Biological Sciences Department

Annual Report 2011 – 2012

Forman Christian College Lahore
(A Chartered University)
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MESSAGE FROM CHAIRMAN

It is indeed great honor and pleasure for me to write 2011-12 annual report of biological sciences department. The BioSci department continues on the path of progress and year 2011 was one of the most successful academic years over the last decade. Our achievements as a department may not be quantifiable; I am pleased to spotlight the many ways in which biological sciences contributes to the goals of the university, and to the broader FCC community.

While faculty members are heavily involved in quality teaching, rich research remains on the radar screen of the department. A 3-fold increase in the number of students as a result of induction of biotechnology program at undergraduate level posed serious challenge and concerted efforts were made not to compromise on the standard of the teaching. Our students performed exceptionally well and won 31% of the total academic and co-curricular awards.

BioSci department is the research epicenter of FCC. Faculty is fully immersed in research culture and competitive research grants amounting rupees 53 million have been secured in recent years. Three department faculty, Drs. Kauser A. Malik, Muhammad Irfan and Asma Maqbool deserve special recognition for their efforts to bring funding to FCC.

Members of department continued to contribute on leadership positions in the university and actively served FCC campus, Government agencies and the public.

One of the major challenges is to stay competitive nationally and internationally especially in the age where technological advancements have made possible for everyone to be innovatively smart. This is a big asking. I am confident that BioSci faculty will rise up to the occasion and expand their efforts to achieve the intended objective.

I have completed two terms in the office and I take this opportunity to pay my sincere thanks to the ex-Rector, Dr. Peter H. Armacost for his support and guidance through out this period. I am also thankful to him for appointing me on various leadership positions. I am deeply humbled by the confidence placed in me by the new Rector, Dr. James Tebbe, in asking me to continue for one more year as Chairman of the department.

In the end I acknowledge with gratitude the support and contribution of faculty and support staff for smooth and efficient working of the department. It is a matter of great satisfaction that every one has worked with zeal and dedication.

In writing this report I sought some help from Student Assistant to analyze student’s grades but I am alone responsible for entire write up and take the responsibility for any omission or error. Your comments and suggestions are welcome.

Mian Wajahat Hussain, PhD
Professor and Chair
Executive Summary

In line with FCC mission statement, bio department has made efforts to impart quality teaching to produce independent minded and effective graduates. About 31% of the academic awards were bagged alone by biological sciences department including the highest academic honor award of the university. The department has succeeded in establishing research culture. It is very heart warming to note that bio department secured competitive grants of more than 53 million rupees in recent years and several research projects are in progress. This year has been very remarkable in the sense that first batch of 65 biotechnology students -the Class of 2012, graduated in June. About 43% of these graduates participated in research and internship. For the first time two merit scholarships for MPhil biotechnology students have been instituted.

The enrollment in the department has increased substantially and the number of student credit hours was more than 9799 for 2011-12 (excluding summer). GE courses for non science students were revised and a new Introductory Biology course has been introduced.

Biological Sciences department is housed in Armacost Science Building with a covered area of approximately 25500 square feet that includes 6 general and 9 research labs, a greenhouse, two climate rooms, a natural history museum, herbarium, seminar room, and a store besides faculty offices. The department also has a botanic garden, measuring about 7 acres, and is located towards east side of the campus and three fish ponds.

The department is comprised of 16 full time faculty members of whom 8 are professors, 2 associate professors, 5 assistant professors and 1 lecturer. Three lecturers were hired on temporary basis to teach biotechnology courses. A notable feature is that 15 faculty members have PhD degrees. Faculty profile is given in Appendix-1.

Academic Programs

1. Undergraduate Programs

At undergraduate level the department offers baccalaureate degrees (4-years Honors) in biological sciences, biotechnology and environmental sciences-an interdisciplinary program. Enrollment in the biological sciences department has steadily increased in the last 5 years. Figure 1 shows year wise overall enrollment in all the courses from 2006 to 2012. In years 2006 to 2010 a phenomenal increase of 349% was recorded and then in the next two years a further increase of 20% was observed.

Analysis of data revealed that initially number of female students in comparison with male was low (female:male ratio in 2006-07 was 0.3) but with each passing year this ratio steadily increased and this year the ratio is 1.25 (Figure 2).

The department has experienced a linear increase in the number of majors since the start of baccalaureate program (Figure 3). Currently the number of majors in the three degree programs is 472 of which biotechnology majors are 387 (82%) while biological sciences and environmental sciences have 49 (10.38%) and 36 (7.6%) respectively (Table 1). This lop sided trend in biotechnology has put tremendous pressure on course offering, lab space and
**Figure 1.** Student enrollment trend in all courses over the last 6 years

**Figure 2.** Gender profile of students from 2006 to 2012 in biological sciences department
expenses. With respect to the number of majors, BioSci department is the largest department on the campus with an enrollment of 472 students. The student:faculty ratio for 2011-12 is 27.7.

### Table 1. Number of students majoring in three degree programs.

<table>
<thead>
<tr>
<th>Year</th>
<th>BL</th>
<th>BT</th>
<th>ES</th>
<th>Total</th>
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<tbody>
<tr>
<td>2006-07</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>2007-08</td>
<td>18</td>
<td>10</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>2008-09</td>
<td>32</td>
<td>104</td>
<td>14</td>
<td>150</td>
</tr>
<tr>
<td>2009-10</td>
<td>44</td>
<td>178</td>
<td>24</td>
<td>246</td>
</tr>
<tr>
<td>2010-11</td>
<td>49</td>
<td>273</td>
<td>35</td>
<td>357</td>
</tr>
<tr>
<td>2011-12</td>
<td>49</td>
<td>387</td>
<td>36</td>
<td>472</td>
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BL = Biological Sciences
BT = Biotechnology
ES = Environmental Sciences

### Baccalaureate Grades

Grade distribution pattern of fall 2011 and spring 2012 are presented in Figure 4. Students scoring A grades in both the semesters were close to 20%. In fall 2011 percentage of B grades was slightly lower (7%) as compared to spring 2011 and this was counter balanced by 7% increase in C grades in fall 2011. Grades D and F ranged close to 12% and 6% in both semesters. It seems that grade patter was not much different than the previous year’s data (not shown) and it followed like a bell shape curve.

