics in Mathematics: from pure Mathematics to how Mathematics is used in the real world.

Courses cross listed with other departments further help students to analyze Mathematics as a real world tool. Students obtain a secure understanding of Mathematics with a good choice of topics in pure and applied Mathematics at an advanced level.

### Learning Objectives

- Demonstrate skills in numerical and symbolic manipulation
- Use logical and quantitative thinking in problem solving
- Apply mathematical knowledge to analyze and interpret information in other disciplines and professions
- Identify Mathematics as a creative human endeavor
- Show high standards of integrity, social responsibility, and respect for humanity in mathematical work
- Prepare for higher studies and careers in mathematical sciences

Department of Mathematics is part of Faculty of Information Technology and Mathematics.

### Requirements for Major

A major consists of 48 credit hours which include:

**Core Courses:** MATH 201, MATH 202, MATH 203, MATH 209, MATH 301, MATH 302, MATH 307, MATH 309, MATH 310\*, MATH 311, MATH 313, and 13 credit hours taken from

**Elective Courses:** MATH 212, MATH 303, MATH 304\*, MATH 308, MATH 312, MATH 314\*, MATH 315\*, MATH 316\*, MATH 401, MATH 402, MATH 403\*, MATH 404, MATH 406, MATH 407, MATH 408\*, MATH 409, MATH 410\*, MATH 411\*.

See the Chairperson of the Mathematics Department or the undergraduate adviser for a degree plan during the first year of study at FCCU. An asterisk (\*) indicates that the course is cross-listed with other departments.

### Requirements for Minor

A minor consists of 24 credit hours, which includes:

**Core Courses:** MATH 102, MATH 103, MATH 201, MATH 202, and 12 credit hours taken from

**Elective Courses:** MATH 203, MATH 209, MATH 212, MATH 301, MATH 302, MATH 303, MATH 304\*, MATH 307, MATH 308, MATH 309, MATH 310\*, MATH 311, MATH 312, MATH 313, MATH 314\*, MATH 315\*, MATH 316\*, MATH 401, MATH 402, MATH 403\*, MATH 404, MATH 406, MATH 407, MATH 408\*, MATH 409, MATH 410\*, MATH 411\*.

## Course Descriptions

### MATH 100: Quantitative Skills (3 credits)

Basic algebra and number theory, rounding, estimating and scientific notation, algebraic expressions, fractions, factoring, solving equations, two equations with two unknowns and their applications to daily life problems, quadratic equations and their applications, percentage problems (profit, loss, commission, zakat deduction, markup, margin, stock exchange, index), ratio and proportion, work problems, distance problems (time, distance, speed, velocity), basic geometry, mean, median, and mode.

### MATH 101: Pre-Calculus and Trigonometry (3 credits)

Fundamentals, solution of equations and inequalities, lines, functions, linear and quadratic functions, polynomial and rational functions, operations on functions, inverse functions, synthetic division, remainder and factor theorem, partial fractions, exponential, logarithmic and trigonometric functions, trigonometric identities, solution of right and oblique triangles.

### MATH 102: Calculus I (3 credits)

*Prerequisite:* MATH 101 or A Level Mathematics or Intermediate with Mathematics

Functions, Graph of functions, Translation, stretching and compressing graphs. Limit, continuity and differentiability, Differentiation and its basic rules, Indeterminate forms, L'Hopital's rule, Integration and its techniques, Introduction to definite integral.

### MATH 103: Introductory Linear Algebra (3 credits)

*Prerequisite:* MATH 101 or A Level Mathematics or Intermediate with Mathematics

Introduction to system of linear equations, matrices and matrix operations, elementary matrices, Gaussian elimination, Gauss Jordan method for solving a system of linear equation, determinants and their properties, vector spaces, subspaces, linear independence, basis and dimensions.

### MATH 105/STAT 102\*: Probability and Probability Distributions (3 credits)

**Note:** Please see the contents from the list of Statistics courses.

### MATH 107/STAT 101\*: Statistical Methods (3 credits)

Nature and scope of statistics, scales of measurements, measures of central tendency and dispersion

for grouped data, moments, skewness and kurtosis, fundamental rules of counting, basic probability, moments in probability context.

### **MATH 201: Calculus II (3 credits)**

*Prerequisite: MATH 102*

Application of derivatives, extreme and mean value theorem, maxima, minima and inflection point of single variable functions, Taylor's theorem and approximation, application of integration, area and arc length, introduction to improper integrals, volume and surface of revolution, infinite series, power series, introduction to Conic section.

### **MATH 202: Ordinary Differential Equations (3 credits)**

*Prerequisite: MATH 102*

Definitions and examples, formation of differential equations, solution of first order differential equations, solution of higher order differential equations, Laplace transforms method, series solution of differential equations.

### **MATH 203: Vector Analysis (3 credits)**

*Prerequisite: MATH 102*

Scalar and vector, product of two vectors, scalar and vector triple product, vector differentiation and its use in differential geometry and mechanics, gradient of a scalar field, divergence and curl of a vector field, vector integration (line integral, surface integral and volume integral), divergence and Stokes theorem.

### **MATH 209: Linear Algebra (3 credits)**

*Prerequisites: MATH 103 and MATH 102*

Review of vector spaces, subspaces and basis, row space, column space, rank, nullity, inner product spaces, orthogonal basis, Gram Schmidt process, orthogonal matrices, Eigenvalues and Eigenvectors, diagonalization, orthogonal diagonalization, positive definite and negative definite matrices, linear and inverse linear transformation.

### **MATH 210: Set Theory (3 credits)**

*Prerequisites: MATH 101 or A Level Mathematics or Intermediate with Mathematics*

Sets and Basic Operations on Sets, relations, functions, cardinal and ordinal numbers, axioms of choice, Zorn's lemma, and well ordering theorem.

### **MATH 212: Elementary Number Theory (3 credits)**

*Prerequisite: MATH 101 or A Level Mathematics or Intermediate with Mathematics*

Division algorithm, divisibility properties, Euclidean algorithm, properties related to greatest common divisor and least common multiple, Diophantine linear equations, prime numbers, Fundamental theorem of arithmetics, prime numbers and divisibility, congruences, properties of congruences, Euler's Phi function, Fermat's theorem, Residue classes modulo  $n$ , solution of congruences, Chinese remainder theorem.

### **MATH 295/395: Themes-Topics in Calculus (2/3 credits)**

*Prerequisite: MATH 102, Calculus I or equivalent*

Parametric equations, relation between polar and rectangular coordinates, sketching polar equations, Tangent and normal in polar coordinates, conics in polar coordinates, definite integral as limit of a sum, properties of definite integral, reduction Formulae, Walli's formulae.

### **MATH 295/395: Themes-Analytical Geometry (2/3 credits)**

*Prerequisite: MATH 101 or A level or Intermediate Mathematics*

Distance formula in Plane, equation of line, equation of circle in standard, general, and polar form; introduction to conics, geometrical properties of Parabola, Ellipse and Hyperbo; equation of line in space, equation of plane, equations of solid objects sphere, prism, cylinder and cone; applications in problem solving.

### **MATH 295/395: Themes-Laplace Transform Method and Fourier Series (2/3 credits)**

*Prerequisite: MATH 201*

Definitions, properties and examples; Inverse Laplace transform and their properties, the convolution theorem and applications; Applications of Laplace Transform Method; Periodicity and orthogonality of Sine and Cosine functions; the Fourier convergence theorem; Fourier series of even and odd functions; Application of Fourier series.

### **MATH 301: Multivariable Calculus (3 credits)**

*Prerequisite: MATH 201*

Vectors, analytic geometry in 3-space, cylindrical and spherical coordinates, quadratic surfaces, partial and directional derivatives, Chain rule, maxima and minima of function of more than one variable, Lagrange's multipliers, double and triple integral with applications, line integral and Green's theorem.

### **MATH 302: Mechanics (4 credits)**

*Prerequisite: MATH 203*

Composition and resolution of forces, friction, kinematics and dynamics of a particle.

### **MATH 303: Discrete Mathematical Structures (3 credits)**

*Prerequisite: MATH 101 or A Level Mathematics or Intermediate with Mathematics*

Propositional logic, propositional equivalence, valid and invalid arguments, predicate logic and quantifiers, methods of proofs (direct and indirect proofs), mathematical induction and the well-ordering principle, relations and functions, pigeonhole principle, counting techniques, introduction to graphs.

### **MATH 304/STAT 313\*: Operations Research (3 credits)**

*Prerequisite: MATH 103 or STAT 102*

Introduction to operations research, graphical solution, Simplex method, two phase method, M-method, sensitivity analysis, primal dual relationship, dual simplex method, transportation model, assignment models, transshipment models, network models, queuing theory.

### **MATH 307: Complex Analysis (4 credits)**

*Prerequisite: MATH 201*

Complex numbers, polar form of complex number, limit, continuity and differentiability of function of a complex variable, analytic functions, C-R equations, transcendental functions, complex integration, contour integration, Green's theorem, Deformation theorem, Cauchy theorems, Liouville's theorem, Morera's theorem, Taylors and Laurent's series, Residue theory, Cauchy residue theorem.

### **MATH 308: Differential Geometry (3 credits)**

*Prerequisite: MATH 301 or MATH 203*

Arc length parametrization, moving trihedron (tangent, normal, binormal), osculating, normal and rectifying planes, curvature and torsion, Serret-Frenet equations, tangent planes, evolute and involute, first and second fundamental forms of surfaces.

### **MATH 309: Real Analysis (3 credits)**

*Prerequisite: MATH 201*

Sets and functions, the completeness property of  $\mathbb{R}$ , intervals, sequences and their limits, convergent and divergent sequences, convergence of monotone sequences, limits of functions, continuous functions, uniformly continuous functions, and differentiability.

### **MATH 310/CSCS 310\*: Numerical Analysis (3 credits)**

*Prerequisite: MATH 102 or MATH 103*

Solution of system of linear equations, solution of non-linear equations, error analysis, interpolation by polynomials, Lagrangian interpolation, numerical differentiation, numerical integration, computer programming will be done by using any suitable software like MATLAB, MAPLE or MATHEMATICA.

### **MATH 311: Topology and Metric Spaces (3 credits)**

*Prerequisite: MATH 210*

Metric spaces, neighborhoods, open and closed sets, closure of a set, convergence and Cauchy sequences, complete metric space, topological spaces, basis and sub-basis, continuity and homeomorphism, compactness, connectedness, separation axioms.

### **MATH 312: Integral Equations (3 credits)**

*Prerequisite: MATH 202*

Introduction to integral equations, linear and non-linear integral equations, Volterra and Fredholm integral equations, conversion of ordinary differential equations to integral equations, integral equations with symmetric and separable kernels, method of successive approximation, integral transform method.

### **MATH 313: Group Theory (3 credits)**

*Prerequisite: MATH 103 and MATH 210*

Definition and examples of group, subgroups, cyclic groups, co-sets, Lagrange's theorem, conjugacy, normal subgroups, quotient groups, homomorphism and isomorphism, Caley's theorem.

### **MATH 314/STAT 304\*: Distribution Theory (3 credits)**

*Prerequisite: MATH 105/STAT 102\**

Note: Please see the contents from the list of "Statistics" courses

### **MATH 315/STAT 311\*: Mathematical Statistics (3 credits)**

*Prerequisite: MATH 105/STAT 102\**

Note: Please see the contents from the list of "Statistics" courses

### **MATH 316/PHYS 341\*: Methods of Mathematical Physics (3 credits)**

*Prerequisite: MATH 102 or PHYS 103*

Note: Please see the contents from the list of "Physics" courses

### **MATH 401: Advanced Group Theory (4 credits)**

*Prerequisite: MATH 313*

Direct product of groups, Sylow Theorems, series in groups, solvable groups, Nilpotent groups, free groups, free products of groups, linear groups.

### **MATH 402: Ring Theory (4 credits)**

*Prerequisite: MATH 313*

Definition and examples of rings, ideals, operations on ideals, prime ideals, maximal ideals, integral domains, principal ideal domain, unique factorization domain, quotient ring, ring homomorphism, extension and contraction of ideals.

### **MATH 403/CSCS 403\*: Graph Theory (4 credits)**

*Prerequisite: MATH 303/COMP 113*

Graphs, sub graphs, isomorphism, trees, connectivity, Eulerian and Hamiltonian graphs, Vertex and Edge Colorings, Planarity.

### **MATH 404: Partial Differential Equations (4 credits)**

*Prerequisite: MATH 202*

Introduction to partial differential equations (PDEs), origins and solution of first-order partial differential equations, origins and solution of second-order partial differential equations, Canonical forms of second-order PDEs, solution of PDEs by method of separation of variables, Boundary Value Problems, solution of PDE's by integral transforms.



**MATH 406: Integration Theory (3 credits)**

*Prerequisite: MATH 201*

Riemann Integrals, conditions of integrability, integrability of continuous and discontinuous functions, mean value theorems of integral calculus, Riemann Stieltjes integrals, theorems related to Riemann Stieltjes integrals, improper integrals, introduction to Generalized Riemann integrals.

**MATH 407: Functional Analysis (3 credits)**

*Prerequisite: MATH 311*

Normed spaces, Banach spaces, convex spaces, equivalent norms, quotient spaces, linear operators, Hilbert spaces, decomposition theorem in Hilbert spaces, annihilators.

**MATH 408/STAT 401\*: Stochastic Processes (3 credits)**

*Prerequisite: MATH 105/STAT 102\**

Note: Please see the contents from the list of "Statistics" courses

**MATH 409: Continuum Mechanics (4 credits)**

*Prerequisite: MATH 203 and MATH 209*

Algebra of vectors, transformation laws for basis vectors and components, algebra of Cartesian tensors, Eigenvalues and Eigenvectors of Cartesian tensors, configurations, and motions of continuum bodies, displacement, velocity, acceleration fields, gradients and related operators, material, spatial derivatives, deformation gradient, strain tensors, rotation, stretch tensors with applications like SIMPLE SHEAR deformation and balance laws.

**MATH 410/PHYS 461\*: Quantum Mechanics I (3 credits)**

*Prerequisite: MATH 302 or PHYS 301*

Note: Please see the contents from the list of "Physics" courses

**MATH 411/PHYS 462\*: Quantum Mechanics II (3 credits)**

*Prerequisite: MATH 410/PHYS 461: Quantum Mechanics I*

Note: Please see the contents from the list of "Physics" courses

**MATH X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

**\* Cross-listed Courses:**

Courses with two designators (coding) are marked with a \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program to be counted towards the degree.

# DEPARTMENT OF PHARMACY



Pharmacy as a profession has historic roots as the art and science of preparing and dispensing medications. This role of pharmacists had been transformed into wide-ranging activities such as pharmaceutical care (community, hospital and clinical pharmacy), pharmaceutical and biotechnology industry, research (drug discovery, drug design and drug delivery), drug regulatory agencies, academics and training of health workers.

FCCU's Department of Pharmacy has been established with an ultimate goal to be the center of excellence in the field of pharmaceutical sciences. The department is located in Peter H Armacost Science Building and consists of modern lecture rooms, seminar rooms with audiovisual arrangements, modern laboratories equipped with all necessary instruments and equipment. The Department is collaborating with the 200-bed tertiary care facility, United Christian Hospital and FCCU's Mercy Health Center for practical training and residency in clinical, hospital and community pharmacy. MOUs have also been signed with the Pakistan Council of Scientific and Industrial Research, Lahore; HEJ Institute of Chemistry Karachi University; Chughtai Diagnostic Laboratory and NovaMed Pharmaceuticals for providing training, internships and research facilities.

Department of Pharmacy is part of Faculty of Natural Sciences.

## Doctor of Pharmacy (PharmD) Program

Keeping in view the ever-increasing demand of professionally skilled pharmacists in the country and abroad, the Department of Pharmacy has taken the initiative to start Doctor of Pharmacy (PharmD), a five-year professional degree program to cater to the needs of the ever growing pharmaceutical industry in research and development, manufacturing, quality assurance, clinical research, marketing, drug regulatory affairs (a major area of pharmaceutical jobs in the country) and the requirements of pharmaceutical care.

The training in the industry, according to GMP and cGMP requirements and healthcare settings, is an essential component of FCCU's Doctor of Pharmacy (PharmD) program and develops

pharmaceutical professionals whose scientific knowledge, training and skills enable them to deliver excellence in the pharmaceutical industry and pharmacy practice. This will strengthen the pharmaceutical industry to manufacture quality and cost-effective pharmaceutical products and makes the PharmD program distinct from other institutions. The program will be conducted according to the requirements of the Pharmacy Council of Pakistan.

### Learning Objectives

- Describe major concepts (principles, practices, etc.) of Pharmacy
- Exhibit the knowledge and confidence to assume professional role of pharmacist in the healthcare system (clinical, hospital and community pharmacy settings), pharmaceutical and biotechnology industry, marketing of pharmaceuticals, supply chain management, drug regulatory affairs, research and academia
- Demonstrate ability to think critically, understand health and health related problems and contribute towards their solutions
- Apply pharmaceutical knowledge in the real, changing and expanding world, and be a lifelong learner
- Describe the range of career possibilities with training in pharmacy
- Use computer technology to gather drug related information for dissemination to other healthcare providers (clinicians, nurses and paramedics) and patients
- Organize themselves as productive individuals in the service of humanity and develop them to become inspiring professionals in the progress of society

### Requirements for Doctor of Pharmacy (PharmD) Program

The Doctor of Pharmacy (PharmD) degree program at FCCU follows the curriculum approved by the Pharmacy Council of Pakistan and the Higher Education Commission. Courses from this curriculum are offered every semester. Additionally, students have to take general education courses according to the University policy.

