



جامعة البلمند دبي
UNIVERSITY OF BALAMAND DUBAI

Catalog 2018-2019

Catalog Table of Content

| | |
|---|----|
| A message from the president..... | 3 |
| Academic Calendar..... | 4 |
| Organization and Governance..... | 5 |
| Organizational Chart..... | 6 |
| Mission and Vision..... | 7 |
| Faculties of the University..... | 7 |
| Academic Offerings..... | 7 |
| Academic Support Facilities..... | 7 |
| Student Life and Office of Student Affairs..... | 8 |
| Academic integrity Policy..... | 9 |
| Academic Copyright Policy..... | 10 |
| Disciplinary Probation..... | 12 |
| Course Delivery Policy..... | 12 |
| Academic Advising..... | 13 |
| Financial Aid and student work..... | 13 |
| Sibling Grant..... | 13 |
| Undergraduate Merit Scholarship..... | 13 |
| Admissions Requirements..... | 13 |
| Advanced Standing..... | 16 |
| Admissions Examinations..... | 17 |
| Admissions Notification Policy..... | 18 |
| Application Procedure..... | 18 |
| Fees and Expenses..... | 19 |
| Payment of Fees..... | 20 |
| Registration..... | 20 |
| Cross Registration..... | 20 |
| Passports and Visas..... | 20 |
| Medical Record..... | 21 |
| Change of Major..... | 21 |
| Name of Diplomas and Degrees..... | 21 |
| Transfer from Other University..... | 21 |
| Residency Requirement..... | 21 |
| Number of Credits..... | 22 |
| Academic Performance Requirement..... | 22 |
| Graduation and Honors..... | 22 |
| University Orientation Program..... | 22 |

| | |
|--|-----------|
| Academic Rules and Regulations..... | 23 |
| Credit Load | |
| Categories of Students | |
| Grading System | |
| Incomplete Grades and Makeup Examination | |
| Attendance and Withdrawals from Courses | |
| Repeating Courses | |
| Scholastic Standings | |
| Dismissal from University | |
| Readmission to the University | |
| Summer Session | |
| Student Record Keeping..... | 27 |
| Independent Study..... | 27 |
| Career Service..... | 28 |
| Student Counseling..... | 28 |
| Food Service..... | 28 |
| Medical Service..... | 28 |
| Faculty of Engineering..... | 29 |
| Department of Chemical Engineering..... | 29 |
| Chemical Engineering Course description..... | 33 |
| Department of Civil Engineering..... | 36 |
| Civil Engineering Course description..... | 40 |
| General Engineering Course description..... | 45 |
| Faculty of Arts and Sciences..... | 47 |
| Department Of Biology..... | 47 |
| Biology Course description..... | 51 |
| Department Of Chemistry..... | 56 |
| Chemistry Course description..... | 60 |
| Department Of Math..... | 63 |
| Math Course description..... | 67 |
| Department Of Physics..... | 70 |
| Physics Course description..... | 74 |
| Department Of English..... | 78 |
| English Course description..... | 82 |
| Department Of Education (TD)..... | 85 |
| TD Course description..... | 87 |
| General Courses description..... | 89 |

Dear UOBD Learner,

I am pleased to welcome you to the University of Balamand Dubai such a lively and multicultural campus community.

You come from different countries and cultures, a reflection of the United Arab Emirates who hosts people from all over the world, to make this country their home. The University and its multinational population offer a welcoming environment to all of you.

UOBD will be the best place in the gulf region, where you test ideas, refine them in the light of learning and gain the experience during your stay. All UOBD learners bring a wide range of experience to the university; what is expected from you is the commitment and dedication in studying towards reaching your goal.

As an American education university, the importance of our programs is clearly reflected through the range of offerings that broadens the education of our learners. As an independent educational institution, we are dedicated to play a positive role as a well-established education entity in an ongoing developmental growing society.

I will take this opportunity to welcome you as UOBD learner and wish you the best of success. Our community is known for its friendly spirit; we are always ready to assist you to integrate smoothly and to fulfill your potential.

Walid Moubayed, Ph.D.

UOBD Academic Calendar 2018-2019*

Fall Semester 2018-2019

| | | |
|--------------------|-------------------------|--|
| Sunday | August 26 | Student Orientation and Welcome Ceremony Students/ Parents |
| Tuesday- Thursday | August 28-30 | Fall 2018 New Students Registration |
| Sunday | September 2 | Fall 2018 Semester begins |
| Wednesday-Thursday | September 5-6 | Fall 2018 Drop/Add Period |
| Tuesday | September 11 | Islamic Hijri New Year Holiday** |
| Tuesday | November 20 | Al Mawlid Al Nabawi (Prophet Mohammed's Birthday)** |
| Thursday | November 29 | Drop Period Ends |
| Friday | November 30 | Martyr's Day |
| Sunday-Monday | December 2-3 | UAE National Day |
| Tuesday-Thursday | December 4-6 | Spring 2019 Semester Pre-Registration |
| Thursday-Saturday | December 13-15 | Reading Period |
| Sunday-Thursday | December 16-20 | Fall 2018 Final Exams |
| Sunday -Wednesday | December 23 - January 2 | Winter Vacation |

Spring Semester 2018-2019

| | | |
|--------------------|-----------------|--|
| Wednesday-Thursday | January 9-10 | Spring 2019 Semester Late Registration |
| Sunday | January 20 | Spring 2019 Semester begins |
| Wednesday-Thursday | January 23-24 | Spring 2019 Drop/Add Period |
| Wednesday | April 3 | Al Israa Wal Miraj Holiday** |
| Sunday- Sunday | April 21-28 | Spring Vacation |
| Monday-Thursday | April 29- May 2 | Summer 2019 Semester Pre-Registration |
| Wednesday | May 1 | Drop Period Ends |
| Sunday-Tuesday | May 12-14 | Fall 2019 Semester Pre-Registration |
| Wednesday-Saturday | May 15-18 | Reading Period |
| Sunday-Thursday | May 19-23 | Spring 2019 Semester Final Exams |

Summer Semester 2018-2019

| | | |
|--------------------|------------|--|
| Sunday-Tuesday | May 12-14 | Summer 2019 Semester Late Registration |
| Wednesday-Saturday | June 5-8 | Eid Al-Fitr Holiday** |
| Sunday | June 9 | Summer 2019 Semester Begins |
| Tuesday-Thursday | June 11-13 | Summer 2019 Semester Drop/Add Period |
| Wednesday | July 17 | Drop Period Ends |
| Thursday-Saturday | July 25-27 | Reading Period |
| Sunday-Wednesday | July 28-31 | Summer Semester Final Exams |

* **This Calendar is a student based calendar.**

****All Eid dates that are determined after sighting the moon. Accordingly the actual dates may not coincide with the dates in the calendar.**

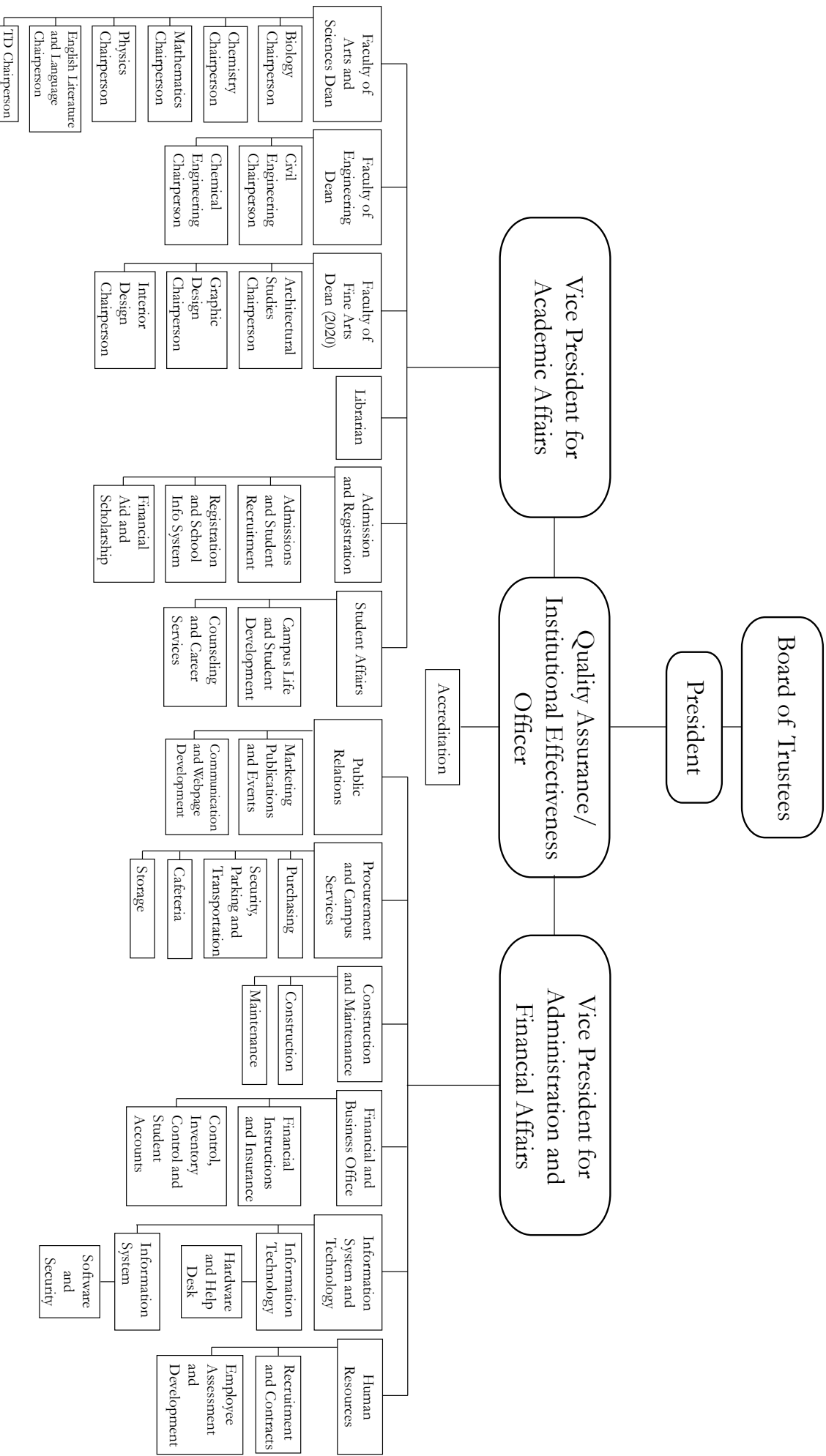
Organization and Governance

The University follows the North American model of higher education in its academic programs and its governance.

A Board of Trustees of 7 members, chaired by the Chairman, is the highest Governing Body in the University and supervises the academic, financial and administrative affairs of the University.

The Board of Trustees relegates the management of the University to a President. The Board meets twice a year and follows closely the work of the University through its President. It appoints, upon the recommendation of the President, Vice-Presidents, Deans, and Directors.

A University Council consisting of the Vice-Presidents and the Deans chaired by the President, acts on all major decisions in the management of the University.



UOBD Mission and Vision

Mission

The University of Balamand Dubai (UOBD) is an institution of higher education that draws on the values of openness, understanding, tolerance, and inquiry. Based on the American system of higher education, the core curricula build on the rich multicultural environment of Dubai to generate graduates cognizant of the values inherent in world cultures. UOBD is dedicated to creating and communicating knowledge. It educates men and women to be successful in their chosen careers, active citizens in their societies, generous in their service to others and reflective lifelong learners. The University is committed to excellence in teaching, to rigorous research, and concern for the public good, within a context of inter-disciplinary openness and skills development. UOBD is committed to the socio-economic development of the region by engaging the community and supporting the initiatives of its faculty, students, and staff.

Vision

UOBD's vision is to be identified as a leader in Higher Education, not only in UAE but also in the region. We aim for excellence through the offering of internationally recognized academic programs focusing on the needs of the regional landscape and its socio-economic development.

Faculties at the University

The University of Balamand Dubai will start with two Faculties the **Faculty of Engineering** (Civil and Chemical Engineering), **Faculty of Arts and Sciences** (Biology, Chemistry, Math, Physics, English literature and Language) and in two years will add the **Académie Libanaise Des Beaux-Arts ALBA** (Architectural Studies, Graphic Design and Interior Architecture and Design).

Academic Offerings

| <u>Program</u> | <u>Degrees</u> |
|-------------------------------------|-------------------------|
| Faculty of Engineering | |
| Civil Engineering | BS; Bachelor of Science |
| Chemical Engineering | BS; Bachelor of Science |
| Faculty of Arts and Sciences | |
| Biology | BS; Bachelor of Science |
| Chemistry | BS; Bachelor of Science |
| Mathematics | BS; Bachelor of Science |
| Physics | BS; Bachelor of Science |
| English literature and Language | BA; Bachelor of Arts |
| Education | TD; Teaching Diploma |

Academic Support Facilities

Library:

Vision

The Founders of the University of Balamand Dubai (UOBD) had, from the outset, envisioned a university library that would, in due course, become a model for library services in its immediate community, as well as the whole academic community in UAE. The University of Balamand Dubai Library system is a key resource and service gateway to the institution.

Mission

The mission of the UOBD Library resides completely within the vision and the goals of the University of Balamand Dubai, as expressed in the motto: "Second to None." As such, the Library's mission is to bring people and information together, and it does this primarily through the collection of relevant and up-to date information resources and by providing access to these resources through superlative services and information literacy programs.

Fundamental to these goals is the recognition that the UOBD community and the broader scholarly community are a principal focus of the Library.

Laboratories:

Students have access to several laboratories (Computer, Physics, Chemistry, Biology, civil and chemical engineering) located in the University building. Laboratory supervisors are available to assist students. Programs to establish networking for laboratories with other universities and access to data servers are in progress.

Student Life and Office of Student Affairs

Statement of Policy for Students

The aim of the University of Balamand Dubai is to create and maintain a community where each student may pursue studies in an atmosphere of academic freedom and co- operation in a climate of tolerance and mutual respect. Students are encouraged to express themselves and to pursue activities within the Policies and Regulations of the University. Activities of divisive partisan character that impair the spirit of the University are prohibited.

Office of Student Affairs

The Office of Student Affairs through its various divisions provides opportunities for student development through extra-curricular activities and programs that improve the students' potentials and interpersonal skills. The office offers a variety of multidisciplinary activities and services in (1) Career Guidance, (2) Counseling, (3) Campus Life and Student Development, (4) Athletics, (5) Student Work and, (6) Student Publication. These services will be available to guide students throughout their university life and will be developed gradually depending on the student enrollment and available facilities.

Events and programs will be communicated to students through electronic means (mainly on UOBD website and social media pages) and updated continuously.

Extra-Curricular Activities Campus Life and Student Development

Clubs and Societies represent a wide variety of interests in which students experience growth outside the classroom setting. Professional staff members and advisors are available to assist individuals forming a club or society, and to advise registered groups. Students are encouraged to join clubs and societies and participate in social, cultural and athletic events.

UOBD provides services in concert with the mission of the University and the underlying mission of the Office of Student Affairs. These are best characterized by the goal of accessibility. The athletic activities' mission is to be accessible to students of all skills, abilities and interests, and to provide an extracurricular environment which will enrich learning and personal growth. In providing this learning environment, the program places emphasis on the academic success of Student Athletes, the fair and equitable treatment of women and men, the principles of fair play and amateur and semi-professional athletics competition and the health and welfare of Student Athletes.

Academic Integrity Policy

1. Introduction

As a community committed to intellectual endeavors, the UOBD recognizes honesty as the foundation of the academic activities of its faculty members and students. UOBD strives to provide students with the knowledge, skills, and judgment they need to function in society as educated adults. Falsifying or fabricating the results of one's research, presenting the words, ideas, data, or work of another as one's own, or cheating on an examination corrupts the essential process of higher education.

2. Guidelines For Academic Integrity

Students assume full responsibility for the content and integrity of the coursework they submit. The following are guidelines to assist students in observing academic integrity:

- Students must do their own work and submit only their own work on examinations, reports, and projects, unless otherwise asked by the instructor. Students are urged to contact their instructor about appropriate citation guidelines.
- Students may benefit from working in groups. They may collaborate or cooperate with other students on graded assignments or examinations if instructed to do so by the instructor.
- Students must follow all written and/or verbal instructions given by instructors prior to taking examinations, placement assessments, tests, quizzes, and evaluations.
- Students are responsible for adhering to course requirements as specified by the instructor in the course syllabus.

3. Forms of Academic Dishonesty

Academic dishonesty includes, but is not necessarily limited to, the following:

- a. Plagiarism is intentionally or carelessly passing off another person's work as one's own. It is taking and using information, ideas, opinions, theories or another person's actual words or source without acknowledging the source, thereby creating the impression that the work is one's own. Plagiarism can occur in the following ways:
 - i. Using text from another source (e. g. books, journals, newspapers, web sites, etc.) without documenting the source
 - ii. Using direct quotation (the exact words or verbatim) from a text without quotation marks, even if the source has been cited correctly
 - iii. Paraphrasing or summarizing the ideas or text of another work without documenting the source
 - iv. Substituting a word or phrase for the original while maintaining the original sentence structure or intent of the passage with or without citing the source
 - v. Using graphics, visual imagery, video or audio material without permission of the author (or publisher) or acknowledgment of the source
 - vi. Translating text from one language to another without citing the original work
 - vii. Obtaining packaged information, foreign language translation or a completed paper from an online source and submitting it as one's own work without acknowledgment of the source
 - viii. Presenting the work of another as one's own.
- b. Cheating is giving or receiving, or attempting to give or receive any unauthorized aid during an examination to improve a grade or obtain course credit. Cheating is not limited to examination situations alone, but arises whenever students attempt to gain an unearned academic advantage.
- c. Duplicate Use of Written Work is the submission of the same paper, or substantially similar papers for two different courses without the consent of the instructors.

4. Penalties for Academic Dishonesty

- a. If a student is found guilty of violating academic integrity policies, any one or a combination of the following penalties may be imposed:

- Failure of the assignment, project, or examination on which the student was found to be academically dishonest.
 - Failure of the course in consultation with the Dean. Such offense will be documented in the student's record to note repeat offenders.
- b. Any case of cheating will automatically result in a grade of zero on the assignment in question. Repeat offenders must be administratively dropped from the course, with a grade of 40, and referred to the University Disciplinary Committee which will consider suspension or expulsion from the university.
- c. The Faculty Dean may also raise the case to the University Disciplinary Committee where the latter may issue the following disciplinary sanctions after a hearing, in accordance with the Academic Integrity and Copyright Policies:
- Placement on Disciplinary Probation
 - Suspension from the University for a Definite Period of time ranging from a semester to a full academic year
 - Dismissal from the University

5. Encouraging Responsible Work

Faculty members should encourage students to do responsible work. This is best accomplished by designing assignments, which require students to draw on their personal skills and do their own work. Lists of possible assignments duplicated/little changed from year to year should be avoided.

6. Plagiarism Statement for Syllabus

Faculty members are requested to include a statement on plagiarism in the syllabus of each course and make reference to the UOBD Policy on Academic Integrity and Copyright.

Academic Copyright Policy

Definitions

According to the UAE copyright law, “the authors of the works and holders of neighboring rights shall enjoy the protection stipulated by the law herein, if an infringement has occurred upon their rights, and particularly the following works:

- 1-Books, pamphlets, articles, and other written works.
- 2-Computer software and applications thereof; databases; and similar works as determined by the decision of the Minister.
- 3-Lectures, speeches, sermons, and any other works of similar nature. 4- Dramatic, dramatico- musical works and pantomime.
- 5- Musical compositions with or without words.
- 6- Audio, visual or audio-visual works.
- 7-Architectural works, and engineering drawings and layouts.
- 8-Works of drawing, painting, sculpture, engravings, lithography, printing on textiles, wood and metals, and any similar works of fine arts.
- 9-Photographic works and analogous works. 10- Works of applied arts and plastic arts.
- 11-Illustrations, geographical maps, sketches, and three- dimensional works relative to geography, topography or architecture and others.
- 12-Derivative works, without prejudice to the protection prescribed for the works from which it has been derived.

Protection shall include the title of the work, provided that such title is innovated; as well as the written innovated idea of the broadcast.”

Fair use

A.The author and his successors shall enjoy, in respect of the work, moral rights, which are not liable for prescription or assignment.

Such rights include:

- 1- The right to decide to first publish the work.
- 2- The right to claim authorship.
- 3-The right to object to any amendment on the work if such amendment shall cause distortion or mutilation to the work, or which would be prejudicial to the reputation of the author.
- 4-The right to withdraw his work from circulation, if serious reasons justifying such has occurred.

The author and his successors or the holder of copyright may solely grant licenses for exploitation of the work, in any manner, particularly, through reproduction, including electronic storage or loading; acting, in any manner; broadcasting; re-broadcasting; public performance or communication; translation; assimilation; modification; rental; leasing; or publication; in any manner, including providing such work through computers, information or communication networks or any other means.

B.Reproducing All The Work Rights

Making one copy of the work through the non-profit archives, libraries or authentication offices, either directly or indirectly, in the following cases:

A-Reproduction is made for the purpose of maintaining the original copy or of substituting a lost, distorted or invalid copy, if it has been impracticable to obtain a substitute thereof under reasonable conditions.

B-Reproduction is made in fulfillment of a request made by a natural person, for using same in study or research. Such reproduction shall be made for only once and on irregular intervals.

C.Reproducing Parts Of The Work

Reproducing short abstracts of a work in the form of manuscripts or audio, visual, or audio-visual recordings, for the purposes of cultural or religious education, or vocational training, with the proviso that:

- i)Reproduction shall be within the reasonable limits.
- ii)Reproduction shall not surpass the purpose thereof.
- iii)Mention shall be made of the name of the author and the title of the work, whenever possible.
- iv)The reproducer shall not seek profit, either directly or indirectly.

What Can Be Photocopied?

A single photocopy of a portion of a copyright-protected work, such as:

- 1.A maximum of 10% from a book (never the entire book);
- 2.An article from a periodical or newspaper;
- 3.A short story, essay, or poem. One work is the norm whether it comes from an individual work or an anthology;
- 4.A chart, graph, diagram, drawing, cartoon or picture from a book, periodical, or newspaper.

However, in all cases, the name of the author and the source should always be indicated.

When Is Permission Required?

- 1.When the material is used for commercial purposes
- 2.When the material is used repeatedly
- 3.When a work longer than 2,500 words is used in its entirety

What Are The Penalties?

The University of Balamand Dubai does not condone nor tolerate the unauthorized copying of licensed material by staff, faculty, or students. The University shall adhere to its contractual responsibilities and

shall comply with all copyright laws, and expects all members of the University community to do so as well. Members of the University community who violate this policy may be subject to discipline through standard University procedures. It falls on the Dean and faculty members to report such cases. Subject to the facts and circumstances of each case, such individuals shall be solely responsible for their defense and any resulting liability.

Disciplinary Probation

Illegal actions and misconduct such as cheating on tests, plagiarism, and disrupting classes and examinations are subject to disciplinary action. A student placed on disciplinary probation is not eligible to receive financial aid during the period of probation. Upon recommendation of the Faculty in which the student is enrolled, the student may be removed from disciplinary probation after one semester. In cases of severe or repeated infractions of University regulations, a student will be subject to suspension or dismissal from the University.

Course Delivery Policy

All major courses at UOBD are delivered by PhD holders specialized in the relevant major. All general or introductory courses are delivered by PhD or Master degree holders specialized in the relevant course major. All Academic departments at UOBD keep a course file for each course offered at the University. The course contents are arranged in line with the CAA standards and are updated regularly. Course instructors (Full timers and Part timers) are responsible for updating the relevant course files while it is the department Chairperson and Dean's responsibility to follow up on the proper updating of the course files. Course files should be submitted by the instructor for each semester or summer term to the Program Chairperson. The Program Chair checks each file for completeness and evaluates the contents as part of the faculty assessment which is forwarded to the Dean of the Faculty. The office of Institutional Effectiveness stores the course files, for a period of ten years in order that they can be examined by representatives of the Commission on Academic Accreditation. Course files are also used by the registrar in responding to grade appeals, by the Program Chair designated mentor to train new instructors, and by the Vice President for Academic Affairs to supervise the quality of courses, programs, and academic schools. Course file material submitted by the instructor for each course every semester or term must contain the following elements: 1) Syllabi for the current and previous offerings of the course; 2) Copies of all instructor teaching materials; 3) Copies of all assessment instruments.; 4) Examples from across the range of student performance of graded responses to all assessment instruments; 5) A comprehensive instructor review of the presentation of the course; 6) Quantitative analysis of student performance (grade distribution); 7) Summary of student feedback on the evaluation of the course.