Further analysis of grades of GE and elective courses (Figure 5) revealed very close correspondence to the overall percentages of the combined grades of the fall 2011 and spring
Figure 5. A comparative account of grades in GE and elective courses (2011-12)

2012 semesters. This suggests uniformity of grading standards in both the categories of courses, though non science students in GE courses are in greater proportion than the science students in majors.

2. Graduate Program
Department started MPhil biotechnology classes in 2009. The overall objective of the programs is to give students an understanding of basic and advanced concepts of molecular biology and to comprehend the theory and practice of various biotechnology applications in agriculture, health, industry and environment. A course on Bioinformatics was especially included in the curriculum to enable students to use all the packages for data mining and to use them for solving specific problems. The unique feature of the program is that students are given the opportunity to develop business entrepreneurship for commercializing various biotech products. For this purpose, a course on Entrepreneurship has been designed. Keeping in view the space and infrastructure student intake is kept at 15.

Curriculum Revision
Keeping in view the essence of Liberal Arts education as envisaged in the Freshman Year Experience Program, BioSci department restructured the GE courses for non-science students who do not have science background. Curriculum revision committee of the department reviewed the three GE courses, namely BIO 101, 103 and 104 and suggested that while these three courses has served GE requirements very well in the last 5 years, however, one complete package of integrative biology was the need of the time. It was therefore, decided to have a Introductory Biology course that would include basic concepts of biology with cell as a building block, its function, reproduction, genetics and inheritance, basic concepts in evolution, ecology and principles of living systems. The course was designed for non-science students to a) provide an overview of modern biology, b) elucidate its importance in every
day life, c) generate sufficient interest to invoke curiosity and debate, and d) impart skills and competence at par with the undergraduate level of study.

In March 2011 the all faculty of the department was involved in revising the biological sciences program. Massive exercise was undertaken and a new structure with 64 credit hours instead of 48 for graduation was proposed. The rationale was that specialization is desirable in the discipline. Students need the opportunity to branch-out from the basics to area that meet the present challenges of sciences especially in health, agriculture and environment. However, the proposal was not accepted by the administration. Dr. Lesyle Johnson’s painstaking efforts in galvanizing all the components of biological sciences into a coherent unit are well appreciated.

Research

The faculty of biological sciences department is committed for superior teaching with a major thrust on high quality interactive teaching and learning in undergraduate program. This pedagogical approach is essential to the science education. At the same time faculty has placed high priority on research activities. Our research program is strong and vibrant and additional efforts are being made to secure more funds for our research programs. The department has seven HEC approved PhD supervisors (Appendix-II).

Faculty members in biological sciences department at FCC have diverse areas of expertise and are always keen to share their experiences. The department has observed a phenomenal increase in research-oriented professional development activities. Faculty supervised 20 undergraduate (14 in molecular biology, 2 in BioSci and 4 in environmental sciences) and 10 MPhil biotechnology students in their research work. More than 18 undergraduate students were sent to NIBGE, NIAB, SBS Punjab University, UVAS, UHS, and MMG Punjab University to complete internship.

During current academic session bio faculty published 13 papers in international and national journals (Appendix –III). Some other notable contributions are narrated as under:

**Dr. Kauser A. Malik, Distinguished National Professor** & Director Office of Research Innovation & Commercialization has played active role in promoting research culture in FCC. He is the single greatest contributor in terms of securing competitive grants amounting Rs. 43.48 million whose details are listed here.

2009: Pakistan Academy of Sciences awarded research grant amounting Rs. 2.4 million to work on microbial diversity and molecular signals in rhizosphere.

2010: Punjab Agricultural Research Board awarded research grant of Rs. 27.288 million to develop wheat with low phytate for increasing bioavailability of iron and zinc

2011: Higher Education Commission, Pakistan awarded a research grant of Rs.13.789 million to expound lignocellulosic biomass for efficient conversion to fermentable sugars and ethanol through genetic engineering
Dr. Asma Maqbool, Assistant Professor, was awarded a research grant amounting Rs. 3.927 million by Pakistan Science Foundation in 2010 to work on phosphorus use efficiency in wheat through genetic engineering.

Dr. Muhammad Irfan, Assistant Professor, received funding to the tune of Rs. 3.13 million from University of Agriculture, Faisalabad under Endowment Fund grant in 2011. This relates to the development and application of molecular diagnostics for live stock based food pathogens.

Dr. Khalid Zamir Rasib, Associate Professor, received a research grant of Rs. 3.66 million from Pakistan Science Foundation in 2012 to investigate termite management through baiting technology without environment contaminations.

Dr. Muhammad Arslan, Professor & ex-Vice Chancellor Quaid-e-Azam University, received a research grant of Rs. 1.264 million from Pakistan Science Foundation in 2012. The research work relates to the influence of family history of type 2 diabetes mellitus (T2DM) in adolescent and young males.

Dr. Natasha Anwar, Associate Professor secured a grant of 0.58 million from BF Bioscience, Lahore in 2012 for establishing an Erythropoietin Bioactivity Assay.

Ms. Umarah Mubeen, Lecturer, was awarded a research grant amounting Rs. 0.30 million by WWF in 2010 to work on algal biofuel.

Projects Submitted:
Faculty members have submitted five research projects, amounting Rs. 58.057 million, to various funding agencies/organizations for approval. Some details of these proposals are shown in Appendix – IV.

Research Projects
The faculty and postgraduate students are currently involved in the following research projects.

Development of transgenic wheat for increased iron and zinc bioavailability
A Competitive Research Grant of Rs. 27 million has been awarded by PARB to FCC to work on this project in collaboration with NIBGE, Faisalabad. According to the recent National Nutrition Survey, acute deficiencies of iron and zinc exist in our diet resulting in increased incidence of anemia, retarded growth and other abnormalities. Reduced bioavailability of these micronutrients is due to the presence of phytase which are known to be antinutrients. The strategy being adapted is to introduce a phytase gene in wheat which should be expressed in the seed endosperm resulting in degradation of phytate, thus increasing bioavailability of the micronutrients. The phytase gene construct has been successfully transformed and resulted in thirty PCR positive transgenic (T0) plants. Twelve wheat varieties have been screened for amount of iron, zinc, calcium, phytate content and phytase activity.