## Course Descriptions

### 1st Semester (1st Professional PharmD)

#### PHRM 101: English-A (Functional English) (3 credits)

Learn and practice the basics of grammar, comprehension, discussion on general topics, everyday conversation, listening, translation skills, paragraph writing, and presentation skills, essay writing and technical report writing.

#### PHRM 110: Pharmaceutics-IA (Physical Pharmacy) (4 credits)

Introduction to the pharmacy profession; explanation of physicochemical principles: solubilization, adsorption, ionization, hydrolysis and micromeritics; Pharmaceutical dispersions (colloids, suspensions and emulsions), their types, and methods of preparation.

#### PHRM 111: Pharmaceutical Chemistry-IA (Organic) (4 credits)

Basic concepts of chemical bonding, hybridization, conjugation, resonance, hyper conjugation, aromaticity, inductive effect, electromeric effect, hydrogen bonding, steric effect, effect of structure on reactivity of compounds, tautomerism of carbonyl compounds, nomenclature of organic compounds; general methods of preparation, properties, identification test and pharmaceutical applications of: alkane, alkenes, alkynes, aromatic compounds, alkyl halide, alcohol, phenols, ethers, amines, ketones, aldehydes, esters, and amides; Nucleophilic and electrophilic substitution reaction.

#### PHRM 112: Pharmaceutical Chemistry-IIA (Biochemistry) (4 credits)

General introduction and basic biochemical principles, role of pharmaceutical biochemistry in the health profession, nature of biochemical reactions, basic chemistry (nature, classification, properties

etc.) and pharmaceutical importance of biomolecules (carbohydrates, lipids, proteins, nucleic acids, vitamins, hormones, enzymes).

#### **PHRM 113: Physiology-A (4 credits)**

Chemical composition of the body, cell structure, protein activity and cellular metabolism, genetic information and protein synthesis, movement of molecules across cell membranes, neural control mechanisms, the sensory systems, principles of hormonal control systems, muscle, control of body movement, consciousness and behavior.

#### **PHRM 114: Anatomy and Histology (4 credits)**

Anatomical terminology, structure of cell, body tissues, integumentary system, cardiovascular system, alimentary system, urinary system, reproductive system, endocrine system, nervous system, principles of histological techniques (preparing, staining and mounting of sections), histological examination of stained sections.

### **2nd Semester (1st Professional PharmD)**

#### **PHRM 102: English-B (Communication and Writing Skills) (3 credits)**

Enhance real life communication skills, paragraph writing, CV writing, translation skills, study skill, summary and précis writing, academic writing skills (letter/memo writing, minutes of meetings), scientific writing (research proposal, article), presentation skills, personality development, pharmacy writing and oral communication.

#### **PHRM 115: Pharmaceutics-IB (Physical Pharmacy) (4 credits)**

Rheology, physicochemical processes (precipitation, crystallization, efflorescence, deliquescence, lyophilization, fusion, adsorption, decantation, evaporation, vaporization, centrifugation, desiccation, levigation and trituration), extraction processes (maceration, percolation, liquid-liquid extraction, large scale), rate order of reactions, kinetic principles of stability testing (theoretic considerations).

#### **PHRM 116: Pharmaceutical Chemistry-IB (Organic) (4 credits)**

Heterocyclic chemistry, reaction mechanisms (Arndt-Eistert, Baeyer-Villiger oxidation, Diels Alder reaction; Grignard's reaction, Metal hydride reduction and Wolff Kishner reduction, Friedel Craft's, Perkin, Cannizzaro's, Mannich reaction), reactive intermediate and free radicals, carbonium ion rearrangements, carbanions (condensation reactions).

#### **PHRM 117: Pharmaceutical Chemistry-IIB (Biochemistry) (4 credits)**

Metabolic fate of biomolecules: carbohydrates, lipids, proteins, amino acids and bioenergetics; Regulation of metabolic processes: role of vitamins, receptor mediated regulation (hormones), secondary messengers, gene expression (replication, transcription and translation). Introduction to clinical chemistry: importance, laboratory tests (uric acid, cholesterol, bilirubin and creatinine).

#### **PHRM 118: Physiology-B (4 credits)**

Coordinated body functions: circulation, respiration, excretions and electrolyte balance, digestion and absorption, regulation of organic metabolism (endocrine and neural control), reproduction, defense mechanisms of the body.

### **1st Semester (2nd Professional PharmD)**

#### **PHRM 103: Communicative Urdu (3 credits)**

Course contents are same as URDU 101

**PHRM 104: Islamic Studies (3 credits)**

Introduction to Quranic Studies, study of selected text of Holy Quran, seerat of Holy Prophet (PBUH), introduction to Sunnah, selected study from text of Hadith, introduction to Islamic law and jurisprudence, Islamic culture and civilization, Islam and science, Islamic economic system, political system of Islam, Islamic history, social system of Islam.

**PHRM105: Christian Ethics (3 credits)**

Course contents are same as CRST 152

**PHRM 210: Pharmaceutics-IIA (Dosage Form Science) (3 credits)**

Pharmaceutical calculations, introduction to dosage form, galenical preparations (infusions, decoctions, extracts, fluid extracts, tinctures, aromatic waters), solvents used in pharmaceutical preparations, preparation of oral solutions (syrups, elixirs and spirits), preparation of oral suspensions, emulsions, magma and gels, preparation and importance of topical and transdermal drug delivery systems (ointments, creams, pastes, poultice, plasters, lotions, liniments, topical gels, topical tinctures, topical solutions, topical powders), ophthalmic, nasal and otic preparations.

**PHRM 211: Pharmaceutics-IIIA (Pharmaceutical Microbiology and Immunology) (4 credits)**

Introduction and pharmaceutical importance of microbiology; Microorganisms: the bacteria (morphology, structure, functions, classification, bacterial cultures), viruses (introduction, classification, cultivation and replication), fungi and protozoa; the normal flora: microbiology of air, soil, normal flora of body (skin, intestinal tract, ear, nose).

**PHRM 212: Pharmacology and Therapeutics-IA (4 credits)**

Introduction to pharmacology, routes of drug administration, pharmacokinetics and pharmacodynamics; Drugs acting on autonomic nervous system (ANS): Organization of ANS, neurotransmitters, sympathetic agonists and antagonists, parasympathetic agonist and antagonists, ganglion stimulants and blockers and, neuromuscular blockers. Drugs acting on gastrointestinal tract: emetics and anti-emetics, purgatives, anti-diarrheal agents, drugs used in treatment of peptic and duodenal ulcer, chronic inflammatory bowel diseases and affecting bile flow.

**PHRM 213: Pharmacognosy-IA (Basic) (4 credits)**

Introduction of pharmacognosy, traditional medicine systems, herbal Pharmacopoeia and modern concepts about Pharmacognosy. Crude drugs: preparation, therapeutic classification, methods of cultivation, evaluation and adulteration. The study of the crude drugs families of medicinal importance: Ranunculaceae, Papaveraceae, Leguminosae, Umbelliferae, Apocynaceae, Asclepiadaceae, Compositae, Solanaceae, Scrophulariaceae, Labiatae, Liliaceae, Zingiberaceae.

**PHRM 214: Pharmacy Practice-IA (Pharmaceutical Mathematics) (3 credits)**

Algebra (solution of Linear and Quadratic equations, arithmetic, geometric and harmonic progressions, permutations and combinations, binomial theorem), trigonometry, analytical geometry, differential calculus, integral calculus.

**PHRM 107: Fundamental of Speech (3 credits)**

Course contents are the same as MCOM 100

**2nd Semester (2nd Professional PharmD)****PHRM 106: Pakistan Studies (3 credits)**

This course is designed to develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan. Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

**PHRM 215: Pharmaceutics-IIB (Dosage Form Science) (4 credits)**

Suppositories and enemas: preparation, packaging and storage. Aerosols, inhalations and sprays: principle, container and, propellants, filling, testing, packaging, labelling and storage. Powders, capsules, tablet dosage forms: preparation of powders, granules, effervescent granulated salts, hard gelatin capsules, soft gelatin capsules and tablets. Introduction to parenterals: official types of injections, solvents and vehicles for injections, added substances. Brief introduction to oral hygiene products.

**PHRM 216: Pharmaceutics-IIIB (Pharmaceutical Microbiology and Immunology) (4 credits)**

Industrial Microbiology: Introduction to sterilization and fermentation. Pharmaceutical products produced by fermentation process. Immunology: introduction and types of immunity, specific and non-specific, antigen-antibody reactions, hypersensitivity, allergy, vaccination. Factory and hospital hygiene: good manufacturing practices. Introduction to diseases: dengue fever, bird flu, SARS or other prevailing diseases of bacteria and virus.

**PHRM 217: Pharmacology and Therapeutics-IB (4 credits)**

Autacoids and their antagonists, drugs acting on respiratory system, drugs acting on cardiovascular system, drugs acting on genitourinary system, anti-anemic drugs, agents affecting endocrine function, drug used for therapy of Diabetes Mellitus.

**PHRM 218: Pharmacognosy-IB (Basic) (4 credits)**

Drugs of animal origin, biologics, surgical dressings, pesticides, growth regulators, poisonous plants allergens and enzymes obtained from plant and animal source.

**PHRM 219: Pharmacy Practice-IB (Bio-statistics) (3 credits)**

Application of statistics in Biological and Pharmaceutical Sciences. Organizing and displaying data, summarizing data and variation, curve fitting, simple regression and correlation, test of hypothesis and significance, student "T", "F" and chi-square distributions, analysis of variance statistical package (SPSS, Minitab, Statistica etc.)

**PHRM 108: Introduction of PR and Advertising (3 credits)**

Course contents same as MCOM 103

## 1st Semester (3rd Professional PharmD)

**PHRM 310: Pharmacy Practice-IIA (Dispensing Pharmacy) (4 credits)**

Basic principles of compounding and dispensing. Extemporaneous dispensing of solutions, suspensions, emulsions, creams, ointments, pastes and gels, suppositories, powders, granules and oral unit dosage form. Pharmaceutical incompatibilities: types manifestations, correction and prevention.

**PHRM 311: Pharmaceutical Chemistry-IIIA (Pharmaceutical Analysis) (4 credits)**

The quantitative and qualitative analyses of drugs using instrumental and titrimetric techniques. Spectroscopic Methods: atomic absorption and emission spectroscopy, molecular fluorescence spectroscopy, flame photometry, IR spectroscopy, mass spectroscopy, NMR spectroscopy, and UV/visible spectroscopy. Chromatographic methods: column chromatography, thin layer chromatography, gas liquid chromatography, HPLC, LCMS, GCMS, Capillary Electrophoresis.

**PHRM 312: Pharmacology and Therapeutics-IIA (4 credits)**

Drugs acting on central nervous system: sedatives and hypnotic, anxiolytics, antidepressants and antimanic drugs, antiepileptic's, anti-Parkinsonian, antipsychotics, opioid analgesics, therapeutic gases, cerebral stimulants, medullary stimulants, spinal cord stimulants, anesthetics. Non-steroidal anti-inflammatory drugs: disease modifying drugs, antirheumatic drugs, non-opioid analgesics and drugs used in the treatment of gout.

### **PHRM 313: Pharmacognosy-IIA (Advanced) (4 credits)**

Separation and isolation of plant constituents: use of spectroscopic and chromatographic techniques for the identification of natural products. Carbohydrates and related compounds: sucrose and sucrose containing drugs, cellulose and cellulose derivatives, gums and mucilage. Alkaloids: areca nut, lobelia, tropane, quinoline, isoquinoline, indole, imidazole, steroidal alkaloids and alkaloidal amines. Glycosides: cardio active glycosides, anthraquinone, saponin glycosides, cyanophore glycosides, isothiocyanate, lactone glycosides and aldehyde glycosides. Plant steroids: bile acids, plant sterols, steroidal sapogenins, steroid hormones, withanolides and ecdysons. Lipids: fixed oils, fats and related compounds and waxes.

### **PHRM 314: Pathology (4 credits)**

Scope of pathology and concept of diseases. Definition and terminology: ischemia, hypoxia, necrosis, infarction, atrophy, hypertrophy, hyperplasia, metaplasia, aplasia and anaplasia. Response of body to injury and infection: acute and chronic inflammation, immunity, allergy, hyper sensitivity. Specific diseases: Ulcer (peptic, duodenal), hypertension, leukemia or blood cancer (malignant carcinoma, sarcoma and lymphomas), diagnosis and treatment of cancer.

## **2nd Semester (3rd Professional PharmD)**

### **PHRM 315: Pharmacy Practice-IIB (Community, Social and Administrative Pharmacy) (3 credits)**

Definitions and background, public health and community pharmacy, medical complication of drug taking, patient education and counseling, control of drug abuse and misuse, role of pharmacist as public health educator in the community for drug monitoring and drug information, health system research, pharmaco economics, alternative therapies, pharmacy layout design.

### **PHRM 316: Pharmaceutical Chemistry-IIIB (Pharmaceutical Analysis) (4 credits)**

Electro chemical techniques, thermal analysis and titrimetric analysis. Occurrence, properties, preparation and application of official inorganic compounds: aluminum hydroxide, ammonium chloride, sodium carbonate, magnesium carbonate, lithium carbonate, sodium nitrite, calcium gluconate, antimony gluconate, ferrous fumarate, ferrous sulfate and silver nitrate.

### **PHRM 317: Pharmacology and Therapeutics-IIB (4 credits)**

Chemotherapy: antibacterials, anti-fungals, anti-virals, anti-protozoals, anti-neoplastic drugs; Immunopharmacology: Pharmacology of immuno-suppressants and stimulants agents; Toxicology: pollution, poisoning (signs, symptoms and treatment).

### **PHRM 318: Pharmacognosy-IIB (Advanced) (4 credits)**

Volatile oils (essential oils), resins and oleoresins, tannins, natural toxicants: nutraceuticals and cosmeceuticals, tumor inhibitors from plants, introduction to clinical pharmacognosy, clinical use of herbs and herbal medicine.

### **PHRM 319: Pharmacy Practice-III (Computer and its Applications in Pharmacy) (4 credits)**

Fundamentals of computers, research methodologies, system analysis and design, data processing, application of computers in hospital pharmacy, application of computer in community pharmacy, application of drug information retrieval and storage, data analysis.

## **1st Semester (4th Professional PharmD)**

### **PHRM 350: Pharmacy Practice-IVA (Hospital Pharmacy) (3 credits)**

Introduction to hospital pharmacy, hospital and its organization, pharmacy, its organization and personnel, pharmacy and therapeutic committee, the hospital formulary, dispensing to inpatients,

dispensing to ambulatory patients, distribution of control substances, dispensing during off-hours, and safe use of medication in the hospital.

**PHRM 351: Pharmacy Practice-VA (Clinical Pharmacy-I) (4 credits)**

General introduction to clinical pharmacy, patient profile and counseling (patient disease profile, taking case history, drug profile of important medications, patient counseling), clinical trials of drug substances, emergency treatment, drug interactions, pharmacovigilance.

**PHRM 352: Pharmaceutics-IVA (Industrial Pharmacy) (4 credits)**

Mass transfer, heat transfer, drying (theories of drying, drying of solids, classification of dryers, general methods), comminution (size reduction, factors affecting size reduction, size analysis, energy mills), mixing (mechanism and equipment), clarification and filtration (filter media, aids, equipment), evaporation, compression and compaction (flow of powder, tablets machine, tablet defects, hardness, capsules).

**PHRM 353: Pharmaceutics-VA (Biopharmaceutics and Pharmacokinetics) (4 credits)**

Definitions and terminology, gastro-intestinal absorption, biological half-life and volume of distribution, drug clearance, pharmacokinetics, multiple dosage regimen, concept of compartment models.

**PHRM 354: Pharmaceutics-VIA (Pharmaceutical Quality Management-I) (4 credits)**

Basic concepts and introduction of pharmaceutical industry in relevance to quality assurance and quality control departments, quality control of solid dosage forms, syrups, elixirs and disperse system, suppositories and sterile products (parenterals) and standardization of pharmaceuticals.

## 2nd Semester (4th Professional PharmD)

**PHRM 355: Pharmacy Practice-IVB (Hospital Pharmacy) (3 credits)**

Manufacturing (bulk and sterile), the pharmacy as central sterile supply room, aseptic dispensing, role of pharmacist in small hospitals, distribution and control of hospital medicines, medical and surgical supplies, nuclear pharmacy, investigational use of drugs, health accessories, surgical supplies, inspection of wards with reference to drug storage and administration, management of accidents and emergency pharmacy.

**PHRM 356: Pharmacy Practice-VB (Clinical Pharmacy-I) (4 credits)**

Pharmacotherapy plan (developing, implementing and monitoring drug therapy plans), drug-induced diseases, utilization of clinical drug literature, online pharmaceutical care services and globalization, provision of pharmaceutical care in multiple environments, disease management (etiology, pathogenesis, clinical presentation, diagnostic, pharmacotherapy of diseases in cardiovascular unit, pulmonary unit and gastroenterology unit).

**PHRM 357: Pharmaceutics-IVB (Industrial Pharmacy) (4 credits)**

Formulation, equipment used in preparation and test methods for pharmaceutical suspensions, emulsions, semisolids, sterile products. Packing and packaging: influence of packaging materials, stability, packaging lines, packaging area, packaging equipment; safety in pharmaceutical industry.

**PHRM 358: Pharmaceutics-VB (Biopharmaceutics and Pharmacokinetics) (4 credits)**

Elimination of drugs (hepatic elimination, renal excretion), protein binding, pharmacokinetics variations in disease states, pharmacokinetics of intravenous infusions, biopharmaceutical aspects in developing a dosage form, bioavailability and bioequivalence, in-vitro-in-vivo correlation.