This policy outlines the details pertaining to course delivery at UOBD:

Course delivery is the implementation of the course design which describes how courses will be offered to students. Courses will be delivered through what is commonly referred to as the "traditional" method, which is primarily comprised of face-to-face instructional delivery occurring in real time, in a classroom or computer lab. Courses will be given on a full time basis, during day-time and over five days of the working week. Course delivery may include online assignments and/or the use of eBooks that complement classroom work in addition to the use of an educational platform such as Moodle.

Courses will be designed with a focus on students' successful achievement of the program learning outcomes. UOBD will ensure that:

- the delivery of each course is consistent with its detailed syllabus.
- the academic assessment of students is fair, accurate, aligned with the learning outcomes and the program goals, and is undertaken at an appropriate level.
- there are updated files for the delivery of each course

The course delivery policy is the responsibility of the Vice President for Academic Affairs office at the University of Balamand Dubai.

Academic Advising Policy

Academic advising is the duty of every full-time faculty member. It is the responsibility of a department chair to assign students' advisors and to make sure that the maximum number of advisees per full-time faculty member is 30.

Academic advising includes all aspects of academics including:

- Selection of courses
- Counseling on academic related matters,
- Monitoring the academic progress of the students and advising advisees to raise the cumulative general average (CGA) if needed,
- Making sure that students follow the plan of study and select courses accordingly.

Prior to course registration, faculty should be available to advisees during their scheduled office hours to discuss academic programs and any academic related issues.

Financial Aid and student work program

• Financial aid is given to qualified and needy students whose financial situation cannot cover educational costs. University financial assistance may be in the form of scholarships (partial or full), student work, or deferred payment of tuition fees. Students should submit an application for financial aid to the Office of Financial Aid and/or an application for student work to the Office of Student Affairs.

Students should comply with the following:

- a. Be enrolled as regular students
- b. Have a good academic record
- c. Be in financial need
- d. Should not be on disciplinary probation.

• Continuing students who are interested in applying for financial aid for the next academic year should apply by mid-May. New students may also apply for financial aid and submit the applications by mid-October (if joining UOBD in the Fall semester) or by mid-March (if joining UOBD in the Spring semester).

• Deferred payment is handled during the registration process through the Comptroller's Office.

• Student work opportunities are available on Campus. Jobs vary from clerical work to laboratory and library assistance. Student work applications should be completed and submitted to the Office of Student Affairs at the end of each semester. New students are not eligible for student work.

Sibling Grant

A Sibling Grant (7.5% for second, 12.5% for third) is given when two or more brothers and/or sisters are registered at the University of Balamand Dubai. No application is needed to qualify for this Grant.

Undergraduate Merit Scholarship

Full-time undergraduate students who are placed on the Dean's Honor List and demonstrate academic excellence by achieving a semester general grade average of at least 85 out of 100 are eligible for a merit scholarship. For more details, contact the Office of Admissions & Registration. No application is needed to qualify for this scholarship.

Admissions Requirements

The Office of Admissions and Registration processes admission to all University Faculties. All inquiries, requests for application forms, and correspondence must be sent to the Office of Admissions and Registration.

Selection of Applicants

The University Admissions Committee, based on the recommendations of the Faculty sub-committees, selects applicants for admission. The Office of Admissions and Registration is responsible for handling admissions procedures. The University admits qualified students without regard to race, color, sex, religion, age, physical handicap, or national origin. The University receives applications on dates announced by the Office of Admissions and Registration. Application forms are obtained from the Office of Admissions and Registration or from the university website.

Record of Nationality

The student's nationality as stated on the application form may not be changed after enrolment.

Conditional Acceptance

Conditional Acceptance

Applicants who do not meet the University admissions requirements may be granted, upon the recommendation of the Admissions Committee, conditional acceptance. The conditional acceptance is granted to applicants satisfying the following conditions:

1. Attained a school average between 70% - 74.99%
2. Attained an English proficiency test result no less than the following:

| TOEFL Compute Based | TOEFL Internet Based | TOEFL Paper Based | IELTS | Level |
|------------------------|-------------------------|-----------------------|-----------------------|---------|
| $197 \leq x \leq 227$ | $71 \leq x \leq 87$ | $527 \leq x \leq 567$ | $5.5 \leq x \leq 6.5$ | ENGL101 |

3. SAT Math grade between 500 - 550 (when applicable)

Students with conditional acceptance are registered as a full-time student on condition that they will register 12-15 credits.

Conditionally accepted students have to attain an average of 70% (GPA 2.00) or more at the end of their first regular semester to remove the conditional acceptance status otherwise he will be placed on academic probation.

UOBD Admission to Undergraduate Studies

University of Balamand Dubai places high emphasis on excellence in education. The University admits students from the entire region without discrimination on the basis of religion, gender, or physical handicap. The qualified candidates are selected to fill the available places.

The instruction language at UOBD is English and good English language proficiency is a basic factor for success at university.

The university requires attendance; no degrees are given through correspondence.

For student admissions school grades and admission test results as per program are considered.

Minimum Admission Requirements (Freshmen/Foundation year):

- Secondary school average:
 - o The minimum average for accepting an applicant is the equivalent of 75 percent or more in the final year or 75 percent or more in the two years out of the last three years.
 - o Higher averages may be applicable for certain colleges/schools and/or specific majors.
- SAT scores or placement examinations results (as applicable).
- A score of 71 or more on internet based TOEFL (iBT) or a score of at least 527 on the institutional paper-based TOEFL (ITP) or a score of at least 5.5 on academic IELTS. Scores are only valid for two calendar years or EMSAT results for national students only.

TD Admission Requirements

Admissions Requirements

- An earned undergraduate degree from an accredited institution.
- A minimum of 2.5 GPA in Undergraduate studies.
- Students applying to the TD should either have a BA/BS in the TD specialized discipline (or a relevant area) or a minor in that discipline.
- Students applying to the TD to a specialty which is not their major (i.e. a mass com major wanting to do a TD in Arabic Literature) need to complete a minor in their specialty or show proof that they have taken enough courses from their former university to comprise a minor.
- TD Special Education students can be holders of any BA or BS. This diploma prepares them to become shadow teachers.
- This is a 2 semester program. Students should complete all courses in 2 semesters.

English Language Requirements

- Students must complete the TOEFL or IELTS exam as an admission requirement. The following are the required scores:
 - * A score of 71 or more on internet based TOEFL (iBT) or a score of at least 527 on the institutional paper-based TOEFL (ITP) or a score of at least 5.5 on academic IELTS (scores are only valid for two calendar years)
 - *Exceptions apply to student applicants who meet the following criteria:
 - o Students who have a degree from an American Accredited institution and who can provide language proficiency scores submitted to their former institution.
 - o A native speaker of English who has completed his degree at an English medium institution in an English speaking country.

Comparison between EmSAT Achieve-English Test and IELTS-Academic Test

| IELTS-Academic | EmSAT Achieve-English |
|----------------|-----------------------|
| 8.0 | 1925-2000 |
| 7.5 | 1800-1900 |
| 7.0 | 1675-1775 |
| 6.5 | 1550-1650 |
| 6.0 | 1400-1525 |
| 5.5 | 1250-1375 |
| 5.0 | 1100-1225 |
| 4.5 | 950-1075 |
| 4.0 | 825-925 |

Students who score below the minimum required TOEFL or IELTS but meet the other admission standards may be admitted to the University Orientation Programs.

Secondary School certificates are awarded either by ministries of education or by private schools or institutions. UOBD recognizes certificates awarded by ministries of education and secondary school certificates awarded by private schools and recognized by their host country. The university also accepts certificates awarded by recognized qualification authorities, international boards and national boards.

Program Admission requirement:

- oLiterary certificates: Holders are admitted to English Department in Arts and Sciences Faculty Majors and Academie Libanaise des Beaux-Arts (ALBA)
- oScientific Certificates: holders can be admitted to any major in any Faculty.

Advanced Standing Policy

The University of Balamand Dubai may give up to a maximum of 12 transfer credits for undergraduate students towards University degree courses from the first year. Decision is based on the diploma the students have or the examination scores they earned on the internationally recognized examinations and various other enhanced instructional programs in secondary schools, i.e., AP, GCE,...

Secondary School Credit Transfers:

Applicants must submit a copy of their original secondary school certificate authenticated by the UAE Ministry of Education, or appropriate authority.

Students who have completed The International Baccalaureate (IB) Diploma/Certificate Program, French Baccalaureate, German Abitur, the GCE Advanced level courses, or any other diploma approved by the University may get equivalence up to a maximum of 12 transfer credits from the first year. Minimum examination scores, applicable credit hours, and eligibility requirements are decided by the relevant Dean and the Registrar.

GCE A-level courses:

University of Balamand Dubai, UOBD, gives transfer credits for GCE A level courses with Grades of B or above.

IB courses:

University of Balamand Dubai, UOBD, gives transfer credits for IB courses with grades of 6 or above.

- No repetition of subjects is allowed
- Based on the HL level courses chosen at High-School and the intended future major at university, students may be requested to register for a number of “remedial courses”. Such courses are nominated by the specific major as pre-requisite to admission

American Advanced Placement (AP) Exams:

University of Balamand Dubai, UOBD, gives transfer credits for AP exams with grades of 4 or above.

French Baccalaureate:

University of Balamand Dubai, UOBD, gives transfer credits for French Baccalaureate subjects' exam with grades of 13 and above.

German Abitur:

University of Balamand Dubai, UOBD, gives transfer credits for German Abitur subjects' exam with grades of 10 and above.

Lebanese Baccalaureate

University of Balamand Dubai, UOBD, gives transfer credits for Lebanese Baccalaureate subjects' exam with grades of 65% and above.

Spanish Baccalaureate

University of Balamand Dubai, UOBD, gives transfer credits for Spanish Baccalaureate subjects' exam with grades of 8 and above.

University students credit transfers

Applicants must submit a copy of their original transcript authenticated by the UAE Ministry of Education, or the appropriate authority, along with the course descriptions to the Admissions and Registration office, that will in return forward it to the relevant Faculty for review of syllabi before taking the decision to transfer the courses. As per the UAE Ministry of education rules and regulations the course to be transferred:

1-should have a minimum grade of C

2-Its syllabi should match at least 80% of the offered course syllabi at UOBD

No more than 50 percent of required credits to earn a UOBD degree may be transferred from another recognized institution.

Admissions Examinations

All Freshman/Foundation applicants who attain the minimum score or higher on the **TOEFL** or **IELTS** are required to sit for placement tests appropriate for their intended Major as shown in the chart below:

| Required Placement Examinations by Major | | | | | |
|---|--------------------|------------|----------------|-------------------------|------------------|
| Major | TOEFL/IELTS | SAT | Drawing | Space Perception | Interview |
| Civil Engineering | X | X | | | |
| Chemical Engineering | X | X | | | |
| Math | X | X | | | |
| Physics | X | X | | | |
| Chemistry | X | X | | | |
| Biology | X | X | | | |
| Architectural Studies | X | | X | X | X |
| Graphic Design | X | | X | | X |
| Interior Architecture and Design | X | | X | | X |
| English Literature and Language | X | | | | |
| Education | X | | | | |

Students who score below the minimum required **TOEFL/IELTS** or **SAT** but meet the other admission standards may be admitted to the **University Orientation Programs**.

Students will be placed in English leveled courses according to the following chart:

| TOEFL Computer Based | TOEFL Internet Based | TOEFL Paper Based | IELTS | Level |
|---------------------------------|---------------------------------|------------------------------|-----------------------|--------------|
| $x < 103$ | $x < 34$ | $x < 410$ | $x < 3.5$ | Not accepted |
| $103 \leq x \leq 130$ | $34 \leq x \leq 44$ | $410 \leq x \leq 447$ | 3.5 | ENGL 001 |
| $133 \leq x \leq 153$ | $45 \leq x \leq 53$ | $450 \leq x \leq 477$ | $4 \leq x \leq 4.5$ | ENGL 002 |
| $157 \leq x \leq 193$ | $54 \leq x \leq 70$ | $480 \leq x \leq 523$ | 5 | ENGL 003 |
| $197 \leq x \leq 227$ | $71 \leq x \leq 87$ | $527 \leq x \leq 567$ | $5.5 \leq x \leq 6.5$ | ENGL101 |
| $230 \leq x \leq 247$ | $88 \leq x \leq 99$ | $570 \leq x \leq 597$ | 7 | ENGL102 |
| $x \geq 250$ | $x \geq 100$ | $x \geq 600$ | $7.5 \leq x \leq 9$ | ENGL203 |

Admission Notification Policy

All UOBD applicants will be notified through social media mediums as soon as the admission decisions are published. The admission decision list will be posted on the official website of the university by ID numbers. Each ID number will be linked either to the student acceptance package documents or to an apology letter. The applicant will have the option to print his own documents or to request a printed copy.

The admission response will consist of:

- A. An apology letter in case the student was not accepted.
- B. An admission package when the student is accepted and it will consist of the following documents:
 - a. Acceptance letter that will include:
 - i. Student type of acceptance (Regular or Conditional)
 - ii. Student English level decision
 - iii. transferred courses if applicable
 - b. University Academic Calendar
 - c. An important data sheet:
 - i. Registration dates
 - ii. University orientation gathering date
 - d. Registration procedure with list of advisors names and offices' location
 - e. Medical Record form
 - f. Medical insurance form for students that are not covered by a UAE medical insurance
 - g. Payment Registration slips

A copy of the admission decision letter will be kept in the student's file.

Application Procedure

The admissions Committee will compile a dossier of documents to be considered for your application to UOBD. To complete the dossier you must submit all the following to the Office of Admissions and Registration:

- A recent passport-size photograph (Taken within the past 6 months).
- A photocopy of your identity Card and Passport.
- A certified official secondary school certificate approved by the Ministry of education (When received).
- Official Grades' report and Recommendations from each of the schools you have attended during the past three years.
- Official Transcript (For transfer applicants).
- SAT or entrance examinations scores. Your English proficiency test: TOEFL/IELTS.
- An application Fee of 300 AED.

Fees and Expenses 2018-2019

A. Application and Entrance Exams Fees

Applicants must complete the University Application Admission Form and pay a non-refundable undergraduate application fee of 300 AED (Hard copy application) or 250 AED (on line application).

B. Tuition Fees

| Faculty | Program | Undergraduate Tuition Credit Hour AED |
|--------------------------|---------------------------------|---|
| Arts and Sciences | Biology | 2650 |
| | Chemistry | 2650 |
| | English Language and Literature | 2500 |
| | Math | 2650 |
| | Physics | 2650 |
| Engineering | Chemical Engineering | 2750 |
| | Civil Engineering | 2750 |

| Program | Professional Diploma Tuition Credit Hour AED |
|------------------------------------|--|
| Professional Teaching Diploma (TD) | 2500 |

The University reserves the right to change the above tuition fees for newly admitted students. For continuing students increases in tuition fees will be limited to a maximum of 5% per academic year.

| | |
|--|--|
| Library and laboratory deposit fee: | 1500 AED held until the student graduates or discontinues his course of study, at which time the deposit, minus debts incurred will be refunded. |
| Health Insurance Fee: | 1700 AED per year (subject to change) |
| Residency Visa Fee: | 1500 AED (subject to change) |
| Reservation Enrollment Deposit: | 5000 AED required upon acceptance and fully applied toward tuition once registered |
| Student Activity Fee: | 550 AED (per semester) |
| Late Registration Fee: | 500 AED is charged to all students who register during the late registration period. |
| Passport Deposit Fee: | 2000 AED (Refundable after cancellation of visa) |

Withdrawal Policy:

If a duly registered student withdraws for justifiable reasons, the following refund policy will be applied:

| | |
|--|---|
| Before the official beginning of classes | Full tuition refund less AED 500 pre-registration fee |
| During the first week of classes | of the tuition 50% |
| During the second week of classes | of the tuition 25% |
| As of the third week of classes | 0% |

Payment of Fees

- 1.Fees must be paid in full following registration every semester. Deferred payments will only be agreed to under specific circumstances and must be arranged before registration.
- 2.Students who fail to honor a deferred payment arrangement forfeit the right to apply for deferred payment arrangements in future semesters. The Comptroller's Office will notify the Office of Admissions and Registration to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled.

Registration

Registration at the appointed time is required of all students in accordance with announced procedures and regulations. Late registration is subject to a late registration fee. New students must make sure that clearance for admission, as specified in the Letter of Admission, is made at the Office of Admissions and Registration before proceeding to registration. Identification cards are issued to all students upon completion of registration.

Cross-Registration

- A.Students enrolled at the UOBD may take courses at other Universities A student registered at the University of Balamand Dubai may be allowed to cross-register at other institutions if all of the following conditions are met:
- 1.The semester for which the course is to be cross-registered is the semester at the end of which the student expects to graduate.
 - 2.The course in which the student intends to cross-register is equivalent to a course offered by the University of Balamand Dubai.
 - 3.The course is required of the student by the University of Balamand Dubai.
 - 4.The course is not offered at the University of Balamand Dubai during the semester at the end of which the student expects to graduate.
 - 5.The Chairman of the Department in which the student is majoring sends the Office of Admissions and Registration a written statement confirming that all of the conditions listed above have been met.
- B.Students enrolled at other universities taking courses at the UOBD for purposes of cross- registration, students studying at other universities who wish to take courses at the University of Balamand Dubai should complete the following procedures:
- 1.Secure the permission of their institution to take specified courses at the University of Balamand Dubai.
 - 2.Secure the permission of the Faculty concerned at the University of Balamand Dubai.
 - 3.Present these written permissions to the Office of Admissions and Registration at the University of Balamand Dubai.
 - 4.Register in accordance with the instructions specified in the registration procedure.

Passports and Visas

Foreign students need to have passports that are valid for at least one year from the date of their joining the University. They should secure an entry visa to UAE from the Emirates embassy or consulate in their home country. The Office of Admissions and Registration provides the necessary documents for admitted and registered foreign students to acquire UAE official residence permits.

Medical Record

The Entrance Medical Record Form is sent only to new students who have already been accepted for admission to the University. It should be completed by the student's family physician and returned at the specified date. Information will be kept confidential.

Change of Major

1. Students wishing to transfer from one major to another within any Faculty or from one Faculty to another may do so only after they have completed at least one semester of work in their current majors.
2. The transfer request should be submitted to the Office of Admissions and Registration during the month of November for the following spring semester and during the first half of the month of August for the fall semester.
3. Students may change their major twice in the same Faculty.
4. Student requesting to shift to another major may stay in their Faculty as a majorless student for one semester only. A summer session in which the student registers for 6 credits or more is counted as one regular semester.
5. The departments and the Admissions Committee of the Faculty concerned must approve all transfers.

Names on Diplomas and Degrees

1. Names on degrees and diplomas will be spelled exactly as they appear on passports or identity cards.
2. Names on the University of Balamand Dubai degrees and diplomas appear in Arabic and in English. If a name on a passport or an identity card does not appear in any of these languages, the name will be spelled on the University of Balamand Dubai degrees and diplomas according to the personal preference of the student concerned in his/her application form.

Transfer from Other Universities

Candidates transferring from recognized institutions of higher education are eligible for consideration for admission subject to the following conditions:

1. They hold the Grade 12 Certificate or its official equivalent.
2. They had met the requirements for admission to the University of Balamand Dubai prior to their admission to the institution from which they are transferring.
3. Applicants must submit a copy of their original transcript authenticated by the UAE Ministry of Education, or the appropriate authority, along with the course descriptions to the Admissions and Registration office, that will in return forward it to the relevant Faculty for review of syllabi before taking the decision to transfer the courses. As per the UAE Ministry of education rules and regulations the course to be transferred:
 - a-should have a minimum grade of C
 - b-Its syllabi should match at least 80% of the offered course syllabi at UOBD No more than 50 percent of required credits to earn a UOBD degree may be transferred from another recognized institution.

Residency requirements

1. A minimum of eight semesters of residence beginning with the freshman year, at recognized institutions of higher education, provided that at least the final three semesters and forty-five credits are completed at the University of Balamand Dubai. Two regular summer sessions are considered equivalent to one semester.
2. A maximum of ten semesters is allowed for the graduation of students who begin with the freshman year, and six semesters for those beginning with the junior year. A student who fails to complete a degree within residency times must petition the Dean for an extension of residence.

Number of credits

Number of credits required generally:

- Minimum of 120 credits for a B.A., B.S.
- 24 credits for a T.D.

See departmental regulations for the exact number of credits.

Academic performance required

- 1.A passing grade in all courses.
- 2.A cumulative general average of 70 or above.
- 3.Students already holding a bachelor's degree who wish to obtain another bachelor's degree must complete all the requirements of the department for that second degree. (Note that a minimum of 36 credits must be completed successfully in at least 3 semesters)

Graduation with Honors

- 1.A student achieving a cumulative average of 90 or above at the University of Balamand Dubai will receive his bachelor's degree with high Distinction.
- 2.A student achieving a cumulative average of 85 or above at the University of Balamand Dubai will receive his bachelor's degree with Distinction.

University Orientation Program (UOP)

The University of Balamand Dubai offers an Orientation Program that consists of an Intensive Language Program and a Remedial Program. To join either of these programs the student must hold a High School Diploma.

The Intensive Language Program is designed to prepare students who completed their secondary education for the language aptitude entrance examinations required by the different departments at the University. Failure to meet language requirements set by the University may place a student in the Intensive Language

Program. This Program helps the student improve his/her language ability. Students have a period of one year to fulfill the language requirements and to join the regular program; otherwise they will have to reapply to the University.

The Remedial Program is designed to prepare students who completed their secondary education for the entrance examinations set by the University. Those students must hold a High School Diploma and may lack the required proficiency in the English language and/or subjects' prerequisite skills for the university entrance exams. Cases are studied individually and acceptances are issued upon the recommendation of the Admissions Office. Students have a period of one year to finish this program.

The two programs are also offered to students who had their secondary education in a language other than English.

UOP students have to take a number of courses depending on the selected major, in addition to the English Language requirements.

These courses are: BIOL005, CHEM005, ENGL001, ENGL002, ENGL003, MATH 005, and PHYS 005. Students who do not meet the admission standards and can be admitted to the University Orientation Programs should satisfy the following conditions as stated in the below table:

| School Average of grades 10 and 11 $\geq 75\%$ | SAT Math 500-550 | IBT ≥ 71 , ITP ≥ 527 or IELTS ≥ 5.5 | UOP Program |
|--|--|--|--|
| yes | yes | no | Admitted into the intensive English department as per his English language test Score |
| yes | no | yes | Admitted to the Math 005 and should pass the course with an average of 70% or more if applying to Engineering or Sciences programs |
| Average between 70-75% | yes | -- | To be admitted to UOP program where cases are studied individually |
| yes | Coming from an Arabic instruction school | | To be admitted to UOP program where cases are studied individually |
| $\leq 70\%$ | -- | | Not accepted |

N.B. Students have a period of one year to fulfill the requirements and join the regular program and he/she will be allowed to register a maximum of 9 credits in addition to the English courses.

Academic Rules and Regulations

A.Credit load

- 1.To be considered as a regular student, a student must register for 12 credits or more per semester.
- 2.Students may seek the approval of the Faculty Council to drop the credit load below 12.
- 3.Special Orientation Program students may register for more than 15 credit hours per semester following the approval of the special program director.
- 4.The credit load for sophomore, junior, and senior students is cited under the “Credit Load” of the appropriate Faculties.
- 5.Credit load for student on Academic probation is detailed in a scholastic standing section.

B.Categories of Students

Students will be classified according to the following categories:

| Category | Year | Number of credits earned or Status |
|----------|-------------|---|
| Regular | Preparatory | Special Orientation Program students |
| | Freshman | Students who have less than 30 credits |
| | Sophomore | Students who have earned less than 57 credits. |
| | Junior | Students who have earned between 57and 86 credits. |
| | Senior | Students who have earned 86 credits or more. |
| | Majorless | Students who are placed out of a department/faculty may remain for one semester as majorless before choosing major. |
| Special | Part-Time | See below |

Classification in a given class does not necessarily imply that the requirements of the previous class have been completed. A student requesting a certificate stating that he/she has completed a given class must have completed all of the requirements for that class.

Special students:

Part-time students may be classified in two categories:

1. Full-time students who, under pressing circumstances, cannot take the required full- load. Such students may register for fewer than 12 credits after getting the approval of the Dean and the Advisor of the Faculty and department concerned.
2. Persons interested in rejoining the University after a lapse of time. The requirements to join this program are the Grade 12 Certificate or its equivalent and the placement test in the corresponding languages. Interested candidates must also have an interview with the Dean of Admissions and Registration and a representative of the department concerned.