Genetically modified biomass for biofuel production
Development of lignocellulosic biomass with reduced lignin content through genetic engineering for bioconversion to ethanol. The aim of this research is to develop biomass which may not need any pretreatment for saccharification. This genetically modified biomass may also be used in paper industry as it will have less lignin thus avoiding the use of noxious chemicals.

Biofertilizers for sustainable agriculture
Molecular biology of plant microbe interaction, elucidation of signal transduction pathways, metagenomic studies on the rhizosphere of plants growing in extreme environments. More than hundred strains of PGPRs have been isolated from rhizosphere and histoplane of salt tolerant (Kochia
indica, Suaeda fruticosa and kallar grass) and other economically important plants (wheat and cotton) has been isolated and characterized. These can be used as biofertilizers.

**Algal species**
Algae are the most efficient converters of solar radiation to chemical energy. These are known to have high oil content. Native algal species with high energy value and biomass productivity has been isolated and optimized for various growth parameters. Effort is being made to cultivate the selected algal species on pilot scale under native environment conditions.

**Plant transformation**
Plant transformation systems provide an opportunity to increase the yield, nutritional value and to make them resistant against different diseases by introducing gene of interest. Agrobacterium mediated plant transformation systems have been successfully established for various plants including cereals, tomato, potato, carrot, populus and eucalyptus by using reporter gene.

**Increasing phosphorus use efficiency in wheat**
Phosphorus is a macronutrient and also a limiting factor for plant growth and development. Most soils contain significant amounts of total soil P but plants are unable to utilize it because the major component of soil organic phosphorus occurs as phytates. Phytase is an enzyme capable of hydrolyzing the phytates into inorganic phosphorus (Pi) and myo-inositol. The project is aimed to express foreign phytase gene in plant roots to enhance phosphorous uptake. For this purpose root specific promoters from barley, Brassica and Arabidopsis have been successfully isolated and characterized.

**Molecular diagnostics for livestock-based food pathogens**
Livestock-based food pathogens are responsible for inflicting severe diseases and economic losses to the agriculture based economy of Pakistan. The project has been initiated to incorporate molecular approaches for rapid detection of common food-borne pathogens from raw and ready-to-eat meat and milk. Almost 300 samples of raw meat and milk were collected from five different regions of Lahore. These were screened for the prevalence of Shiga toxin producing E. coli and Salmonella spp. by PCR using gene specific primers.

**Estimation of inorganic P released by degradation of phytases**
Legumes are generally used for green manuring and phytate content in legumes is high (75%). Phosphorous requirements of plants can be met by degradation of organic P in the form of phytates by using phytase. For this purpose inoculation of phytase producing microorganisms such as A. niger was used to degrade phytates and released inorganic P was calculated. It will result in increased P uptake by plants thus reducing dependence on expensive phosphate fertilizers.

**Termite management through baiting technology**
Termites are highly destructive pests of agro forest ecosystems. The theme of the project is to promote ecofriendly termite management while discouraging indiscriminate use of insecticides.

**Endocrinology and metabolism**
Currently, two areas of research are being actively pursued. The first relates to the biochemical spectrum and molecular genetics of severe obesity in Pakistani children. The second research group has initiated a project to establish normal values of metabolic and reproductive hormones in the Pakistani population. Active research collaborations have also been established with a number of national and international clinical, basic sciences, and translational research groups, in the relevant fields of study.

**Bioassay Development**
In this project we are using an animal model to evaluate the biological activity of recombinant compounds. A mouse model has been established and is being optimized to test the biological activity of recombinant erthryropoietin, which has been manufactured and produced in eukaryotic cell culture.
Molecular Assay for Dengue Virus
We are developing a sensitive and specific assay that will detect virus in serum from patients and in Aedes mosquitoes, the vector. The method will allow for detection of the virus in the vector and enable us to determine the baseline level of dengue virus carriage by the Aedes mosquito. Once this data is available it will not only help plan an effective intervention that will reduce the numbers of the vector but also enable surveillance of the virus in the mosquito on a regular basis.

Aquatic Biology
Research work is in progress to monitor the impact of Lahore sewage discharge on the fish population in river Rivi, extending from Shadhara to Head Balloki. The broad aim of the study is to monitor the seasonal changes in the chemical composition of the river water and variation in fish distribution. This will help to document ecological requirements as well as strategies to protect fish population.

Linkage
The Department has developed linkage with the following biotechnology institutions which allow its students to get internships and develop research collaborations.
- Center of Excellence in Molecular Biology, Punjab University (CEMB)
- National Institute for Biotechnology and Genetic Engineering, Faisalabad (NIBGE)
- National Institute of Agriculture and Biology, Faisalabad (NIAB)
- Pakistan Council of Scientific & Industrial Research, Lahore (PCSIR)
- School of Biological Sciences, University of Punjab (SBS)
- Shaukat Khanum Memorial Cancer Hospital & Research Center, Lahore (SKMHRC)
- University of Health Sciences, Lahore (UHS)
- University of Veterinary and Animal Sciences, Lahore (UVAS)

Memorandum of Understanding
Biological sciences department has made efforts for collaborative and interdisciplinary research. In this context, earlier this year, Dr. Natasha Anwar was instrumental in signing a MoU between FCC and BF Biosciences Limited. BF Biosciences is Pakistan’s first Biotech Pharmaceutical Company specializing in the production of biological compounds used in the treatment of Hepatitis C and Cancer. BF Biosciences is a joint venture between The Bagó group of Argentina and Ferozsons Laboratories Limited of Pakistan.

Conferences, Workshops, Seminars
Following faculty members participated in various international conferences.

Dr. Muhammad Arslan
1. Participated in 4th International Testosterone Symposium, held in Schloss Hohenkammer, Munich Germany from October 1-4, 2011
2. Attended a workshop on Genetics and Physiology of Extreme Obesity, held in Looe, Cornwall, UK, from June 9-14, 2012

Dr. Kauser Abdulla Malik
Participated in Second Asian conference on PGPR held in Beijing, China. August 2011.
Dr. Muhammad Irfan
Attended an international conference on “Environmental Risk Assessment of Genetically Engineered Plants” held in Dhaka, Bangladesh from April 15-17, 2012

Dr. Hamid Saeed
Participated in Biosafety & Biosecurity Conference, held in Bangkok, Thailand. February 2011

Dr. Asma Maqbool
1. Visited Department of Genetics and Biotechnology Research Center, Flakkebjerg DK-4200 Slagelse, Aarhus University, Denmark for three weeks. February 2011.