**PHRM 359: Pharmaceutics-VIB (Pharmaceutical Quality Management) (4 credits)**

Biological assays, alcohol determination, alkaloidal drug assay, quality assurance of vaccines, miscellaneous determinations and tests, statistical interpretation of quality control charts during manufacturing processes.



## 1st Semester (5th Professional PharmD)

### **PHRM 410: Pharmaceutics-VIIA (Pharmaceutical Technology) (4 credits)**

Principles of pharmaceutical formulation and dosage form design, advanced granulation technology (design and practice), polymers used in drug delivery systems, novel drug delivery systems (sustained/controlled release drug delivery system), microencapsulation techniques, developmental aspects of matrix and reservoir systems.

### **PHRM 411: Pharmacy Practice-VIA (Advanced Clinical Pharmacy-II) (4 credits)**

Rational use of drugs, introduction to essential drugs (criteria for selection, usage and advantages, development of EDL), disease management (etiology, pathogenesis, clinical presentation, diagnostic, pharmacotherapy of diseases in central nervous system, infectious diseases and endocrinology units), drug utilization evaluation and drug utilization review, clinical pharmacokinetics.

### **PHRM 412: Pharmacy Practice-VIIA (Forensic Pharmacy) (3 credits)**

Introduction (forensic pharmacy, history of drug legislation and drug control administration), role of forensic pharmacist, pharmaceutical ethics (patents and generics, sale, industry, research), and study of drug laws (Drugs Act, 1976/DRAP Act, 2012, provincial drug rules, advertisement rules, other related rules, legal aspects).

### **PHRM 453: Pharmacy Practice-VIIIA (Pharmaceutical Management and Marketing) (3 credits)**

Management and marketing: principles of management, types and functions of managers, planning, organizing, management control systems, motivation, innovation and creativity, principles of marketing, product management, marketing research. Production management: material management, planning of production, batch record maintenance.

### **PHRM 454: Pharmaceutical Chemistry-IVA (Medicinal Chemistry) (4 credits)**

Introduction to medicinal chemistry, drug targets and drug designing, general properties, chemistry, biological action, structure activity relationship and the therapeutic applications of hormones, proteinous hormones, anti-neoplastic agents, sedatives and hypnotics, anaesthetics, general anaesthetics, analgesics and antipyretics.

## 2nd Semester (5th Professional PharmD)

### **PHRM 455: Pharmaceutics- VIIB (Pharmaceutical Technology) (4 credits)**

Novel GIT drug delivery system (oral osmotic pumps, ion-exchange controlled, pH-controlled, bio/mucoadhesive and floating DDS), drug carrier system (liposomes, niosomes), targeted drug delivery system (active and passive drug targeting), pharmaceutical biotechnology (introduction, techniques, genetic engineering and its application, pharmaceutical recombinant therapeutic proteins, monoclonal antibodies, immobilized enzymes).

### **PHRM 456: Pharmacy Practice-VIB (Advanced Clinical Pharmacy-II) (4 credits)**

Pharmaceutical care, its scope, management and applications, clinical therapeutics, disease management (etiology, pathogenesis, clinical presentation, diagnostic, pharmacotherapy of diseases in oncology, nephrology, and hematology units), clinical toxicology, safe intravenous therapy, hazards of IV therapy and non-compliance.

### **PHRM 457: Pharmacy Practice-VIIB (Forensic Pharmacy) (3 credits)**

The Pharmacy Act 1967, Control of Narcotics Substances Act 1997 (laws relating to narcotic drugs and psychotropic substances), the Poisons Act 1919, the Factories Act 1934, Shops And Establishments Ordinance 1969 with rules.

**PHRM 458: Pharmacy Practice-VIIB (Pharmaceutical Management and Marketing)  
(3 credits)**

Marketing management, (ethics in pharmaceutical marketing, marketing research, market analysis techniques, 3Cs, marketing performance, marketing channels), sales management, business development management, business communication, strategies, and global meetings.

**PHRM 459: Pharmaceutical Chemistry-IVB (Medicinal Chemistry) (4 credits)**

General properties, chemistry biological action, structure activity relationship and therapeutic applications of sulphonamides, antimalarials, diuretics, antitubercular drugs, antiviral drugs, antibiotics.

**Note:**

Following courses fulfill the General Education requirements of the University:

PHRM 101 (ENG 101), PHRM 102 (ENG 103), PHRM 103 (URDU 101), PHRM 104 (ISLM 101), PHRM 105 (CRST 152), PHRM 106 (PKST 101), PHRM 107 (MCOM 100), PHRM 108 (MCOM 103), PHRM 315 (SOCL 450), PHRM 111/CHEM 160, PHRM 211 (BIOL 315), PHRM 214 (MATH 102), PHRM 219 (STAT 101), PHRM 319 (CSCS 100), PHRM 453 (ECON 304).  
PharmD students are required to enroll courses with Pharmacy course codes (PHRM).



## DEPARTMENT OF PHILOSOPHY

The vision and mission of FCCU “to impart, create and disseminate knowledge” is best encapsulated in the oldest of disciplines: Philosophy.

The wisdom of the sages is captured in the branches Metaphysics and Epistemology; the application of this sagacity is developed by the branches of Logic and Ethics. The wide diversity of theories and application is complemented by an in-depth study of specific thinkers from ancient medieval, modern and contemporary periods. The study of Philosophy thus is the most significant guarantor of critical and creative thinking, and an indispensable requirement of today.

The Department of Philosophy at FCCU is relatively new – launched in 2010, but the rich tradition of learning and knowledge-seeking is adopted and adapted for contemporary times. It is part of the Faculty of Humanities.

### Learning Objectives

- Know the major philosophical movements through the history of Philosophy, past to present
- Understand the various methods that have been used to identify and resolve philosophical problems
- Analyze philosophical arguments
- Apply critical thinking to whole life issues, that is, career, recreation, self-development, etc

### Requirements for Major

A minimum of 36 credit hours, taken under advisement from the courses offered. 12 credits of core courses, 21 credits of major electives, and the senior capstone course (which includes an internship) must be completed.

### Requirements for Minor

The minor in Philosophy builds on the offerings taken from the major, accumulating to 18 credits: 4 core courses in addition to 2 courses of choice.

**Core courses:** PHIL 101, PHIL 201, PHIL 202, PHIL 221.

## Course Descriptions

### Core courses

#### **PHIL 101: Introduction to Philosophy (3 credits)**

Selection of the problems historically identified as philosophical along with the methods philosophers have used to solve these problems, including justice and moral order, evaluation and justification of belief and human value and dignity, identifying the problems that have bothered critical thinkers, followed by selective philosophical solutions and their authors.

#### **PHIL 201: Philosophy: Ancient through Medieval (3 credits)**

Rise of critical thought in the pre-Socratic Greek world and its development through the issues related to deriving the morally right and individual significance by understanding the universe's structure and function, classic Platonic and Aristotelian worldviews, evaluation of their Eastern and Western historical critics through the end of the medieval period.

#### **PHIL 202: Philosophy: Modern to Contemporary (3 credits)**

Critical thought as it develops from the 16th century CE to the present, including Eastern as well as Western thinkers, issues that captured attention because of the rise of the sciences, the development of naturalism, humanism and the challenges of 20th century social crises.

#### **PHIL 221: Logic: How to Think Clearly (3 credits)**

Examination of logic, including both Stoic contributions as well as the systematic organization of the rules of right thinking developed by Aristotle and expanded by Medieval and later thinkers, concern about the issues raised by JS Mill and others who systematized inductive logic.

### Elective Courses

#### **PHIL 231: Philosophy of Religion (3 credits)**

Set of issues that has dominated modern and contemporary concerns about religious thought, problem of evil, meaningfulness of God talk, relevance of religion for moral and social justice etc.

#### **PHIL 301/PLSC 301\*: Ancient, Medieval, and Early Modern Political Philosophy (3 credits)**

A study of political thought from early Greece through the 17th century. Analysis and evaluation of the issues and positions will be conducted using some original sources from philosophers including Plato, Aristotle, Hobbes, Machiavelli, Locke and Rousseau.

#### **PHIL 303/PLSC 303\*: Contemporary Political Philosophy (3 credits)**

Debates concerning the nature of political rights and duties, and the justification of political theories such as Utilitarianism, Marxism, and Democracy. Of special interest will be the classic documents influencing contemporary discussion, such as Jean-Jacques Rousseau's *Discourse on Inequality*, JS Mill's *On Liberty*, Che Guevara, *Global Justice: Liberation and Socialism*, Gandhi, *All Men are Brothers*, John Rawls, *A Theory of Justice* (1971), Robert Nozick, *Anarchy, Society and Utopia* (1974).

#### **PHIL 304/HIST 301\*: Philosophy of History (3 credits)**

This course studies in-depth the ideas behind the study of history, the different schools of thought in history, and the underlying theories. Special attention will be given to the development of South Asian and Muslim philosophy of history.

#### **PHIL 322: Symbolic Logic (3 credits)**

*Prerequisite: PHIL 221 or permission from the Instructor*

Logical formulation of the ideal language that is the basis of modern computer language, Physics, and linguistics, natural deduction using quantification, sentential calculus.

### **PHIL 325: Philosophy of Education (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

Key issues relating to the conveying and acquisition of knowledge, examining their resolution by those theories which have been used to direct classroom practices, evaluating these approaches in terms of contemporary methods and challenges

### **PHIL 331: Theories of Ethics (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

Ethical issues of objectivity vs subjectivity in moral judgement, relativity vs universalizability of moral principles, the logical foundation of moral perspectives, the scope and limits of moral language etc. in light of contemporary theories designed to resolve them.

### **PHIL 332: Metaphysics (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

This course analyzes the nature and structure of reality with attention to issues such as physical and immaterial reality, time, the connection of mind and body, and the nature of the human person. Attention may also be given to the building of worldviews into language, the molding of perception by cultural structures, and the tools necessary to reveal how the regularities of human experience and worth are to be explained.

### **PHIL 341: Epistemology (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

This course provides a critical analysis of the foundations of knowledge. Classical theories will be examined but the emphasis will be on recent trends in substantiating belief and defining knowledge.

### **PHIL 342: Philosophy of Science (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

Rise of the scientific method from the perspective of the logic of scientific explanation, relevance of theory to experimental information, dependence of scientific explanation on a paradigm of how the world functions, etc.

### **PHIL 401: Philosophical Investigations: The Ancient Period (3 credits)**

### **PHIL 402: Philosophical Investigations: The Ancient Period (3 credits)**

### **PHIL 403: Philosophical Investigations: The Ancient Period (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

The courses are rotated over a three-year sequence and allow the student to concentrate on careful study in the thought, context and impact of a specific ancient philosopher.

### **PHIL 411/CRST 452\*: Philosophical Investigations: The Medieval Period (3 credits)**

### **PHIL 412: Philosophical Investigations: The Medieval Period (3 credits)**

### **PHIL 413: Philosophical Investigations: The Medieval Period (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

The courses are rotated over a three-year sequence and allow the student to concentrate on careful study in the thought, context and impact of a specific medieval philosopher.

### **PHIL 421: Philosophical Investigations: The Modern and Contemporary Periods (3 credits)**

### **PHIL 422: Philosophical Investigations: The Modern and Contemporary Periods (3 credits)**

### **PHIL 423: Philosophical Investigations: The Modern and Contemporary Periods (3 credits)**

*Prerequisite: Any Philosophy course or permission from Instructor*

The courses are rotated over a three-year sequence and allow the student to concentrate on careful study in the thought, context and impact of a specific modern or contemporary philosopher.

### **PHIL440/ENGL440\*: Literature and Philosophy (3 credits)**

*Prerequisites: ENGL 201*

The main focus of this course is to trace the connections between two disciplines: Literature and Philosophy; students survey how writers make use of philosophical ideas, themes, vocabulary and language; study of how literary texts can focus on important philosophical issues; emphasis on both Philosophy in literature and Philosophy as literature.

### **PHIL X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **PHIL 499: Philosophical Research and Use Seminar. This is a Senior Capstone Course including an internship (3 credits)**

*Prerequisites: The core courses as listed in the catalog, that is, PHIL 101, PHIL 201, PHIL 202, and PHIL 221 and 18 credits of electives from the major as listed in the catalog*

Comprehensive study of the contemporary issues in Philosophy involving the development of a major research paper with the provision of a community internship.

#### **\*Cross-listed Courses:**

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program to be counted towards the degree.



## DEPARTMENT OF PHYSICS

Physics has been taught at Forman Christian College (A Chartered University) since it was established in 1864. The Physics Department was instituted in 1907 with Prof DJ Fleming as its first Head. A long line of distinguished professors and prominent scientists have served at this Department, including Nobel Laureate Dr Arthur Compton, Prof JM Benade and Dr Piara Singh Gill. Dr Compton conducted most of his research on cosmic rays while a faculty member at FCC, which led to his receiving the Nobel Prize for Physics in 1927. Prof JM Benade was one of the longest serving professors in the Department, eventually retiring as its Head in 1970. He was an active researcher and the Asian representative in Dr Compton's international research team. Dr Compton's student Dr Piara Singh Gill was a faculty member at FCC from 1940 to 1947 and active in research. He was associated with the University of Chicago and the Georgia Institute of Technology. All these scientists and professors have made significant contributions to the field of Physics.

The Department of Physics offers a BS (Hons) degree in Physics that concentrates on building its students capacities as physicists through a variety of courses and learning activities. The Department is part of the Faculty of Natural Sciences.

### BS (Hons) Physics

#### Learning Objectives

- Demonstrate a general working knowledge of the basic areas of Physics and apply formal knowledge in a problem-solving environment
- Demonstrate proficiency in basic laboratory skills (e.g. instrumental analysis and laboratory safety) and formulate effective strategies for solving scientific problems
- Efficiently use library resources and technology to gather information, read, understand, and communicate scientific information clearly and precisely, both orally and in writing
- Analyze the broader implications of Physics-related experimentation and application processes (e.g., resource management, economic factors, and ecological considerations)
- Work effectively with others as part of a team to solve scientific problems

- Describe the opportunities in, and requirements for, careers available to those with training in Physics

### Requirements for Major

A minimum of 48 credit hours including the following core courses: PHYS 103, PHYS 104, PHYS 221, PHYS 222, PHYS 301, PHYS 321, PHYS 335, PHYS 461 and PHYS 462.

Of the 48 credits required overall, the remaining credits from Physics courses-200 and above must be taken as electives.

Students are also recommended to take MATH 101, MATH 102, MATH 201, MATH 202 and MATH 203.

### Requirements for Minor

A minor in Physics is open to students of all disciplines with a minimum CGPA of 2.50.

A minimum of 24 credit hours including the following core courses: PHYS 103, PHYS 104, PHYS 221, PHYS 222.

Of the 24 credits required overall, a minimum of 9 credits from the Physics courses – 200 and above must be taken as electives.

### Notes

- The Department offers these courses in accordance with available faculty and student load. Students should consult their faculty Advisor or the Department Chairperson about the availability in a particular semester or academic year
- All courses of four (4) credit hours have laboratory instruction and practical associated with them
- Students desirous of pursuing higher educational Physics degrees in Pakistan should ensure that their combined aggregate credits in Physics, Chemistry and Mathematics, including courses in the General Education Science and Mathematics category, should exceed 70 credits
- The courses PHYS 341, PHYS 461 and PHYS 462 are cross-listed with the Mathematics Department
- Physics courses which appear in the Environmental Sciences section of the catalog likewise count towards the fulfillment of degree requirements in both programs

\* Students not taking PHYS 498 or PHYS 499 due to eligibility or other reasons must take two additional Physics courses to complete the required credit hours for majoring/graduating.

## Course Descriptions

### PHYS 100: Introduction to Physics (4 credits)

*Not for students who have studied Physics at Intermediate or A Level or equivalent*

Scope of Physics, kinematics and bodies in motion, communication, basic electricity, medical physics and elements of astrophysics, laboratory: familiarization with measuring instruments and related experimentation.

### PHYS 102: General Physics II/CSCS 105 Basic Electronics\* (4 credits)

*Prerequisite: PHYS 100 or A Level or Intermediate Physics CSCS 105 course is open only to Computer Science majors*

Electricity, magnetism, DC and AC Current, modern Physics, laboratory.

### PHYS 103: Mechanics (4 credits)

*Prerequisite: PHYS 100 or Intermediate or A Level Physics or equivalent*

Study of physical phenomena in mathematical terms, statics and dynamics of particles and rigid bodies, oscillatory and rotary motion, gravitation and fluid mechanics, laboratory.



### **PHYS 104: Wave and Vibrations (4 credits)**

*Prerequisite: PHYS 103 or Intermediate or A Level Physics or equivalent*

Study of physical phenomena in mathematical terms, types of waves, mathematical representations, energy of waves, interference, diffraction and polarization, laboratory.

### **PHYS 151/ENVR 151\*: Introduction to Sources of Energy and Environment (3 credits)**

*Not recommended for first semester Freshmen*

Conventional energy resources, fossil fuels including petroleum, natural gas, coal and tar sands, the promise and problems of nuclear energy, alternative energy sources, wind, solar, biogas, tidal, etc, energy conservation, environmental pollution and its global effects.

### **PHYS 192/SOCL 192\*: Science and the World Around Us (3 credits)**

*The course is open to undergraduates in all departments*

This course bridges the divide between science and non-science students by introducing major scientific concepts using simple language, and creates an understanding of important contemporary issues that simultaneously involve science, society, and politics. Main topics are: the nature and history of science; great achievements of science; science and politics in the modern world; the challenge of climate change; science and war.