The academic rules and regulations for special students are the same as for full-time students.

The Office of Admissions and Registration receives and processes applications of regular and special students.

C.Grading System

1. All final course grades are expressed in numbers ranging from 40 to 100.
2. The Dean of the Faculty concerned must approve transferable courses from other institutions.
3. The grading system is as follows:

| Notation | Grade % | Symbol | GPA |
|--------------------|----------------|---------------|------------|
| Outstanding | 95-100 | A | 4.00 |
| Excellent | 90-94.9 | A- | 3.50-3.99 |
| | 85-89.9 | B+ | 3.25-3.50 |
| Very Good | 80-84.9 | B | 3.00-3.25 |
| Good | 78-79.9 | B- | 2.80-2.99 |
| | 75-77.9 | C+ | 2.50-2.79 |
| Fair | 70-74.9 | C | 2.00-2.49 |
| Weak | 68-69.9 | C- | 1.80-1.99 |
| | Weak | D+ | 1.50-1.79 |
| | 60-64.9 | D | 1.00-1.49 |
| Fail | <60 | F | 0.00 |

| Non-Graded | Notation |
|-------------------|--|
| Aud | Audit |
| F | Fail |
| I | Incomplete |
| M | Graduate course |
| N | Non-credit, not counted in average |
| P | Pass |
| R | Repeated course for raising average |
| S | Satisfactory |
| T | Counted after a change of major |
| V | Non-credit, counted only in semester average |
| W | Withdrawal |

| | |
|----|--|
| WF | Administrative Withdrawal |
| Y | Final grade issued on yearly basis |
| Z | Counted toward a degree (in the case of year to be repeated) |

D.Incomplete Grades and Makeup Examination

- 1.Course work must be completed by the date on which the semester ends. In exceptional cases, and with the approval of the instructor, the chairman of the department, and the Dean, a student may be allowed to make up incomplete work before the end of the Drop/Add period of the next semester.
- 2.The time and date of make-up tests within the period specified in (1) above will be set by the instructor concerned with due consideration for the student's schedule. Approval of the head of the department is required for setting the time and date.
- 3.Failure to complete the requirements for incomplete courses within the periods specified above will result in a grade of zero for the missing work with the course grade computed accordingly. Failure to make-up a missing final examination will result in a final grade of 40 on the course.

E.Attendance and withdrawal from courses

Class Attendance:

- 1.Students are expected to attend all classes and laboratory sessions.
- 2.Absence, whether excused or not, from any class or laboratory session does not excuse students from their responsibility for the work done or for any announcements made during their absence.
- 3.A student who is near missing one-sixth of the course sessions will be receiving a written warning from the instructor. Once the number of missed sessions reaches one-sixth of the course sessions, the instructor notifies the student in writing and copies the Registrar that it is the student's responsibility to officially withdraw from the course before the end of the drop period, otherwise he will earn a WF as a final grade for the course.

A WF grade is counted as a numerical grade of 40 for the course in computing the student's averages.

Withdrawal from courses

- 1.Students are permitted to withdraw from courses not later than 10 weeks after the start of the semester (four weeks in the case of the summer session).
- 2.Students withdrawing from a course will receive a grade of "W" for this course. A "W" grade and the corresponding course credits are not included in computing the semester or the cumulative average.
- 3.The student's academic advisor must approve all withdrawals. Withdrawing from an entire semester requires the approval of the Faculty Council.
- 4.If a student withdraws or is dropped (for any reason) from one course or more resulting in a credit load below 12 credits, the case will be reviewed by the Faculty Council. The Council will determine:
 - a.The eligibility of the student to continue the semester
 - b.The withdrawal of the student from that semester
 - c.The dismissal of the student from the Faculty

F.Repeating Courses

- 1.A student may repeat a course only once to achieve its required grade; a W or a WF (40) on a transcript is counted, for this purpose, as a grade.
- 2.Students may not repeat a course in which they have already achieved a grade of 70 unless the department rules require a higher score.
- 3.A student repeating a course more than once must seek the approval of the Dean.

G.Scholastic Standing

1.Dean's Honor list

To be placed on the Dean's Honor List at the end of a given Fall or Spring semester, a student must:

- Be registered for at least 12 credits,
- Not be on Probation,
- Have a semester average of at least 85 or be ranked in the top 10 percent of the class and have a semester average of at least 80,
- Have no failing, withdrawals, repeated, or incomplete grades,
- Have no disciplinary action in his/her record,
- Be deemed worthy by the Dean to be placed on the Honor List.

2.Evaluation of Academic performance

The evaluation of the academic performance of a student begins when a regular student has reached at least the level of ENGL 101 and has registered for a minimum of 6 of the required credits from his/her plan of study.

Students transferring from another institution of higher education or from another department at UOBD receive a written statement from their new department showing their academic status in conformity with the faculty and department rules.

2.a-Department Requirements

Students joining a department must pass the courses indicated in the University Catalogue as department requirements with a minimum grade of 70 or higher for each course in the specified period of time. Students who fail to fulfill the department requirements within the specified period of time will have one regular semester to pass the required courses with a minimum grade of 70 or higher for each course. If they fail to do so, they will be dropped from the Department. Dropping any of these required courses is not recommended.

2.b-Academic Probation

If a student enters the University with a conditional acceptance, the conditions for its removal must be fulfilled by the end of the first semester. Starting from the second semester, a student must maintain a cumulative average of 70 or above. Failure to do so by the end of a semester places the student under academic probation. Under such circumstances, the student may be required to take a lighter credit load, which may result in a delay in graduation.

Such students will not be allowed to take more than 12 new credits in the semester during which they are on probation and will also be required to retake the courses they had failed the next time they are offered. Such students will be encouraged by their advisor to take courses in the Summer Semester.

2.c Removal of Probation

A student placed on probation has to achieve a cumulative average of 70 or above in the next semester in order to remove the probation.

2.d Continued Probation

Students who are on probation and who fail to achieve a cumulative average of 70 in the next semester will be placed on continued probation if their semester average is 70 or higher.

2.e Strict Probation

A student placed on probation and who fails to achieve a semester average and a cumulative average of at least 70 or placed on continuing probation and who fails to remove it, is placed on strict probation for one semester under the following conditions:

- a.The student is allowed to register for a maximum of 12 credits.
- b.The student registers only for courses in which the grade earned was less than 70.
To remove the strict Probation the student must not fail any course and obtain a cumulative average of 70 or above.

2.f Dropping from the Department

Students will be dropped from the Department for any of the following reasons (other than those mentioned in paragraph 2.1 above) if:

- a.They are subject to probation for a third time.
- b.They are on Strict Probation and are not able to remove the probation by the end of the next semester.

H.Dismissal from the University

Students dropped from a Department have one semester as a majorless student to meet the transfer requirements to other Departments. If, at the end of the semester, they fail to meet these requirements, they will be dropped from the University.

I.Readmission to the university

When a student is dismissed, the implication is that the student is not qualified to continue at the University. Consideration for readmission is given for one of the following reasons:

- a.If the student was not able to do work efficiently because of health reasons. In such cases, the University is to be notified promptly by the student and will require a medical report from the University Physician. The report is to be presented to the dean's office within 30 days after the student is dismissed.
- b.If, after spending a minimum of one year at another recognized institution of higher education, a satisfactory record is achieved (a general average of at least 70 that includes courses relevant to the major), the student may seek readmission to the University.

J.Summer Session

The summer I and II sessions extend over eight weeks of teaching. The maximum academic load during the summer session is 10 credits (7 credits for students on probation).

The courses offered during the summer session are identical in scope and content with those offered during the regular academic year. A summer session in which the student is registered for at least 6 credits is considered as a regular semester.

Students Record Keeping

The Office of Admissions and Registration will be the central office for maintaining and storing the official permanent records of students. Data storage will be largely electronic and non-electronic. This information will be released to the students, faculty advisors and accounting department via a sophisticated automated student information system whenever such legitimate needs arise.

The system will contain information on students' admission, course enrollments, grades, academic transcripts, personal records, tuition payment, class schedule and students' general study progress. The staff of the Office of Registrar will be experienced in operating and maintaining sophisticated automated student information system. The Registrar will ensure the importance and integrity of securing and maintaining these records. Electronic back-ups of the entire student records information database will be stored at a local off-site banking facility.

Permanent records for all students and alumni will be kept in digital formats. Paper copies of other pertinent student files will be stored in fireproof cabinets. The Registrar will issue transcripts, letters of recommendation and letters certifying academic standing or completion. Maintaining the rights of individual privacy and confidentiality of records, release of information will require prior consent and authorization from concerned authority.

Independent Study

Although UOBD does not encourage students to take courses as Independent Study, students may petition to complete a maximum of 6 credit hours (two courses) during his undergraduate academic years.

To be eligible, students must have completed at least 45 credit hours at UOBD with a minimum cumulative average of 3.0.

Students who are taking independent courses are ensured with adequate student supervision and compatibility in content and assessment methods to other courses.

Students must submit their Independent Study petition 3 weeks prior to the beginning of the semester in which the work is to be completed.

The petition must include the following:

- 1.Reasons for wanting to complete an Independent Study Course
- 2.A consent of the faculty member who will be supervising the Independent Study Course
- 3.The detailed plan for the course and its objective in addition to the learning outcomes. Also the formal assessment should be specified in the plan.

Petition must be approved by the concerned Dean who will consult with the student Academic Advisor to decide if the Independent Study Course will be allowed. Then students will be notified of the decision within two weeks of the petition submission.

Career Services

This department will educate, prepare, and assist students and alumni to pursue career development and the job search process in the corporate world. The Student Affairs Department will facilitate employers in advertising job openings and students to access this information.

Students will be able to learn about career services in various ways. Presentations will be available on topics like career planning, resume preparation, and interviewing techniques. Career resources will be available all year round. Students may be referred through faculty, staff, or other students. All enrolled students and alumni will have access to career services.

Student Counseling

The Counseling Center provides professional counseling services and related programs to help students succeed and make the most of their total college experience personally, intellectually, vocationally, socially and physically. Through the Counseling Center, assistance is provided to students facing personal and educationally related problems.

Food Service

The Cafeteria is a great place to go for everything from a quick snack to breakfast, hot meals, soup, sandwiches, munchies, fresh fruit, salads and hot and cold beverages. In addition to the many items on its regular menu, the cafeteria features daily specials and special holiday meals. Operating hours are Sunday - Thursday (8:00 a.m. -5:00 p.m.).

Medical Services

The University offers medical services to students in an infirmary equipped to deal with minor medical problems. All students are insured against accidents that occur within the University or while using its facilities.

University of Balamand Dubai
Faculty of Engineering
Department of Chemical Engineering

Mission Statement

The Chemical Engineering Department aims to develop and maintain:

1. Excellence in teaching which ensures that the graduates have the knowledge and the professional skills they need to become highly qualified chemical engineers who can contribute to regional growth and development, and who are prepared to cope with the rapidly-changing global technologies
2. Programs with quality analytical and design components which are responsive to the needs of society and industry
3. Programs with a strong embedded commitment to serve the regional needs in the vital areas, mainly the food and energy resources, the environment safety and protection, and the socio-economic development.

Program Educational Objectives

The objectives of the BS program in Chemical Engineering are to produce graduates equipped with:

1. A diverse and solid technical background built on analytical and critical thinking, and problem-solving skills that enable the graduates to excel as professionals contributing to a variety of engineering basic roles within the various fields of chemical engineering, or succeed in pursuing graduate chemical engineering studies
2. Readiness for professional development and lifelong learning to stay current in their field and achieve continued professional growth
3. Desire for innovation in response to emerging technologies, social developments, and contemporary issues
4. Ability to act professionally and ethically, and work as effective team members possessing good oral and written communication and leadership skills.

Program Learning Outcomes

Upon graduation with a Bachelor of Science degree in Chemical Engineering from the University of Balamand Dubai, our graduates are expected to demonstrate:

- a. An ability to apply knowledge of mathematics, science, and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning;
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

After completing the General Education Courses (University Requirements), students should be able to:

1. Demonstrate knowledge of humanities, social sciences, library science and leadership skills
2. Communicate more effectively in oral and written English

3. Develop quantitative and research skills
4. Think more critically and creatively
5. Apply ethics in their behavior and decision making
6. Work collaboratively, learn independently and practice lifelong learning
7. Exercise leadership and have a sense of responsibility as UAE citizens
8. Have pride in Arabic culture and Islamic values
9. Recognize and appreciate the diversity of the human experience.

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>University Requirement</u> (22 credits) | ENGL 101 | 3 |
| | ENGL 102 | 3 |
| | ENGL 203 | 3 |
| | ENGL 204 | 3 |
| | ENTR 201 | 3 |
| | ISLM 101 | 3 |
| | LISP 200 | 1 |
| | SOCL 201 | 3 |

| Requirement | Course Code | # of Credits |
|--|-------------------------|---------------------|
| <u>Faculty Requirement</u> (41 credits) | CHEM 100 | 3 |
| | CHEM 102 | 3 |
| | CSIS 206 | 3 |
| | GENG 101 | 1 |
| | GENG 390 | 2 |
| | GENG 391 | 2 |
| | MATH 112 | 3 |
| | MATH 113 | 3 |
| | MATH 200 | 3 |
| | MATH 211 | 3 |
| | MATH 240 | 3 |
| | MATH 230 OR Math 270 | 3 |
| | MECH 243 | 3 |
| | PHYS 100 | 3 |
| | PHYS 102 | 3 |
| | GENG 380 | 0 |

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>Department Requirement</u> (77 credits) | CHEM 202 | 3 |
| | CHEM 203 | 1 |
| | CHEM 242 | 3 |
| | CHEM 244 | 3 |
| | CHEM 245 | 1 |
| | CHEM 262 | 3 |
| | CHEN 206 | 1 |
| | CHEN 212 | 3 |
| | CHEN 215 | 3 |
| | CHEN 222 | 1 |
| | CHEN 303 | 3 |
| | CHEN 312 | 3 |
| | CHEN 322 | 3 |
| | CHEN 323 | 3 |
| | CHEN 324 | 1 |
| | CHEN 325 | 3 |
| | CHEN 327 | 1 |
| | CHEN 328 | 1 |
| | CHEN 333 | 3 |
| | CHEN 336 | 3 |
| | CHEN 357 | 3 |
| | CHEN 369 | 3 |
| | CHEN 370 | 1 |
| | CHEN 377 | 3 |
| | CHEN 380 | 3 |
| | CHEN 397 | 3 |
| | CHEN 398 | 3 |
| CHEN 399 | 3 | |
| GENG 311 | 3 | |
| MECH 232 | 3 | |
| MECH 321 | 3 | |

Four Years Curriculum (Total: 140 credits)

Year One

First Semester

| Course Code | Course Title | Credit |
|-------------|--------------------------------|--------|
| CHEM 100 | Introduction to Chemistry I | 3 |
| ISLM 101 | Islamic Studies | 3 |
| ENGL 101 | English Communication Skills I | 3 |
| MATH 112 | Introduction to Calculus I | 3 |
| PHYS 100 | Introduction to Physics I | 3 |

15

Second Semester

| Course Code | Course Title | Credit |
|-------------|---|--------|
| CHEM 102 | Introduction to Chemistry II | 3 |
| CSIS 206 | Principles of Programming | 3 |
| ENGL 102 | English Communication Skills II | 3 |
| GENG 101 | Introduction to the Engineering Discipline and Ethics | 1 |
| MATH 113 | Introduction to Calculus II | 3 |
| PHYS 102 | Introduction to Physics II | 3 |

16

Year Two

Third Semester

| Course Code | Course Title | Credit |
|-------------|-----------------------------------|--------|
| CHEM 202 | Basic Chemistry | 3 |
| CHEM 203 | Basic Chemistry Laboratory | 1 |
| CHEN 212 | Chemical Engineering I | 3 |
| CHEN 215 | Materials Science and Engineering | 3 |
| ENGL 203 | English Communication Skills III | 3 |
| MATH 200 | Calculus | 3 |
| MECH 232 | Thermodynamics | 3 |

19

Fourth Semester

| Course Code | Course Title | Credit |
|-------------|--|--------|
| CHEM 242 | Organic Chemistry I | 3 |
| CHEN 206 | Instrumentation Lab and Research Methods | 1 |
| CHEN 312 | Mass Transfer | 3 |
| CHEN 377 | Chemical Engineering Thermodynamics II | 3 |
| MATH 211 | Applied Linear Algebra | 3 |
| MATH 270 | Applied Differential Equations | 3 |
| OR | | |
| MATH 230 | Numerical Analysis I | 3 |
| MECH 243 | Fluids Mechanics | 3 |

19

Year Three

Fifth Semester

| Course Code | Course Title | Credit |
|-------------|-------------------------|--------|
| CHEM 244 | Organic Chemistry II | 3 |
| CHEM 245 | Organic Chemistry Lab I | 1 |

| | | |
|----------|---------------------------------------|---|
| CHEM 262 | Physical & Chemical Kinetics | 3 |
| CHEN 222 | Process simulation and Modeling | 1 |
| CHEN 325 | Chemical Reactions and Reactor Design | 3 |
| SOCL 201 | UAE Studies | 3 |
| ENGL 204 | Language, Society and Culture | 3 |
| LISP 200 | Library Use and Research methods | 1 |

18

Sixth Semester

| Course Code | Course Title | Credit |
|--------------------|--|---------------|
| CHEN 303 | Unit Operations | 3 |
| CHEN 324 | Petroleum Engineering Lab | 1 |
| CHEN 333 | Food Chemistry and Technology Principles | 3 |
| CHEN 357 | Gas Engineering | 3 |
| ENTR 201 | Innovation And Entrepreneurship | 3 |
| GENG 311 | Engineering Management & Economics | 3 |
| MATH 240 | Probability and Statistics | 3 |

19

Summer 3rd year

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| GENG380 | Field Training | 0 |

Year Four

Seventh Semester

| Course Code | Course Title | Credit |
|--------------------|--|---------------|
| CHEN 327 | Chemical Engineering Lab I | 1 |
| CHEN 336 | Separation Processes | 3 |
| CHEN 322 | Petroleum Refinery Engineering | 3 |
| CHEN 369 | Continuous-Time Process Control Systems | 3 |
| CHEN 370 | Process-Modeling and Control Lab | 1 |
| GENG 390 | Fundamentals of Engineering Project Design | 2 |
| MECH 321 | Heat Transfer | 3 |

16

Eighth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------------------------|---------------|
| CHEN 323 | Plant and Environmental Safety | 3 |
| CHEN 328 | Chemical Engineering Lab II | 1 |
| CHEN 380 | Chemical Process Synthesis and Design | 3 |
| CHEN 398 | Advanced Chemical Reactor Design | 3 |
| CHEN 399 | Advanced Transport Phenomena | 3 |
| GENG 391 | Capstone Design Project | 2 |
| CHEN 397 | Industrial Catalytic Processes | 3 |

18

COURSE DESCRIPTION

CHEN 206 INSTRUMENTATION LAB AND RESEARCH METHODS

0.3: 1 cr.

This course teaches how to write a report, and serves as an introduction to the fundamental principles of instrumentation and measurements, along with research techniques and the use of American Psychological association style. Also, this course helps students with the use of Microsoft Office Word, Excel, and PowerPoint.

Prerequisite: CHEM102, PHYS100, PHYS102.

CHEN 212 CHEMICAL ENGINEERING I

3.0: 3 cr.

This course provides an introduction to the discipline of chemical engineering. An introduction is provided to the first principles of chemical engineering, as well as environmental, health, safety and ethical issues in chemical engineering practice. An overview is provided of the chemical engineering profession, career choices, the course of study, and a survey of the chemical industry, e.g., polymer, pharmaceutical, food processing, electrochemical, biotechnology, process control, energy, and petroleum refining.

Prerequisite: MATH 200.

CHEN 215 MATERIALS SCIENCE AND ENGINEERING

3.0: 3 cr.

This course introduces fundamental concepts in materials science. The main purpose of this course is to provide a good understanding of the materials science and engineering. Topics covered include: atomic structure and interatomic bonding, crystalline structure, crystal defects, diffusion, phase diagrams, mechanical properties of metals, ceramic, polymers and composite materials, corrosion and degradation of materials.

Prerequisite: CHEM102, PHYS 100.

CHEN 222 PROCESS SIMULATION AND MODELING

0.3: 1 cr.

This course makes use of computers and software as problem solving aids in chemical engineering. The course provides an introduction to drawing software AutoCAD. It also focuses on the learning and application of process simulation, modeling and control software such as LabVIEW.

Prerequisite: CHEN212, CHEN312.

CHEN 303 UNIT OPERATIONS

3.0: 3 cr.

The course covers the principles of unit operations with emphasis on distillation, absorption, extraction, and fluid-solid systems. Property prediction of multi-component fluids. Cases will cover principles of heat-exchanger design, multi-component fractionation, absorption, stripping and extraction.

Prerequisites: CHEN 312, CHEN 325, CHEN 377 and MECH 243.

CHEN 312 MASS TRANSFER

3.0: 3 cr.

The Mass Transfer course provides an understanding of the basic principles of mass transfer and its application to continuous contact operations. These principles cover all the process variables including diffusivity, mass transfer coefficients and fluxes. Materials balance are also covered in this course and applied on the study of equilibrium-stage separation processes including distillation, gas-liquid absorption and stripping, liquid-liquid extraction, and humidification.

Prerequisites: MECH 232 and CHEN 212.

CHEN 322 PETROLEUM REFINERY ENGINEERING

3.0: 3 cr.

This course covers the following topics: petroleum composition, crude oil preparation, evaluation of oil stocks, refinery products and test methods, physical properties of petroleum oil, refinery equipment, and the main refinery operations in petroleum processing.

Prerequisite: CHEN312, CHEN325, CHEN 357.

CHEN 323 PLANT AND ENVIRONMENTAL SAFETY

3.0: 3 cr.

The course is designed to acquaint students to topics of the safety, health and environment (SHE) in the chemical plants like: temperature and pressure hazards, fire and explosion hazards, radioactive wastes hazards, equipment, energy and electrical hazards, construction and tool hazards, personal protective equipment hazards, engineering controls, administrative controls, vehicle and transportation hazards, working

area and height hazards, hearing and noise hazards, fire, rescue, and emergency response equipment.

Prerequisite: CHEN 303.

CHEN 324 PETROLEUM ENGINEERING LAB

3.0: 3 cr.

Experiments on distillation of petroleum products, sulfur in oil analyzer unit, density meter, density of light hydrocarbons by pressure hydrometer, Reid vapor pressure cylinders, flash point Pensky-Martens closed cup tester, Saybolt viscosity, octane analyzer for spark ignition engine fuel, aniline point and mixed aniline point of petroleum products and hydrocarbon solvents, colorimeter, oxidation stability of aviation fuels/ potential residue method, corrosiveness to copper from petroleum products by copper strip, freezing point of aviation fuels, cone penetrometer, gum content in fuels by jet evaporation, Conradson carbon residue apparatus, cloud point and pour point apparatus, twin-column adsorption apparatus, flash series 8 'activecool' closed cup tester, oil test centrifuge, automatic oil testers, foam dual twin foam test baths will be performed.

Co-requisite: CHEN 322.

CHEN 325 CHEMICAL REACTIONS AND REACTOR DESIGN

3.0: 3 cr.

The aim of this course is to introduce the principles of chemical reactions, emphasizing chemical equilibrium and rate of reaction. It proceeds to the theory and practice of heat and mass transfer, and important considerations in the design of chemical reactors.

Prerequisite: CHEN 212, CHEN 312.

CHEN 327 CHEMICAL ENGINEERING LAB I

0.3: 1 cr.

Experiments covering fundamental mass, energy, momentum transport and purification processes. State-of-the-art equipment such as centrifugal pumps, fluid dynamics apparatus, pasteurization unit, press filter, fluidization/drying unit, heat exchangers and reverse osmosis membrane are demonstrated and manipulated by the students.

Prerequisites: CHEN325, MECH 243.

CHEN 328 CHEMICAL ENGINEERING LAB II

0.3: 1 cr.

Experiments covering advanced mass, energy, momentum transport and separation processes. State-of-the-art equipment such as polyvalent reactor, continuous reactors, crystallization unit, batch and continuous distillation columns, ebulliometer, liquid-liquid extractor and liquid-gas absorption column are demonstrated and manipulated by the students.

Prerequisites: CHEN327.