2. Selected for a visit to China under Pakistan Youth Delegation Program for 10 days in April 2011

International Conferences at FCC

Dr. Kauser A. Malik organized two international conferences at FCC.

A three day international training workshop, sponsored by ISESCO was held at FCC in December 2011. The theme of workshop was “Bioinformatics Applications in Biotechnology for Young Biotechnologists”. Participants from different universities of Bangladesh, Beirut, Egypt, Jordan and Pakistan attended the workshop from December 9 to 11, 2011.

A two day workshop at FCC in collaboration with International Council of the Life Sciences, Washington and COMSTECH, Islamabad was held on January 31, & February 1, 2011. The workshop was entitled “The Conduct of Responsible Science” and well-known intellectuals from Pakistan and abroad participated.

Seminars

Department faculty, graduate and undergraduate students participated in a one day seminar captioned “Biotechnology and Food Security” at FCC which was organized by Dr. Kauser A. Malik in collaboration with DuPont Pioneer Seed Company, Pakistan in March 2012. Dr. Asif Ali Shah, country head DuPont Pioneer, was the chief guest.

A seminar on the Energy Prospects of Pakistan was held in May 2012. Dr. Shaukat Hameed Khan, nuclear physicist and a senior professor of nuclear physics at the Ghulam Ishaq Khan Institute of Engineering Sciences and Technology was the guest speaker. FCC faculty and students participated in the seminar.

A seminar on Growing Economic Problems of Pakistan “Umeed” was arranged by Dr. Kauser Malik on June 1, 2012 in Public Policy Department. Dr. Sohail Jehangir Malik, Chairman Innovation Development Strategies (Pvt.) Ltd; Senior Research Fellow, International Food Policy Research Institute, USA was the guest speaker. Department members participated in the seminar.

Dr. Khalid Zamir Participated in an international conference - Latest Techniques for Conservation of Animal Genetic Resources in Pakistan held at UVAS, Lahore, 14-15 Sep. 2011

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Ms. Umarah Mubeen was a resource person in a workshop on “Green Technologies” held at COMSTECH, Islamabad, 28-30 June, 2011. She also participated in the “1st National Phycological Conference” held on March 30-31st, 2011 at Government College University, Lahore.

Center for Learning and Teaching Activities

Faculty participated in several academic activities related to professional growth and development organized by CLT. Details of these activities are summarized in Appendix-V.

Awards

In recognition of his outstanding services, Chief Minister of the Punjab conferred a Life Time Achieve Award to Dr. Kauser Abdulla Malik in 2010.

Dr. Farhat Iqbal was awarded Fulbright Fellowship for one year.

Mr. Nadeem Asad, who is studying in University of Kansas, USA under Fulbright scheme, won the Graduate Teaching Award in June 2012.

Mr. Muhammad Adeel, biotechnology graduate won the highest academic award – Summa Cum Laude, among the university students (June 2012) by securing 3.98 CGPA.

Some details of the co-curricular awards won by the students of BioSci department are listed in Appendix-VI.

Merit Scholarship

One of the major contributions of Dr. Kauser Malik is the setting up of two merit scholarship for biotechnology students which will be funded by Pioneer Pakistan Seed Ltd. The scholarship will be named as “DuPont Pioneer Biotechnology Education Grant”. A MoU have been signed in this context between FCC and DuPont Pioneer Seed Company, Pakistan. This will go a long way in promoting the cause of biological sciences department in the wider community.

Lab Equipment & Computer Facility

The department has nine dedicated research and six teaching laboratories as well as state of the art equipment such as: PCR-thermal cycler, real-time PCR, micro-centrifuges, electroporator, refrigerated table top centrifuge, ultra low freezer, nanodrop spectrophotometer, orbital shaker, infrared gas analyzer (IRGA), gas chromatogram, CO2 incubator, gel electrophoresis system, gel documentation system, bio-safety cabinets, leaf area meter, quantum sensor, etc. Recently 10 liter microprocessor controlled fermenter has been installed.

Fish pond, three in number; have been constructed in botanic garden recently. Construction on animal house on the third floor mezzanine (block A) in Armacost Building has started and is expected to be completed soon.
All the faculty members have access to computer, printer and internet facility within the department, some faculty have their own laptop. The faculty: computer ratio is 0.81. Efforts will be made to improve this ratio. The department also has several overhead projectors and two multimedia. These are regularly used by the faculty members of the department. Other departments also send requisition to use these facilities.

Co-curricular Activities

Elections of the Senior Biological Society were held in early 2011 and following students were elected for various position.

- **President:** Muhammad Nauman Arshad
- **Senior Vice President:** Mujtaba Choudhary
- **Junior Vice president:** Sunita Salamat
- **Secretary:** Malik Murtaza Kasi
- **Treasurer:** Zeeshan Ali Yousuf
- **Activities Coordinator:** Ali Raza Anser

In consultation with the advisor, Dr. Muhammad Irfan (earlier Dr. Aisha Saleem Khan served as advisor) the society arranged the following functions:

- **May 26, 2012** Farewell party to graduating seniors
- **April 3, 2012** Dr. Waseem Anwar from Punjab University gave a talk on Dengue awareness.
- **March 10, 2012** Society arranged a trip to Rawal Lake, near Rawalpindi.
- **January 26, 2012** Society arranged a quiz competition
- **November 21, 2011** Dr. Noman Aftab from GCU gave a lecture on Genomics & Bioinformatics
- **July 22, 2011** Society arranged one day function – “Jaman Day”. It was designed to collect the delicious edible fruit known in local language “jaman” from the trees (*Eugenia jambolana*), is well known for its therapeutic value) located on the campus and distribute it to FCC community as a goodwill gesture.

Dr. Saba Butt is serving as advisor to **Red Crescent Youth Group (RCYG)**. Red Crescent Youth Group won the best society award for 2011-12. In June 2012 RCYG arranged 12 days Medical First Respondent Training in collaboration with Rescue 1122 Academy and 20 students were trained. Earlier, in December 2012, RCYG also arranged short training sessions on Basic Life Saving training in collaboration with Rescue 1122 and some students and faculty benefited from this activity. Dr. Saba Butt arranged blood donating camps for FATIMID Foundation for children suffering from Thalassaemia. She took initiative to start FCC Emergency Service for the first time and also organized charity functions.