### **PHYS 221/ENVR 221\*: Electricity and Magnetism (4 credits)**

*Prerequisite: PHYS 103*

Electrostatics, magneto-statics, electric current, laws of magnetism, Maxwell's equations, electromagnetic energy and electromagnetic wave equations, laboratory.

### **PHYS 222: Modern Physics (4 credits)**

*Prerequisite: PHYS 221 or PHYS 103*

Study of Einstein's special theory of relativity, black body radiation, the Bohr atom, elementary wave mechanics, atomic and molecular spectra, exclusion principle, periodic table, X-ray spectroscopy, introduction to lasers, laboratory.

### **PHYS 255/ENVR 255\*: Introduction to Meteorology (3 credits)**

*Prerequisite: PHYS 102 or PHYS 103*

Study of the physical processes of condensation, precipitation, radiation and radiative transfer, solar radiation, atmospheric motion measuring properties of the atmosphere, ionosphere and magnetosphere, Earth's magnetic field and charge density movement in the atmosphere.

### **PHYS 300: Fundamentals of Optics (4 credits)**

*Prerequisite: PHYS 104, and PHYS 221*

One dimensional waves, harmonic waves, phase and phase velocity, group velocity, laws of electromagnetic theory, electromagnetic waves, Poynting Vector, Rayleigh scattering, reflection, refraction, Fermat's Principle, total internal reflection, lenses, aperture and field stop, mirror, aberration, astigmatism, polarizers, dichroism, birefringence, application of the Fresnel equation, liquid crystals, interference, Young's experiment, Michelson's Interferometer, Fabray-Perot Interferometer, applications of interferometry, diffraction, Huygens-Fresnel Principle, Fraunhofer and Fresnel diffraction, The Double Slit, grating spectroscopy, holography, laboratory.

### **PHYS 301: Classical Mechanics (3 credits)**

*Prerequisite: PHYS 103 or MATH 302*

Study of the motion of particles and system of particles, direct application of Newtonian mechanics, Lagrangian formulation, Hamiltonian formulation, motion under an inverse force field, two body problems, planetary orbital motion, Legendre transformation, canonical transformations and their properties, Poisson's brackets, theorems and invariance.

### **PHYS 321: Electrodynamics (4 credits)**

*Prerequisite: PHYS 221, MATH 203/PHYS 341*

Emphasis on the unity of electric and magnetic phenomena, introduction of electrostatics and magneto-statics, solution of boundary-value problems, time-varying fields, gauge transformations, Maxwell's equations and wave equations, electromagnetic wave propagation in lossless, Lossy and metallic media, wave propagation through coaxial transmission lines, rectangular wave guides and radiation from oscillating dipoles, laboratory.

### **PHYS 331: Electronics I (4 credits)**

*Prerequisite: PHYS 221/PHYS 102*

Circuit analysis, characteristics and applications of semiconductor devices and circuits, power supplies, special diodes, bipolar junction transistors (BJTs) with biasing analysis and frequency response, BJT models, field effect transistors (FETs), signal analysis of BJTs and FETs, power amplifiers, feedback concepts and types, oscillator circuits and applications, multivibrators, laboratory.

### **PHYS 332: Electronics II (4 credits)**

*Prerequisite: PHYS 331*

Models for active devices, single-ended and differential amplifiers, current sources and active loads, operational amplifiers, feedback, design of analog circuits for particular functions and specifications, design of decision-making circuits, memory type circuits and digital circuits, laboratory.

### **PHYS 335: Thermodynamics and Statistical Physics (3 credits)**

*Prerequisite: PHYS 221 and PHYS 301*

Heat, temperature, laws of thermodynamics and their applications, entropy, enthalpy, a statistical approach to thermodynamics, thermal and chemical equilibrium, classical and expanding gas heat engines, plane transition and irreversible processes, behavior of large assemblies of particles, phase space, physical systems, ensembles, partition functions, thermodynamics functions and the principle of equi-partition energy, Planck's distribution, Boltzman's distribution, Bose-Einstein distribution, and Fermi-Dirac distribution.

### **PHYS 341/MATH 316\*: Methods of Mathematical Physics (3 credits)**

*Prerequisite: PHYS 221/PHYS 321/MATH 201/MATH 203*

Vector analysis and special function curvilinear coordinates, Legendre polynomials, Bessel functions, Neumann functions, Cauchy-Riemann equations, Fourier series and Fourier transformations, tensor analysis.

### **PHYS 342: Computational Physics (3 credits)**

*Prerequisite: PHYS 221*

Introduction to scientific computing, basic numeric tools to solve Physics problems, ordinary differential equations, partial differential equations, finite difference time domain method (FDTD), Monte Carlo technique.

### **PHYS 351/ENVR 351\*: Environmental Physics (3 credits)**

*Prerequisite: PHYS 221*

Introduction to environmental Physics, radiation, radiation balance, heat and mass transfer, micrometeorology of crops.

### **PHYS 352: Plasma Physics (4 credits)**

*Prerequisite: PHYS 221*

Plasma state; criteria for the plasma state; Debye shielding, gas discharge; space physics; controlled fusion; modern astrophysics; MHD energy conversion; ion/plasma propulsion; solid-state plasma, single particle motion in electric and magnetic fields (uniform, non-uniform, time-independent and time varying fields); plasmas as magnetic mirror, continuity equation, Poisson's equation, waves and wave propagations in plasmas; phase velocity; group velocity; dispersion relations.

### **PHYS 422: Nuclear Physics (3 credits)**

*Prerequisite: PHYS 222*

Structure and properties of the nucleus, nuclear forces, nuclear phenomenology, reaction and stability of nuclear models, radiation and decay, alpha, beta and gamma decay, nuclear reactions and detection of radiation.

### **PHYS 451/ENVR 451\*: Sources of Energy (3 credits)**

*Prerequisite: PHYS 222*

Study of the different alternative sources of energy, including hydroelectric, wind, solar, photovoltaics, nuclear and thermonuclear (fission and fusion). New energy technologies like fuel cells and the role of hydrogen, the Physics of these sources and their environmental impact.

### **PHYS 460: Introduction to Medical Physics (3 credits)**

*Prerequisite: PHYS 222 or PHYS 422 or equivalent*

Application of Physics in medicine, i.e., radiation therapy, medical imaging, and nuclear medicine. Ionizing radiation and radiation safety; radioactivity, radiation therapy, computed tomography, nuclear medicine, ultrasound, and magnetic resonance imaging, etc.

### **PHYS 461/MATH 410\*: Quantum Mechanics I (3 credits)**

*Prerequisite: PHYS 301 or MATH 302*

Historical origination of the quantum theory, foundation of wave mechanics, Schrodinger wave equation and its solution for free particles, the hydrogen atom and the harmonic oscillator.

### **PHYS 462/MATH 411\*: Quantum Mechanics II (3 credits)**

*Prerequisite: PHYS 461*

Matrix mechanics, vector spaces and linear operators, time dependent and time independent perturbation theories, WKB approximation, identical particles, scattering, Dirac equation, application of principles of quantum mechanics to solid state and nuclear systems.

### **PHYS 472: Lasers (3 credits)**

*Prerequisite: PHYS 321, PHYS 461*

Study of the concepts of laser, spontaneous and stimulated emissions, absorption, pumping process, properties of laser beams, laser resonators, matrix formulation of geometric optics, stable and unstable laser resonators, modes in a laser cavity, loop gain Q-switching, energy levels of molecules.

### **PHYS 481: Solid State Physics I (3 credits)**

*Prerequisite: PHYS 221*

Study of solids, crystal structure, direct and reciprocal lattices, types of bonding, lattice vibrations, the thermal, electrical properties of solids and the effects of crystals.

### **PHYS 482: Solid State Physics II (3 credits)**

*Prerequisite: PHYS 481*

Free electrons, Fermi gas, nearly free electrons, energy bands, optical transitions, superconductors and magnetic properties.

### **PHYS 483: Materials Science (3 credits)**

*Prerequisite: PHYS 321*

Study of the properties of material, internal structure of materials, performance of materials during manufacture, production and processing, performance of materials during service, crystal structures, crystal geometry, solidification, crystalline imperfections, diffusion in solids, thermodynamics and phase diagrams and electrical materials.

### **PHYS 498: Internship (6 credits)**

*For Physics majors with a minimum CGPA of 2.50 and 90 completed credit hours*

Students will have to work in a well-known industry/organization or the university/institute for six to

eight weeks and will observe the timings as prescribed by the host organization. Manager Internships will act as a liaison officer between the Department and the industry/organization, university/institute. The student will have a supervisor from the Department as well from the host organization. At the end of training students will submit a written report to both the supervisors and will be evaluated by the departmental committee.

**PHYS 499: Senior Thesis Project (6 credits spread over two semesters)**

*For Physics majors with a minimum CGPA of 2.50 and 90 completed credit hours*

Each student works on an independent project under the supervision of a faculty member, with the expectation that the student will prepare a senior thesis and will present a seminar on his/her work.

**PHYS X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

**\* Cross-listed Courses:**

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program.

# DEPARTMENT OF POLITICAL SCIENCE



The Department of Political Science at FCCU is one of the largest departments in Social Sciences. The courses offered by the Department are open to students majoring in Political Science as well as other disciplines. The Department's teaching faculty had the distinction of having scholars of national and international prominence like Dr Carl W Wheelless, Prof Mary Wheelless, Dr Kitchen, Dr Anwar M Barkat, Dr Arshad Karim Syed, Dr Shokat Ali, Dr Hamid Kizilbash, Prof Naseem Zakariya, Dr Parveen Shaukat and Dr Shafqat Hussain Chaudhary.

The quality of instructional work in the Department has indeed been of a high standard. Research work is encouraged. There is a dedicated faculty available to teach various papers and supervise research. The Department arranges extensive lectures, seminars and study tours to facilitate academic excellence in students. Alumni of this Department have contributed positively to national uplift and have excelled in numerous professions.

The department offers a BA (Hons) degree in Political Science and is part of the Faculty of Social Sciences.

## **BA/BS (Hons) Political Science**

The 4-year degree in Political Science encourages students to take courses in the fields of International Relations, Politics of Pakistan and Political Philosophy. Students are encouraged to develop a critical understanding of various phenomena of national and international politics, and their abilities to critically evaluate these concepts are nurtured through active classroom discussions.

### **Learning Objectives**

- Demonstrate in-depth knowledge of the major concepts of politics
- Think critically and analytically with a view to developing the habit of lifelong learning
- Use appropriate skills for careers in foreign and domestic service, politics, law school, teaching, research and graduate study in Political Science
- Function as active citizens in keeping with high ethical standards
- Write analytically on an issue and present it effectively to an audience

## Requirements for Major

### BA (Hons) Requirements:

Minimum 36 credit hours in Political Science including PLSC 101, PLSC 102, PLSC 203, PLSC 301, PLSC 302, PLSC 403 and one course in Comparative Politics (PLSC 201 or PLSC 202 or PLSC 312).

### BS (Hons) Requirements:

Minimum 48 credit hours in Political Science including PLSC 101, PLSC 102, PLSC 203, PLSC 301, PLSC 302, PLSC 403 and one course in Comparative Politics (PLSC 201 or PLSC 202 or PLSC 312).

### Requirements for Minor:

A minimum of 18 credit hours are required for a minor in Political Science, which is open to students from any discipline with a minimum CGPA of 2.50.

3 Courses from (100-200) level have to be taken

(Note: Core course required for minor in Political Science is PLSC 101).

3 Courses from (300-400) level have to be taken for minor in Political Science.

(Note: Any course prerequisites have to be taken into consideration).

## Course Descriptions

### PLSC 101: Introduction to Political Science (3 credits)

Areas covered in Political Science including the nature of Political Science, the nature and forms of the state, structure of government, political dynamics, and the development of an appropriate Political Science vocabulary.

### PLSC 102: Pakistan Government-National (3 credits)

A history of the freedom movement and study of the main institutions of the national government and what makes the Pakistan government unique.

### PLSC 201: Government of Western Europe and the United States (3 credits)

*Prerequisite: PLSC 101*

Parliamentary, presidential, unitary and federal systems of major western nations.

### PLSC 202: Governments of Developing Countries (3 credits)

*Prerequisite: PLSC 101*

Unique characteristics of governments in Asia and Africa, historical development and a comparison between these nations and the rest of the world.

### PLSC 203: International Relations (3 credits)

*Prerequisite: PLSC 101*

Theory and practice of International Relations using the distinction between realism and idealism as the basis for study, power relationships, theories of war and conflict, international morality, collective security and terrorism.

### PLSC 204: Pakistan Government-Provincial/Local (3 credits)

Government at the provincial and local level with an examination of the basic institutional arrangements of the provincial government, provincial elections, political party organization, state public policy matters and a detailed exploration of the operation of government at these levels.

### PLSC 301/PHIL 301\*: Ancient, Medieval and Early Modern Political Theory (3 credits)

*Prerequisite: PLSC 101*

Political thought from early Greece through the 17th century using original sources from philosophers including Aristotle, Plato, Hobbes, Machiavelli, Locke, Rousseau and Hegel.

### **PLSC 302: Modern Political Theory (3 credits)**

*Prerequisite: PLSC 101*

Modern ideologies since the French Revolution, including liberalism, conservatism, capitalism, nationalism, fascism and anarchism.

### **PLSC 303: Contemporary Political Theory (3 credits)**

*Prerequisite: PLSC 101 and 302*

Status of rights, utilitarianism, liberalism, communitarian Marxist, libertarian and feminism using John Stuart Mill's Utilitarianism on Liberty, Essay of Bentham, Milton Friedman's Capitalism and Freedom.

### **PLSC 304: Research Methodology (3 credits)**

*Prerequisite: STAT 100 or STAT 101 or STAT 103 or ECON 203*

Techniques and tools for significant research in the field of Political Science.

### **PLSC 305: Islamic Political Thought (3 credits)**

*Prerequisite: PLSC 101*

Development of Islamic political thought from ancient times to the present, Muslim thinkers Al-Farabi, Al-Mawardi, Al-Ghazzali, Ibn Khaldun, Shah Waliullah and Allama Muhammad Iqbal.

### **PLSC 310/HIST 312\*: Politics of the Middle East (3 credits)**

*Prerequisites: PLSC 101*

Political development and advance of modernization of the area, the role of Islam, Arab-Israeli conflict, politics of Persian Gulf, politics of OPEC, political parties, military and politics of change.

### **PLSC 311: Politics of Developing Areas (3 credits)**

*Prerequisite: PLSC 101*

Examination of the development of political awareness and economic growth, assessing explanations for the failure of development of some countries and the strategies used to escape the poverty of underdevelopment. It will examine the interrelationships between 'first' and 'third' worlds, critique the major developmental theories; understand the underpinnings of development strategies, examine the complex nature of some the major challenges facing the developing countries.

### **PLSC 312: Theories of Comparative Politics (3 credits)**

*Prerequisite: PLSC 101*

Political forces, institutions and practices of state, describing, explaining and predicting political events, importance of geographical, racial, ideological, ethnic and socioeconomic explanation of political institutions, processes and behavior, political structure, institutions, ideologies, interest groups and governmental systems, analysis of decision-making processes, political conflict and change, and group interaction.

### **PLSC 317: Political Dynamics: Parties and Processes (3 credits)**

*Prerequisites: PLSC 101, PLSC 102*

Two-party and multi-party systems including a discussion of what parties are, history of political parties, parties and elections, parties in a federal system and parties around the world.

### **PLSC 321: Pakistan Foreign Policy (3 credits)**

*Prerequisite: PLSC 101*

Status and relationships between Pakistan and the rest of the world with special emphasis upon relations with the Islamic world and the United States.

### **PLSC 322: International Law (3 credits)**

*Prerequisites: PLSC 101, PLSC 203*

Historical evolution of international law, coverage of classifications of states, rights and duties of jurisdiction, theories of nationalism, diplomatic relations, operation and enforcement of treaties, redress of differences by war and other methods and neutrality.

### **PLSC 323: International Organization (3 credits)**

*Prerequisites: PLSC 101, PLSC 203*

Background of the United Nations Organization with an analysis of the success and failure of the League of Nations, the Security Council, the General Assembly and the organs of the United Nations and Pakistan's position on the issues.

### **PLSC 330: Constitutional Law in Pakistan (3 credits)**

*Prerequisites: PLSC 101, PLSC 102*

History, formation and implementation of each of the constitutions of Pakistan and the interpretation of test cases before the Supreme Court of Pakistan.

### **PLSC 331: Constitutional Law – United States (3 credits)**

Development of American federalism and national power, civil rights and civil liberties, commerce clause and nationalization of the economy, various amendments introduced in the US constitution, role of Supreme Court in American government, the controversy over the interpretation of different approaches to constitutional interpretations.

### **PLSC 335: Public Opinion (3 credits)**

*Prerequisite: PLSC 101*

General nature of public opinion and its development and application to Pakistan, modern techniques of measurement.

### **PLSC 336: Public Administration (3 credits)**

*Prerequisites: PLSC 101, Junior Status*

Art of administration, organizational aspects, management agencies, unity under the chief executive, departmental organization, federal-provincial and headquarters field-relationships, line functions, fiscal management, budget strategy and tactics, and government career service.

### **PLSC 400: Current Political Problems (3 credits)**

*Prerequisites: PLSC 101, Junior Status*

Topical issues and themes of justice, equality and liberty, women's rights, race relations, child labor, birth control and other topics as chosen by the Professor and members of the class.