CHEN 333 FOOD CHEMISTRY AND TECHNOLOGY PRINCIPLES

3.0: 3 cr.

The aim of this course is to provide an introduction to the chemistry of the major food constituent amino acids, proteins, enzymes, fats, carbohydrates and vitamins; analyze the major food groups; describe the main reactions of the major food constituents. This course emphasizes on the relationship of processing technology to keep quality, nutritional value, and acceptability of foods.

Prerequisites: CHEN 212, CHEN 312.

CHEN 336 SEPARATION PROCESSES

3.0: 3 cr.

This course covers concepts on the thermodynamics, mechanisms, processes and design of equilibrium separation processes such as membrane separations, adsorption, ion exchange, chromatography and crystallization.

Prerequisites: CHEN 303, 312 and MECH 243.

CHEN 357 GAS ENGINEERING

3.0: 3 cr.

This course deals with the inflow performance. Material balance between the well, fracture and reservoir will be stated to deduce the pseudo-steady and steady state equations of the flow. Near well bore alterations and the different flow regimes heading to the well bore will be studied. The two types of well drilling are explained: Vertical and Horizontal well. The influencing aspects on the wells performance as: Water conning, frack and gravel pack completions will be covered.

Prerequisite: MECH 232, MATH 200, CHEN 325.

CHEN 369 CONTINUOUS-TIME PROCESS CONTROL SYSTEMS**3.0: 3 cr.**

Continuous-time signal transformations and system classifications; Fourier series and transform; Laplace transform; block diagram algebra and signal flow graph; stability analysis techniques (Routh-Hurwitz Criterion); root locus; state space analysis; modern control design (State Feedback Control) and classical control design (PID and phase compensation).

Prerequisites: MATH 211, CSIS 206, CHEN 303.

CHEN 370 PROCESS-MODELING AND CONTROL LAB**0.3: 1 cr.**

This course covers the modeling techniques of chemical engineering problems through the use of computer aided process design and simulation tools such as Aspen-plus and Hy sys. This course is also intended to provide laboratory application of fundamental principles of chemical process dynamics and feedback control. This includes open-loop dynamics of typical chemical engineering processes such as distillation, fluid flow, chemical reactors and heated stirred tanks. Closed-loop experiments will involve control loop design, controller tuning, multivariable, and computer control. The tools discussed in this course are used in subsequent courses on the analysis and design of chemical reactors and mass transfer processes.

Prerequisite: CHEN 369.

CHEN 377 CHEMICAL ENGINEERING THERMODYNAMICS II**3.0: 3 cr.**

This course covers the second law of thermodynamics, entropy, thermodynamic properties of fluids and thermodynamic diagrams, Application of thermodynamics to flow processes, power production from heat, refrigeration, vapor-liquid equilibrium, solution thermodynamics, and chemical reaction equilibria and equilibrium constants.

Prerequisite: MECH 232.

CHEN 380 CHEMICAL PROCESS SYNTHESIS AND DESIGN**3.0: 3 cr.**

Strategy for the conceptual design and building up methods of industrial chemical processes; rules of thumb for chemical engineers, simulation to assist process synthesis, introduction to product design and molecular structure design, efficiency and sustainability in the chemical industry.

Prerequisite: CHEN 336, GENG 390.

CHEN 397 INDUSTRIAL CATALYTIC PROCESSES**3.0: 3 cr.**

This course covers the fundamentals of catalytic science; catalyst properties, preparation and characterization, catalytic reactor design and catalyst deactivation. This part is followed by an overview of the most important industrial catalytic processes: Hydrogen Production and synthesis Gas reactions, Hydrogenation and dehydrogenation of organic compounds, Oxidation of organic and inorganic compounds.

Prerequisite: CHEN 325.

CHEN 398 ADVANCED CHEMICAL REACTOR DESIGN**3.0: 3 cr.**

This course deals with the interpretation of rate data and development of performance equations for single and multiple reactor systems. Course topics include: design of ideal reactors and deviations from ideality, multiple chemical reactions, steady state and unsteady-state operation, optimization of reactors, collection and analysis of rate law data and bioreactors.

Prerequisite: CHEN 325.

CHEN 399 ADVANCED TRANSPORT PHENOMENA**3.0: 3 cr.**

This course covers the fundamental theory of momentum, mass and energy transport in porous media for incompressible and compressible fluid flow; applications of steady-state balances and equations of change to fluid drag, piping system design, filtration, packed beds. Analogy between the three types of transport is presented.

Prerequisite: CHEN 312, MECH 321, MECH 243.

University of Balamand Dubai
Faculty of Engineering
Department of Civil Engineering

Mission Statement

The Civil Engineering Department aims to develop and maintain:

1. Excellence in teaching which ensures that the graduates have the knowledge and the professional skills they need to become highly qualified civil engineers who can contribute to regional growth and development, and who are prepared to cope with the rapidly-changing global technologies;
2. Programs with quality analytical and design components which are responsive to the needs of society and industry;
3. Programs with a strong embedded commitment to serve the regional needs in the vital areas, mainly construction and transportation, the environment safety and protection, and the socio-economic development.

Program Educational Objectives

The objectives of the BS program in Civil Engineering are to produce graduates equipped with:

1. A diverse and solid technical background built on analytical and critical thinking, and problem-solving skills that enable the graduates to excel as professionals contributing to a variety of engineering basic roles within the various fields of civil engineering, or succeed in pursuing graduate civil engineering studies;
2. Readiness for professional development and lifelong learning to stay current in their field and achieve continued professional growth;
3. Desire for innovation in response to emerging technologies, social developments, and contemporary issues;
4. Ability to act professionally and ethically, and work as effective team members possessing good oral and written communication and leadership skills.

Program Learning Outcomes

Upon graduation with a Bachelor of Science degree in Civil Engineering from the University of Balamand Dubai, our graduates are expected to demonstrate:

- a. An ability to apply knowledge of mathematics, science, and engineering;
- b. An ability to design and conduct experiments, as well as to analyze and interpret data;
- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d. An ability to function on multidisciplinary teams;
- e. An ability to identify, formulate, and solve engineering problems;
- f. An understanding of professional and ethical responsibility;
- g. An ability to communicate effectively;
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i. A recognition of the need for, and an ability to engage in life-long learning;
- j. A knowledge of contemporary issues;
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

General Education Courses (University Requirements)

students should be able to:

1. Demonstrate knowledge of humanities, social sciences, library science and leadership skills
2. Communicate more effectively in oral and written English

3. Develop quantitative and research skills
4. Think more critically and creatively
5. Apply ethics in their behavior and decision making
6. Work collaboratively, learn independently and practice lifelong learning
7. Exercise leadership and have a sense of responsibility as UAE citizens
8. Have pride in Arabic culture and Islamic values
9. Recognize and appreciate the diversity of the human experience.

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>University Requirement</u> (22 credits) | ENGL 101 | 3 |
| | ENGL 102 | 3 |
| | ENGL 203 | 3 |
| | ENGL 204 | 3 |
| | ENTR 201 | 3 |
| | ISLM 101 | 3 |
| | LISP 200 | 1 |
| | SOCL 201 | 3 |

| Requirement | Course Code | # of Credits |
|--|----------------------------|---------------------|
| <u>Faculty Requirement</u> (41 credits) | CHEM 100 | 3 |
| | CHEM 102 | 3 |
| | CSIS 206 | 3 |
| | GENG 101 | 1 |
| | GENG 390 | 2 |
| | GENG 391 | 2 |
| | MATH 112 | 3 |
| | MATH 113 | 3 |
| | MATH 200 | 3 |
| | MATH 211 | 3 |
| | MATH 240 | 3 |
| | MATH 230 OR MATH 270 | 3 |
| | MECH 243 | 3 |
| | PHYS 100 | 3 |
| | PHYS 102 | 3 |
| | GENG 380 | 0 |

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>Department Requirement</u> (76 credits) | CIVE 201 | 3 |
| | CIVE 202 | 3 |
| | CIVE 203 | 1 |
| | CIVE 204 | 3 |
| | CIVE 205 | 3 |
| | CIVE 206 | 1 |
| | CIVE 208 | 2 |
| | CIVE 209 | 3 |
| | CIVE 210 | 1 |
| | CIVE 212 | 3 |
| | CIVE 214 | 1 |
| | CIVE 243 | 1 |
| | CIVE 301 | 3 |
| | CIVE 303 | 1 |
| | CIVE 304 | 3 |
| | CIVE 305 | 3 |
| | CIVE 306 | 1 |
| | CIVE 307 | 3 |
| | CIVE 308 | 3 |
| | CIVE 309 | 3 |
| | CIVE 311 | 3 |
| | CIVE 312 | 2 |
| | CIVE 313 | 1 |
| | CIVE 315 | 1 |
| | CIVE 316 | 1 |
| | CIVE 317 | 3 |
| | CIVE 318 | 1 |
| | CIVE 319 | 2 |
| | CIVE 320 | 2 |
| | CIVE 321 | 2 |
| | CIVE 322 | 2 |
| CIVE 323 | 2 | |
| CIVE 324 | 2 | |
| MECH 221 | 3 | |
| MECH 222 | 3 | |
| MECH 233 | 1 | |

Four Years Curriculum (Total: 139 credits)

Year One

First Semester

| Course Code | Course Title | Credit |
|-------------|--------------------------------|-----------|
| CHEM 100 | Introduction to Chemistry I | 3 |
| ISLM 101 | Islamic Studies | 3 |
| ENGL 101 | English Communication Skills I | 3 |
| MATH 112 | Introduction to Calculus I | 3 |
| PHYS 100 | Introduction to Physics I | 3 |
| | | ----- |
| | | 15 |

Second Semester

| Course Code | Course Title | Credit |
|-------------|--|-----------|
| CHEM 102 | Introduction to Chemistry II | 3 |
| CSIS 206 | Principles of Programming | 3 |
| ENGL 102 | English Communication Skills II | 3 |
| GENG 101 | Introduction to the Engineering Discipline | 1 |
| LISP 200 | Library Use and Research methods | 1 |
| MATH 113 | Introduction to Calculus II | 3 |
| CIVE 203 | Engineering Drawing | 1 |
| PHYS 102 | Introduction to Physics II | 3 |
| | | ----- |
| | | 18 |

Year Two

Third Semester

| Course Code | Course Title | Credit |
|-------------|---|-----------|
| CIVE 201 | Statics | 3 |
| CIVE 212 | Introduction to Environmental Engineering | 3 |
| CIVE 318 | Environmental Engineering Modeling | 1 |
| ENGL 203 | English Communication Skills III | 3 |
| MATH 200 | Calculus | 3 |
| MATH 211 | Applied Linear Algebra | 3 |
| MECH 222 | Science of Materials | 3 |
| | | ----- |
| | | 19 |

Fourth Semester

| Course Code | Course Title | Credit |
|-------------|--|-----------|
| CIVE 202 | Mechanics of Materials | 3 |
| MECH233 | Workshop Technology | 1 |
| CIVE 204 | Construction Materials & Methods | 3 |
| SOCL 201 | UAE Studies | 3 |
| ENGL 204 | Language, Society and Culture | 3 |
| MATH 270 OR | | |
| MATH 230 | Applied Differential Equations OR Numerical Analysis I | 3 |
| MECH221 | Engineering Dynamics | 3 |
| | | ----- |
| | | 19 |

Year Three

Fifth Semester

| Course Code | Course Title | Credit |
|-------------|------------------------|--------|
| CIVE 205 | Theory of Structures I | 3 |

| | | |
|----------|---------------------------------|---|
| CIVE 206 | Engineering Drawing II | 1 |
| CIVE 208 | Surveying | 2 |
| CIVE 214 | Surveying Laboratory | 1 |
| CIVE 317 | Engineering Geology | 3 |
| ENTR 201 | Innovation And Entrepreneurship | 3 |
| MATH 240 | Probability and Statistics | 3 |

16

Sixth Semester

| Course Code | Course Title | Credit |
|--------------------|--|---------------|
| CIVE209 | Reinforced Concrete I | 3 |
| CIVE 210 | Strength of Materials Laboratory | 1 |
| CIVE 243 | Fluid Mechanics Laboratory | 1 |
| CIVE 301 | Soil Mechanics | 3 |
| CIVE 306 | Soil Lab | 1 |
| CIVE 309 | Engineering Economy | 3 |
| CIVE 322 | Technical Platform Computing for Civil Engineers | 3 |
| MECH 243 | Fluid Mechanics | 3 |

18

Summer 3rd year

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| GENG380 | Field Training | 0 |

Year Four

Seventh Semester

| Course Code | Course Title | Credit |
|--------------------|--|---------------|
| CIVE 303 | Computer Aided Design | 1 |
| CIVE 304 | Reinforced Concrete II | 3 |
| CIVE 308 | Transportation Engineering | 3 |
| CIVE 312 | Construction Management Fundamentals | 2 |
| CIVE 316 | Construction Management Modeling | 1 |
| CIVE 319 | Revit for Civil Engineers | 2 |
| CIVE 323 | Introduction to Geographic Information Systems (GIS) | 2 |
| CIVE 324 | Structural Steel Design | 2 |
| GENG 390 | Fundamentals of Engineering Project Design | 2 |

18

Eighth Semester

| Course Code | Course Title | Credit |
|--------------------|-------------------------------------|---------------|
| CIVE 305 | HVAC | 2 |
| CIVE 307 | Foundation Design | 3 |
| CIVE 311 | Sanitary Engineering | 3 |
| CIVE 313 | Transportation Engineering Modeling | 1 |
| CIVE 315 | Geotechnical Engineering Modeling | 1 |
| CIVE 320 | Structural Detailing | 2 |
| CIVE 321 | Advanced Computer Aided Design | 2 |
| GENG 391 | Capstone Design Project | 2 |

16

COURSE DESCRIPTION

CIVE 201 STATICS

3.0: 3 cr.

Concept of forces, moments, and other vector quantities; analysis of force systems; conditions of equilibrium; analysis of simple structures; friction; centroids and moments of inertia; shear and bending moment diagrams. Pre-requisites: PHYS 100.

CIVE 202 MECHANICS OF MATERIALS

3.0: 3 cr.

Fundamental stress and strain relationships, axial stress, safety factors, statically indeterminate axially loaded members, torsion, bending and shear stresses in beams, transformation of stress and strain, combined stresses, deflections in beams, and analysis of columns. Pre-requisites: CIVE 201, MATH 200.

CIVE 203 DRAWING I

0.3: 1 cr.

Concepts and practices in lettering, geometric construction, multi-view and auxiliary projections, sections and connections, dimensioning, sketching wall sections and isometric and oblique pictorials. Emphasis on freehand sketching skills. Pre-requisites: None.

CIVE 204 CONSTRUCTION MATERIALS AND METHODS

3.0: 3 cr.

Materials and methods used in the construction industry. Physical and mechanical properties of construction materials; Portland cement concrete, asphalt, wood, ferrous metals, non-ferrous metals; proportioning of concrete mixtures including admixtures with Laboratory demonstration. Pre-requisite: CHEM 102, CIVE 202.

CIVE 205 THEORY OF STRUCTURES I

3.0: 3 cr.

Stress resultants (reactions, axial forces, shear forces, and bending moments) for beams and framed structures. Deflections of beams and frames by geometric methods (moment-area theorems and applications; conjugate beam analogy), and energy methods (virtual work method, Castigliano's theorems). Influence line functions and their applications. Criteria for moving loads. Analysis of statically indeterminate beams and frames by force methods (consistent deformations) and displacement methods (slope deflection and moment distribution). Structural analysis with software application. Pre-requisite: CIVE 202.

CIVE 206 DRAWING II (Auto Cad)

0.3: 1 cr.

The course aims at preparing the future civil engineer to meet the growing needs of the local specifications, and to be able to understand and create architectural drawings of residential buildings. Learning this course is based on the ability of using CAD packages (AutoCAD). The course seeks to develop the student effective utilization of computer aided drafting (CAD) skills, using AutoCAD to quickly create professional-quality 3D models. Pre-requisite: CIVE 203.

CIVE 208 SURVEYING

2.2: 2 cr.

The course will consist of providing the different types of surveying, mathematical and physical concepts, coordinate systems, leveling, contour lines, traversing, area measurement, horizontal and vertical curves, and field applications to the above topics. Pre-requisite: MATH 200 Co requisite: CIVE 214.

CIVE 209 REINFORCED CONCRETE I

3.0: 3 cr.

Fundamentals of reinforced concrete behavior, analysis and design of rectangular beams, T- beams and one-way slabs including flexural and shear behavior, development and anchorage of reinforcement, deflections and crack control. Analysis and design of short reinforced concrete columns. Pre-requisite: CIVE 205.

CIVE 210 STRENGTH OF MATERIALS LABORATORY**0.3: 1 cr.**

This course is designed to provide students with the basic properties, testing and inspection of common civil engineering materials that include mineral aggregates, cement, concrete, steel reinforcement and asphalt. Students will experience the way concrete is designed, mixed, compacted and tested according to international standards including hot-weather effects and will gain a comparative knowledge of material properties and possible applications in construction. Written reports and oral presentation of experimental results is required.

Pre-requisites: CIVE 204.

Co-requisite: CIVE 209.

CIVE 212 INTRODUCTION TO ENVIRONMENTAL ENGINEERING**3.0: 3 cr.**

Knowledge of environmental elements; mass and energy transfer and balances; environmental chemistry; mathematics of growth and decay; risk assessment and management; surface water pollutants, biological and chemical oxygen demands, eutrophication; water supply systems and drinking water standards; wastewater treatment systems and effluent standards; groundwater flow, contaminant transport, and remediation technologies; hazardous waste and pollution prevention; air pollution sources, control and atmospheric stability; ambient air quality standards, indoor air quality; global temperature, greenhouse effect and warming potential; global energy balance, carbon emission, and stratospheric ozone depletion; solid waste management, landfill disposal; medical waste; green building; and environmental law, ethics, and justice. Field trips are integrated into the classes.

Pre-requisite: CHEM 100.

CIVE 214 SURVEYING LABORATORY**0.3:1 cr.**

Field application of concepts learned in class (CIVE 208) including basic measuring procedures for distances, elevations, angles, bearings, azimuth; theory of measurements and errors, mapping, construction and topographic surveys, traverses, adjustment and closure, area and volume computations.

Pre-requisite: CIVE 206,

Co-requisite: CIVE 208.

CIVE 243 FLUID MECHANICS LABORATORY**0.3: 1 cr.**

Laboratory applications in fluid mechanics including fluid measurements and properties; flow in pipes; Reynolds number; forces on gates; orifices; weirs; open channel flow; and pumps.

Pre-requisite: None.

Co-requisite: MECH 243.

CIVE 301 SOIL MECHANICS**3.0: 3 cr.**

Origin of soil and grain size, weight volume relationships and soil plasticity, engineering classification of soil, permeability and seepage, effective pressure concept, shear strength of soil, stress in a soil mass, soil consolidation settlement, lateral earth pressure (Retaining wall).

Pre-requisites: CIVE 202.

CIVE 303 COMPUTER-AIDED DESIGN**0.3: 1 cr.**

Application of computers to analyzing common structures. Use of standard industry software packages (ETABS and SAFE) for analyzing two dimensional and three dimensional structures including trusses, moment resisting frames, and shear walls against gravity loads as well as lateral loads (seismic and wind). Introduction of Local and Global Coordinates Systems, the importance of the proper connectivity among elements as well as the definition of the Cardinal points and the insertion points. Modeling of one-way and two-way slabs using different slabs types. Export of Structure Reactions from ETABS to SAFE and modeling of foundations.

Pre-requisites: CIVE 205.

Co-requisite: CIVE 304.

CIVE 304 REINFORCED CONCRETE II**3.0: 3 cr.**

Analysis and design of advanced reinforced concrete structures and components: short columns subjected to flexure in one or in two directions, slender columns, beams subjected to shear and torsion, and floor systems including two-way slabs (flat slabs and slabs with beams).

Pre-requisites: CIVE 209, CIVE 210.

CIVE 305 HEATING, VENTILATING and AIR CONDITIONING (HVAC)**3.0: 3 cr.**

Environmental comfort parameters. Heat transfer in building sections. Estimating heating, cooling and ventilation loads and the choice of appropriate systems. Selection of equipment, design and layout of distribution ducts, pipes, and outlets.

Pre-requisite: MECH 243.

CIVE 306 SOIL MECHANICS LABORATORY**0.3: 1 cr.**

Soil properties and behavior, soil classifications, sieve analysis of soil, specific gravity of soil, relative density of soil, Atterberg limits, Proctor test, CBR test, in situ density of base material, hydrometer of fine grained soil, permeameter test (Constant head and falling head method), consolidation and settlement, strength characteristics.

Co-requisite: CIVE 301.

Pre-requisite: None.

CIVE 307 SHALLOW FOUNDATION ANALYSIS AND DESIGN**3.0: 3 cr.**

Design and analysis for shallow reinforced concrete footings: centrally loaded isolated footing, eccentrically loaded isolated footings, combined rectangular footing, combined trapezoidal footing, strap footing, mat foundation, retaining wall design.

Pre-requisites: CIVE 301, CIVE 304.

CIVE 308 TRANSPORTATION ENGINEERING**3.0: 3 cr.**

The role of transportation in society and the engineer's role in planning, design and operation of transportation systems; consideration of system constraints, costs and basic design criteria. Theory and practice in highway design according to AASHTO criteria; design of vertical and horizontal curves and cross-sections. Introduction to traffic elements including intersection design and analysis of roads and intersections service levels.

Pre-requisite: CIVE 208.

CIVE 309 ENGINEERING ECONOMY**3.0: 3 cr.**

The course introduces the student to the fundamental concepts of engineering economy covering: time value of money; economic analysis and evaluation of private construction projects, namely: net present value, future and annual worth, and internal rate of return; evaluation of public projects, mainly benefit to cost ratio; replacement analysis; depreciation methods; break even analysis; economic risk analysis; and after tax cash flow.

Pre-requisite: MATH 200.

CIVE 312 CONSTRUCTION MANAGEMENT FUNDAMENTALS**2.2: 2 cr.**

Civil engineers working on sites as construction managers need to know the fundamentals of construction management. This course introduces the basic principles and procedures of construction management, mainly contracts management, planning, scheduling and cost estimation. It also expands on project deterministic scheduling, mainly, bar charts, network schedules AON and AOA, and CPM. The course expands on the basic cost terminology, quantity take-off, bar bending schedule estimation and bill of quantities.

Pre-requisites: CIVE 206 and CIVE 209.

CIVE 313 TRANSPORTATION ENGINEERING MODELING**0.3: 1 cr.**

Highway design using professional commercial software integrating planning, geometric design including horizontal and vertical curves design, cross-sections with cut and fill calculations, and traffic modeling including traffic lights design and level of service. Results visualizations and assessment

Pre-requisite: CIVE 2016, CIVE 308.

CIVE 315 GEOTECHNICAL ENGINEERING MODELING**0.3: 1 cr.**

Geotechnical analysis and design using commercial software PLAXIS including design of foundations and lateral earth retaining systems. Results visualizations and assessment

Co-requisite: CIVE 307.

Pre-requisite: None.

CIVE 316 CONSTRUCTION MANAGEMENT MODELING**0.3:1 cr.**

Use of commercial software for the operations, planning, budgeting, scheduling, resource allocation, resource leveling, and controlling construction projects.

Co-requisite: CIVE 312.

Pre-requisite: None.

CIVE 317 ENGINEERING GEOLOGY**3.0: 3 cr.**

This course explores the fundamentals of geology applied to civil engineering problems. Topics include rock and mineral types, soil properties, rock mechanics, geologic structures, groundwater, active tectonics and earthquake hazards, causes and classification of landslides, stability assessment for soil and rock slopes, mitigation of landslide hazard, effect of earthquakes on constructed facilities and infrastructure, geotechnical and structural considerations in mitigation of earthquake hazard.

Pre-requisite: None.

CIVE 318 ENVIRONMENTAL ENGINEERING MODELING**0.3:1 cr.**

Analysis and design using commercially available software: wastewater treatment plant; sizing of tanks; effluent concentration, results visualizations and assessment: cost analysis, operation and maintenance.

Co-requisite: CIVE 212.

Pre-requisite: None.

CIVE 319 REVIT FOR CIVIL ENGINEERS**3.0:2 cr.**

The Autodesk Revit software is a Building Information Modeling (BIM) program that streamlines the design process through the use of a central 3D model, where changes made in one view update across all views and on the printable sheets. The first part of the course is designed to teach engineering students the Autodesk Revit functionality as they would work with it throughout the design process. Students begin by learning about the user interface and basic drawing, editing, and viewing tools; then learn design development tools including how to generate a structural model and interface with ETABS for analysis and design purposes. Finally, they learn the processes that take the model to the construction documentation phase.