Dr. Aisha SAleem Khan, an active member of Botanical Society of America was helpful in getting a gift membership to 15 students of bio department.
Service

The faculty and staff in Biological Sciences are actively serving the department and university. Dr. Hamid Saeed is Registrar. He is also serving as Secretary Staff Club, member Executive Council, member Strategic Planning Committee and Executive member of FCC Alumni. Dr. Mian Wajahat Hussain is Controller of Examinations, member Academic Standard Committee, and member Academic Assessment Committee. Dr. Kauser A. Malik is Director, Office of Research Innovation and Commercialization. Recently he has been appointed as Chairman, River Ravi Commission by Lahore High Court. Dr. M. Rehan Siddiqi is member Academic Development Committee and campus Tree czar. Dr. Saba Butt is in-charge of Natural History Museum. All professors along with Dr. Natasha Anwar, Dr. Asma Maqbool (Rector’s nominees) and Dr. Saba Butt (Chair’s nominees) are serving on Board of Faculty of Natural Sciences.

Dr. William George is member FAA executive committee, Member Presbyterian Education Board, Chairman, Pastoral Endowment Trust, Member UCH medical board, and Chairman Presbyterian Foundation Trust

Dr. Kauser Abdulla Malik and Dr. Mian Wajahat Hussain served as resource person to CLT.

Department members are regularly contributing towards FCC scholarship fund. Following is the list of contributors for 2011-12.

Dr. Mian Wajahat Hussain  Dr. William George  Dr. Aisha Saleem Khan
Dr. Kauser A. Malik  Dr. Lesyle Johnson  Dr. Saba Butt
Dr. Hamid Saeed  Dr. Khalid Zameer Rasib  Ms. Umarah Mubeen
Dr. M. Rehan Siddiqi  Dr. Natasha Anwar

The department conducted 14 faculty meetings, including board of studies meeting, between July 2011 and June 2012 to deliberate issues related to the academics, department, administration, etc. Some meetings were exclusively devoted to follow-up the Rector’s agenda of interactive teaching and learning, and faculty load reduction. During the meetings the Chair placed emphasis on interactive teaching, new policies and procedures, research, professional development, course and syllabus revision, attendance policy, exams and grading.

Dr. Kunwar Shoaib retired on June 30, 2012 after serving FCC for more than 44 years. He served as Head of the Botany Department during 2000 to 2001. He also served as dean postgraduate studies from 2003 to 2007. Dr. Natashs Anwar joined as associate professor. Ms. Tehmina Saleem Khan was hired in place of Dr. Farhat Iqbal who proceeded to USA as a Fulbright Fellow in fall 2011. Ms. Anood Atta and Ms. Fareeha Naz were hired as temporary lecturers to teach biotechnology courses.

Support staff (Appendix-VII) of the department, besides performing their regular duties in the labs and offices, is fully involved in the conduct of competency, comprehensive and intermediate send-up examinations. They are also engaged in the registration of senior graduating students and in the preparation of seating plan for students, faculty, and guests during commencement.
Departmental Committees

Several committees at departmental level such as curriculum revision committee, educational assessment committee, academic integrity committee, purchase committee, and search committee work closely with Chair to look after departmental matters in an effective way. Names of the faculty who are serving on these committees are given in Appendix-VIII.

Budget

The total expenditure of the department during 2011-12 was close to 3.331 million. This includes (a) equipment, chemicals and glassware amounting Rs. 1,448,511.00, 803,571.00, 754,811.00 respectively and (b) routine petty purchases for labs and research work totaling Rs. 324,563.00. We are thankful to Dr. Sufian Aslam, Dean of Natural Sciences for providing some funds to purchase some equipment for the baccalaureate labs.

It is important to note that the department has also spent approximately 1.2 million rupees from research grants, over and above the departmental allocation, to cater the needs of baccalaureate programs.

Commencement and Academic Honors

Following are the highlights of 2011-12 BSc (Hons) graduation

- A record number of 84 students graduated from biological sciences department in 2011-12. This represents more than 2.8-fold increase in graduating students from BioSci department as compared to last year.

- The students graduated from BioSci department represented 21% of the total number of university graduates.

- There was a record number of student credit hours (>9799) in 2011-12 which represents 13% increase as compared to last year.

- About 43% of graduating seniors participated in research and internship.

- BioSci students bagged highest number of academic and co-curricular awards, 17 out of a total of 54 (31.5%), among all the university students (Figure 6).

- During 2011-12 more than 25 students of the BioSci department were named on Vice Rector’s list.

- Several students (about 13) were awarded USAID scholarship.

**Summa Cum Laude**

Muhammad Adeel

**Magna Cum Laude**

Amna Shakkullah
Adeela Hussain
Chandni Yaqoob
Maria Maqsood

Muhammad Awais Afzal
Lamia Islam Khan
Werda Shermeen Zia
Cum Laude

Zeeshan Majeed  
Ayesha Aslam  
Mudassar Iqbal  
Maheen Alam Chaudhry

Fareeha Naz  
Amna Qadeer  
Tauseef Iftikhar  
Alina Zahra

Fakhar Waqas  
Shakila Younas  
Muhammad Amer Javed

Department Outstanding Student Awards

Areeba Hussain (Biological Sciences)  
Muhammad Adeel (Biotechnology)

Core Values Awards

Chandni Yaqoob  
Shakila Younas  
Roshan Mubeen

Khazima Yousaf  
Muhammad Umair Akhter

Services Awards

Mudassar Iqbal  
Alina Zahra

Core Values & Services Award

Adil Daniel  
Tauseef Iftikhar  
Saloom Aslam  
Abraham Akhter Murad  
Wyclife Uzziah  
Muhammad Adeel  
Adnan Iqbal

Aoun Ali  
Amna Shakrullah  
Maria Maqsood  
Sumia Khan  
Zon Yousaf  
Sania Munir  
Aisha Aslam

Sarah Ephraim  
Durray Shahwar  
Syeda Ayesha Qadeer  
Muhammad Shafiq  
Qamar Fatima  
Alina Rafi

Figure 6. The data reflects that bio department bagged 31.5% of the total awards among the university students.
List of Graduates 2011-12

Names of the students who graduated from biological sciences department with BSc (Hons) degrees in Biological Sciences, Environmental Sciences and Biotechnology and MPhil Biotechnology degree (November 2011 commencement) are given in Appendix – IX.