### **PLSC 401: International Political Economy (3 credits)**

*Prerequisites: PLSC 101, ECON 100*

Phenomena that are both political and economic in nature, substantive issues, methodological and conceptual framework: rational choice theory.

### **PLSC 402: Islam and Modernity (3 credits)**

*Prerequisite: PLSC 101*

Interrelation of Islam and Modernity by deploying a multi-disciplinary perspective and addressing challenging questions about the nature of Islam's mission in the world, major accounts of modernity's genesis in the West and concomitant decline of religion, historical terrain of modern West's forays into Muslim societies in the era of imperialism and colonialism.

### **PLSC 403: Seminar and Major Political Science Research Paper (3 credits)**

*Prerequisite: PLSC 304*

Major paper (20 pages minimum) written under the direction of a political science Professor.

### **PLSC 412: Foreign Policy Analysis (3 credits)**

*Prerequisite: PLSC 203*

Patterns and processes involved in the formulation of a country's foreign policy, deciphering the apparent 'black box' of state and highlighting the actors, processes, organizations and motives that help to shape a country's foreign policy.



### **PLSC 413: Critical Theory and Post-Colonial Situation (3 credits)**

*Prerequisite: PLSC 302 or PLSC 303*

Emerging trends in the contemporary theoretical field of post-colonial studies which aims to conceptualize the interrelation of culture, power and knowledge in post-colonial societies, examination of works of Aijaz Ahmed, Ashis Nandy, Partha Chatterjee, Gayatri Spivak, Homi Bhabha, Gyan Parkash, Arif Dirlik, Kwame Appiah and others to raise fundamental questions about the scope, ambitions and epistemological transgression of post-colonial theory.

### **PLSC X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **PLSC 498: Political Science Internship (3 credits)**

Open to Political Science majors with a grade point average of 3.00 or above

Working with the national, provincial or municipal government offices, assignments with selected government and civic organizations.

### **PLSC 499: Thesis (6 credits)**

*Prerequisite: PLSC 304*

Open to Seniors majoring in Political Science who have maintained a CGPA of 3.50 or above.

A detailed research project approved by the department Chairperson and directed by a faculty member in the Department.

#### **\* Cross-listed Courses:**

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program to be counted towards the degree.



## DEPARTMENT OF PSYCHOLOGY

The undergraduate program in Psychology introduces students to an understanding of the basic core of psychological knowledge, theory and methods of research and clinical practice. It is an interesting and challenging area of scientific enquiry with the potential to benefit both individuals and society as a whole. The Department of Psychology offers a broad range of undergraduate courses in the major areas of Psychology that are important for understanding mind and behavior.

### Learning Objectives

- Describe major psychological concepts and research findings
- Effectively employ research methods used by psychologists
- Think critically about psychological concepts, theories and research
- Clearly speak and write about psychological material
- Analyze real world situations using psychological concepts
- Demonstrate increased respect for human unity and diversity
- Describe the range of career possibilities with training in Psychology
- Efficiently use library resources and technology to gather information and solve problems in Psychology
- Apply ethical principles of psychologists both personally and through socially responsible behaviors

Department of Psychology is part of Faculty of Social Sciences.

### BA/BS (Hons) Psychology

Students majoring in Psychology have two options. They can study to earn a BA (Hons) or BS (Hons) degree. It is recommended that students choose their courses logically and sequentially i.e. take 300 and 400 level courses during junior and senior year.

### Requirements for BA (Hons) Major

A minimum of 36 credits including core courses: PSYC 100, PSYC 150, PSYC 220, PSYC 280, PSYC 305, PSYC 340, PSYC 415, and PSYC 450.

## Requirements for BS (Hons) Major

A minimum of 48 credits. The following core courses must be taken: PSYC 100, PSYC 150, PSYC 220, PSYC 305, PSYC 315, PSYC 340, PSYC 350, PSYC 415, and PSYC 450. The BS (Hons) degree allows students to pursue topics in Psychology with a greater emphasis on hard science, such as neuroscience and cognition. It also has a greater emphasis on empirical research including lab work.

**Note:** Students who are majoring with BS in Psychology and have not taken PSYC 499 must take two other courses in Psychology to complete the requirements for their major.

## Requirements for Minor

A minimum of 18 credits and is open to students (of all disciplines) with a minimum CGPA of 2.00. In addition to the two core courses, i.e. PSYC 100 and PSYC 150; the remaining courses can be selected from the list of courses offered by the Department.

## Course Descriptions

### PSYC 100: Introduction to Psychology (3 credits)

Historical background and subfields of Psychology, research methods, biological basis of behavior and psychological processes such as sensation, attention, perception, learning, memory, motivation, emotions, intelligence, thinking and personality.

### PSYC 150: Developmental Psychology-I (3 credits)

*Prerequisite: PSYC 100*

Human development from conception to adolescence focusing on physical, intellectual and personality development, special emphasis on development in adolescence and the quest of identity, research activities integrated into the coursework.

### PSYC 200: Developmental Psychology-II (3 credits)

*Prerequisite: PSYC 150*

Human development from adulthood to old age focusing on the physical, intellectual and personality development, life after retirement and problems of old age, death and bereavement.

### PSYC 220: Statistics for Psychology (4 credits)

*Prerequisite: PSYC 100*

Statistical concepts and skills necessary for conducting research and providing an adequate quantitative foundation for understanding psychological literature and SPSS. This course will cover (a) descriptive statistical techniques including frequency distributions, graphing, and measures of central tendency and variability, and (b) inferential statistical techniques including t-tests, analysis of variance, correlation and chi-square. The emphasis is upon the application of statistics rather than the mathematical basis of statistics. The application of these techniques to research and the interpretation of results will be emphasized.

### PSYC 240: Theories of Personality (3 credits)

*Prerequisite: PSYC 100*

Theories of personality including psychodynamic, trait, cognitive, humanistic, physiological, and learning as well as some new approaches, research activities and analysis will be integrated in the coursework.

### PSYC 280: Social Psychology (3 credits)

*Prerequisite: PSYC 100*

Nature, scope, historical perspective and research methods, social perception, cognition and identity, interpersonal relationships, attribution, conformity, pro-social behavior, groups, leadership, attitudes, prejudice and aggression. Theories and findings will be related to everyday social issues and concerns.

### **PSYC 290: Consumer Psychology (3 credits)**

*Prerequisite: PSYC 100*

Methods of studying consumer behavior, basic psychological concepts concerning consumer behavior such as perception, cognition, learning, attitude, cognitive dissonance, risk-taking, motivation and personality of the buyer. Emphasis on the interrelations of economics and socio-cultural factors on decision-making including recent research findings, consumer psychology in Pakistan.

### **PSYC 300: Positive Psychology (3 credits)**

*Prerequisite: PSYC 100*

Positive aspects of human behavior, practical wisdom through a series of exercises in sensitivity and growth, Neuro-Linguistic Programming (NLP), optimism, self-confidence, listening and communication skills, time management, handling criticism, happiness, self-esteem, emotional quotient (EQ), morality, empathy, friendship, love, achievement, creativity, music and humor.

### **PSYC 301: Industrial and Organizational Psychology (3 credits)**

*Prerequisite: PSYC 100*

Applications of psychological theory and research to the workplace and the means by which industrial/organizational psychology contributes to improved organizational effectiveness and employee satisfaction, recruitment of applicants, hiring, training, evaluation of employees' performance, employee motivation, leadership, and human factors.

### **PSYC 305: Research Methods in Psychology (3 credits)**

*Prerequisite: PSYC 220*

Research methodology, history of scientific approach, basic elements, methods, design and structure of research with emphasis on data collection, analysis, interpretation and ethics of social science research, research project. Students will write a research proposal.

### **PSYC 315: Cognitive Psychology including Lab (4 credits)**

*Prerequisite: PSYC 220*

Information processing, attention, memory, concept formation, reasoning, problem solving and decision-making. In the lab, students will replicate classical cognitive Psychology experiments, conduct an empirical research project and present their findings.

### **PSYC 340: Abnormal Psychology (3 credits)**

*Prerequisite: PSYC 100*

Nature and concepts of abnormality, historical perspective with special emphasis on Pakistan, psychoanalytic, medical, behavioristic; humanistic, and cognitive behavioral models of abnormal behavior; psychological disorders; anti-psychiatry movement; overview of major psychotherapeutic techniques; prevention of mental sickness.

### **PSYC 350: Biopsychology (3 credits)**

*Prerequisite: PSYC 100*

Behavior and mental processes from the biological perspective with particular emphasis on the role of neurochemical and endocrine factors in the function of the central nervous system, chemical and neural basis of sensory processes, motivation, emotion, learning, memory, language, sleep, reproduction, gender and psychopathology.

### **PSYC 360: Psychological Testing and Measurement (3 credits)**

*Prerequisite: PSYC 100*

Functions, origins and basic concepts of psychological testing, test construction, ability/intelligence and personality testing, application of psychological tests in educational, occupational and clinical contexts and ethical issues.

### **PSYC 375: Psychology of Gender (3 credits)**

*Prerequisite: PSYC 150*

Gender stereotypes, the role of biological, cognitive, social, and cultural factors in creating and maintaining gender differences, social roles, attitudes and achievement in males and females, views of women in early Psychology and survey of current gender-based scientific research and theory.

### **PSYC 385: Forensic Psychology (3 credits)**

*Prerequisite: PSYC 340 or permission from Instructor*

Psychological theories and research that address legal issues and the role psychologists play in the criminal justice system. Overview of services provided by psychologists such as expert witnessing, criminal profiling, trial consulting, legal decision making. Assessment and therapeutic services provided to individuals in forensic settings with suspected deviant behaviors. Gender, race, and ethnic differences in criminal violence, causes and effects of violence in media, psychology of sexual assault, victimology, development of habitual criminal behavior and crime prevention are included. The course includes a study tour to Punjab prisons and students prepare a report based on their observations, information obtained during the tour, and classroom learning.

### **PSYC 415: Research Methods in Psychology-II (3 credits)**

*Prerequisites: PSYC 305*

An overview of the topics covered in PSYC 305 focusing on examining the applications, strengths, weaknesses of different approaches as well as considerations and challenges involved in social research. This course will introduce qualitative research methods focusing on observations, interviews, focus groups, case studies, grounded theory, discourse analysis, action research, and mixed method approach. All students will conduct a research project and write a paper based on the APA format.

### **PSYC 430: Health Psychology (3 credits)**

*Prerequisite: PSYC 100*

Psychosocial factors relevant to general health maintenance, recovery from disease or injury, stress management techniques, personality characteristics associated with disease, effects of diet and exercise, theories of pain and pain management, illness prevention, handling chronic illness and psychosocial rehabilitation, developing and maintaining a healthy lifestyle.

### **PSYC 440: Counseling Psychology (3 credits)**

*Prerequisite: PSYC 340 or permission from the instructor*

Introduction to theories, assessment and approaches to counseling, psychoanalytic, client-centered, behavioral, cognitive behavioral, transactional analysis and rational emotive approaches, educational and occupational counseling, counseling for emotional and sexual problems, family, marriage and community mental health counseling, ethics in counseling.

### **PSYC 450: History and Systems of Psychology (3 credit)**

*Prerequisite: PSYC 100*

Historical origin of modern Psychology with a focus on Greek contribution, Muslim contribution, European philosophy, and physiology, development of various schools of thought in Psychology including structuralism, functionalism, associationism, behaviorism, gestalt psychology, psychoanalysis, cognitive psychology, humanistic psychology, evolutionary psychology, and some current trends.

### **PSYC 465: Clinical Psychology (4 credits)**

*Prerequisites: PSYC 340, PSYC 360*

Historical background of clinical psychology, clinical assessment, diagnosis and classification of psychological disorders, and psychological intervention, legal and ethical issues in clinical psychology, case reports (under supervision) with individuals having psychological problems.

**PSYC X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

**PSYC 498: Internship (3 credits)**

*Prerequisites: Open to Psychology majors and minors who have taken PSYC 340, and minimum CGPA of 2.75*

The course is intended to serve as a bridge between University and career. Internships through the Psychology Department are intended to help students to achieve valuable training and work experiences, and to provide a meaningful link between formal coursework and applied professional work. The culmination and tangible product of this internship will be a portfolio containing evidence of what students have done and learned during this course.

**PSYC 499: Senior Thesis (6 credits)**

*Prerequisites: PSYC 305*

*For Psychology majors with a minimum CGPA of 3.0 and 90 credits completed.*

An independent research study on a topic chosen by the student. The research study will be supervised by a faculty member of Department of Psychology.



## DEPARTMENT OF RELIGIOUS STUDIES

The Department of Islamic Studies was renamed in 2005 as Department of Religious Studies to be a model of interfaith harmony and representative of the vision of the founder of Pakistan who once stated thus, "We are starting in the days when there is no discrimination, no distinction between one community and another, no discrimination between one caste or creed and another. We are starting with this fundamental principle that we are all citizens and equal citizens of one State."

The Department of Religious Studies contributes to fulfill the mission, vision and values of FCCU by creating an atmosphere that is conducive to character building, liberal arts education, higher order thinking skills, and inter-faith relations. Here, students have the opportunity to study in a religiously diverse environment where they work together with people of different religious faiths, ethnicity and culture. The Department adopts an interdisciplinary approach to the academic study of religion to provide students a broader understanding of the role of religion in human life. Although most courses offered by the Department are on Islam and Christianity, we do not endorse a particular creed or sectarian position.

The Department of Religious Studies offers four streams: BA (Hons) Islamic Studies, BA (Hons), BS (Hons) Christian Studies and Certificate in Biblical Language (18 credits). The lower division courses for each concentration are designed to provide students with the fundamental understanding of respective major, while the upper division courses provide them with depth and breadth of knowledge.

Department of Religious Studies is part of Faculty of Humanities.

### BA (Hons) Islamic Studies

#### Learning Objectives

- Explain fundamental concepts and intellectual basis of various branches of Islamic Studies
- Recite, translate, and interpret texts of the Holy Quran, Hadith and other sources of Islam
- Diagnose and solve everyday problems in the light of Islamic teachings, principles and values

- Develop research proposals, select method and design, collect and analyze material, and evaluate results
- Demonstrate respect for diversity and apply Golden Rule (No one of you is a believer until he desires for his brother that which he desires for himself) as the fundamental principle of actions
- Formulate a personal plan for inner process of spiritual development and personal growth

#### Requirements for Major in Islamic Studies

**Core Courses:** ISLM 104, ISLM 201, ISLM 202, ISLM 301, ISLM 302, ISLM 401, ISLM 499

#### 15 credit hours from the following courses:

ISLM 101, ISLM 103, ISLM 303, ISLM 304, ISLM 305, ISLM 306, ISLM 402, ISLM 403, ISLM 406, ISLM 407

#### Requirements for Minor in Islamic Studies

Minor in Islamic Studies is open to students of all disciplines with a minimum CGPA of 2.00.

**Core Courses:** ISLM 104, ISLM 202, ISLM 401

#### 9 credit hours from the following courses:

ISLM 101, ISLM 103, ISLM 201, ISLM 301, ISLM 302, ISLM 303, ISLM 304, ISLM 305, ISLM 306, ISLM 402, ISLM 403, ISLM 407

## BA (Hons) Christian Studies

### Learning Objectives

- Describe the central theme of the Bible; how each book of the Bible fits into the biblical timeline; and the key biblical teachings
- Skillfully use biblical study methods to interpret what effect the original writers intended to have on their readers
- Use the Bible, evaluate and solve practical issues of life through ethical attitudes and actions
- Critically evaluate claims to truth based on the teachings, events and personalities of the Bible
- In accordance with FCCU's core values, demonstrate spiritual maturity through:
  - o Evidencing maturity and holistic growth in Christian character and Christian disciplines
  - o Exemplifying maturing faith in relationship with God and in commitment to reconciled relationships and restored communities

### Requirements for Major in Christian Studies

A minimum of 36 credits is required to complete the degree, including:

**Core Courses:** CRST 151, CRST 155, CRST 281, CRST 291, CRST 498 (Christian Servant Leadership Capstone – 2.75 minimum CGPA to take this course. Students who do not qualify must take CRST 499 – Research Project).

#### 6 credit hours from Applied Theology

CRST 211, CRST 212, CRST 311, CRST 312, CRST 411, CRST 412

*\*(Note: Each Applied Theology course is 1 credit)*

15 credit hours from any of the following ISLM or CRST courses (excluding CRST 152 – Christian Ethics).

### Requirements for Minor in Christian Studies

Minor in Christian Studies is open to students of all disciplines with a minimum of CGPA 2.00.

A minimum of 18 credits is required for the minor, including:

**Core Courses:** 10 credits

CRST 151, CRST 155, CRST 211, CRST 291

*\*(Note: CRST 211 is 1 credit course)*

6 credit hours from any the following courses:

CRST 281, CRST 381, CRST 391, CRST 451

**2 credit hours from Applied Theology**

CRST 212, CRST 311, CRST 312, CRST 411, CRST 412

*\*(Note: Each Applied Theology course is 1 credit)*



## BS (Hons) Christian Studies (Biblical Language Emphasis)

### Learning Objectives

- Demonstrate competence in translating Biblical texts, which enables students to interpret these texts with growing sensitivity to semantics, syntax, context, genre and manuscript evidence
- Demonstrate general grasp of the biblical timeline of Old and New Testament history and integrate this knowledge of key events and people with foundational biblical themes
- Demonstrate competent critical thinking skills by the application of principles of good biblical exegesis
- Using biblical theological principles, demonstrate growing competence in researching and formulating appropriate principles and their application to relevant issues in the student's context within the Christian community and the larger community of Pakistan
- In accordance with FCCU's core values, demonstrate spiritual maturity through:
  - Evidencing maturity and holistic growth in Christian character and Christian disciplines
  - Exemplifying maturing faith in relationship with God and in commitment to reconciled relationships and restored communities

### Requirements for BS (Hons) in Christian Studies (Biblical Language Emphasis)

15 credit hours from Core Courses, 3 credit hours from Elective Courses, 12 credit hours from Biblical Survey, 18 credit hours from either Greek or Hebrew Languages.