The second part of the course focuses specifically on the ability of the engineering students to design a well-coordinated project on Revit and then use the same Revit file for scheduling, management, quantity take-off, and planning either using the Revit software or by connecting the Revit file to different management software such as Primavera or MS Project.

Co-requisite: CIVE 316.

Pre-requisites: CIVE 206, CIVE 303.

CIVE 320 STRUCTURAL DETAILING**3.0:2 cr.**

A computer-aided drafting technique and drawings generation course using CAD programs. It includes generating drawings based on the conventions of engineering graphical communication with applications to different Civil Engineering areas of specialty. The course concentrates on the detailing and shop drawings preparation of Reinforced Concrete members according to ACI-315. A required project at the end of the course

introduces the students to the preparation of execution drawings and consideration of production methods.

Co-requisites: CIVE 304, CIVE 307.

Pre-requisite: CIVE 206.

CIVE 321 ADVANCED COMPUTER AIDED DESIGN

3.0: 2 cr.

Advanced modeling techniques using ETABS/SAFE Software packages. It consists of modeling in multiple-grid systems using Cartesian and/or Polar coordinates, as well as non-concentric modeling with a variation in the Cardinal Points and Insertion Points; the use of Section Designer members and Non-Prismatic elements; all loading types and shapes in global and local coordinates; the ETABS concept for the Pattern Live Load; modeling of inclined slabs for stairs and ramps, and modeling of shells for all types of domes. Introduction to the ETABS overwrites for the design of Reinforced Concrete members (Seismic or Non-Seismic Design) using ACI318 Provisions. Introduction to temperature loads. Design of all types of Foundations using SAFE.

Pre-requisite: CIVE 304.

CIVE 322 TECHNICAL PLATFORM COMPUTING FOR CIVIL ENGINEERING

3.0: 2 cr.

This course develops computing skills using the technical computing platform Mathematica. Topics include: introduction to Mathematica, symbolics, numerics, graphics, animations, programming, document organization and typesetting. Applications to statics, dynamics, engineering mechanics, fluid mechanics and other engineering related courses. Emphasis on ability to plan solutions to technical problems then execute and prepare organized technical reports including tables, figures and illustrations.

Pre-requisites: MATH 200, 211, CIVE 201, MECH 243 and CSIS 206.

CIVE 323 INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS (GIS) FOR CIVIL AND ENVIRONMENTAL ENGINEERING

3.0: 2cr.

Basic theoretical and practical understanding of GIS concepts and technical issues and its application to the design and analysis of environmental engineering systems. The focus is a fundamental understanding of spatial data acquisition, civil and geo- processing, geo-statistical methods; visualization, and querying of spatial data; network modeling, terrain mapping, and spatial analysis. Students are trained through extensive computer lab sessions. The course will be based on the recently released ESRI ArcGIS 11.

Prerequisite: CIVE 206, CIVE 208.

CIVE 324 STRUCTURAL STEEL DESIGN

3.0: 2cr.

The primary objective of the course is to provide the student with solid background in the fundamentals of structural steel design. Steel will be used for typical civil engineering structures such as trusses, bridges, and framed structures. Structural design establishes the configuration, details and dimensions for standard AISC rolled shapes. The course addresses the design of simple individual structural elements (truss members, beams and columns in braced frames) and the design of simple connections of structural elements (welded and bolted).

Pre-requisite: CIVE 205.

FACULTY OF ENGINEERING
GENERAL REQUIREMENT COURSE DESCRIPTION

GENG 101 INTRODUCTION TO THE ENGINEERING DISCIPLINE **0.3: 1 cr.**

This module consists of introducing the engineering discipline in terms of its essential branches, sub-disciplines with the associated scope and major specialties, job market, and required skills.

GENG 311 ENGINEERING ECONOMY AND MANAGEMENT **3.0: 3 cr.**

Engineers with excellent managerial skills and superior economic acumen are needed as leader of the new century engineering world. This course prepares engineers to fulfill their managerial responsibilities, and acquire useful economic perspectives. This course is organized to contain two major parts: (I) Functions of engineering management, and (II) Economic fundamentals for engineering managers. Part (I) introduces the basic functions on engineering management such as planning, organizing, leading and controlling, while part (II) covers the fundamentals of engineering economics.

Pre-Requisites: MATH 200, MATH 211.

GENG 380 FIELD TRAINING **0.3: 0 cr.**

The internship is a form of experiential learning where knowledge and theory learned in the classroom are integrated with practical application and skills development in a professional setting. An internship experience provides the student with an opportunity to explore career interests while discovering how to apply knowledge and skills learned in the classroom in a work setting. The experience also helps students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks, and to gain valuable applied experience and make connections in professional fields they are considering as a career path. It also gives employers the opportunity to guide and evaluate the students' talents and preparedness.

GENG 390 FUNDAMENTALS OF ENGINEERING PROJECT DESIGN **2.0: 2 cr.**

This module consists of introducing and developing of engineering design skills based on problem-based learning (PBL) student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem. The module covers topics such as examining and defining the problem; exploring the underlying issues; seeking all needed information and tools; evaluating different possible approaches; reaching the optimized solution; and properly reporting the solution or the design. Applications involve hardware as well as software and simulations.

Pre-requisite: LISP 200 and senior standing.

GENG 391 CAPSTONE DESIGN PROJECT **0.3: 2 cr.**

Applied work and design skills in the related engineering field. Applications involve hardware as well as software and simulations.

Pre-requisite: GENG 390.

MECH 221 ENGINEERING DYNAMICS **3.0: 3 cr.**

Kinematics and kinetics of particles: Force, acceleration, work, energy and momentum. Two dimensional kinematics and kinetics of rigid bodies, translational and rotational motions. Vibrations.

MECH 222 SCIENCE OF MATERIALS **3.0: 3 cr.**

Material classification. Atomic structures. Crystal structure solidification. Crystalline imperfections. Phase diagrams. Engineering alloys. Electrical and Mechanical properties of metals. Polymeric ceramic and magnetic materials. Corrosion. Composite materials.

Prerequisite: English Proficiency Level: ENGL 101.

MECH 232 THERMODYNAMICS **3.0: 3 cr.**

Basic concepts and definitions. Properties of pure substance. Heat. Work. First Law of Thermodynamics.

Second Law of Thermodynamics. Entropy. Reversibility and Irreversibility. Power and refrigeration cycles.
Prerequisites: CHEM 102, PHYS 100.

MECH 233 WORKSHOP TECHNOLOGY

0.3: 1 cr.

Drilling, milling, grinding, lath work, welding, molding, heat treatments, forging, electric workshop technologies.

MECH 243 FLUID MECHANICS

3.0: 3 cr.

Fluid properties, fluid statics and manometry, kinematics, basic conservation equations of continuity, momentum and energy. Incompressible flows. Viscous effects in pipes and restrictions, Laminar and Turbulent Flows. Dimensional Analysis and Similitude.

MECH 321 HEAT TRANSFER

3.0: 3 cr.

This course covers fundamental concepts of Conduction, Convection, and Radiation. Students should identify the physical origins of transport processes, perform Heat Transfer Engineering calculations, apply Heat Transfer principles to tackle real-life applications, and perform problems-solving techniques applying appropriate simplifying assumptions.

Prerequisites: MECH 243, MECH 323, PHYS 100.

University of Balamand Dubai
Faculty of Arts and Sciences
Department Of Biology

Mission Statement

The primary mandate of the Department of Biology is to provide excellence in teaching at the undergraduate level. The Department offers a comprehensive program, which exposes students to the full range of biological sciences. Our undergraduate three-year curriculum introduces students to modern studies in general, molecular, cell, and environmental biology. It also emphasizes active, hands-on experience with modern technology. Small class sizes with an emphasis on laboratories and tutorials foster ongoing, productive interactions between students and faculty.

Program Learning Objectives

- 1.Introduce students to modern studies in general, molecular, cell, organ systems and environmental biology
- 2.Emphasize active, hands on experience with modern technology.
- 3.Prepare the students to go on to professional programs in medicine, medical sciences, biotechnology or science education.
- 4.Prepare the students to enter the workforce directly, as research assistants, data analysts and members of marketing teams in the pharmaceutical and health industries.
- 5.Help the students to pursue graduate studies in biological sciences, with the aim of following a career in academia or industry.

Program Learning Outcomes

By the time that undergraduate students graduate from our programs, they will:

1. Have gained sufficient understanding of the different biological facts and concepts
2. Have acquired the most updated findings in the different biological areas
3. Be able to think logically and communicate clearly the acquired biological knowledge and experimental skills
4. Have acquired enough knowledge and skills to join and excel in professional programs as medicine, medical sciences, biotechnology or science education
5. Be outstanding members of the workforce by having adequate skills to retrieve, evaluate and communicate information from the scientific literature, electronic databases, and experimental data
6. Have enough skills to formulate and evaluate scientific models based on observation of biological phenomena and apply quantitative methods to biological problems
7. Be able to use scientific instrumentation and information technology and have written, and oral, and multimedia scientific communication.

After completing the General Education Courses (University requirements and Free Electives)

1. Demonstrate knowledge of humanities, social sciences, library science and leadership skills
2. Communicate more effectively in oral and written English
3. Develop quantitative and research skills
4. Think more critically and creatively
5. Apply ethics in their behavior and decision making
6. Work collaboratively, learn independently and practice lifelong learning
7. Exercise leadership and have a sense of responsibility as UAE citizens
8. Have pride in Arabic culture and Islamic values
9. Recognize and appreciate the diversity of the human experience.

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>Department Requirement</u> (67 credits) | BIOL 101 | 3 |
| | BIOL 102 | 1 |
| | BIOL 103 | 3 |
| | BIOL 104 | 1 |
| | BIOL 207 | 3 |
| | BIOL 213 | 3 |
| | BIOL 214 | 1 |
| | BIOL 283 | 3 |
| | BIOL 284 | 1 |
| | BIOL 345 | 3 |
| | BIOL 346 | 1 |
| | BIOL 351 | 3 |
| | BIOL 361 | 3 |
| | BIOL 362 | 1 |
| | BIOL 385 | 3 |
| | CHEM 101 | 3 |
| | CHEM 103 | 3 |
| | CHEM 104 | 1 |
| | CHEM 205 | 3 |
| | CHEM 211 | 3 |
| | CHEM 212 | 1 |
| | CHEM 213 | 3 |
| | CSIS 101 | 3 |
| | MATH 101 | 3 |
| | MATH 243 | 3 |
| | PHYS 111 | 3 |
| PHYS 112 | 1 | |
| PHYS 113 | 3 | |
| PHYS 114 | 1 | |

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>University Requirement</u> (22 credits) | ENGL 101 | 3 |
| | ENGL 102 | 3 |
| | ENGL 203 | 3 |
| | ENGL 204 | 3 |
| | ENTR 201 | 3 |
| | ISLM 101 | 3 |
| | LISP 200 | 1 |
| | SOCL 201 | 3 |

5 Department Elective Courses (15 credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | BIOL 307 | 3 |
| | BIOL 397 | 3 |
| | BIOL 325 | 3 |
| | BIOL 327 | 3 |
| | BIOL 329 | 3 |
| | BIOL 331 | 3 |
| | BIOL 333 | 3 |
| | BIOL 363 | 3 |
| | BIOL 387 | 3 |
| | BIOL 391 | 3 |

2 Lab Electives (2 credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | BIOL 208 | 1 |
| | BIOL 326 | 1 |
| | BIOL 386 | 1 |

6 Free Elective Courses (18 credits) or any other courses offered in the University

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | CSPR 205 | 3 |
| | CSPR 206 | 3 |
| | EDUC 213 | 3 |
| | EDUC 217 | 3 |
| | EDUC 275 | 3 |
| | MCOM 201 | 3 |
| | MCOM 220 | 3 |
| | MCOM 225 | 3 |
| | PSYC 200 | 3 |
| | PSYC 229 | 3 |
| | PSYC 254 | 3 |

Four Years Curriculum (Total: 124 credits)

Year One

First Semester

| Course Code | Course Title | Credit |
|-------------|--------------------------------|-----------|
| BIOL 101 | General Biology I | 3 |
| BIOL 102 | General Biology I Lab | 1 |
| CHEM 101 | Introduction to Chemistry | 3 |
| ENGL 101 | English Communication Skills I | 3 |
| MATH 101 | Calculus I | 3 |
| ISLM 101 | Islamic Studies | 3 |
| | | ----- |
| | | 16 |

Second Semester

| Course Code | Course Title | Credit |
|-------------|----------------------------------|-----------|
| BIOL 103 | General Biology II | 3 |
| BIOL 104 | General Biology II Lab | 1 |
| CHEM 103 | General Chemistry | 3 |
| CHEM 104 | General Chemistry Lab | 1 |
| ENGL 102 | English Communication Skills II | 3 |
| PHYS 111 | Fundamentals of Physics I | 3 |
| PHYS 112 | Fundamentals of Physics I Lab | 1 |
| LISP 200 | Library Use and Research Methods | 1 |
| | | ----- |
| | | 16 |

Year Two

Third Semester

| Course Code | Course Title | Credit |
|-------------|--|-----------|
| BIOL 213 | Cell Biology | 3 |
| BIOL 214 | Cell Biology Lab | 1 |
| CHEM 211 | Organic Chemistry | 3 |
| CHEM 212 | Organic Chemistry Lab | 1 |
| ENGL 203 | English Communication Skills III | 3 |
| PHYS 113 | Fundamentals of Physics II | 3 |
| PHYS 114 | Fundamentals of Physics II Lab | 1 |
| CSIS 101 | Personal Computers for Applied Science | 3 |
| | | ----- |
| | | 18 |

Fourth Semester

| Course Code | Course Title | Credit |
|-------------|---------------------------------|-----------|
| BIOL 283 | Genetics | 3 |
| BIOL 284 | Genetics Lab | 1 |
| BIOL 207 | General Ecology | 3 |
| ENGL 204 | Language, Society and Culture | 3 |
| MATH 243 | Statistics for Applied Sciences | 3 |
| CHEM 213 | Organic Chemistry II | 3 |
| | | ----- |
| | | 16 |

Year Three**Fifth Semester Course Code**

| Course Code | Course Title | Credit |
|--------------------|----------------------------|---------------|
| BIOL 385 | Molecular Biology | 3 |
| BIOL 351 | Principles of Biochemistry | 3 |
| SOCL 201 | UAE Studies | 3 |
| | Free Elective 1 | 3 |
| | Major Elective 1 | 3 |
| | Lab Elective 1 | 1 |
| | | ----- |
| | | 16 |

Sixth Semester

| Course Code | Course Title | Credit |
|--------------------|------------------------|---------------|
| BIOL 361 | Microbiology | 3 |
| BIOL 362 | Microbiology Lab | 1 |
| BIOL 345 | Plant Physiology | 3 |
| BIOL 346 | Plant Physiology Lab | 1 |
| CHEM 205 | Analytical Chemistry I | 3 |
| | Free Elective 2 | 3 |
| | | ----- |
| | | 14 |

Year Four**Seventh Semester**

| Course Code | Course Title | Credit |
|--------------------|---------------------------------|---------------|
| ENTR 201 | Innovation and Entrepreneurship | 3 |
| | Major Elective 2 | 3 |
| | Major Elective 3 | 3 |
| | Free Elective 3 | 3 |
| | Free Elective 4 | 3 |
| | | ----- |
| | | 15 |

Eighth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| | Major Elective 4 | 3 |
| | Major Elective 5 | 3 |
| | Lab Elective 2 | 1 |
| | Free Elective 5 | 3 |
| | Free Elective 6 | 3 |
| | | ----- |
| | | 13 |

COURSE DESCRIPTION

BIOL 100 INTRODUCTION TO BIOLOGY I

3.0: 3 cr.

This course is an introduction to the basic concepts of life sciences covering basic chemistry, metabolism, genetics, evolution and human systems.

Prerequisite: None.

BIOL 101 GENERAL BIOLOGY I

3.0: 3 cr.

This course covers the basic aspects of cell structure, heredity, diversity, classification, evolution and energy transfer through living organisms. This course covers a wide array of biological phenomena and each phenomenon will be thoroughly discussed.

Prerequisite: None.

BIOL 102 GENERAL BIOLOGY I LABORATORY

0.3: 1 cr.

General Biology I Laboratory is the first direct encounter of students with the concrete world of biology. Experiments will cover the subjects and theories introduced in course work. The student will then acquire a working knowledge of biology, and will be familiar with much of the overall aspects of our surrounding environment. In a laboratory framework, many details of the biological world will be explored and thus will become clearer and better understood.

Co-requisite: BIOL 101.

BIOL 103 GENERAL BIOLOGY II

3.0: 3 cr.

General Biology II is designed to complement the information learned in General Biology I. BIOL 203 is intended to biology majors, pre-health professionals, or those needing an in-depth biology sequence. The course is designed to give a general overview of structure and life processes in animals. Presented with an evolutionary perspective, representative organisms of the various classes are examined with a comparative and dissecting eye, through which the animal body is discovered. The course strongly emphasizes comparative animal physiology, showing the structural, functional, and behavioral adaptations that help animals meet environmental challenges. A comparative approach is used to examine how various animal groups have solved similar and diverse problems.

Pre-requisite: BIOL 101.

BIOL 104 GENERAL BIOLOGY II LABORATORY

0.3: 1 cr.

General Biology II Laboratory is an active learning about different types of tissue and organs in the animal kingdoms. Experiments will cover the subjects and theories introduced in course work. Details of the biological world, particularly those aspects which cannot be seen with the unaided eye, remain to be understood, and explored. The way of knowledge acquisition suggested in each session enables students not only to be active recipients to information but this will also develop their scientific skills in biology through the performance of observing, inquiring, and reporting about living things.

Co-requisite: BIOL 103.

BIOL 207 GENERAL ECOLOGY

3.0: 3 cr.

This course covers the essential principles of ecology from the physical environment to evolution and adaptation, energy flow, population and communities' interactions. Under each section, human activities affecting natural processes will be examined in case studies and/or examples.

Pre-requisite: BIOL 103.

BIOL 208 GENERAL ECOLOGY LABORATORY

0.3: 1 cr.

Field and laboratory exercises illustrating concepts of general ecology.

Co-requisite: BIOL 207.

BIOL 213 CELL BIOLOGY**3.0: 3 cr.**

BIOL 213 is an introductory course in cell biology. Its objective is to describe the behavior of the cells in their microenvironment, focusing on cell-cell and cell-extracellular matrix interaction. Students will also be exposed to different tools and methods used in cell biology to investigate the basic functions of the cell and intracellular sorting within its compartments.

Pre-requisite: BIOL 101 and BIOL 103.

BIOL 214 CELL BIOLOGY LABORATORY**0.3: 1 cr.**

This laboratory course exposes students to an overview of cell-related techniques. It emphasizes biological principles through investigative exercises. Practicums will be mainly related to subjects and theories introduced in the Cell Biology (BIOL213) course work. Another objective is to allow students to search and read scientific papers

Co-requisite: BIOL 213.

BIOL 283 GENETICS**3.0: 3 cr.**

With this course, an undergraduate student will be exposed to a clear, comprehensive, and balanced introduction to genetics and genomics. The material deals with transmission genetics and molecular genetics, as fully integrated subjects, and provides an understanding of the basic processes of gene transmission, mutation, expression, and regulation.

Pre-requisite: BIOL 103.

BIOL 284 GENETICS LABORATORY**0.3: 1 cr.**

Applications of genetic principles are reviewed through demonstrations, problem solving, and research. Experimental techniques employed in the study of genetics utilizing plants, animals, and microorganisms.

Co-requisite: BIOL 283.

BIOL 307 EVOLUTION**3.0: 3 cr.**

This course examines concepts and theories that underline our understanding of evolution, ecology, diversity, and the adaptation of living things to their natural environment. Topics include the origins of diversity, evolutionary change, phylogeny and classification, diversity in form and function, evolution by natural selection, modes of speciation, and long-term trends in evolution and adaptations.

Pre-requisite: BIOL 207

BIOL 325 ANIMAL PHYSIOLOGY**3.0: 3 cr.**

The course is a well-organized and engaging treatment of the fundamental principles of animal physiology. Throughout the course, the aim is to integrate concepts from all levels of biological organization to explore the nature of diversity in cells, physiological systems, and whole animals.

Pre-requisite: BIOL 103.

BIOL 326 ANIMAL PHYSIOLOGY LABORATORY**0.3: 1 cr.**

This laboratory course is intended to supplement the material presented in the animal physiology course, as well as to provide hands on experience with current techniques used in physiological studies. In general, each week we will complete a set of experiments examining a particular aspect of animal physiology. We use a variety of animal models (frog and rats) to conduct these experiments. Be aware that animals will be sacrificed on several occasions during the semester.

Pre-requisite: BIOL 103.

Co-requisite: BIOL 325.

BIOL 327 NEUROPHYSIOLOGY**3.0: 3 cr.**

BIOL 327 is designed to introduce undergraduate biology students to the field of neurophysiology. Topics elaborated within this course cover basic neuronal cell physiology, signaling cascades and pathways, cellular neurobiology, neurodegenerative diseases, behavioral neuroscience and behavioral disorders. The nervous

system (peripheral and central, PNS & CNS), sensory modalities and central processing of sensory information and pathways including special senses are covered. In addition, higher brain functions, such as learning and memory and language and communication will be addressed.

Pre-requisite: BIOL 103.

BIOL 329 IMMUNOBIOLOGY

3.0: 3 cr.

The purpose of the Immunobiology course is to provide a basic knowledge of the immune response and its involvement in health and disease, albeit briefly. Introductory concepts of immunity, structure and function of the immune system, antigens and antibodies, complement, genetic basis of the immune response, humoral and cellular immunity, immunological tolerance, organ and tissue transplantation, allergy and autoimmunity

Pre-requisite: BIOL 213.

BIOL 331 DEVELOPMENTAL BIOLOGY

3.0: 3 cr.

The course is a study of the fundamental principles and mechanisms that govern development in animals, with an emphasis on the cellular and molecular aspects.

Pre-requisite: BIOL 103.

BIOL 333 ENDOCRINOLOGY

3.0: 3 cr.

This course deals with hormones, their structure, synthesis, secretion, role, and regulation. It deals also with related diseases and disorders.

Co-requisite: BIOL 213.

BIOL 345 PLANT PHYSIOLOGY

3.0: 3 cr.

This is an upper level undergraduate course focusing on the physiology and biochemistry of plant growth and development under normal and extreme environments. Topics covered include plant water relations, mineral nutrition, hormones and growth regulators; sensing the environment; responding to cold, heat, drought, flooding, pathogens and pests. Crop productivity and its manipulation by recombinant DNA technology; and environmentally friendly uses of plants for combating disease and pollution will also be discussed. This course consists of three hours of lecture per week.

Pre-requisite: BIOL 101.

BIOL 346 PLANT PHYSIOLOGY LABORATORY

0.3: 1 cr.

The lab includes experimental applications to the course material covering plant water relations, plant nutrition, plant secondary metabolites and hormones.

Pre-requisite: BIOL 101.

Co-requisite: BIOL 345.

BIOL 351 PRINCIPLES OF BIOCHEMISTRY

3.0: 3 cr.

This undergraduate course provides students with a working knowledge of the macromolecules and fundamental metabolic pathways of eukaryotes, with emphasis on human systems. Principles of Biochemistry is devoted to mastering 1) the structure and function of amino acids and proteins, 2) carbohydrate and lipid structure and metabolism, as a means of understanding biological processes in general, 3) structure and biochemical characteristic of nucleotides. Overarching thermodynamic principles that drive life processes and the regulatory mechanisms that fine-tune them are stressed in order to provide the rationale and framework for students to master the necessary molecular structure and pathways. Relevance to human physiology and medicine is used to stimulate students to begin the integration of biochemistry with other disciplines.

Pre-Requisites: BIOL 103.

Co-requisites: CHEM 213.

BIOL 361 MICROBIOLOGY**3.0: 3 cr.**

Microbiology course explores the biology of microorganisms. Major fields to be covered include microbial cell structure and function, physiology, metabolism, genetics, diversity, and ecology. Applied aspects of microbiology will also be covered, such as biotechnology, the role of microorganisms in environmental processes, and medical microbiology.

Pre-requisite: BIOL 103.