Courses Offered

Department offered 31 and 26 courses in fall 2011 and spring 2012 respectively in BSc (Hons) program. In MPhil biotechnology 10 courses were taught during 2011-12 session. The details of the courses are given in Appendix – X. Many courses in fall and spring had multiple sections. Thus a total of 42 and 43 sections were offered in fall 2011 and spring 2012 respectively (details not shown).

Departmental Strengths

- Faculty that shows strong commitment to engage students in interactive learning
- Faculty that goes beyond normal expectations to help students develop professionally
- Immense dedication to secure competitive grants to support research
- Highest number of faculty members with PhD degree
- Highest number of HEC Approved PhD Supervisors
- Highest number of major enrollment (2011-12)
- Highest number of GE enrollment in the last 6 years
- Leadership role of faculty in administrative, academic and professional development activities

Departmental Weaknesses

- Reliance on other department and visiting faculty to teach our MPhil students.
- Budgetary constrain for necessary equipment, chemicals, and glassware for laboratory and research activities.
- Inadequate support staff to meet general and research lab needs
- Acceptance of additional responsibilities by faculty despite teaching and research work.
- Excess teaching load and lack of time availability for faculty to work on innovative projects.

Departmental Goals

- To prepare a 5-year strategic plan for the department
- To revise baccalaureate biological sciences curriculum to make it more market oriented
- To prepare assessment plan for academic program
- To strengthen infrastructure of general laboratories
Faculty

Dr Mian Wajahat Hussain
PhD University of Florida, USA
Professor and Chair

Dr Kauser Abdullah Malik (HI, SI, TI)
PhD University of Aston, Birmingham, UK
HEC Distinguished Professor and Director ORIC

Dr. Muhammad Arslan
PhD University of Wisconsin, USA
Professor (Hon), Ex-Vice Chancellor, QU Islamabad

Dr M Rehan Siddiqi
PhD Miami University, Ohio, USA
Professor Emeritus

Dr Leslye D. Johnson*
PhD University of Maryland, USA
Professor

Dr William George
PhD Free University Berlin, Germany
Professor

Dr Hamid Saeed
PhD, Punjab University, Lahore
Professor and Registrar

Dr Kunwar Shoaib
PhD Punjab University, Lahore
Professor

Dr. Natasha Anwar
PhD Imperial College, London, UK
Assistant Professor

Dr Khalid Zamir Rasib
PhD Punjab University, Lahore
Post doc, Imperial College, London, UK
Associate Professor

Dr Farhat Iqbal
PhD Punjab University, Lahore.
Assistant Professor, On leave as Post doc Fellow, Fulbright Scholarship, USA

Appendix - 1

Dr Asma Maqbool
PhD CEMB, Punjab University, Lahore
Assistant Professors

Dr Muhammad Irfan
PhD CEMB, Punjab University, Lahore
Assistant Professor

Dr Aisha Saleem Khan
PhD Punjab University, Lahore
Post doc, Miami, Ohio, USA
Assistant Professor

Dr Saba Butt
PhD Punjab University, Lahore
Assistant Professor

Ms. Umarah Mubeen
MPhil GCU, Lahore
Lecturer

Ms. Tehmina Saleem Khan
MPhil GCU, Lahore
Lecturer (temporary)

Ms. Anood Atta
MPhil FCC, Lahore
Lecturer (temporary)

Ms. Fareeha Naz
MPhil FCC, Lahore
Lecturer (temporary)

Dr Mahkoor Mohsin
PhD NIBGE/QAU, Islamabad
Assistant Professor, on leave as Alexander Von Humboldt Fellow, Germany

Nadeem Asad
MPhil GCU, Lahore
Lecturer, on leave for PhD under Fulbright scholarship scheme

* Taking half teaching load
Visiting Faculty

Dr Aftab Bashir  
PhD University of Illinois, Urban Campaign, USA  
Post Doctorate Scripps Institute, La Jolla, USA and University of Manchester, UK. Principal scientist NIBGE, Faisalabad

Dr Muhammed Waheed Akhtar TI  
PhD University of Strathclyde, Glasgow, UK. Fulbright Fellow, Cornell University, US; Director School of Biological Sciences, Punjab University, Lahore.

Dr Yusuf Zafar TI  
PhD University of Hanover, Germany/ QAU, Islamabad  
Post Doctorate Texas A&M, USA  
Project Director, National Institute of Genomics and Advanced Biotechnology (NIGAB), NRC, Islamabad

Dr. Omar Abdulla Malik  
PhD Rochville University, USA; MSc Aston University, Birmingham, UK  
Co-founder & Chief Operating Officer In Vitro Vogue Pvt. Ltd. Pakistan

Research Associates

Humaira Aslam Awan  
MSc. PU, Lahore  
Research Fellow

Nabila Abid  
MSc. AU, Faisalabad  
Research Officer

Mehwish Ashraf  
BSc (Hons), FCC, Lahore  
Research Officer

Mohsin Arshad  
BSc (Hon), GCU, Lahore  
Research Associate

Muhammad Afzal  
BSc (Hon), FCC, Lahore  
Research Associate
Appendix – II

HEC Approved Supervisors

1. Dr Kauser Abdullah Malik (HI, SI, TI)
2. Dr. Muhammad Arslan
3. Dr Mian Wajahat Hussain
4. Dr. Natasha Anwar
5. Dr Asma Maqbool
6. Dr Muhammad Irfan
7. Dr Aisha Saleem Khan

Appendix - III


Aisha Saleem Khan. 2012. Environmental Factors affecting calcium oxalate crystals formation in Tredescantia pallida (Commelinaceae). Plant Growth Regulators. (Accepted)

Aisha Saleem Khan. 2012. A comparison of Effects of Heavy Metals on Plant Growth. Plant Growth Regulators. (Accepted)