**Core Courses:** CRST 151, CRST 155, CRST 211 (1 credit), CRST 212 (1 credit), CRST 311 (1 credit), CRST 322 (1 credit), CRST 411 (1 credit), CRST 422 (1 credit), CRST 352.

**3 Credits Elective:** Any CRST 300 or 400 level course

**Biblical Survey Sequence:** CRST 281, CRST 291, CRST 381, CRST 391

**Choose either Greek or Hebrew**

**For Greek Language**

**12 credits Basic Greek Language Courses:** CRST 271, CRST 272, CRST 371, CRST 372

**3 credits Greek Reading Courses:** CRST 455, CRST 456

**3 credits Greek Exegesis Courses:** CRST 475, CRST 476

**For Hebrew Language**

**12 credits Basic Hebrew Language Courses:** CRST 231, CRST 232, CRST 331, CRST 332

**3 credits Hebrew Reading Courses:** CRST 421, CRST 422

**3 credits Hebrew Exegesis Courses:** CRST 431

**Minor in Biblical Language (Either New Testament Greek or Biblical Hebrew)**

Any regularly enrolled FCCU student wishing to gain proficiency in a biblical language (either Koine Greek, the language of the Christian New Testament or biblical Hebrew, the language of the Christian Old Testament) may earn a minor in Biblical Language through the Department of Religious Studies. This affords opportunities for students to study the Hebrew or Greek languages without the burden of pursuing a major in Christian Studies. This might be helpful for students who plan to pursue post-graduate degrees in history, religious studies or philosophy. It would especially be helpful for students who intend after graduation to enter a graduate program in theology, perhaps in a Christian seminary. The Certificate consists of 6 courses (18 credits) in either the Hebrew or Greek language.

### Learning Objectives

- Demonstrate competence in translating Biblical texts, which enables students to interpret these texts with growing sensitivity to semantics, syntax, context, genre and manuscript evidence
- Demonstrate competent critical thinking skills by the application of principles of good biblical exegesis

### Minor in Biblical Language (New Testament Greek)

#### Core Courses:

CRST 271 (New Testament Greek 1)

CRST 272 (New Testament Greek 2)

CRST 371 (New Testament Greek 3)

CRST 372 (New Testament Greek 4)

#### Electives

1 Greek Reading Course (Any Greek course with the word “Reading” in its course title)

1 Greek Exegesis Course (Any Greek course with the word “Exegesis” in its course title)

### Minor in Biblical Language (Biblical Hebrew)

#### Core Courses:

CRST 231 (Biblical Hebrew 1)

CRST 232 (Biblical Hebrew 2)

CRST 331 (Biblical Hebrew 3)

CRST 332 (Biblical Hebrew 4)

#### Electives:

1 Hebrew Reading Course (Any Hebrew course with the word “Reading” in its course title)

1 Hebrew Exegesis Course (Any Hebrew course with the word “Exegesis” in its course title)

## Certificate in Biblical Language (18 credits)

Anyone who is not enrolled in the Baccalaureate (Hons) program and wishes to gain proficiency in a biblical language (either Koine Greek, the language of the Christian New Testament or biblical Hebrew, the language of the Christian Old Testament) may earn a Certificate in Biblical Language through the Department of Religious Studies. This affords opportunities for students and others to study the Hebrew or Greek languages without the burden of pursuing a major in Christian Studies. This might be especially helpful for Postgraduate students who feel their Postgraduate research would be enriched through the acquisition of Hebrew or Greek or professors of religious studies who wish to expand their knowledge of the Bible. The Certificate consists of 6 courses (18 credits) in either the Hebrew or Greek language.

#### Learning Objectives

- Demonstrate competence in translating Biblical texts, which enables students to interpret these texts with growing sensitivity to semantics, syntax, context, genre and manuscript evidence
- Demonstrate competent critical thinking skills by the application of principles of good biblical exegesis

#### Requirements for Biblical Language Certificate (Choose either Greek or Hebrew)

##### For Greek Language

12 credits Basic Greek Language Courses: CRST 271, CRST 272, CRST 371, CRST 372

3 credits Greek Reading Courses: CRST 455, CRST 456

3 credits Greek Exegesis Courses: CRST 475, CRST 476

##### For Hebrew Language

12 credits Basic Hebrew Language Courses: CRST 231, CRST 232, CRST 331, CRST 332

3 credits Hebrew Reading Courses: CRST 421, CRST 422

3 credits Hebrew Exegesis Courses: CRST 431

## Course Descriptions

### **ISLM 101: Islamic Education (3 credits)**

Introductory understanding of Islam, Islamic way of life in this subject as they study about logical and rational vindication of their fundamental beliefs, improvement of character traits, personality strengths and social manners in the light of Islamic teachings. Special focus is put on faith, spirituality and character as the principles of success.

### **ISLM 103: Islamic Ideology (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

The course is designed to meet the requirements for those who want to enhance their fundamental understanding of Islam as a code of life. Contents include: definition of ideology, functions of ideology, Islamic ideology, chief characteristics of Islamic ideology, social teachings of Islamic ideology, economic principles of Islam, political teachings of Islam, and legal thoughts of Islamic ideology.

### **ISLM 104: Arabic Communication Skills (3 credits)**

Arabic grammar and composition, basic structure of Arabic language; everyday conversation, vocabulary enhancement, translation and composition.

### **ISLM 201: Tajweed-UI-Quran (3 credits)**

*Prerequisite: ISLM 101*

Reading and recitation of the Holy Quran, speech sounds of Arabic, Qiraat, Arabic phonology, articulation and accent, pronunciation.

### **ISLM 202: The Quran – Contents, Style and Interpretation (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

The Holy Quran with its meaning and commentary, compilation of the Holy Quran, content types, general style, selected readings from the Holy Quran, Ulum-al-Quran (collection, exegesis and Ijaz al-Quran) inimitability of the Quran, qualities of Mufassir and different types of interpretations.

### **ISLM 301: Hadith – Status, Origin and Development (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Ulum-al-Hadith, authenticity of the sayings of the Prophet Muhammad (PBUH), importance of Sunnah, codification and compilation of early Hadith literature, review of Hadith collections and reading of selected chapters from Hadith books.

### **ISLM 302: Islamic Jurisprudence (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Definition of law sources of Islamic Sharia, Quran, Sunnah, Ijma, Qiyas, Ijtihad, types of Islamic law, Islamic injunctions and family law, Islamic law and jurisprudence with its historical development.

### **ISLM 303: Contemporary Muslim World (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Geographical, social and cultural features of the modern Muslim world, concept of Ummah, its resources, population, political and economic systems, organizations, challenges to the Muslim world and their solutions.

### **ISLM 304: Seerat-Un-Nabi (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Development of biographical studies of the Prophet Muhammad (PBUH), their influence on Islamic thought throughout Islamic history, the Prophet (PBUH) as an example to be followed, the difference between the Prophet's (PBUH) tradition (Hadith) and his biography (Seerah), the Prophet's (PBUH) life before his mission, early period of Makkah where he faced opposition, migration to Madinah, establishment of the Islamic state in Madinah, treaties and relations with non-Muslims, Ghazwaat and conquest of Makkah and the last sermon and its impact on modern human life.

### **ISLM 305/CRST 354/SOCL 305\*: Interfaith Relations (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Religious pluralism and interfaith relations, historical interaction between major faiths such as Judaism, Islam and Christianity on one hand, and Hinduism and Buddhism on the other is studied, new contents and forms that arise from the modern challenge of interfaith relations, preliminary outlines of the future religions that can coexist comfortably in global community, major features of the current situation, observations as to the future of religions.

### **ISLM 306/CRST 355\*: Religion and Science (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Relationship between modern empirical science and religion, the nature of science and the epistemologies of science and of religious belief, conflict or concord between religion and science on common domains, religion and science in search of reality.

### **ISLM 401/CRST 453\*: Comparative Study of Religions (3 credits)**

*Prerequisites: ISLM 101 or CRST 152*

Major religions of the world, cultural contexts, scriptures, fundamental beliefs, practices and sacred art are examined, various global forms of religions, South and East Asian rich traditions of Hinduism, Buddhism, Taoism and Confucianism, monotheistic religions with roots in the Middle East: Judaism, Christianity and Islam, comparative study of religions.

### **ISLM 402: Islam and the West (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Islam and the West, some general considerations; Islam and the West on peace, terrorism, democracy, and human rights; Western understanding of Islam (orientalism); Muslim perception of the Western civilization; study and analysis of the thesis of "Clash of Civilization".

### **ISLM 403: Modern Islamic Thoughts (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Modern Islamic thoughts with emphasis on Islamic political, economic, social and educational thoughts, political, strategic, economic and social factors underlying modern Islam, comparison of thoughts of Jamaluddin Afghani, Shah Wali Ullah, Allama Iqbal and Syed Maududi.

### **ISLM 406/CRST 455\*: Research Methodology (3 credits)**

*Prerequisite: Only for majors*

Need and role of research, types of research, research design, various research methodologies and frameworks, management of research, approaches to data collection, data analysis, research in religious studies, ethics of research and writing a research proposal.

### **ISLM 407/CRST 454\*: Teaching of Religious Studies (3 credits)**

*Prerequisite: ISLM 101 or CRST 152*

Teaching techniques including the fundamental skills and characteristics of religious teachers, teaching strategies, classroom management, lesson planning, course designing, feedback and assessment, and materials development.

### **ISLM X95/CRST X95: Themes (1-3credits)**

Sections:

A-E to be of 1 credit

F-J to be of 2 credits

K-Z to be of 3 credits

### **ISLM 499/CRST 499\*: Research Project (3 credits)**

*Prerequisite: ISLM 406 or CRST 455*

Students will conduct a research project under the prearranged supervision of a faculty member of the Department on a topic approved in ISLM 406/CRST 455. Students will have a viva-voce examination before a committee for the successful qualification of research.

### **CRST 151: Introduction to Christian Thought (3 credits)**

Foundational Christian beliefs such as the nature of God, the person and work of Christ, the purpose of the church, the meaning of Christian life and growth, and the nature of God's Word as revealed in the Old and New Testaments.

### **CRST 152: Christian Ethics (3 credits)**

Biblical and theological foundations of Christian ethics with special emphasis on developing the skills necessary to formulate ethical questions and find their solutions in the Bible.

### **CRST 155: Interpreting the Bible (3 credits)**

Interpreting the Old and New Testaments in light of a particular passage's historical and cultural context as well as placing that passage in its context within the Bible itself. This course focuses on acquiring practical skills in identifying different types of biblical literature, skills in interpreting those types of literature and skills in employing appropriate research methods. The end goal is to enable students to grasp what impact the original writer wanted any piece of biblical writing to have on his original readers.

### **CRST 211: Applied Theology 1: Introduction (1 credit)**

*Prerequisite: CRST 152 or CRST 151*

An introduction to principles governing application of biblical theology to the individual and community in a holistic approach, concerned with emotions, intellect, relationships and mental, physical and spiritual health.

### **CRST 212: Applied Theology 2: Prayer (1 credits)**

*Prerequisite: CRST 211*

An introduction to principles governing application of biblical theology to prayer on an individual and corporate level.

### **CRST 231: Biblical Hebrew 1 (3 credits)**

Introduces the student to the grammar, vocabulary and syntax of Biblical Hebrew (i.e., the original language in which the Old Testament of the Bible was written). This course seeks to help students to read, translate and interpret the ancient Hebrew Old Testament.

### **CRST 232: Biblical Hebrew 2 (3 credits)**

*Prerequisite: CRST 231*

Continues the study of the grammar, vocabulary and syntax of Biblical Hebrew (i.e., the original language in which the Old Testament of the Bible was written). This course seeks to help students to read, translate and interpret the ancient Hebrew Old Testament.

### **CRST 252: Christian History (3 credits)**

*Prerequisites: CRST 151*

Rise of Christianity from the period immediately following the ministry of Jesus Christ to the contemporary worldwide Christian movement, studying Christians who have made significant impact upon the Church. In addition, the course investigates different Christian movements with special emphasis on Christianity in South Asia from the missionary work of the Apostle Thomas to the present day.

### **CRST 271: New Testament Greek 1 (3 credits)**

First half of a year's course on beginning Greek. Introduces the student to the grammar and syntax of Koine Greek (i.e., the original language in which the New Testament of the Bible was written). This course seeks to help students to read, translate and interpret the ancient Greek New Testament.

### **CRST 272: New Testament Greek 2 (3 credits)**

*Prerequisite: CRST 271*

Second half of a year's course on beginning Greek. Introduces the student to the grammar and syntax

of Koine Greek (i.e., the original language in which the New Testament of the Bible was written). This course seeks to help students to read, translate and interpret the ancient Greek New Testament.

### **CRST 281: Old Testament I – Law and Poetry (3 credits)**

*Prerequisite: CRST 155*

An introduction to the Old Testament, examining historical, cultural, political, and religious backgrounds of the Old Testament world as well as surveying the various kinds of literature found in the Old Testament. This course will also survey the five books of the Torah (Genesis – Deuteronomy) and the five books of poetry (Job – Ecclesiastes). Special attention will be given to interpreting these books according to sound hermeneutical principles.

### **CRST 291: New Testament I-The Gospels (3 credits)**

*Prerequisite: CRST 155*

A survey of the New Testament Gospels, introducing the historical, cultural, political and religious background of the New Testament in general and the four gospels in particular and examining the life, teachings and impact of Jesus Christ. Special attention will be given to interpreting these gospels according to sound hermeneutical principles.

### **CRST 311: Applied Theology 3: Scripture (1 credit)**

*Prerequisite: CRST 211*

An introduction to principles governing application of biblical theology to Christian scriptures, focusing on holistic personal and corporate engagement with scripture.

### **CRST 312: Applied Theology 4: Servanthood (1 credit)**

*Prerequisite: CRST 211*

An introduction to principles governing application of the biblical theology of servanthood as taught by Jesus Christ and the apostles, focusing on both personal and corporate expressions of service.

### **CRST 331: Biblical Hebrew 3 (3 credits)**

*Prerequisite: CRST 232*

A deepening emphasis on syntax, translation and interpretation, continuing the study of the grammar, vocabulary and syntax of Biblical Hebrew (i.e., the original language in which the Old Testament of the Bible was written). This course seeks to help students to read, translate and interpret the ancient Hebrew Old Testament.

### **CRST 332: Biblical Hebrew 4 (3 credits)**

*Prerequisite: CRST 331*

Applying principles of grammar, semantics and syntax to the translation and interpretation of Biblical Hebrew (i.e., the original language in which the Old Testament of the Bible was written). This course seeks to help students to read, translate and interpret the ancient Hebrew Old Testament.

### **CRST 352: Christian Theology (3 credits)**

*Prerequisites: CRST 151, CRST 152*

Approaches to presenting a reasonable and rational basis for the Christian faith including investigation of historical evidences, evaluation of philosophical arguments, examination of biblical reliability, and explanation of key biblical teachings.

### **CRST 353: Jesus Christ: Life, Teachings, and Impact (3 credits)**

*Prerequisite: CRST 351*

Life, ministry and teachings of Jesus Christ within their prophetic, cultural and historical setting as revealed in the four gospels of the Bible with a special emphasis on Bible study methods for communicating his teachings to others.

### **CRST 371: New Testament Greek 3 (3 credits)**

*Prerequisite: CRST 272*

Last third of a unified program of studies for learning the ancient Greek language. Introduces the student to the grammar and syntax of Koine Greek (New Testament Greek), with a view towards the translation and exegesis of the New Testament.

### **CRST 372: New Testament Greek 4 (3 credits)**

*Prerequisite: CRST 371*

Advanced grammar and syntax to aid in the translation and interpretation of Koine Greek (i.e., the original language in which the New Testament of the Bible was written).

### **CRST 381: Old Testament II – History and Prophecy (3 credits)**

*Prerequisite: CRST 155*

A survey of the Old Testament books of history (Joshua – Esther), focusing on the unified story described in those books, examined within the historical, cultural, political and religious backgrounds of the Old Testament world. This course will survey the Old Testament prophets (Isaiah – Malachi) in the context of their historical settings, with a special emphasis on messianic prophecy. Special attention will be given to interpreting these books according to sound hermeneutical principles.

### **CRST 391: New Testament II – The New Testament Letters and Acts (3 credits)**

*Prerequisite: CRST 155*

A survey of the Acts of the Apostles and the New Testament letters (Romans – Revelation), examining these books within their first century context, looking at cultural, historical, political and religious issues impacting the first century church. Special attention will be given to interpreting these books according to sound hermeneutical principles.

### **CRST 411: Applied Theology 5: Teaching (1 credit)**

*Prerequisite: CRST 211*

An introduction to the principles governing application of the biblical theology of teaching Christian beliefs and Scripture, focusing on transformational approaches to communicating the Christian faith.

### **CRST 412: Applied Theology 6: The Christian in Society (1 credit)**

*Prerequisite: CRST 211*

An introduction to the principles governing application of the biblical theology of how a Christian must respond to living within the larger community of those who do not share the Christian faith.