BIOL 362 MICROBIOLOGY LABORATORY**0.3: 1 cr.**

Microbiology laboratory is set up to familiarize the student with the techniques necessary to grow and identify microorganisms. It covers basic techniques of media preparation, staining and microscopy, and also recognition and differentiation of microbial characteristics in culture. A series of laboratory exercises designed to provide a practical understanding of the microbial identification based on metabolic differences and molecular biology tools will also be performed. Moreover, this laboratory covers also some experiments of applied microbiology.

Co-requisite: BIOL 361.

BIOL 363 NUTRITION**3.0: 3 cr.**

This course introduces students to the language and principles of nutrition. It presents scientifically based, accurate, up-to-date information in an accessible format. In addition, "Nutrition" provides an integrated overview of the physiological requirements of energy, and functions of the major nutrients that are determinants of health and disease. The topics include also dietary sources, intake levels, assessment of nutrient status in individuals and populations; the development of dietary guidelines and of nutrition policies in different countries; and the role of diet on the development of chronic diseases, such as cardiovascular disease, cancer, diabetes, etc.

Pre-requisite: BIOL 351.

BIOL 385 MOLECULAR BIOLOGY**3.0: 3 cr.**

With this course, the student will acquire knowledge in the field of modern molecular biology as it covers the molecular mechanisms of gene expression and regulation, the fundamental aspects of recombinant DNA technology, the protein structure and function, the signaling pathways that control gene activity, the regulation of the eukaryotic cell cycle, the Cell birth lineage and death, and Cancer.

Pre-requisite: BIOL 283.

BIOL 386 MOLECULAR BIOLOGY LABORATORY**0.3: 1 cr.**

Required laboratory includes an introduction to protein purification techniques, gene cloning, and recombinant DNA technology

Co-requisite: BIOL 285.

BIOL 387 BIOTECHNOLOGY & RECOMBINANT DNA**3.0: 3 cr.**

There is no field of experimental biology that has not been deeply affected by the ability to isolate, analyze and manipulate genes. Application of recombinant DNA technology brought about a whole new era of scientific discovery and a true revolution in our understanding of life and its evolution. This course intends to present a concise introduction to the methods, underlying concepts and far-reaching applications of recombinant DNA technology.

Pre-requisite: BIOL 283.

BIOL391 SPECIAL TOPICS IN BIOLOGY**3.0: 3 cr.**

The course discusses various topics of Biology with special contemporary importance. Subjects may include advances in technical and theoretical knowledge as well as discussions of specific topics like cancer, cloning, theoretical biology, etc.

Pre-requisite: BIOL 103.

BIOL 397 UNDERGRADUATE RESEARCH IN BIOLOGY**3.0: 3 cr.**

The purpose of the introduction to scientific research course is to provide an introduction of scientific research performance via lectures, readings, projects design, data analysis and scientific communication. Graduate students will present their research work and allow undergraduate students to join them in the laboratory for a period of six weeks in order to get practical research experience. Students have to present their work as oral or poster presentation at the end of the semester and will be assessed by faculty members.

Pre-requisite: BIOL 103 + 18 BIOL Credits.

University of Balamand Dubai
Faculty of Arts and Sciences
Department of Chemistry

Mission Statement

The Department of Chemistry aims to provide its students, within the BS program, with the opportunity to learn about traditional fields of chemistry: Analytical, Organic, Inorganic and Physical. As well, the Department will provide the necessary support to the other programs within the University through providing the needed service, theoretical and laboratory, courses.

The Department of Chemistry will strive to furnish its students with the basic concepts of Chemistry, qualify them to engage in the corresponding emerging fields; Biochemistry, Environmental Chemistry, Industrial Chemistry, Pharmaceutical Chemistry, etc., help them develop communication skills, and acquire the critical and analytical thinking; thus to prepare them to be competitive in the fields of education, industry, and research (science, environment, health). In short, the Department of Chemistry aims to present its students as scientifically literate citizens.

Program Learning Objectives

The BS program in Chemistry aims at furnishing students with the following knowledge and skills:

1. Understand the fundamentals in the various fields in chemistry
2. Acquire skills in problem solving and critical thinking
3. Acquire safety, operational and analysis skills required in chemistry laboratories
4. Communicate effectively in the chemistry field and develop interpersonal skills
5. Be able to join a graduate program in a field of study related to chemistry
6. Be able to fit in any related employment opportunity: such as research, industry, teaching and even administration

Program Learning Outcomes

Upon the successful completion of the BS curriculum in Chemistry, graduates must be able to demonstrate:

1. Execute fundamental laboratory experiments, resulting in a scientific report
2. Communicate and defend effectively scientific information and data
3. Effectively use knowledge in the various fields of Chemistry
4. Apply theoretical and experimental of chemical concepts and instrumentation
5. Use critical thinking in solving chemistry problems/exercises
6. Acquire basic knowledge in Mathematics and Physics to apply chemistry concepts
7. Gain the required skills for future professional endeavors

After completing the General Education Courses (University requirements and Free Electives) students should be able to:

1. Demonstrate knowledge of humanities, social sciences, library science and leadership skills
2. Communicate more effectively in oral and written English
3. Develop quantitative and research skills
4. Think more critically and creatively
5. Apply ethics in their behavior and decision making
6. Work collaboratively, learn independently and practice lifelong learning
7. Exercise leadership and have a sense of responsibility as UAE citizens
8. Have pride in Arabic culture and Islamic values
9. Recognize and appreciate the diversity of the human experience.

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>Department Requirement</u> (67 credits) | CHEM 101 | 3 |
| | CHEM 103 | 3 |
| | CHEM 104 | 1 |
| | CHEM 201 | 3 |
| | CHEM 205 | 3 |
| | CHEM 206 | 1 |
| | CHEM 211 | 3 |
| | CHEM 212 | 1 |
| | CHEM 213 | 3 |
| | CHEM 214 | 1 |
| | CHEM 221 | 3 |
| | CHEM 301 | 3 |
| | CHEM 303 | 3 |
| | CHEM 305 | 3 |
| | CHEM 311 | 3 |
| | CHEM 321 | 3 |
| | CHEM 322 | 1 |
| | CHEM 323 | 3 |
| | CHEM 399 | 3 |
| | CSIS 101 | 3 |
| | MATH 101 | 3 |
| | MATH 103 | 3 |
| | MATH 211 | 3 |
| | PHYS 111 | 3 |
| | PHYS 112 | 1 |
| | PHYS 113 | 3 |
| | PHYS 114 | 1 |

11 Free Elective courses or any other Subject offered at University (33 Credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | CSPR 205 | 3 |
| | CSPR 206 | 3 |
| | EDUC 213 | 3 |
| | EDUC 217 | 3 |
| | EDUC 275 | 3 |
| | MCOM 201 | 3 |
| | MCOM 220 | 3 |
| | MCOM 225 | 3 |
| | PSYC 200 | 3 |
| | PSYC 229 | 3 |
| | PSYC 254 | 3 |

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>University Requirement</u> (22 credits) | ENGL 101 | 3 |
| | ENGL 102 | 3 |
| | ENGL 203 | 3 |
| | ENGL 204 | 3 |
| | ENTR 201 | 3 |
| | ISLM 101 | 3 |
| | LISP 200 | 1 |
| | SOCL 201 | 3 |

Four Years Curriculum (Total: 122 Credits)

Year One

First Semester

| Course Code | Course Title | Credit |
|-------------|--------------------------------|-----------|
| CHEM 101 | Introduction to Chemistry | 3 |
| ENGL 101 | English Communication Skills I | 3 |
| MATH 101 | Calculus I | 3 |
| PHYS 111 | Fundamentals of Physics I | 3 |
| PHYS 112 | Fundamentals of Physics I Lab | 1 |
| | Elective 1 | 3 |
| | | ----- |
| | | 16 |

Second Semester

| Course Code | Course Title | Credit |
|-------------|---------------------------------|-----------|
| CHEM 103 | General chemistry | 3 |
| CHEM 104 | General Chemistry Lab | 1 |
| ENGL 102 | English Communication Skills II | 3 |
| MATH 103 | Calculus II | 3 |
| PHYS 113 | Fundamentals of Physics II | 3 |
| PHYS 114 | Fundamentals of Physics II Lab | 1 |
| | | ----- |
| | | 14 |

Year Two

Third Semester

| Course Code | Course Title | Credit |
|-------------|----------------------------------|-----------|
| CHEM 201 | Advanced General Chemistry | 3 |
| CHEM 211 | Organic Chemistry I | 3 |
| CHEM 212 | Organic Chemistry I Lab | 1 |
| ENGL 203 | English Communication Skills III | 3 |
| MATH 211 | Linear Algebra | 3 |
| CSIS 101 | Computer Literacy | 3 |
| | | ----- |
| | | 16 |

Fourth Semester

| Course Code | Course Title | Credit |
|-------------|----------------------------------|-----------|
| CHEM 205 | Analytical Chemistry | 3 |
| CHEM 206 | Analytical Chemistry Lab | 1 |
| CHEM 213 | Organic Chemistry II | 3 |
| CHEM 214 | Organic Chemistry II Lab | 1 |
| ENGL 204 | Language, Society and Culture | 3 |
| LISP 200 | Library Use and Research methods | 1 |
| | Elective2 | 3 |
| | | ----- |
| | | 15 |

Year Three**Fifth Semester**

| Course Code | Course Title | Credit |
|--------------------|--|---------------|
| CHEM 221 | Statistical Mechanics and Thermodynamics | 3 |
| CHEM 301 | Inorganic Chemistry I | 3 |
| CHEM 311 | Applied Molecular Spectroscopy | 3 |
| ISLM 101 | Islamic Studies | 3 |
| | Elective3 | 3 |
| | | ----- |
| | | 15 |

Sixth Semester

| Course Code | Course Title | Credit |
|--------------------|------------------------------|---------------|
| CHEM 321 | Physical & Chemical Kinetics | 3 |
| CHEM 322 | Physical Chemistry Lab | 1 |
| CHEM 303 | Inorganic Chemistry II | 3 |
| SOCL 201 | UAE Studies | 3 |
| | Elective4 | 3 |
| | Elective5 | 3 |
| | | ----- |
| | | 16 |

Year Four**Seventh Semester**

| Course Code | Course Title | Credit |
|--------------------|--|---------------|
| CHEM 305 | Instrumental Analysis | 3 |
| CHEM 323 | Quantum theory and structure of matter | 3 |
| ENTR 201 | Innovation and Entrepreneurship | 3 |
| | Elective6 | 3 |
| | Elective7 | 3 |
| | | ----- |
| | | 15 |

Eighth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------------|---------------|
| CHEM 399 | B.S. Project in Chemistry | 3 |
| | Elective8 | 3 |
| | Elective9 | 3 |
| | Elective10 | 3 |
| | Elective11 | 3 |
| | | ----- |
| | | 15 |

COURSE DESCRIPTION

CHEM 101 INTRODUCTION TO CHEMISTRY

3.0: 3 cr.

The course covers the fundamental basics in chemistry starting with the atomic theory of matter, stoichiometry and types of chemical reactions including precipitation, acid/base, and redox reactions. The course moves on to discuss quantum mechanics in preparation to move on to the last part dealing with bonding and its general concepts

Pre-requisite: None.

CHEM 103 GENERAL CHEMISTRY

3.0: 3 cr.

The course covers chemical equilibrium and its applications, acids and bases, as well as applications of aqueous equilibria. The course further discusses covalent bonding and the molecular orbital's model as well as a brief introduction to spectroscopy. Finally, introduction to organic chemistry will be given through the discussion of alkanes, alkenes, alkynes, aromatic hydrocarbons, hydrocarbon derivatives and organic polymers

Pre-requisite CHEM 101.

CHEM 104 GENERAL CHEMISTRY LABORATORY

0.3: 1 cr.

The aim of this laboratory course is to introduce the students to the basic techniques and equipment of common use in a chemistry lab, as well as titration experiments. Special focus on safety is also considered. This course consists of three hours of experiments per week

Co-requisite: CHEM 103.

CHEM 201 ADVANCED GENERAL CHEMISTRY

3.0: 3 cr.

This course discusses the three main states of matter: gases, liquids and solids. It develops further into the properties of solution compared to pure liquids. The course then introduces the two main concepts of physical chemistry: thermodynamics and quantum mechanics. It builds on the second concept to discuss atomic and molecular structure. The last part of the course will be an introduction to inorganic molecules, from main group elements to transition metal chemistry, ending with coordination chemistry. This course consists of three hours of lecture per week.

Pre-requisite CHEM 103.

CHEM 202 BASIC CHEMISTRY

3.0: 3 cr.

This course is designed to cover the basic concepts in Chemistry. Students will especially learn about the atomic theory, phases of a substance (gases and liquids), chemical equilibrium, and reactions in solution (precipitation, redox and acid-base reactions), molecular geometry and some thermo chemical issues.

Pre-requisite: CHEM 102.

CHEM 205 ANALYTICAL CHEMISTRY

3.0: 3 cr.

This course covers the following topics: Activities and Activity Coefficients, Equilibrium Calculations in Complex Systems, Precipitation Titration, Neutralization Titration for Complex Acid-Base systems, Complex-Formation titration, Electrochemistry, Reaction Kinetics

Pre-requisite CHEM 103.

CHEM 206 ANALYTICAL CHEMISTRY LAB

0.3: 1 cr.

This course aims to familiarize students with the laboratory environment, as well as, to introduce them to the proper and safe way of running an experiment in analytical chemistry.

By the end of this course, students should have gained knowledge of:

*General safety guidelines

*Principles and applications of electrochemistry

Pre-requisite: CHEM 104 & CHEM 201.

Co-requisite: CHEM 205.

CHEM 211 ORGANIC CHEMISTRY I / CHEM 242 **3.0: 3 cr.**

The course covers the following topics : Methane. Alkanes. Stereochemistry. Substitution reactions. Eliminations reactions. Competition between substitution / Elimination. Alkenes. Dienes. Alkynes. Alcohols. Ethers/ Epoxides. Cyclic aliphatic compounds. .

Pre-requisite: CHEM 103.

CHEM 212 ORGANIC CHEMISTRY I LAB / CHEM 245 **0.3: 1 cr.**

This lab course is intended to introduce students to basic techniques in organic chemistry, synthesis and extraction, chromatography and identification of functional groups.

Pre-requisite: CHEM 104.

Co-requisite: CHEM 211.

CHEM 213 ORGANIC CHEMISTRY II / CHEM 244 **3.0: 3 cr.**

This course covers the following topics: aromatic compounds, aldehydes and ketones, carboxylic acids, acid chlorides, esters, anhydrides, amides, amines and spectroscopic techniques

Pre-requisite: CHEM 211.

CHEM 214 ORGANIC CHEMISTRY II LAB **0.3: 1 cr.**

This lab course is intended to familiarize students with synthesis of organic compounds and their characterization. This course consists of three hours of experiments per week

Pre-requisite: CHEM 201 & CHEM 212.

Co-requisite: CHEM 213.

CHEM 221 STATISTICAL MECHANICS AND THERMODYNAMICS **3.0: 3 cr.**

This subject deals primarily with equilibrium properties of macroscopic systems, basic thermodynamics, chemical equilibrium of reactions in gas and solution phase, and rates of chemical reactions

Pre-requisite: CHEM 201 and MATH 103.

CHEM 301 INORGANIC CHEMISTRY I **3.0: 3 cr.**

This course presents the first concepts in Inorganic Chemistry. It starts from the atomic structure of elements and elaborates towards bonding and structures within inorganic molecules. The structure aspect is then discussed for simple ionic solids, with an introduction to solid-state phases. This is followed by the study of acids and bases as well as redox reactions from an inorganic perspective, and the discussion of molecular symmetry of different inorganic molecules. Finally, a general overview of the chemical properties of Main Group elements

Pre-requisite CHEM 201.

CHEM 303 INORGANIC CHEMISTRY II **3.0: 3 cr.**

This course builds up on the concepts discussed in CHEM 301 to focus on the study of coordination chemistry, a central part of Inorganic Chemistry. It introduces coordination compounds, their naming and structural features. It then elaborates towards d-metal complexes and their electronic structures and reactivity in particular, and finishes with an overview about organometallic chemistry. The physical techniques in studying and characterizing inorganic compounds are also discussed within the course

Pre-requisite: CHEM 301.

CHEM 305 INSTRUMENTAL ANALYSIS **3.0: 3 cr.**

This course is a follow up to the Analytical Chemistry course and covers the main analytical instrumentation. After an introduction to the methods in the course, the students will have an overview on the following subjects: Atomic Spectrometry, Molecular Spectroscopy, Chromatographic Methods and Thermal Analysis.

Pre-requisite: CHEM 205.

CHEM 311 APPLIED MOLECULAR SPECTROSCOPY**3.0: 3 cr.**

This course covers the following topics: Nuclear Magnetic Resonance spectroscopy, Infrared, Ultraviolet, Visible, and Mass Spectrometry

Pre-requisite: CHEM 213.

CHEM 321 PHYSICAL AND CHEMICAL KINETICS / CHEM 262**3.0: 3 cr.**

This course deals with the theoretical aspects of chemical reaction kinetics, including rate laws, rate constants, classification of kinetic processes: order of reaction, quasistationarity principle, analysis of kinetic data (integration, differential, isolation, and relaxation methods), formal description of complex reactions: sequential reactions, parallel reactions, reversible reaction, enzyme kinetics, simplification of the description of complex reactions: chemical and mathematical methods, temperature and pressure dependence of the reaction rate. In addition, migration properties of gases (diffusion, heat transfer, viscosity, etc.) are considered with an eye on the relation to collision theory and its implication in theoretical chemical kinetics.

Moreover, the course deals with the experimental aspects of chemical reaction kinetics including stopped flow, fast and ultra-fast processes, temperature-jump relaxation methods, molecular beam, shock tube and flash photolysis techniques. Reactions in the gas phase, liquid phase, and on surfaces are discussed with examples drawn from atmospheric, combustion, industrial, catalytic, and biological chemistry.

Pre-requisite: CHEM 201 and MATH 103.

CHEM 322 PHYSICAL CHEMISTRY LAB**0.3: 1 cr.**

The course exposes students to experiments dealing with thermodynamics (gases, liquids, chemical reactions) to measure heat capacities, variation of internal energies, enthalpy, heat and rate of reactions

Pre-requisite: CHEM 221.

Co-requisite: CHEM 321.

CHEM 323 QUANTUM THEORY AND STRUCTURE OF MATTER**3.0: 3 cr.**

This course deals with the theoretical aspects of quantum chemistry, including black body radiation, the photoelectric effect, Compton's effect, and other phenomena that show how classical mechanics fail to explain experimental observations. The spectrum of the hydrogen atom is explained using Bohr Theory before the consideration of hydrogenic atoms and electronic orbitals. A particle in different spaces is then considered and probability equations are developed to describe the behavior of the particle in a one, two and three dimensional potential wells. The tunneling effect is also considered followed by the introduction of the Schrödinger equation that is then applied to hydrogen, hydrogenic atoms and finally polyelectronic atoms. Spectral terms are then introduced and the effect of a magnetic field on the spectra of different atom is detailed (Zeeman effect). Finally, the valence bond theory and molecular orbital theory are presented and insights in the orbitals present in polyatomic systems are investigated.

Pre-requisite: CHEM 201 and MATH 211.

CHEM 399 BS PROJECT**3.0: 3 cr.**

In this course, each student will choose a research topic following a literature survey. The project may be carried out in the lab as a research project, or a written review paper on a specific field in chemistry. The student will then introduce the work during a seminar towards the middle of the semester, and finally present his findings and defend his outcome in the presence of a jury towards the end of the semester. Additionally, the student will present a final report describing his project, procedure, results and discussion

Pre-requisite: Approval of Department.

University of Balamand Dubai
Faculty of Arts and Sciences
Department of Mathematics

Mission Statement

The mission of the Department of Mathematics is to provide a strong mathematical background to students who are interested in teaching Mathematics, pursuing jobs in industry or pursuing a higher degree in Mathematics or other disciplines.

We fulfill this mission by developing the student's ability to pursue knowledge independently by acquiring skills in problem solving, critical thinking, and logical analysis. We also enable students to understand the power of Mathematics and its role in human culture.

Program Learning Objectives

The Department of Mathematics offers a program leading to a Bachelor of Science (BS) in Mathematics. The program aims at:

1. Providing students with a robust and extensive background in Mathematics.
2. Preparing students for graduate and further higher level studies.
3. Prepare students for careers in Mathematics or Mathematics education and careers in industry where there is a demand for a rigorous understanding of Mathematics or Statistics majors.
4. Emphasizing the close association of Mathematics with the real world and its role in the fields of social sciences, physical and life sciences, engineering, and business.

Program Learning Outcomes

Students graduating with a BS in Mathematics will be able to:

1. General understanding of the field of mathematics.
2. Recognize what constitutes mathematical thinking.
3. Produce and judge the validity of rigorous mathematical arguments.
4. Communicate mathematical ideas, written and verbally, in a clear and organized way.
5. Relate mathematics to real world problems.
6. Use appropriate technology for the analysis and solution of mathematical problems.
7. Research and present a topic.

After completing the General Education Courses (University requirements and Free Electives), students should be able to:

1. Demonstrate knowledge of humanities, social sciences, library science and leadership skills
2. Communicate more effectively in oral and written English.
3. Develop quantitative and research skills.
4. Think more critically and creatively.
5. Apply ethics in their behavior and decision making.
6. Work collaboratively, learn independently and practice lifelong learning.
7. Exercise leadership and have a sense of responsibility as UAE citizens.
8. Have pride in Arabic culture and Islamic values.
9. Recognize and appreciate the diversity of the human experience.

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>Department Requirement</u> (60 credits) | CHEM 101 | 3 |
| | CHEM 103 | 3 |
| | CHEM 104 | 1 |
| | CSIS 206 | 3 |
| | MATH 101 | 3 |
| | MATH 103 | 3 |
| | MATH 201 | 3 |
| | MATH 211 | 3 |
| | MATH 213 | 3 |
| | MATH 230 (331) | 3 |
| | MATH 240 (241) | 3 |
| | MATH 271 | 3 |
| | MATH 311 | 3 |
| | MATH 321 | 3 |
| | MATH 325 | 3 |
| | MATH 343 | 3 |
| | MATH 371 | 3 |
| | PHYS 111 | 3 |
| | PHYS 112 | 1 |
| | PHYS 113 | 3 |
| PHYS 114 | 1 | |

9 Free Elective courses or any other Subject offered at University (27 Credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | CSPR 205 | 3 |
| | CSPR 206 | 3 |
| | EDUC 213 | 3 |
| | EDUC 217 | 3 |
| | EDUC 275 | 3 |
| | MCOM 201 | 3 |
| | MCOM 220 | 3 |
| | MCOM 225 | 3 |
| | PSYC 200 | 3 |
| | PSYC 229 | 3 |
| | PSYC 254 | 3 |

4 Major Elective (12 Credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | MATH 215 | 3 |
| | MATH 261 | 3 |
| | MATH 263 | 3 |
| | MATH 333 | 3 |
| | MATH 345 | 3 |
| | MATH 351 | 3 |
| | MATH 399 | 3 |

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>University Requirement</u> (22 credits) | ENGL 101 | 3 |
| | ENGL 102 | 3 |
| | ENGL 203 | 3 |
| | ENGL 204 | 3 |
| | ENTR 201 | 3 |
| | ISLM 101 | 3 |
| | LISP 200 | 1 |
| | SOCL 201 | 3 |

Four Years Curriculum (Total: 121 Credits)

Year One

First Semester

| Course Code | Course Title | Credit |
|-------------|--------------------------------|-----------|
| CHEM 101 | Introduction to Chemistry | 3 |
| ENGL 101 | English Communication Skills I | 3 |
| MATH 101 | Calculus I | 3 |
| PHYS 111 | Fundamentals of Physics I | 3 |
| PHYS 112 | Fundamentals of Physics I Lab | 1 |
| | Elective 1 | 3 |
| | | ----- |
| | | 16 |

Second Semester

| Course Code | Course Title | Credit |
|-------------|---------------------------------|-----------|
| CHEM 103 | General chemistry | 3 |
| CHEM 104 | General Chemistry Lab | 1 |
| ENGL 102 | English Communication Skills II | 3 |
| MATH 103 | Calculus II | 3 |
| PHYS 113 | Fundamentals of Physics II | 3 |
| PHYS 114 | Fundamentals of Physics II Lab | 1 |
| | Elective 2 | 3 |
| | | ----- |
| | | 17 |

Year Two

Third Semester

| Course Code | Course Title | Credit |
|-------------|----------------------------------|-----------|
| MATH 201 | Calculus III | 3 |
| MATH 213 | Set Theory | 3 |
| CSIS 206 | Principles of Programming | 3 |
| ENGL 203 | English Communication Skills III | 3 |
| LISP200 | Library Use and Research methods | 1 |
| | Major Elective I | 3 |
| | | ----- |
| | | 16 |

Fourth Semester

| Course Code | Course Title | Credit |
|-------------|--|-----------|
| MATH 211 | Linear Algebra I | 3 |
| MATH 241 | Introduction to Probability & Statistics | 3 |
| MATH 271 | Elementary Differential Equations | 3 |
| ENGL 204 | Language, Society and Culture | 3 |
| | Elective 3 | 3 |
| | | ----- |
| | | 15 |

Year Three**Fifth Semester**

| Course Code | Course Title | Credit |
|--------------------|--------------------------------|---------------|
| MATH 321 | Real Analysis | 3 |
| MATH 371 | Partial Differential Equations | 3 |
| MATH 230(331) | Numerical Analysis I | 3 |
| ISLM 101 | Islamic Studies | 3 |
| | Elective 4 | 3 |
| | | ----- |
| | | 15 |

Sixth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| MATH 323 | General Topology | 3 |
| MATH 241 (343) | Statistics I | 3 |
| MATH 311 | Linear Algebra II | 3 |
| SOCL 201 | UAE Studies | 3 |
| | Elective 5 | 3 |
| | | ----- |
| | | 15 |

Year Four**Seventh Semester**

| Course Code | Course Title | Credit |
|--------------------|---------------------------------|---------------|
| MATH 325 | Complex Analysis | 3 |
| ENTR 201 | Innovation and Entrepreneurship | 3 |
| | Major elective II | 3 |
| | Elective 6 | 3 |
| | Elective 7 | 3 |
| | | ----- |
| | | 15 |

Eighth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| | Major Elective III | 3 |
| | Elective 7 | 3 |
| | Elective 8 | 3 |
| | Elective 9 | 3 |
| | | ----- |
| | | 12 |

COURSE DESCRIPTION

MATH 101 CALCULUS I

3.1: 3 cr.