BOOK

## APPENDIX - IV

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DONOR AGENCY</th>
<th>PI</th>
<th>AMOUNT (million RS)</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbial diversity as depicted by metagenomic analysis of rhizosphere of plants growing in extremely halophytic and xerophytic environment</td>
<td>HEC</td>
<td>Dr Kauser Abdulla Malik</td>
<td>5.965</td>
<td>3 Years</td>
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<td>Enhancing fertilizer use efficiency in wheat by using transgenic approach.</td>
<td>Punjab Agricultural Research Board (PARB)</td>
<td>Dr Kauser Abdulla Malik</td>
<td>19.962</td>
<td>3 Years</td>
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<td>Development of nutraceutical transgenic tomatoes</td>
<td>Pakistan Agricultural Research Council, PARC-ALP</td>
<td>Dr Kauser Abdulla Malik</td>
<td>8.8</td>
<td>5 years</td>
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<td>Use of entomopathogenic fungi as promising alternative to chemicals</td>
<td>PARB</td>
<td>Dr Khalid Zamir Rasib</td>
<td>22.75</td>
<td>4 Years</td>
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<td><strong>Total</strong> 57.47</td>
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</table>

## APPENDIX - V

Names of the faculty who participated in various professional activities arranged by CLT during 2011-12

**July 2011**
- Ms. Umarah Mubeen  Res. Academic writing

**October 2011**
- Dr. Natasha Anwar  Course Designing
- Dr. M. Rehan Siddiqi   Moodle
- Ms. Umarah Mubeen  Moodle
- Dr. Natasha Anwar  Moodle
- Dr. Lesyle Johnson  Moodle
- Dr. Aisha Saleem khan  Moodle

**April 2012**
- Dr. Kauser A. Malik   Using Turnitin
- Ms. Umarah Mubeen   Using Turnitin
- Dr. Mian W. Hussain  Using Turnitin

**May 2012**
- Dr. Saba Butt   Using JSTOR
- Technology for Teaching:
  - Dr. Saba Butt
  - Ms. Anood Atta
  - Ms. Fareeha Naz

**February 2012**
- Dr. Saba Butt   Turnitin

**March 2012**
- Dr. Saba Butt   Searching for Research: From Theme to Thesis

**June 2012**
- Dr. Saba Butt   Creating Course Web Site

Drs. William George, Khalid Rasib, Muhammad Irfan, Mian Wajahat Hussain and Asma Maqbool participated in meeting of Learning Groups.
APPENDIX - VI

Some achievements of the students of biological sciences department at FCC and outside during 2011.

Muhammad Adeel

- Stood 1st in the Chief Minister’s Essay Writing Competition at District and Division Level for three consecutive years 2009-2011.
- Stood 1st in the All Pakistan Essay Writing Competition at FAST University Islamabad, 2011.
- Runners Up at All Pakistan Parliamentary Debates at FAST University, Lahore, 2011.
- Stood 3rd in All Pakistan Parliamentary Debates at University of Central Punjab, 2012.
- Stood 2nd in Home Declamation (English) at FCCU, 2011.
- Represented Lahore at Youth Development Center, Murree on the directive of CM, Punjab, 2012.
- Highest CGPA among all baccalaureate students for the session 2008-2012: 3.98
- Have been mentioned in the Vice Rector’s list in all semesters.

Muhammad Awais Afzal

- 1st position in All Pakistan Bilingual Declamation Contest of King Edward Medical College University Lahore, 2011
- Best Speaker in All Pakistan Bilingual Declamation Contest of Lawrence College Murree, 2011.
- Secured 1st Position in All Punjab Chief Minister’s Debate competition, 2011 and was declared the Best Speaker amongst 4000 speakers and won a cash prize of Rs. 2,00,000.00.
- Declared 2nd Best Speaker in All Pakistan Bilingual Declamation Contest of Government College University Lahore, 2011
- Awarded Role of Honor in Bilingual Debates and Declamation at FCC, 2011.

Zeeshan Ali yousuf

- Secured Ist position in presentation competition arranged by Speer's chemical society, FCC, 2011

Muhammad Nauman Arshad

- Secured Ist position in a quiz competition arranged Education Society, FCC, 2011
Support Staff

1. Shakeel Siddique, Lecture Assistant
2. Younas Masih, Lecture Assistant
3. Atif Javed, Laboratory Technician
4. Arshad Masih, Laboratory Attendant
5. Shringrif Dilnawaz, Laboratory Attendant
6. Ayaz Imtiaz, Laboratory Attendant
7. Karamat Ashiq, Laboratory Attendant
8. Rafaqat Mirza, Laboratory Attendant
9. Hussain Iqbal, Laboratory Attendant

Departmental Committees

Curriculum Revision Committee
Dr. Kauser Abdulla Malik (Convener)  Dr. Khalid Rasib
Dr. Lesyle Johnson  Dr. Natasha Anwar
Dr. M. Rehan Siddiqi  Dr. Muhammad Irfan
Dr. Muhammad Arslan  Dr. Saba Butt
Dr. Kunwar Shoaib  Dr. Aisha Saleem
Dr. Hamid Saeed  Ms. Umarah Mubeen
Dr. William George  Ms. Tehmina Saleem Khan

Educational Assessment Committee
Dr. M. Rehan Siddiqi (Convener)  Dr. William George
Dr. Aisha Saleem Khan  Ms. Umarah Mubeen

Academic Integrity Committee
Dr. Kauser Abdulla Malik (Convener)  Dr. Natasha Anwar
Dr. Khalid Rasib  Dr. Aisha Saleem Khan

Purchase Committee
Dr. Khalid Zamir Rasib (Convener)  Dr. Saba Butt
Dr. Muhammad Irfan

Search Committee (bio)
Dr. Mian Wajahat Hussain (Convener)  Dr. Asma Maqbool
Dr. Khalid Zamir Rasib

Dr. William George and Dr. Aisha Saleem Khan are serving as committee members of Chemistry and Physics search committees respectively.
APPENDIX – IX

List of Graduates 2012

HONORS DEGREE

Biological Sciences

Areeba Hussain
Muhammad Aslam Wazir
Sidra Javed
Hafsa Shahzadi
Romail Younis
Waqs Shafique
Iram Naeem
Ruha Arshad
Zanib Binat E Hamid
Muhammad Yasir
Sahrish George