### **CRST 421: Biblical Hebrew Reading 1: Hebrew Narrative Literature (3 credits)**

*Prerequisite: CRST 331*

Reading through Hebrew Old Testament narrative passages with a concentration on grammar and narrative flow as well as sermon and church lesson applications.

### **CRST 422: Biblical Hebrew Reading 2: Hebrew Narrative/Legal Literature (3 credits)**

*Prerequisite: CRST 331*

Reading through narrative and legal passages with a special emphasis on the Book of Deuteronomy. Students will gain skills in applying this theology to contemporary Pakistan.

### **CRST 431: Hebrew Exegesis 1(3 credits)**

*Prerequisite: CRST 332*

An introduction to the principles and methods of exegesis in OT narrative texts. Students will be expected to prepare for class presentations and to interact critically with the materials, with the goal of applying these principles learned to church lesson and sermon preparation.

### **CRST 441: New Testament Greek Reading 1: The Gospel of Mark (3 credits)**

*Prerequisite: CRST 371*

Reading extensively from the Greek New Testament Gospel of Mark with grammatical analysis of the

text and discussion of textual criticism issues (analysis of variant readings to determine the original wording of the text).

### **CRST 442: New Testament Greek Reading: Galatians (3 credits)**

*Prerequisite: CRST 371*

Reading extensively from the Greek New Testament, Paul's letter to the Galatians with grammatical analysis of the text and discussion of textual criticism issues (analysis of variant readings to determine the original wording of the text). Includes projects for communicating key theological points in sermons or church lessons.

### **CRST 451: Paul's Life, Theology and Impact (3 credits)**

*Prerequisite: CRST 351 or CRST 391*

A study of the life of Paul, including the political, cultural and religious context of Paul's first century Mediterranean world. In addition, this course will discuss Paul's theology, setting it in the context of the earliest Christian teachings, those of both Jesus Christ and his apostles. Students will survey Paul's 13 letters in light of their origin, purpose, and audience as well as focusing on two of Paul's representative letters.

### **CRST 452/PHIL 411\*: Great Theologians (3 credits)**

*Prerequisite: CRST 151*

The student will concentrate careful study in the thought, context, and impact of specific medieval theologians such as Augustine, Aquinas, Anselm, etc.

### **CRST 475: Greek Exegesis 1: The Sermon on the Mount**

*Prerequisite: CRST 372*

A verse-by-verse exposition. Emphasis includes the continued development of exegetical methodology, the investigation of interpretative options and the discovery of practical application. Translation and a practical, exegetical sermon manuscript are required. Includes projects for communicating key theological points in sermons or church lessons.

### **CRST 476: Greek Exegesis: Philippians**

*Prerequisite: CRST 372*

A close reading of Philippians in the Greek text. As part of the in-class discussion students are required to translate, decline and conjugate. Students will produce sermons or church lessons as a part of this course.

### **CRST 498: Christian Servant Leadership Capstone (3 credits)**

*Open to the Juniors/Seniors with 90 completed credit hours with at least 9 upper division credit hours from CRST or ISLM courses*

A combination of weekly classroom learning with an internship in a Christian NGO or local church under careful supervision, along with a writing project.

**Note:** Students with CGPA 2.75 or above will be eligible for Internship. Students who do not meet this requirement have the option of CRST 499, Research Project.

### **CRST 499/ISLM 499\*: Research Project (3 credits)**

*Prerequisite: ISLM 406 or CRST 455*

Students will conduct a research project under the prearranged supervision of a faculty member of the Department on a topic approved in ISLM 406/CRST 455. Students will have a viva voce examination before a committee for the successful qualification of research.

#### **Cross-listed Courses:**

Cross-listed courses indicated with \* have more than one designator (ISLM/CRST) and sometimes different codes (401/453). Students must register in cross-listed courses with the correct code applicable to their major.



# DEPARTMENT OF SOCIOLOGY



Sociology is the systematic study of human society. It looks at social behavior, culture, social institutions, grouping within a society, and the relationships between different groups in society. Sociology helps us to identify social issues within our society and gives us conceptual tools to understand those issues so that we can have a society that is better for all of its members.

Students who study Sociology will learn to look at their own society and other societies in new ways, to question assumptions, to understand the society from the research of others, to record observations from a neutral position and to analyze them objectively, and to interpret their finding, all within an ethical framework.

Sociology helps orient students in terms of their future life, so that they learn skills helpful in many areas of business, government, and non-governmental organizations, as well as their personal lives. The Department of Sociology's goal is to have students understand themselves and society at a family, group, local, regional, national, and global level.

The Sociology Department is part of the Faculty of Social Sciences.

## Learning Objectives:

- Demonstrate a mastery of sociological concepts and be able to use them
- Demonstrate a mastery of sociological theories and be able to apply them
- Apply sociological concepts and theories to real world situations at individual, family, group, national, and global levels
- Demonstrate quantitative and qualitative research concepts and skills to conduct research projects
- Demonstrate critical thinking in the context of sociological and societal issues
- Demonstrate a mastery of the English language and be able to understand reading and oral presentations and to be able to present ideas and research efforts in a scholarly and clear manner in standard English, both orally and in writing
- Demonstrate the ethical principles of Sociology in working with people as well as in conducting research, including the demonstration of respect for cultural, religious, gender, ethnic and other social diversity at local, regional, national, and global levels

- Apply the knowledge base, thinking and technical skills relevant to the future and present job market and for graduate school in Pakistan and abroad

### Degrees offered

The Department of Sociology at FCCU offers two degrees, a BA (Hons) and a BS (Hons) in Sociology. Both emphasize the development of sociological skills, observing, analyzing and interpreting the events of human behavior of individuals and groups at the family, group, societal, national and global levels. The BS (Hons) builds on the BA (Hons) degree by requiring two more core courses and two more additional courses at the 300/400 level.

#### Requirements for BA (Hons) Major

Minimum of 36 credit hours (12 courses) which must include the following: SOCL 100, SOCL 201, SOCL 301, SOCL 494 and SOCL 499. At least 4 Sociology courses must be at the 300/400 level. STAT 103 may be counted as a Sociology course.

#### Requirements for BS (Hons) Major

Minimum of 48 credit hours which must include the following: SOCL 100, SOCL 201, SOCL 223, SOCL 301, SOCL 325, SOCL 350, SOCL 494 and SOCL 499. At least 6 Sociology courses must be at the 300/400 level. STAT 103 may be counted as a Sociology course.

#### Requirements for Minor

Minimum of 18 credit hours (6 courses) which must include the following: SOCL 100, SOCL 201. At least 2 courses must be at the 300/400 level.

## Course Descriptions

### SOCL 100: Introduction to Sociology (3 credits)

Presents fundamental concepts of Sociology. Helps students to observe and understand the actions, beliefs, and interactions of people in their own and other societies and to think critically about themselves in relation to social structures in their own and other societies at the individual, group and societal levels. Analyzes current social issues in Pakistan and other countries in terms of sociological concepts. Assignments focus on analyzing and interpreting social issues in societies around the world in sociological terms with practical assignments that reinforce classroom learning.

### SOCL 101: Introduction to Social Work (3 credits)

Introduces the values, ethics, history and methods of professional social work practice with particular emphasis on the profession in Pakistan. The course helps students understand the impact of social and economic problems on individuals, families, and communities. The course introduces basic social work principles and techniques to help people help themselves and improve the quality of their lives when experiencing problems due to societal and economic factors such as poverty, homelessness, social discrimination, substance abuse, or involving family issues like parent-child conflict, marital conflict, or caring for aged relatives.

### SOCL 150: Sociology of Globalization (3 credits)

Presents theories of globalization and the history of globalization, various ways in which societies and cultures have been transformed by this phenomenon; analysis of globalization's impact on Pakistani society.

### SOCL 170: Environmental Sociology (3 credits)

*Prerequisite: SOCL 100*

There exists a dialectic relationship between society and our natural environment. The course will be an attempt to introduce the field of environmental sociology enabling students to see environment in the light of sociological perspectives. A central aim of this course is to illuminate the students about the relationship that they have with their environment highlighting how ecological issues are social problems.

### **SOCL 192/PHYS 192\*: Science and Society (3 credits)**

Presents theories of globalization and the history of globalization, various ways in which societies and cultures have been transformed by this phenomenon; analysis of globalization's impact on Pakistani society.

### **SOCL 201: Sociological Research (3 credits)**

*Prerequisites: SOCL 100 or another introductory course in the Social Sciences*

This is the basic research course in Sociology. Students learn the comparative advantages and limitations of different research orientations, the ethics of research, and strategies and techniques including experiments, field observations, interviewing, unobtrusive research and surveys. There will also be a brief introduction to qualitative research. In addition to lectures and discussions, students will learn basic research methods and techniques by doing a social research project of their own. This will help to develop skills in observation, interviewing, hypothesis building, theory building, questionnaire construction, some basic statistical tests, computer data manipulation, data interpretation, and research report writing.

### **SOCL 202: Qualitative Methodology (3 credits)**

*Prerequisites: SOCL 100 and SOCL 201*

The course will present various qualitative methods of social research. It will use readings that describe methods, writings (articles and chapters from books) based on qualitative research. Students will carry out exercises that practice these methods such as participant observation, open-ended interviewing; photography, and possibly a focus (focal) group situation.

### **SOCL 220: Introduction to Criminology (3 credits)**

*Prerequisite: SOCL 100*

Introduces the sociological basis to understand deviancy and criminal behavior, causes and consequences of crime, responses to crime and historical transition of ideas about crime. It also presents tools for the scientific investigation of criminal behavior.

### **SOCL 223: Social and Cultural Anthropology (3 credits)**

Studies cultures and social groups throughout the world with an emphasis on looking at a culture from the perspective of someone in that culture. It introduces tools for more effective inter-cultural communications and a mirror in which to see our own cultural group more clearly. The course covers the basics of cultural concepts and ethnographic description.

### **SOCL 270: Sociology of Inequality (3 credits)**

*Prerequisite: SOCL 100*

Investigates the concept of social inequality, concentrating on class, gender, religion and ethnicity as relations of domination along with a structural analysis of these social relationships, their links with each other, and their effects on societies and individuals.

### **SOCL 290: Political Sociology (3 credits)**

*Prerequisite: SOCL 100*

This course explores the relation between politics and society to understand how they shape and are in turn shaped by each other. It is based on the assumption that the political field does not exist independently of social institutions. The course is organized in five thematic areas. First, we will study the modern state, paying particular attention to the process of its formation. Then we consider various theories of power. The third theme is the relation of identity and politics which we will investigate by looking at nationalism, gender and ethnicity as well as religion. We then shift our focus to social movements and their relevance for politics. The last part of the course is on the global dimensions of politics. We will cover a wide range of theories and empirical cases to make sense of these social dimensions of politics.

### **SOCL 291: Economic Sociology (3 credits)**

*Prerequisite: SOCL 100*

Explores the Sociology of market and economic activity and the ways that economic activities are modified or impeded by social relations and social institutions. Explores the influence of social institutions and processes on economies and economic decisions.

### **SOCL 301: Theoretical Perspectives in Sociology (3 credits)**

*Prerequisite: SOCL 100*

Examines the structure and scope of sociological theorizing, how to “use information and develop reason in order to achieve lucid summations of what is going on in the world and of what may be happening within ourselves” (Wright Mills 1959:5); it presents the theory, method and object of investigation of some masters of sociological thought. It also explains sociological theory as the basis for sociological research.

### **SOCL 305/ISLM 305\*: Religion and Inequality (3 credits)**

This is a seminar course which focuses on dialogue about religion with a focus on learning what people believe and what people of different religious traditions have in common to work toward a peaceful society. It also speaks to inequalities between religious communities and seeks ways to provide religious freedom and civil rights to all religious communities.

### **SOCL 325: Sociology of Gender (3 credits)**

*Prerequisite: SOCL 100*

Analyzes cultural values, social institutions and theories in the construction of gender. The course analyzes gender inequality in contemporary societies and explores the social experience of gender across different cultures and societies. It discusses legal statutes and the social placement of gender as an outcome of socioeconomic and cultural environment.

### **SOCL 350: Sociology of Development (3 credits)**

*Prerequisite: SOCL 100*

Takes an in-depth look at development, including theories of development, the impact of development assistance programs, and insights from a wide variety of development models and experiences.

### **SOCL 355: Sociology of Media (3 credits)**

*Prerequisite: SOCL 100*

Investigates the social institution of the media and its impact on society, the analysis of the social structure of media organizations, major theories of media effects and their application to Pakistani and other societies. It examines the representation of different social groups by media and teaches methods appropriate for media research.

### **SOCL 363: Linguistic Anthropology (3 credits)**

*Prerequisites: SOCL 100 and SOCL 223*

Linguistic anthropologists see “language” as a cultural resource and “speaking” as a cultural practice. Language is, therefore, both a mode of thinking and a means of practice. According to Alessandro Duranti, language is active. It is a form of action that presupposes and at the same time brings about ways of being in the world, including what is not said. This course looks at some common ways that language is socially situated and culturally mediated. We will begin with a review of some tools used by linguists, create a baseline of what is meant by “cultural mediation”, and then explore a selection of writings and case studies produced by linguistic anthropologists. Our focus is speech communities distinguished by focal activity, as in the case of sign language and hip hop, and by social practices linked to race, social class, and gender.

### **SOCL 390: Cities and Urban Lives (3 credits)**

*Prerequisite: SOCL 100*

This course approaches cities and urban lives from three different perspectives. First, it looks at the city as an infrastructure, both material and non-material that shapes social organization and behavior. Classic sociological questions of the relation of the city to modernity and space and social control will be addressed here. Secondly, the course traces ongoing urban transformations with a special focus on cities of the Global South. Issues taken up here include migration, marginalization, and globalization. The final section of the course focuses on public practices in the city by looking at the overlapping realms of religion, market, culture, and community life. An understanding of these three distinct approaches will enable students to understand the city from a range of viewpoints. In focusing on a diverse range of urban forms, trends, and practices, this course also goes beyond the limitations imposed by focusing on cities only through the lens of development and progress.

### **SOCL 410: Sociology of Art and Culture (3 credits)**

*Prerequisites: SOCL 100, SOCL 301*

Investigates cultural issues sociologically using a range of theoretical approaches to the Sociology of culture, exploration of sociological viewpoints on the nature of artistic creation and other forms of cultural activity. It analyzes what the terms “high culture” and “popular culture” may mean, and the stakes that are involved in their use in different social contexts.

### **SOCL 423: Ethnography of Pakistan (3 credits)**

*Prerequisites: SOCL 100, SOCL 223*

Ethnography of Pakistan deals with the many cultures and societies of Pakistan. It is a reading-intensive course, with readings selected to cover different geographic regions of Pakistan, different topics, and methodologies. All have been written after Partition (1947) but only a few of the writings concern that event. Indeed, Partition may not mean the same thing to everyone within the nation-state. A few readings touch on current issues of political unrest, but considered together, they provide a rich and diverse account of life in Pakistan.

### **SOCL 425: Sociology of Work (3 credits)**

*Prerequisites: SOCL 100, SOCL 201, SOCL 301*

Explores how social groups exercise control over the work environment and make sense of their work experience; relates work to central issues of personal identity and social standing, distribution of social power and organization of work. It examines concepts of efficiency, performance, productivity and quality of work from a sociological lens.

### **SOCL 430: Sociology of Consumption (3 credits)**

*Prerequisites: SOCL 100, SOCL 201, SOCL 301*

Examines consumption and consumer behavior, trends in consumption by emphasizing socio-cultural aspects of consumption, goods, meaning of signs, political economy of consumption, welfare and well-being and social stratification of consumption. It considers development of consumer behavior by focusing on production, marketing, distribution, sale and appropriation of goods and products having various social identities.

### **SOCL 435: The Sociology of Aging and Policy Choices (3 credits)**

Examines biological, psychological and sociological theories and the changes that occur with aging in Pakistan and other cultures and discusses culture's influence on aging policies and practices in Pakistan and elsewhere; it presents an introduction to social policy generally, and then works with students to analyze the situation of older people in Pakistan and Pakistan's policies that relate to aging and/or affect older people. Students gain the ability to identify possible solutions at an individual and policy level and experience field research with older persons.

### **SOCL 450: Health and Health Systems (3 credits)**

*Prerequisites: SOCL 100*

This course will help students to: (i) understand health, illness, biomedicine and care management,

and (ii) assess health systems in developed and developing countries in a comparative manner. The aim is to deconstruct medical knowledge as we know it and elaborate on how socio-economic factors such as gender, race and income impact health and inequalities in access to health. Main topics that will be covered include the sociological approaches to health and illness, social factors and illness, the meaning and experience of illness and health care systems and the connection between social structures and health outcomes.

### **SOCL 455: Sociology of Religion (3 credits)**

*Prerequisites: SOCL 100, SOCL 201, SOCL 301*

Explores the development of religion in human history; presents the functions of religions for the individual, the religious group and for the society as a whole; organizational structures of religious groups; role of religion in social cohesion and social conflict; fundamentalism in all religions; the social organization of rituals and religious practices and the phenomenology of religious experiences.

### **SOCL 465: Sociology of Sport and Leisure (3 credits)**

*Prerequisites: SOCL 100, SOCL 201, SOCL 301*

Presents cultural and economic relations in sport and leisure including outdoor recreation, spectator sport, informal play, tourism and other entertainment activities from contemporary and historical perspectives with emphasis on the dynamics of power and identity.

### **SOCL 494: Senior Sociology Seminar on Writing a Research Proposal (3 credits)**

*Prerequisites: SOCL 100, SOCL 201, SOCL 301*

Students review critical elements of sociological theory and select an independent research topic along with a theoretical framework for exploring their issue or question. They conduct a literature review, and then develop a plan for a proposed research project that includes its methodology, plan for analyzing the data, ethical issues to consider, permissions as needed, and a budget. Work will be done under the supervision of a faculty member(s) in Sociology in a seminar setting with other students developing their own research projects.