This course covers limits and continuity of functions, differentiation and its applications. Sequences, their limits and convergence follow. The course then gives an overview of three dimensional analytical geometry and complex numbers.

Pre-requisite: None.

MATH 103 CALCULUS II

3.1: 3 cr.

This course covers techniques of integration for definite and indefinite integrals as well as applications of definite integrals. The convergence and divergence of infinite series and power series follow. The course then gives an overview of Fourier series, and an introduction to multiple integral and differential equations.

Prerequisites: MATH 101.

MATH 112 INTRODUCTION TO CALCULUS I

3.1: 3 cr.

The basic ideas concerning sequences and their limits are covered in the first part of the course.

Algebraic manipulation and substitution integration technique are carried. The concept of probability is then introduced.

Logarithmic and exponential functions are introduced in detailed.

Pre-requisite: None.

MATH 113 INTRODUCTION TO CALCULUS II

3.1: 3 cr.

The course covers the following topics: Algebraic manipulation, substitution integration techniques, integration by parts, tabular methods, rational and inverse functions, the concept of differential equations (first and second order), basic operations in the set of complex numbers, applications to Demoivre's and Euler's formulas, solutions to differential and second order complex equations, analytic geometry.

Pre-requisites: MATH 112.

MATH 200 CALCULUS

4.0: 3 cr.

This course covers techniques of integration for definite and indefinite integrals as well as applications of definite integrals. Sequences and their limits and the convergence and divergence of infinite series and power series follow. The course then gives an overview of Fourier series. Polar coordinates are introduced. The course finally presents functions of several variables and double integrals.

Prerequisite: MATH 113.

MATH 201 CALCULUS III

3.1: 3 cr.

This course deals mainly with functions of several variables. Topics include: Multi-variable functions; multiple integrals; cylindrical and spherical coordinates; line integrals; circulation and flux; Green's theorem, surface integrals, Stoke's and divergence theorem.

Pre-requisites: MATH 103.

MATH 211 LINEAR ALGEBRA I

3.1: 3 cr.

Linear Systems. Matrix Operations. Echelon Form. Vector Spaces. Linear Transformation. Determinants. Eigenvalues and Eigenvectors.

Prerequisites: MATH 103.

MATH 213 SET THEORY

3.1: 3 cr.

This course covers the following topics: Logic and Mathematical Language, Propositional calculus, Methods of demonstration, Set theory, Binary relations, Functions, Cardinality, Arithmetic of ordinal and cardinal numbers.

Pre-requisite: None.

MATH 215 ABSTRACT ALGEBRA I**3.1: 3 cr.**

This course covers the following topics: Groups, Subgroups, Cyclic groups, Permutation Groups, Homomorphism and Isomorphism of groups, Lagrange's Theorem, external direct products and introduction to rings and fields.

Pre-requisite: MATH 213.

MATH 240 PROBABILITY & STATISTICS/ MATH 341 INTRODUCTION TO PROBABILITY AND STATISTICS**3.1: 3 cr.**

This course will enhance the learning potential of the students and enable them to tackle large Scientific and engineering problems using statistical tools. The course includes: Descriptive statistics. Probability. Random variables and probability distribution. Mathematical expectation. Discrete probability distributions: Uniform, Binomial and Multinomial, Hyper-geometric, Negative Binomial, Geometric and Poisson distributions. Continuous probability distribution: Normal distribution, Gamma and exponential distributions, Chi squared distribution. Introduction to Inference Statistics: Sampling theory, estimation theory, hypothesis tests.

Prerequisite: MATH 103.

MATH 243 STATISTICS FOR APPLIED SCIENCES**3.1: 3 cr.**

This course provides the student with the basic knowledge required to tackle some of the statistical problems of interest in medicine or other health-related areas. In Descriptive statistics (chapter 2), all the major numeric and graphic tools used for displaying medical data are presented. In the section where Probability is discussed (chapters 3 through 5), the basic principles of probability are developed, and the most common probability distributions—such as the binomial, Poisson and normal distributions—are introduced. Inference Statistics is discussed extensively in chapters 6 through 8, where the t and Chi-square distributions are developed, also hypothesis testing and the notion of confidence intervals are presented. In Chapters 9 through 10, the goodness-of-fit of a normal distribution and fitting data using regression lines and least-squares methods are developed and discussed.

Pre-requisite: None.

MATH 261 OPERATIONS RESEARCH**3.1: 3 cr.**

Operations research helps in solving problems in different environments that needs decisions. The module cover topics that include: linear programming, Transportation, Assignment, and CPM/SPM and all-related Network problems techniques. Analytic techniques will be used to solve problems facing business managers in decision environments.

Pre-requisite: None

MATH 263 MATH FOR FINANCE**3.1: 3 cr.**

This course covers the following topics: Fractional exponents and radicals, simple interest, compound interest and compound amount, compound discount and present value, simple annuities, effective annual rate of interest, amortization and equity, and sinking funds.

Pre-requisite: None.

MATH 270 DIFFERENTIAL EQUATIONS / MATH 271 ELEMENTARY DIFFERENTIAL EQUATIONS**3.1: 3 cr.**

This course covers the following topics: first, second and higher order ordinary differential equations, separable and exact first order equations, Bernoulli and Euler-Cauchy equations, undetermined coefficient, variation of parameters, and classification of partial differential equations.

Prerequisite: MATH 103.

MATH 311 LINEAR ALGEBRA II**3.1: 3 cr.**

This course covers the following topics: Diagonalization and triangulation of matrices and its applications. Bilinear and quadratic forms. Euclidian Spaces, inner product, orthogonality, orthogonal projection.

Prerequisite: MATH 211.

- MATH 321 REAL ANALYSIS** **3.1: 3 cr.**
 This class serves as an introduction to Real Analysis. Topics include: properties of real numbers, sequences and series, continuity and limits, pointwise and uniform convergence, differentiation, integration.
 Prerequisite: MATH 201.
- MATH 323 GENERAL TOPOLOGY** **3.1: 3 cr.**
 This course covers the following topics: metric spaces and topological spaces, completeness, compactness, connectedness, separation, topological properties in general topological spaces.
 Prerequisite: MATH 321.
- MATH 325 COMPLEX ANALYSIS** **3.1: 3 cr.**
 This course deals mainly with complex numbers and functions. Topics include: Complex numbers; analytic functions; derivatives; conformal mappings; complex integration; Cauchy theorem; power and Taylor series; residue theorem.
 Prerequisite: MATH 321.
- MATH 331 NUMERICAL ANALYSIS I /MATH 230 NUMERICAL ANALYSIS** **3.1: 3 cr.**
 Analysis and implementation of current numerical methods: number representation and round-off errors; difference equations; polynomials interpolation; solution of non-linear equations; functions approximation; numerical differentiation and integration; numerical solution of differential equations; solution of systems of linear equations.
 Prerequisite: CSIS 206, MATH 103, MATH 211.
- MATH 333 NUMERICAL ANALYSIS II** **3.1: 3 cr.**
 This course covers the following topics: Finite elements, solution of elliptic, hyperbolic and parabolic equations, approximation, matrix representation, solution of non – linear systems, solution of non stationary systems, numerical methods to calculate eigenvalues and eigenvectors.
 Prerequisite: MATH 331, MATH 371.
- MATH 343 STATISTICS I** **3.1: 3 cr.**
 Inference Statistics: Theory of Sampling, Theory of Estimation. Tests of Hypothesis :The null and alternative hypothesis, level of significance, critical values, p-values. Confidence interval.. Application with SPSS or STATISTICA software
 Prerequisite: MATH 341.
- MATH 345 STATISTICS II** **3.1: 3 cr.**
 Inference Statistics Tests of Hypothesis :The null and alternative hypothesis for 2 samples, test ANOV, non-parametric test. Application with SPSS or STATISTICA software
 Prerequisite: MATH 341.
- MATH 351 DIFFERENTIAL GEOMETRY** **3.1: 3 cr.**
 This course covers the following topics: Geometry of curves and surfaces in three-space and higher dimensional. Parallel transport, curvature, and geodesics. Surfaces with constant curvature. Minimal surfaces.
 Prerequisite: MATH 201, MATH 371.
- MATH 371 PARTIAL DIFFERENTIAL EQUATIONS** **3.1: 3 cr.**
 The emphasis in MATH 371 is on solving Partial Differential Equations (PDE's) and boundary value problems using a variety of analytical methods. The techniques covered include characteristics method, separation of variables, Fourier series and Fourier transforms.
 Prerequisite: MATH 201, MATH 271.

University of Balamand Dubai
Faculty of Arts and Sciences
Department of Physics

Mission Statement

The discipline of Physics is the fundamental search to understand reality at its deepest levels by focusing on the study of natural phenomena.

At the University of Balamand Dubai the mission of the Department of Physics is to deliver excellent teaching and education through solid instruction and a well-balanced and designed program that covers all the fundamental topics of physics.

Graduates of the Department will be confident in their abilities and understanding of physics and will be well prepared for their teaching or scientific careers.

Program Learning Objectives

1. Provide students with a broad, sound and extensive knowledge of the fundamental concepts of Physics.
2. Gain an insight into physical phenomena and processes.
3. Develop an understanding of the power of Physics to deal with problems related to technology and the environment.
4. Qualitatively analyze and provide solutions to problems.
5. Prepare students for teaching and/or research positions in colleges, universities, laboratories and research centers.
6. Gain effective communication skills both verbally and in writing.
7. Help students attain their full academic potential by encouraging them to be critically receptive to new ideas.

Program Learning Outcomes

1. Develop a thorough conceptual understanding of the principles of physics in the fields of mechanics, optics, relativity, electricity, magnetism, classical and quantum mechanics.
2. Demonstrate proficiency in mathematics to facilitate the understanding, manipulation, description and then solution of physical problems.
3. Develop efficient analytical thinking skills and demonstrate written and oral communication skills.
4. Organize and convert complex physics problems to mathematical formulations, analyze them quantitatively and suggest reasonable solutions.
5. Develop efficient practical laboratory skills to collect experimental data, analyze it, represent it graphically and assess it statistically by treating errors and uncertainties.
6. Utilize the scientific and technical knowledge and skills in other disciplines and become aware of the impact of physics in social, economical, and environmental issues, among others.
7. Develop critical thinking skills, reflections and observational skills that are essential to classroom teachers and future researchers, and will enable them to pursue successful employment in many commercial and industrial sectors.

After completing the General Education Courses (University requirements and Free Electives), students should be able to:

1. Demonstrate knowledge of humanities, social sciences, library science and leadership skills
2. Communicate more effectively in oral and written English
3. Develop quantitative and research skills
4. Think more critically and creatively
5. Apply ethics in their behavior and decision making
6. Work collaboratively, learn independently and practice lifelong learning
7. Exercise leadership and have a sense of responsibility as UAE citizens
8. Have pride in Arabic culture and Islamic values
9. Recognize and appreciate the diversity of the human experience.

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>Department Requirement</u> (72 credits) | CHEM 101 | 3 |
| | CHEM 103 | 3 |
| | CHEM 205 | 3 |
| | CSIS 206 | 3 |
| | MATH 101 | 3 |
| | MATH 103 | 3 |
| | MATH 201 | 3 |
| | MATH 211 | 3 |
| | MATH 271 | 3 |
| | PHYS 111 | 3 |
| | PHYS 112 | 1 |
| | PHYS 113 | 3 |
| | PHYS 114 | 1 |
| | PHYS 201 | 1 |
| | PHYS 221 | 3 |
| | PHYS 231 | 3 |
| | PHYS 243 | 3 |
| | PHYS 255 | 3 |
| | PHYS 323 | 3 |
| | PHYS 331 | 3 |
| PHYS 341 | 3 | |
| PHYS 345 | 3 | |
| PHYS 361 | 3 | |
| PHYS 381 | 3 | |
| PHYS 383 | 3 | |
| PHYS 385 | 3 | |

6 Free Elective Courses (18 Credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | CSPR 205 | 3 |
| | CSPR 206 | 3 |
| | EDUC 213 | 3 |
| | EDUC 217 | 3 |
| | EDUC 275 | 3 |
| | MCOM 201 | 3 |
| | MCOM 220 | 3 |
| | MCOM 225 | 3 |
| | PSYC 200 | 3 |
| | PSYC 229 | 3 |
| | PSYC 254 | 3 |

3 Major Elective Courses (9 Credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | PHYS 235 | 3 |
| | PHYS 251 | 3 |
| | PHYS 347 | 3 |
| | PHYS 363 | 3 |
| | PHYS 399 | 3 |

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>University Requirement</u> (22 credits) | ENGL 101 | 3 |
| | ENGL 102 | 3 |
| | ENGL 203 | 3 |
| | ENGL 204 | 3 |
| | ENTR 201 | 3 |
| | ISLM 101 | 3 |
| | LISP 200 | 1 |
| | SOCL 201 | 3 |

Four Years Curriculum (Total: 121 Credits)

Year One

First Semester

| Course Code | Course Title | Credit |
|-------------|--------------------------------------|-----------|
| CHEM 101 | Introduction to Chemistry | 3 |
| ENGL 101 | English Communication Skills I | 3 |
| MATH 101 | Calculus I | 3 |
| PHYS 111 | Fundamentals of Physics I | 3 |
| PHYS 112 | Fundamentals of Physics I Laboratory | 1 |
| | | ----- |
| | | 13 |

Second Semester

| Course Code | Course Title | Credit |
|-------------|---------------------------------------|-----------|
| CHEM 103 | General Chemistry | 3 |
| ENGL 102 | English Communication Skills II | 3 |
| MATH 103 | Calculus II | 3 |
| PHYS 113 | Fundamentals of Physics II | 3 |
| PHYS 114 | Fundamentals of Physics II Laboratory | 1 |
| | Elective 1 | 3 |
| | | ----- |
| | | 16 |

Year Two

Third Semester

| Course Code | Course Title | Credit |
|-------------|-----------------------------------|-----------|
| CHEM 205 | Analytical Chemistry I | 3 |
| ENGL 203 | English Communications Skills III | 3 |
| MATH 201 | Calculus III | 3 |
| PHYS 201 | Instrumentation Laboratory | 1 |
| PHYS 221 | Classical Mechanics | 3 |
| PHYS 243 | Circuit Analysis I | 3 |
| | | ----- |
| | | 16 |

Fourth Semester

| Course Code | Course Title | Credit |
|-------------|-----------------------------------|-----------|
| ENGL 204 | Language, Society and Culture | 3 |
| LISP 200 | Library Use and Research methods | 1 |
| MATH 211 | Linear Algebra I | 3 |
| MATH 271 | Elementary Differential Equations | 3 |
| PHYS 231 | Thermodynamics | 3 |
| PHYS 255 | Modern Physics | 3 |
| | | ----- |
| | | 16 |

Year Three

Fifth Semester

| Course Code | Course Title | Credit |
|-------------|---------------------------|-----------|
| CSIS 206 | Principles of Programming | 3 |
| ISLM 101 | Islamic Studies | 3 |
| PHYS 341 | Electricity and Magnetism | 3 |
| PHYS 323 | Quantum Physics | 3 |
| | Elective 2 | 3 |
| | | ----- |
| | | 15 |

Sixth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------------------|---------------|
| SOCL 201 | UAE Studies | 3 |
| PHYS 331 | Thermal and Statistical Physics | 3 |
| PHYS 345 | Modern Optics | 3 |
| | Elective 3 | 3 |
| | Major Elective 1 | 3 |
| | | ----- |
| | | 15 |

Year Four**Seventh Semester**

| Course Code | Course Title | Credit |
|--------------------|---------------------------------|---------------|
| ENTR 201 | Innovation and Entrepreneurship | 3 |
| PHYS 361 | Special Relativity | 3 |
| PHYS 381 | Atomic and Molecular Physics | 3 |
| | Elective 4 | 3 |
| | Major Elective 2 | 3 |
| | | ----- |
| | | 15 |

Eighth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| PHYS 383 | Nuclear Physics | 3 |
| PHYS 385 | Particle Physics | 3 |
| | Elective 5 | 3 |
| | Elective 6 | 3 |
| | Major Elective 3 | 3 |
| | | ----- |
| | | 15 |

COURSE DESCRIPTION

PHYS 100 INTRODUCTION TO PHYSICS I

3.0: 3 cr.

This course introduces students to the following concepts in classical mechanics: physical quantities, standards and units, vectors and scalars, velocity and acceleration, motion in one, two and three dimensions, Newton's laws, falling bodies, uniform circular motion, Work and energy, power, Kinetic energy theorem, conservation of total energy, rectilinear sinusoidal motion, angular sinusoidal motion, linear and angular momentum collisions, gravitation

PHYS 102 INTRODUCTION TO PHYSICS II

3.0: 3 cr.

This course introduces students to the following concepts in both electrostatics and electro-magnetism: charges, electrostatic force, electric fields, electric potential and electric potential energy, electric circuit, capacitors, kirchoff's low, magnetism, magnetic field created by electric currents, Laplace's force, electro-magnetic induction, and self-induction, alternating currents.

Prerequisite: MATH 112.

PHYS 201 INSTRUMENTATION LABORATORY

0.3: 1 cr.

This laboratory provides an introduction on the use of multi-meters, oscilloscopes, function generators, power supplies and other instrumentation. Applications include solenoids, resistors, capacitors, periodic signals analysis, balanced bridge circuit, RC, RL and RLC circuits.

PHYS 211/ PHYS 111 FUNDAMENTALS OF PHYSICS I

3.0: 3 cr.

The course introduces some of the basic fundamentals of physics, including: kinematics of a particle, relative motion analysis, Newton's laws of motion, work, energy, center of mass, linear impulse and momentum, collision, torque, equilibrium, elasticity, gravity, properties of fluids, simple harmonic motion, transverse and longitudinal waves, resonance, sound waves, Doppler effect, thermal expansion, first and second laws of thermodynamics, entropy.

Co-requisite: MATH 101.

PHYS 212 /PHYS 112 FUNDAMENTALS OF PHYSICS I LABORATORY

0.3: 1 cr.

This laboratory introduces students to the types of basic apparatus used in physics. Experiments are designed to demonstrate the meaning and applications of the physical concepts included in the "Fundamental of Physics I" course.

Co-requisite: PHYS 111.

PHYS 213/PHYS 113 FUNDAMENTALS OF PHYSICS II

3.0: 3 cr.

The course introduces some of the basic fundamentals of physics, including: electric charge, Coulomb's law, electrostatic force, electric field, electric potential, Gauss' Law, capacitors, capacitance, electric current, resistance, Ohm's law, power, emf, internal resistance, magnetic field, magnetic force, magnetic materials, alternating current, rms voltage and current, polarization, reflection, refraction, mirrors, thin lenses, interference, diffraction, photoelectric effect, blackbody radiation, Hydrogen atom, fluorescence, atomic and mass numbers, isotopes, alpha, beta and gamma decays, nuclear fission, nuclear fusion.

Pre-requisite: PHYS 111.

PHYS 214/ PHYS 114 FUNDAMENTALS OF PHYSICS II LABORATORY

0.3: 1 cr.

This laboratory introduces students to the types of basic apparatus used in physics. Experiments are designed to demonstrate the meaning and applications of the physical concepts included in the "Fundamentals of Physics II" course.

Co-requisite: PHYS 113.

PHYS 201 INSTRUMENTATION LABORATORY**0.3: 1 cr.**

This laboratory provides an introduction on the use of multi-meters, oscilloscopes, function generators, power supplies and other instrumentation. Applications include solenoids, resistors, capacitors, periodic signals analysis, balanced bridge circuit, RC, RL and RLC circuits.

Co-requisite: PHYS 243.

PHYS 221 CLASSICAL MECHANICS**3.0: 3 cr.**

This course deals with the fundamental principles of Classical Mechanics. It treats particle dynamics, the motion of systems of particles, rigid body motion, moving coordinate systems. Lagrange's equations, Hamilton's equations and small oscillations.

Pre-requisites: PHYS 111 and MATH 103.

PHYS 231 THERMODYNAMICS**3.0: 3 cr.**

This course introduces some basic concepts and definitions of Thermodynamics, properties of substance, heat, work, first law of Thermodynamics, Second law of Thermodynamics, entropy, reversibility and irreversibility, power and refrigeration cycles.

Pre-requisite: PHYS 111.

PHYS 235 FLUID MECHANICS**3.0: 3 cr.**

The course introduces some of the basic fundamentals of Fluid Mechanics, including: pressure distribution; hydrostatic forces on surfaces; buoyancy; Reynolds transport theorem, conservation of mass, linear momentum equation, Bernoulli and energy equations; differential relations for fluid flow; fluid acceleration field, mass conservation, linear momentum and energy equations; stream function; vorticity and irrotationality; frictionless irrotational flows, principle of dimensional homogeneity, Pi theorem, non-dimensionalization of the basic equations; modelling and its pitfalls; viscous flow in ducts; Reynolds number regimes, head loss, friction factor, minor or local losses in pipe systems.

Pre-requisite: PHYS 231.

PHYS 243 CIRCUIT ANALYSIS I**3.0: 3 cr.**

The course introduces some of the fundamentals of Circuit Analysis, including: Current, Voltage, Conductors, Insulators, Semiconductors, Ammeters, Voltmeters, Resistance, Superconductors, Conductance, Ohmmeters, Thermistors, Photoconductive Cell, Ohm's Law, Power, Energy, Kirchhoff's Voltage Law, Kirchhoff's Current Law, Series-Parallel Networks, Mesh Analysis, Nodal Analysis, Thévenin's Theorem, Norton's Theorem, Millman's Theorem, Reciprocity Theorem, Capacitance, Dielectric Strength, Capacitors In Series And Parallel, Energy, Magnetic Fields, Flux Density, Permeability, Hysteresis, Ampère's Circuital Law, Faraday's Law, Lenz's Law, R-L-C Circuits.

Pre-requisites: PHYS 201, MATH 103, MATH 211.

PHYS 251 INTRODUCTION TO BIOPHYSICS**3.0: 3 cr.**

The course introduces some of the basic fundamentals of biophysics, including: heat and free energy, cell physiology, molecules and their sizes, probability in biophysics, ideal gas law, Brownian motion, diffusion and friction, Reynolds number, entropy, Boltzmann distribution, pressure and flow, chemical potential and reactions, elasticity, enzymes and molecular machines and nerve impulses.

Prerequisite: PHYS 113.

PHYS 255 MODERN PHYSICS**3.0: 3 cr.**

The course describes the most important developments in various topics during the last century. These include Special Relativity, Quantum Mechanics, Atomic and Molecular Physics, Nuclear Physics and Nuclear Energy, Elementary Particles and Astrophysics and Cosmology.