Environmental Sciences

Anila Javed
Lamia Islam Khan
Sarah Ephraim
Ayesha Mehmood
Muhammad Afzal
Wyclife Uzziah
Fatima M. Masood
Muzaib Riaz

Biotechnology

Adeela Hussain
Hammad Afzal
Muhammad Adeel
Adnan Iqbal
Haseeb Nasir
Muhammad Umair Akhtar
Alina Zahra
Hina Ahmed
Neelam Muzaffar Ahmed
Alina Rafi
Huma Younis
Qamar Fatima
Amina Qadir
Imran Rafique
Qura tu Ain
Amina Shakrullah
Kamran Aslam
Rabia Shad
Anam Saghir
Khazeema Yousaf
Roshan Mubeen
Asma Rehman
M. Ammir Javed
Rubyia Yousaf
Ayesha Aslam
M. Awais Afzal
Saadia Munir
Ayesha Ameen
M. Hassan Nawaz
Sana Zulfiqar
Ayesha Qasim Ali
M. Murtaza Hussain
Sana Farooq
Chandni Yaqoob
M. Qandeel Waheed
Sania Munir
Durray Shahwar
Madeeha Munir
Sehrish Khan
Faiza Jameel
Madiha Mahmood Gillani
Shakila Mohd Younis
Fakhar Waqas
Madiha Shad
Sohail Samuel
Farid Ul Haq
Maheen Alam Chaudhry
Sumia Khan
Hafiz Ali Hassam
Maria Maqsood
Sundas Sarfraz
Hafiza Rabia Sarwar
Maryam Kabir Ali
Syed Aoun Ali
Hafiza Sidrah Yasin
Muddassar Iqbal
Syed Ramiz
List of Graduates 2011

MASTER OF PHILOSOPHY - BIOTECHNOLOGY

Graduated in November 2011

Abdul Razzaq          Dalaq Aiysha          Sana Jamil
Anood Atta Sheikh     Fareeha Naz          Sharoon Akhtar
Aqeela Ashraf         Nufaid Khan          
Asma Danyal

APPENDIX - X

List of courses offered in BSc (Hon) and MPhil biotechnology program during 2011-12.

BSc (Hon) courses

Fall 2011

<table>
<thead>
<tr>
<th>BIOL 100</th>
<th>Introductory Biology</th>
<th>BIOT 301</th>
<th>Analytical Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 101</td>
<td>Man &amp; Environment</td>
<td>BIOT 302</td>
<td>Fundamentals of Enzymology</td>
</tr>
<tr>
<td>BIOL 102</td>
<td>Introductory Plant Biology</td>
<td>BIOT 307</td>
<td>Molecular Immunology</td>
</tr>
<tr>
<td>BIOL 103</td>
<td>Elementary Human Biology</td>
<td>BIOT 309</td>
<td>Microbial Biochemistry</td>
</tr>
<tr>
<td>BIOL 104</td>
<td>Life on Earth</td>
<td>BIOT 313</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>BIOL 105</td>
<td>General Zoology</td>
<td>BIOT 313</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>BIOL 201</td>
<td>Cell Biology</td>
<td>BIOT 314</td>
<td>Bioenergetics and Metabolism</td>
</tr>
<tr>
<td>BIOL 202</td>
<td>Diversity in Plants</td>
<td>BIOT 316</td>
<td>Fundamentals of Virology</td>
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<tr>
<td>BIOL 203</td>
<td>General Genetics</td>
<td>BIOT 407</td>
<td>Aquaculture Technology</td>
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<tr>
<td>BIOL 205</td>
<td>Biostatistics</td>
<td>BIOT 408</td>
<td>Recombinant DNA Technology</td>
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<tr>
<td>BTNY 207</td>
<td>Economic Botany</td>
<td>BIOT 411</td>
<td>Agriculture Biotechnology</td>
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<td>BIOL 313</td>
<td>Biochemistry</td>
<td>BIOT 412</td>
<td>Medical Biotechnology</td>
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<td>BIOL 315</td>
<td>Fundamentals of Microbiology</td>
<td>ZOOL 305</td>
<td>Integrated Pest Management</td>
</tr>
<tr>
<td>BIOL 404</td>
<td>Conservation Biology</td>
<td>ENVR 301</td>
<td>Introduction to Environment Science</td>
</tr>
<tr>
<td>BIOT 201</td>
<td>Introduction to Biotechnology</td>
<td>ENVR 402</td>
<td>Solid Waste Management</td>
</tr>
<tr>
<td>BIOT 202</td>
<td>Protoplast, Cell &amp; Tissue Culture</td>
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</tr>
</tbody>
</table>
Spring 2012

BIOL100 Introductory Biology
BIOL 102 Introductory Plant Biology
BIOL105 General Zoology
BIOL 201 Cell Biology
BIOL 203 Genetics
BIOL 204 Diversity in Animals
BIOL 205 Biostatistics
BIOL301 Plant Form and Function
BIOL 302 Animal Form & Function
BIOL 303 General Ecology
BIOL 313 Biochemistry
BIOT 201 Introduction to Biotechnology
BIOT 202 Protoplast Cell & Tissue Culture
BIOT 301 Analytical Techniques in Biology
BIOT 307 Molecular Immunology
BIOT 313 Molecular Biology
BTNY 323 Plant Arch. through Space & Time
BIOT 315 Genomics & Tools of Bioinformatics
ZOOL 303 Animal Physiology & Endocrinology
BIOL 473 Industrial Microbiology
BIOT 407 Aquaculture Technology
BIOT 408 Recombinant DNA Technology
BIOT 411 Agriculture Biotechnology
BTNY 403 Plant Physiology
ZOOL 408 Entomology
ENVR 251 Living Green

MPhil Biotechnology courses

Semester I (Fall 2011)

BIOT 501: Biomathematics  
BIOT 502: Advanced Microbial Biotechnology  
BIOT 503: Recombinant DNA Technology  
BIOT 504: Techniques in Biotechnology

Students also studied MATH 101 Maths as a pre-requisite for BIOT 501.

Semester II (Spring 2012)

BIOT 601: Bioinformatics  
BIOT 602: Industrial Biotechnology  
BIOT 605: Business Entrepreneurship  
BIOT 608: Advances in Agricultural Biotechnology  
BIOT 609: Advances in Health Biotechnology