### **SOCL X95: Themes (Special Seminar in Sociology) (1-3 credits)**

*Prerequisites: SOCL 100, SOCL 201, SOCL 301*

Provides an opportunity to explore some current issue of Sociology in some depth and integrates learning from other courses in relation to the special topic.

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **SOCL 498: Internship (3 credits)**

*Prerequisites: Sociology majors and minors who have taken SOCL 100, SOCL 201 and SOCL 301 and have a minimum CGPA of 2.75*

An internship in an organization which utilizes the skills learned in the study of Sociology. Students must develop learning goals for their internship and write a report describing their experience and what they have learned in sociological terms.

### **SOCL 499: Final Year Independent Research Project (3 credits)**

*Prerequisites: SOCL 494*

Based on the research plan completed in the first semester of this course, the student will carry out his/her research project collecting data, analyzing the data, writing it up, and making a formal presentation of the results to faculty and other students. Work will be done under the supervision of a faculty member(s) in Sociology in a seminar setting with other students who are conducting their own research projects.

#### **\*Cross-listed Courses:**

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program.



# DEPARTMENT OF STATISTICS

The Department of Statistics started functioning in 1974 and has made significant progress with quality faculty and students. It aims to provide a core understanding of statistical concepts with their application to real world problems. The Department offers a BS (Hons) degree and is part of the Faculty of Information Technology and Mathematics.

## Learning Objectives

- Demonstrate knowledge about basic statistical concepts, terms and techniques
- Analyze various types of data and interpret the results effectively
- Think critically about applications of Statistics in various fields
- Practice high moral and ethical values in their personal and professional lives and in their communities

## Requirements for Major

48 credit hours including STAT 101, STAT 102, STAT 201, STAT 202, STAT 301, STAT 302, STAT 304, STAT 305, STAT 403;

and any 7 of the following courses: STAT 103, STAT 205, STAT 303, STAT 307, STAT 308, STAT 309, STAT 310, STAT 311, STAT 313, STAT 314, STAT 315, STAT 400, STAT 401, STAT 406, STAT 407, STAT 408, STAT 410, STAT 411, STAT 412, STAT 499.

## Requirements for Minor

A minor in Statistics is open to students of all disciplines with a minimum CGPA of 2.0.

Courses required: Any 8 of the following courses: STAT 101, STAT 102, STAT 103, STAT 201, STAT 202, STAT 205, STAT 301, STAT 302, STAT 303, STAT 304, STAT 305, STAT 307, STAT 308, STAT 309, STAT 310, STAT 311, STAT 313, STAT 315, STAT 400, STAT 401, STAT 403, STAT 407, STAT 408, STAT 411, STAT 412.

## Course Descriptions

### STAT 100: Basic Statistics (3 credits)

Sample and population, variables, collection and presentation of data, measures of central tendency and dispersion for ungrouped data, index numbers, correlation and free hand line of trend.

**STAT 101/MATH 107\*: Statistical Methods (3 credits)**

Nature and scope of Statistics, scales of measurements, measure of central tendency and dispersion for grouped data, moments, skewness and kurtosis, fundamental rules of counting, basic probability, moments in probability context.

**STAT 102/MATH 105\*: Probability and Probability Distributions (3 credits)**

Basic set theory. Different approaches and laws of probability. Conditional probability, Bayes' rule. Random variables, some standard discrete and continuous probability distributions.

**STAT 103: Quantitative Methods in Social Sciences (3 credits)**

Application of statistical methods in social sciences. Data analysis using SPSS.

**STAT 201: Statistical Inference I (3 credits)**

*Prerequisite: STAT 101 or STAT 102*

Population and sample; Introduction to sampling distributions and their properties; point and interval estimation; testing of hypotheses about means, proportions and variances.

**STAT 202: Statistical Inference II (3 credits)**

*Prerequisite: STAT 201*

Tests based on Chi-square distribution. ANOVA and analysis of basic designs. Non-parametric tests.

**STAT 205: Business Statistics (3 credits)**

Application and concept of probability and probability distributions in business, sample and sampling distributions, statistical inference in marketing and business, polynomial models in supply and demand, model fitting through simple and multiple regression.

**STAT 301: Sampling Techniques I (3 credits)**

*Prerequisite: STAT 201*

Basic sampling designs with applications, estimation of means, proportions and variances. Ratio and regression estimates.

**STAT 302: Experimental Design I (3 credits)**

*Prerequisite: STAT 202*

Principles of design of experiments. ANOVA, covariance and underlying assumptions. Model and analysis of CR, RCB and Latin Square designs. Fixed, random and mixed effect models.

**STAT 303: Regression Analysis I (3 credits)**

*Prerequisite: STAT 201*

Estimation of regression parameters, residual analysis; Inference about regression.

**STAT 304/MATH 314\*: Distribution Theory (3 credits)**

*Prerequisite: STAT 102/MATH 105*

Random variables and expectations of their functions. Theory and application of important discrete and continuous distributions.

**STAT 305: Statistical Quality Control (3 credits)**

*Prerequisite: STAT 101*

Control charts for attributes and variables. Acceptance sampling plan, quality improvement procedures, Taguchi method of online or offline approach to quality improvement; signal-noise ratios using orthogonal arrays.

**STAT 307: Sampling Techniques II (3 credits)**

*Prerequisite: STAT 301*

Probability proportional to size sampling. Some well-known estimators. Selection procedures using unequal probability sampling.



### **STAT 308: Experimental Design II (3 credits)**

*Prerequisite:* STAT 302

Experiments with more than 2 factors; ANOVA, fixed random and mixed models, factorial designs and experiments, confounding and factorial replication, multiple comparison tests, split plot and nested designs.

### **STAT 309: Regression Analysis II (3 credits)**

*Prerequisite:* STAT 303

Generalized linear regression, assumptions, diagnostics and remedial measures, inference about parameters. Simultaneous equation models. Model building.

### **STAT 310: Time Series Analysis (3 credits)**

*Prerequisite:* STAT 303

Types of time series data, trends, seasonal and cyclical analysis of data, irregular series, short-term forecasting, ARMA and ARIMA models, diagnostic checking, forecasts, Box-Jenkin's approach, spectral analysis.

### **STAT 311/MATH 315\*: Mathematical Statistics (3 credits)**

*Prerequisite:* STAT 102/MATH 105

Transformation of variables, t, Chi square and F distribution with properties, distribution of order statistics, non-central distributions.

### **STAT 313/MATH 304\*: Operations Research (3 credits)**

*Prerequisite:* STAT 102/MATH 103

Introduction to operations research, graphical solution, simplex method, two phase method, M-method, sensitivity analysis, primal dual relationship, dual simplex method, transportation model, assignment models, transshipment models, network models, queuing theory.

### **STAT 314: Reliability Analysis (3 credits)**

*Prerequisite:* STAT 304

Review of probability functions, basic reliability definitions, failure time distribution, exponential time-to-failure models, hazard rates, life testing, and reliability estimation of parameters. System reliability.

### **STAT 315: Statistical Packages and Data Analysis (3 credits)**

*Prerequisite:* STAT 202

Introduction to data analysis using software packages, applications of parametric and non-parametric tests, model fitting, probability distribution fitting, basic multivariate analysis of survey data.

### **STAT 400: Acceptance Sampling (3 credits)**

*Prerequisite:* STAT 305

Introduction to acceptance sampling plans, classification of sampling plans, probability and operating characteristic curves, probability functions, single, double, multiple sampling and sequential sampling by attribute.

### **STAT 401/MATH 408\*: Stochastic Processes (3 credits)**

*Prerequisite:* STAT 102/MATH105

Introduction, random walk and ruin problem, Markov chains and Markov processes, power spectra and linear systems, renewal theory, Brownian motion.

### **STAT 403: Point Estimation (3 credits)**

*Prerequisite:* STAT 304

Properties of estimators: Unbiasedness, consistency, sufficiency, efficiency, completeness. Methods of estimation: Moments, ML, LS, minimum Chi-squares, Bayes method of estimations.

### **STAT 406: Applied Multivariate Analysis (3 credits)**

*Prerequisite: STAT 202*

Multivariate data, review of multiple regression analysis, PC analysis and Factor analysis, Canonical correlation, Hotelling T procedures, MANOVA, Discriminant analysis.

### **STAT 407: Estimation and Hypothesis Testing (3 credits)**

*Prerequisite: STAT 304*

Interval estimation, Neyman-Pearson Lemma, power functions, uniformly most powerful test. Deriving tests of hypothesis for parameters in Normal, Exponential, Gamma and Uniform distributions.

### **STAT 408: Biostatistics (3 credits)**

*Prerequisite: STAT 102*

Introduction, probability distributions of biological variables, probit and logit transformations, ANOVA in biostatistics, developing G test, R x C test of independence.

### **STAT 410: Advanced Multivariate Analysis (3 credits)**

*Prerequisite: STAT 406*

Multivariate normal distribution, inference about mean vector and variance covariance matrix, central and non-central multivariate sampling distributions, theoretical aspects of important multivariate analysis techniques.

### **STAT 411: Survey Methods (3 credits)**

*Prerequisite: STAT 301*

Survey types, construction of survey instruments, benchmarking questionnaires, choosing appropriate research designs, estimation of sample size, pilot survey, preliminary and technical reports.

### **STAT 412: Advanced Statistical Quality Control (3 credits)**

*Prerequisite: STAT 305*

Double sampling plans and probability of acceptance, measurement system analysis (MSA), failure mode and effect analysis (FMEA), introduction to Six Sigma methodology and DMAIC Cycle, introduction to ISO 9000 QMS and ISO 14000.

### **STAT X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

### **STAT 499: Research Project (6 credits)**

Students with CGPA 2.5 or above will be eligible for research; students with CGPA less than 2.5 will have to take any other course from the list of electives.

#### **\*Cross-listed Courses:**

Courses with two designators (coding) are marked with \* to identify them as cross-listed courses. Students must select the correct designator for their applicable program to be counted towards the degree.

# DEPARTMENT OF URDU



The Department of Urdu is one of the oldest at FCCU and has had renowned faculty such as Maulana Farzand Ali, Dr Agha Suhail and Prof Iqbal Ahmed Khan. Both teachers and students take an active interest in the fields of research, creative writing and literary criticism. The Department has also produced some fine writers. The Department of Urdu offers a BA (Hons) degree and is part of the Faculty of Humanities.

## BA (Hons) Urdu

### Learning Objectives

- Reading: become accomplished, active readers who appreciate ambiguity and complexity, and who can articulate their own interpretations with an awareness and curiosity for other perspectives
- Writing skills and process: write effectively for a variety of professional and social settings, practice writing as a process of motivated inquiry, engaging other writers' ideas as they explore and develop their own, and develop an awareness of and confidence in the voice as a writer
- Oral communication skills: demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively, listening carefully and respectfully to others' viewpoints, articulating ideas and questions clearly, situating ideas in relation to other voices and ideas, and preparing, organizing and delivering an engaging oral presentation
- Critical Approaches: express ideas as informed opinions that are in dialogue with a larger community of interpreters, and understand how an approach compares to the variety of critical and theoretical approaches
- Research Skills: identify topics and formulate questions for productive inquiry, identify appropriate methods and sources for research and evaluate critically the sources found, and use their chosen sources effectively in writing, citing all sources appropriately
- Culture and History: gain a knowledge of the major traditions of literatures written in Urdu, an appreciation for the diversity of literary and social voices within and sometimes marginalized by those traditions, develop an ability to read texts in relation to historical

and cultural contexts in order to gain a richer understanding of both text and context, and become more aware of self as situated historically and culturally

#### **Requirements for Major**

Minimum of 36 credit hours including: URDU 201, URDU 204, URDU 208, URDU 302, URDU 405 and URDU 499 (research project).

#### **Requirements for Minor**

A minor in Urdu is open to students of all disciplines with a minimum CGPA of 2.00.

#### **Core Courses Required: URDU 104, URDU 208 and URDU 303.**

3 courses from the following: URDU 103, URDU 201, URDU 202, URDU 205, URDU 206, URDU 207, URDU 301, URDU 304, URDU 305, URDU 306, URDU 401, URDU 402 and URDU 403.

## **Course Descriptions**

#### **URDU 101: Communicative Urdu (3 credits)**

Communication and its different means, brief introduction to Urdu language, some fundamentals of Urdu grammar, functional Urdu, creative writing and journalistic Urdu.

#### **URDU 103: A Selection of Urdu Verse (3 credits)**

Ghazal (Ghalib, Mir and Iqbal), nazam (Nazeer Akbar Abadi, Akbar Allah Abadi, Majeed Amjad and Syed Zamir Jafri).

#### **URDU 104: A Selection of Urdu Prose (3 credits)**

Letters (Ghalib), essays (Sir Syed Ahmad Khan, Wazir Agha and Mushtaq Ahmad Yousfi), short story (Premchand), character sketch (M Abdul Haque), extract of travelogue (Begum Akhtar Riaz-ud-Din).

#### **URDU 201: A Brief History of Urdu Language and Literature (3 credits)**

Introduction to Urdu language and theories regarding its origin, phases and trends in Urdu literature up till the 20th century, Urdu in Delhi and Lucknow, evolution of Urdu prose.

#### **URDU 202: Classical Urdu Poetry (3 credits)**

Introduction to classicism, study of classical ghazal (Mir Taki Mir, Khawaja Mir Dard, Haider Ali Atish, Momin, Asadullah Khan Ghalib), masnawi (Mir Hassan) and marsya (Mir Anees).

#### **URDU 203: Introduction to Satire and Humor in Urdu Literature (3 credits)**

Difference between satire and humor, a brief history and importance of satire and humor, prose (Patras Bukhari, Ibn-e-Insha, Mushtaq Ahmad Yousfi, Col Muhammad Khan), poetry (Akbar Illahabadi, Syed Muhammad Jaffri, Syed Zamir Jafri, Anwar Masood).

#### **URDU 204: Urdu Grammar and Literary Terms (3 credits)**

Ilm-ul-Bayan, Ilm-ul-Badih, Adabi Istalahat.

#### **URDU 205: Pakistani Poetry (3 credits)**

Pakistani poetry (Munir Niazi, Shahzad Ahmad and Ahmad Faraz), nazam (Munir Niazi, Anwar Masood, Parveen Shakir and Amjad Islam Amjad).

#### **URDU 206: Pakistani Prose (3 credits)**

Pakistani fiction and prose: novel by Abdullah Hussain and short stories by Ahmad Nadeem Qasmi, Mumtaz Mufti and Bano Qudsia.

#### **URDU 207: Literary Journalism (3 credits)**

Difference between journalistic and literary use of language, evolution of literary journalism in Urdu, leading literary journals (Tehzeeb-ul-Ikhlaf, Awadh Puch, Saqi, Adbi Dunya, Naqoosh and Fanoon).

**URDU 208: Script Writing in Urdu (3 credits)**

Documentary writing: program scripts, journalistic scripts, business scripts, drama and film scripts.

**URDU 301: Modern Urdu Poetry (3 credits)**

Modernity and modernism, ghazal (Hasrat Mohani, Faiz Ahmad Faiz, Nasir Kazmi), nazam (Majeed Amjad, Faiz Ahmad Faiz), lyrics (Hafeez Jalandhry), an analysis of Urdu poetry in the 20th century in a nutshell.

**URDU 302: Criticism (3 credits)**

Basic principles and definition of criticism, oriental criticism, western criticism, practical criticism.

**URDU 303: An Introduction to Selected Genres (3 credits)**

Poetic and prose genres of Urdu literature: ghazal, nazam, rubai, qata, haiku, dastaan, novel, drama and character sketch.

**URDU 304: Biographical Literature in Urdu (3 credits)**

Evolution of biographical literature in Urdu, biography of Khawaja Altaf Hussain Haali.

**URDU 305: Autobiographical Literature in Urdu (3 credits)**

Evolution of autobiographical literature in Urdu, autobiographers: Abdul Majeed Salik, Rashid Ahmed Siddiqui, Ihsan Danish and Qudrat Ullah Shahab.

**URDU 306: Travelogues in Urdu (3 credits)**

Evolution of travelogues in Urdu, selected extracts from Mahmood Nizaami, Begum Akhtar Riaz-ud-Din, Ibn-e-Insha and Mustansar Hussain Tarrar.

**URDU 401: Study of Iqbal (3 credits)**

Life sketch of Iqbal, Iqbal as a poet and selected Urdu ghazals and nazams.

**URDU 402: A Study of Urdu Drama (3 credits)**

Art and evolution of Urdu drama, selected extracts from Anarkali, Mirza Ghalib Bandar Road Per and Man Chalay Ka Soda.

**URDU 403: Modern Literary Movements in Urdu (3 credits)**

Literary movements, modernity and modernism, important movements of the 20th century, romanticism, progressive movement, symbolism, modernism.

**URDU 405: Principles of Literary Research (3 credits)**

Importance of literary research, evolution of Urdu research up till Aab-e-Hayat by M Hussain Azad, principles and resources of research, terminology and preparation of research paper.

**URDU X95: Themes (1-3 credits)**

Sections:

A-E of 1 credit

F-J of 2 credits

K-Z of 3 credits

**URDU 499: Practical Research (3 credits)**

A research paper of 50-100 pages on any topic regarding Urdu language and literature.

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**FORMAN  
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COLLEGE**  
(A CHRISTIAN UNIVERSITY)

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