Pre-requisites: PHYS 113 and MATH 201.

PHYS 323 QUANTUM PHYSICS**3.0: 3 cr.**

The course describes the development of quantum physics; waves in classical physics, wave-packets, uncertainty principle, wave functions, operators, expectation values of dynamical observables; Schrödinger equation with application to one-dimensional problems, the hydrogen atom, electrons in periodic table; selected topics in perturbation theory, scattering theory.

Pre-requisites: PHYS 255, MATH 201 and MATH 271.

PHYS 331 THERMAL AND STATISTICAL PHYSICS**3.0: 3 cr.**

The laws of thermodynamics, elementary probability theory, kinetics theory of gases and Brownian motion, equilibrium, statistical mechanics of ideal systems: statistical origins of heat, temperature, entropy and equilibrium between phases.

Pre-requisite: PHYS 231.

PHYS 341 ELECTRICITY AND MAGNETISM**3.0: 3 cr.**

The course introduces some of the fundamentals of Electricity and Magnetism, including: Law of Coulomb, Electric Field, Charge Distribution, Line Charge, Streamlines, Electric Flux Density, Gauss' Law, Divergence, Maxwell's First Equation, Energy and Potential, Potential Gradient, Dipole, Energy Density, Conductors, Semiconductors, Dielectric Materials, Capacitance, Poisson's and Laplace's Equations, Biot-Savart Law, Ampere's Circuital Law, Stokes' Theorem, Magnetic Forces, Magnetic Materials, Permeability, Inductance, Faraday's Law.

Pre-requisites: PHYS 113, MATH 201 and MATH 271.

PHYS 345 MODERN OPTICS**3.0: 3 cr.**

This course covers the fundamental principles of modern physical optics and contemporary optical systems. Topics include propagation of light, polarization, coherence, interference, diffraction, Fourier optics, absorption, scattering, dispersion, and image quality analysis. Special emphasis is placed on the instrumentation and experimental techniques used in optical studies.

Pre-requisites: PHYS 113 and MATH 201.

PHYS 347 FUNDAMENTALS OF PHOTONICS**3.0: 3 cr.**

The course introduces some of the basic fundamentals of photonics, including: ray optics, wave optics, interference, Gaussian beam, Bessel beam, transmission, optical Fourier transform, electromagnetic waves, polarization, photonic crystals, dielectric media, fiber optics, photon optics, laser amplifiers and lasers.

Pre-requisite: PHYS 345.

PHYS 361 SPECIAL RELATIVITY**3.0: 3 cr.**

The course introduces some of the fundamentals of Special Relativity, including: spacetime, inertial frame, observer, measuring particle speed, the principle of relativity, simultaneity, Lorentz contraction of length, invariance of the interval, twin paradox, Lorentz contraction, worldline, stretch factor, causality, light cone, conservation of momentum and its consequences, energy without mass: photon, spacetime curvature, black hole.

Pre-requisites: PHYS 221 and PHYS 255.

PHYS 363 GENERAL RELATIVITY**3.0: 3 cr.**

The course introduces some of the fundamentals of General Relativity by initially reviewing the basics of Special Relativity and vector analysis, then focusing on topics including: tensor analysis, general and perfect fluids, Gauss' law, gravitation and curvature, various types of curved manifolds, Ricci and Einstein tensors, Einstein's equations, gravitational waves, Schwarzschild geometry and black holes.

Pre-requisites: PHYS 361 and MATH 211.

PHYS 381 ATOMIC AND MOLECULAR PHYSICS**3.0: 3 cr.**

The course introduces some of the basic fundamentals of atomic and molecular physics, including: Black body radiation, the photoelectric effect, atomic spectra, Schrodinger equation, energy levels, eigenfunctions, Einstein coefficients, Zeeman effect, Stark effect, Lamb shift, two-electron atoms, molecular structure, molecular spectra, rotational energy levels, electronic spin and nuclear spin.

Pre-requisite: PHYS 255.

PHYS 383 NUCLEAR PHYSICS**3.0: 3 cr.**

The course introduces some of the fundamentals of Nuclear Physics, including: Quantum Mechanics, Angular Momentum, Parity, Nuclear Radius, Abundance of Nuclides, Nuclear Binding Energy, Nuclear Force, Shell Model, Radioactive Decay Law, Counters, Detectors, Energy-Measurements, Nuclear Lifetimes, Alpha Decay, Spectroscopy, Beta Decay, Fermi Theory, Forbidden Decays, Neutrino Physics, Gamma Decay, Nuclear Resonance Fluorescence, Neutron Sources, Nuclear Fission, Reactors, Nuclear Fusion, Solar Fusion.

Pre-requisite: PHYS 255.

PHYS 385 PARTICLE PHYSICS**3.0: 3 cr.**

The course introduces some of the fundamentals of Particle Physics, including: Leptons, Quark, Hadrons, Lorentz Transformations, Particle Probability, the Fock Operators, Maxwell Equations, Field Energy and Momentum, Boson Fields, Fermion Fields, Collisions and Decays, Parity, CPT Theorem, Mesons, Baryons, Gauge Field, Quantum Chromodynamics, Abelian Symmetry, Electroweak Interaction, Feynman Rules, CP Violation, Neutrinos, Effective Mass, Muon and Tau Lepton Decays, Gluon.

Pre-requisite: PHYS 255.

PHYS 399 INTRODUCTION TO SCIENTIFIC RESEARCH**3.0: 3 cr.**

The purpose of this course is to introduce undergraduate students to scientific research via lectures, seminars, readings, projects design, data analysis and scientific communication. Students work on simple projects in the Physics laboratory for a period of six weeks in order to get practical research experience. Students have to present their work as oral or poster presentation at the end of the semester.

Pre-requisite: Department Approval

University of Balamand Dubai
Faculty of Arts and Sciences
Department of English Language and Literature

Bachelor's Degree in English Language and Literature

Mission Statement

Students majoring in English are exposed to a rich curriculum that enables them to comprehend and appreciate English literature and language. The diverse teaching approaches help students to become critical thinkers, active learners, and good writers. The Program prepares students for employment in related fields, as well as for MA programs in English language and literature and English language teaching.

Program Learning Objectives

1. Provide students with a solid theoretical background in the discipline of the English language, its historical development, and understanding of language as a system and as a social practice
2. Expose students to a wide range of English literature, its historic significance and its role as commentator on social and cultural contexts and development
3. Cultivate a systematic knowledge of theories in related fields
4. Promote understanding of the link between theory and practice
5. Develop an appreciation of literary and aesthetic values and their relationship to modern life
6. Develop students' analytical, research, and critical thinking skills
7. Foster reflective and skilled practitioners who can work in multidisciplinary contexts

Program Learning Outcomes

Upon the successful completion of the BA curriculum in English Language and Literature students will be able to:

1. Demonstrate knowledge of theories and terminology in the field of English linguistics and literature
2. Use theory in practice in the fields of linguistics and literature
3. Critically analyze, evaluate and respond to conceptually complex texts in the discipline
4. Conduct academic research in the fields of literature and linguistics
5. Write well-organized, developed and researched academic essays in literature and linguistics
6. Use multi-media tools to communicate effectively
7. Display the ability to reflect on one's learning
8. Observe ethical standards in scholarly activities

After completing the General Education Courses (University requirements and Free Electives), students should be able to:

1. Demonstrate knowledge of humanities, social sciences, library science and leadership skills.
2. Communicate more effectively in oral and written English.
3. Develop quantitative and research skills.
4. Think more critically and creatively.
5. Apply ethics in their behavior and decision making.
6. Work collaboratively, learn independently and practice lifelong learning.
7. Exercise leadership and have a sense of responsibility.
8. Have pride in Arabic culture and Islamic values.
9. Recognize and appreciate the diversity of the human experience.

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>Department Requirement</u> (59 credits) | BIOL 101 | 3 |
| | BUSN 101 | 3 |
| | COMP 200 | 2 |
| | ENGL 220 | 3 |
| | ENGL 221 | 3 |
| | ENGL 222 | 3 |
| | ENGL 223 | 3 |
| | ENGL 238 | 3 |
| | ENGL 239 | 3 |
| | ENGL 249 | 3 |
| | ENGL 252 | 3 |
| | ENGL 253 | 3 |
| | ENGL 260 | 3 |
| | ENGL 261 | 3 |
| | HIST 101 | 3 |
| | MATH 105 | 3 |
| | PHIL 101 | 3 |
| | PSIA 101 | 3 |
| | PSYC 101 | 3 |
| SOCL 101 | 3 | |

| Requirement | Course Code | # of Credits |
|---|--------------------|---------------------|
| <u>University Requirement</u> (22 credits) | ENGL 101 | 3 |
| | ENGL 102 | 3 |
| | ENGL 203 | 3 |
| | ENGL 204 | 3 |
| | ENTR 201 | 3 |
| | ISLM 101 | 3 |
| | LISP 200 | 1 |
| | SOCL 201 | 3 |

8 Free Elective Courses (24 credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | CSPR 205 | 3 |
| | CSPR 206 | 3 |
| | EDUC 213 | 3 |
| | EDUC 217 | 3 |
| | EDUC 275 | 3 |
| | MCOM 201 | 3 |
| | MCOM 220 | 3 |
| | MCOM 225 | 3 |
| | PSYC 200 | 3 |
| | PSYC 229 | 3 |
| | PSYC 254 | 3 |

5 Department Elective Courses (15 credits)

| | Course Code | # of Credits |
|--------------|--------------------|---------------------|
| choose from: | ENGL 230 | 3 |
| | ENGL 244 | 3 |
| | ENGL 245 | 3 |
| | ENGL 246 | 3 |
| | ENGL 247 | 3 |
| | ENGL 251 | 3 |
| | ENGL 256 | 3 |
| | ENGL 257 | 3 |

Four years Curriculum (Total: 120 Credits)

Year One

First Semester

| Course Code | Course Title | Credit |
|-------------|--------------------------------|--------|
| MATH 105 | Statistics | 3 |
| ENGL 101 | English Communication Skills I | 3 |
| BIOL 101 | Introduction to Biology I | 3 |
| BUSN101 | Introduction to Business | 3 |
| HIST 101 | The Twentieth Century | 3 |

15

Second Semester

| Course Code | Course Title | Credit |
|-------------|-----------------------------------|--------|
| PSIA 101 | Introduction to political Science | 3 |
| ENGL 102 | English Communication Skills II | 3 |
| PHIL 101 | Introduction to Philosophy | 3 |
| PSYC 101 | Introduction to Psychology I | 3 |
| SOCL 101 | Introduction to Sociology I | 3 |

15

Year Two

Third Semester

| Course Code | Course Title | Credit |
|-------------|----------------------------------|--------|
| ENGL 203 | English Communication Skills III | 3 |
| ISLM 101 | Islamic Studies | 3 |
| LISP 200 | Library Use and Research Methods | 1 |
| COMP 200 | Computer Applications | 2 |
| | Elective 1 | 3 |
| | Elective 2 | 3 |

15

Fourth Semester

| Course Code | Course Title | Credit |
|-------------|---|--------|
| ENGL 204 | Language, Society and Culture | 3 |
| ENGL 220 | Approaches to Literature: Ways of Reading | 3 |
| ENGL 249 | The Linguistics of English | 3 |
| SOCL 201 | UAE Studies | 3 |
| | Elective 3 | 3 |

15

Year Three

Fifth Semester

| Course Code | Course Title | Credit |
|-------------|--|--------|
| ENGL 221 | Literature I: Renaissance to Romanticism | 3 |
| ENGL 238 | Introduction to Literary Criticism | 3 |
| ENGL 239 | The History of the English Language | 3 |
| ENTR 201 | Innovation and Entrepreneurship | 3 |
| | Major Elective 1 | 3 |

15

Sixth Semester

| Course Code | Course Title | Credit |
|--------------------|-----------------------------------|---------------|
| ENGL 222 | Literature II: 1800—Present Day | 3 |
| ENGL 223 | Comparative and World Literatures | 3 |
| ENGL 252 | Morphology and Syntax | 3 |
| | Major Elective 2 | 3 |
| | Elective 4 | 3 |
| | | ----- |
| | | 15 |

Year Four**Seventh Semester**

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| ENGL 253 | Creative Writing | 3 |
| ENGL 260 | ELT Pedagogy | 3 |
| | Major Elective 3 | 3 |
| | Elective 5 | 3 |
| | Elective 6 | 3 |
| | | ----- |
| | | 15 |

Eighth Semester

| Course Code | Course Title | Credit |
|--------------------|---------------------|---------------|
| ENGL 261 | Senior Seminar | 3 |
| | Major Elective 4 | 3 |
| | Major Elective 5 | 3 |
| | Elective 7 | 3 |
| | Elective 8 | 3 |
| | | ----- |
| | | 15 |

COURSE DESCRIPTION

ENGL 101 ENGLISH COMMUNICATION SKILLS I **3.0: 3 cr.**

This course focuses on training students to communicate in an academic environment. Emphasis is placed on the comprehension and analysis of oral and written texts and the production of paragraphs and short essays. Oral communication through formal and informal discussions and presentations is an integral element of the course.

Pre-requisite: ENGL 003 or required TOEFL, SAT or IELTS score.

ENGL 102 ENGLISH COMMUNICATION SKILLS II **3.0: 3 cr.**

This course intends to develop the language skills required for successful participation in academic studies at the university level. Writing skills are emphasized with particular focus on developing a documented, argumentative essay. Oral communication skills are also introduced.

Pre-requisite: ENGL101 or required scores in TOEFL, SAT or IELTS.

ENGL 203 ENGLISH COMMUNICATION SKILLS III **3.0: 3 cr.**

This course is designed as a writing workshop that emphasizes writing for particular purposes and particular audiences. Students' ability to read critically and analyze texts of various types and styles is stressed.

Importance is placed on students' ability to argue academically and to use references to support their point of view. The oral communication skill is nurtured through formal and informal discussions and presentations.

It is a content-based composition course promoting English for academic purposes. Term papers are based on literary, scientific and economic texts chosen to enhance students' ability to analyze and discuss advanced writing

Pre-requisite: ENGL 102 or required scores in TOEFL, SAT or IELTS.

ENGL 204 LANGUAGE, SOCIETY AND CULTURE **3.0: 3 cr.**

This course examines how social and cultural factors influence language, and the role language plays in representing social and cultural categories.

This course satisfies the exit requirements of the Department of English Language and Literature in oral communication, critical thinking, academic writing, and writing for different purposes.

Pre-requisites: ENGL 203.

ENGL 220 APPROACHES TO LITERATURE: WAYS OF READING **3.0: 3 cr.**

This course is an introduction to literary study that develops students' critical reading skills through the analysis of poetry, prose fiction, drama, and film. The key themes of the course will focus on the ways different individuals, societies and cultures represent themselves in literature, and how we read and interpret those forms of representation through the application of critical theory tools and theories.

Pre-requisite: ENGL 203.

ENGL 221 LITERATURE I: RENAISSANCE TO ROMANTICISM **3.0: 3 cr.**

This course consists of a sustained study of historical, biographical, thematic and formal elements of the Old English, Medieval, Renaissance, and Early Modern eras with readings drawn from the works of figures such as Chaucer, Spenser, Marlowe, Shakespeare, Donne, Milton, Pope, Swift, and Johnson, as well as others of major significance, in poetry, drama, and prose.

Pre-requisite: ENGL 203.

ENGL 222 LITERATURE II: 1800—PRESENT DAY **3.0: 3 cr.**

This course aims to illustrate the impact upon literary form of the moral, political and aesthetic debates about gender, ethnicity, class and the structures of expression and power in which Victorian, Modernist and Postmodernist writers were engaged. Authors studied may include Carlyle, Dickens, Ruskin, Arnold, George Eliot, Wilde, Shaw, TS Eliot, Woolf and Calvino.

Pre-requisite: ENGL 203.

ENGL 223 COMPARATIVE AND WORLD LITERATURES**3.0: 3 cr.**

The course examines literature within an international frame, reading literature across borders of language, time, and place. The course will introduce students to different cultures, genres and modes in literature. The course might also take the Middle East as its focal point through reading English translations of Middle Eastern texts, Middle Eastern literature written in English, and literature from elsewhere that has been influenced by Middle Eastern literature.

Pre-requisite: ENGL 203.

ENGL 230 INTRODUCTION TO LANGUAGE**3.0: 3 cr.**

This course is a general introduction to language and to the nature of the human communication system. Topics included in the course are language and mind, first and second language acquisition, language maintenance, shift and death, and the social and cultural factors which affect language.

Pre-requisites: ENGL 203.

ENGL 238 INTRODUCTION TO LITERARY THEORY**3.0: 3 cr.**

This course introduces different critical approaches and practices in literary studies from classical times to the present in order to expand the range of critical tools available to literature students and to increase the range of their critical vocabularies. Emphasis in the course will be placed not only on an understanding of the range of literary criticism but also upon the application of critical frameworks to literary texts.

Pre-requisite: ENGL 203.

ENGL 239 THE HISTORY OF THE ENGLISH LANGUAGE**3.0: 3 cr.**

In this course, the historical development of the English language is examined, tracing the language to its Indo-European and Germanic ancestry, and examining the linguistic, historical and social characteristics of Old English, Middle English and Modern English. The course also addresses issues in the study of contemporary English.

Pre-requisites: ENGL 203.

ENGL 244 MODERN DRAMA IN ENGLISH**3.0: 3 cr.**

This course consists of the reading and analysis of English-language drama, British, American, or Commonwealth, of the Modern Era, with attention to contemporaneous contexts of history, social issues, aesthetic and literary movements, and corresponding national culture.

Pre-requisites: ENGL 203.

ENGL 245 THE MODERN NOVEL**3.0: 3 cr.**

This course consists of reading and analysis of English-language novels, British, American, or Commonwealth, of the Modern Era, with attention to contemporaneous contexts of history, social issues, aesthetic and literary movements, and corresponding national culture. This course satisfies the exit requirements of the Department of English Language and Literature in oral communication, critical thinking, academic writing, and writing for different purposes.

This course will look at various narrative forms, themes, and character development (or lack thereof) as embodied through three important novels of the twentieth-century and one novel from the early 21st century.

Pre-requisites: ENGL 203.

ENGL 246 MODERN POETRY IN ENGLISH**3.0: 3 cr.**

This course is a study of the poetry of major British poets such as Hardy, Yeats, Thomas, TS Elliot and Auden. This course satisfies the Department of English Language and Literature's exit requirements in oral communication critical thinking, academic writing and writing for different purposes.

Pre-requisites: ENGL 203.

ENGL 247 TOPICS IN AMERICAN LITERATURE**3.0: 3 cr.**

This course focuses on the study of a particular author, period, topic or problem taken from American literature.

Pre-requisites: ENGL 203.

ENGL 249 THE LINGUISTICS OF ENGLISH**3.0: 3 cr.**

This course is a general introduction to the linguistic structure of English, and the social and cultural factors which affect the language. By the end of the course, students are expected to have developed skills for describing and analyzing the English language and to show an understanding of the context of English language usage.

Pre-requisites: ENGL 203.

ENGL 251 DISCOURSE ANALYSIS**3.0: 3 cr.**

This course is an introduction to the central theories and methods in the analysis of spoken and written units of language, which are larger than the sentence. Topics include speech act theory, ethnography of communication, conversation analysis, interactional sociolinguistics, and critical discourse analysis. The course places particular focus on the examination of real-life samples of language.

Pre-requisites: ENGL 203

ENGL 252 MORPHOLOGY AND SYNTAX**3.0: 3 cr.**

This course is an in-depth examination of the word and sentence structure of the English language. Students learn to identify and describe the main morphological and syntactic constructions in English.

Pre-requisites: ENGL 203.

ENGL 253 CREATIVE WRITING**3.0: 3 cr.**

A course for new writers wishing to establish and enhance basic skills in original writing. Equal attention will be given to the work turned in for critique and to the development of the student's critical skills. This course satisfies the exit requirements of the Department of English Language and Literature in oral communication, critical thinking, academic writing, and writing for different purposes.

Pre-requisite: ENGL 203

ENGL 256 LITERATURE AND IDENTITY**3.0: 3 cr.**

This course examines literature as an expression of various national, racial, ethnic or gender identities.

Pre-requisites: ENGL 203.

ENGL 257 LITERATURE AND FILM**3.0: 3 cr.**

This course will focus on the relationship between literature and film. At the core of this study will be the investigation of film interpretations of literary texts.

Pre-requisites: ENGL 203.

ENGL 260 ELT PEDAGOGY**3.0: 3 cr.**

This course provides students with a theoretical foundation for the teaching of the English language. The course develops a basic understanding of the principles of teaching language skills as well as the teaching of literature.

Pre-requisites: ENGL 222 and 252.

ENGL 261 SENIOR SEMINAR**3.0: 3 cr.**

This course provides a senior capstone experience for the English major students. This course will afford each student the opportunity to focus on a subject of interest and pursue a semester-long project culminating in a senior essay of 5000+ words .

Pre-requisites: ENGL 203.

University of Balamand Dubai
Faculty of Arts and Sciences
Department of Education

Mission Statement

The Department of Education at the University of Balamand Dubai is founded on four pillars that are rooted in civic engagement, aesthetic appreciation, human fulfillment and professional expertise and integrity. It believes that the educator is an essential person directly responsible for the facilitation of the development of the child. This development implies the flourishing of curiosity and exploration in ways that allow the child to understand the laws of an ever-changing environment, to critically approach new situations, inventions and discoveries that cross his/her path, and to creatively find solutions or alternatives to practical problems. The Department insists on the integrity of the human being and the inter-relationship among physical, cognitive and socio-affective fields of functioning. This philosophy is promoted through the adoption of interdisciplinary, socio-constructivist and socio-cultural approaches to training educators.

Teaching Diploma program learning Objective:

The aim of the specialized TD is to prepare future educators to:

- Develop their knowledge of teaching and learning methodologies.
- Explore different educational systems.
- Teach specific disciplines using proper teaching methods and classroom management techniques.
- Explore traditional and alternative assessment tools.
- Use Information and Communication Technologies (ICT) to enhance student learning and assessment.
- Identify learner developmental characteristics and needs

Learning Outcomes at the TD Level:

At the end of the Specialized TD program, students will be able to:

1. Teach a specific discipline at the intermediate and secondary levels with an emphasis on developing students' knowledge of instructional methodologies and the national educational system.
2. Explore and apply Information and Communication Technology (ICT) in teaching.
3. Demonstrate problem - solving abilities applicable to diverse classroom contexts.
4. Create various discipline-related assessment tools which allow the evaluation of students' learning abilities, their academic needs and their progress.
5. Demonstrate cooperative and active teaching skills.
6. Plan lessons, units and curricular cycles by choosing appropriate teaching methodologies and assessment tools.
7. To prepare educators to be class instructors capable of classroom management.
8. Demonstrate autonomous, professional and reflective skills.

The core courses (24 Credits) are distributed as follows:

| SEMESTER 1 | SEMESTER 2 |
|--|--|
| EDUC 217: School General Didactics (3cr.) EDUC 253: Instructional Computer Applications in Education (3cr.) Specialized Didactics Course (3cr.) EDUC 290: Studies in Inclusive Education (3cr.) | PSYC 254: Psychology and Education (3cr.) PRAC 258: Practicum (6cr.) EDUC 275: Classroom Management (3cr.) |

The student should select 1 course (3 credits) of the following courses in specialized didactics depending on his/her BA/BS specialization.

| <i>Specialized TD Tracks</i> | <i>Courses (3 cr. each)</i> |
|------------------------------|---|
| TD in English Language | EDUC 277: Teaching English at the Intermediate Level |
| TD in Mathematics | EDUC 258: Teaching Mathematics in Intermediate and Secondary School |
| TD in Biology | EDUC 268: Teaching Biology at the Intermediate and Secondary Level |
| TD in Business | EDUC 287: Teaching Business at the Secondary Level |
| TD in Chemistry | EDUC 269: Teaching Chemistry at the Intermediate and Secondary Level |
| TD in Physics | EDUC 285: Teaching Physics at the Intermediate and Secondary Level |
| TD Special Education | EDUC 289: Intervention for students with learning disabilities (3 credits each) |
| TD Visual Arts | EDUC 279: The teaching of Arts |

COURSE DESCRIPTION

EDUC 217 GENERAL DIDACTICS

3.0: 3 cr.

The objective of this course is to become acquainted with didactic terminology and concepts. It includes a theoretical and practical part. The theoretical part anchored in a scientific experimental methodology of thinking consists of developing the different concepts: didactic triangle, didactic transposition, didactic contract, didactic mediation and didactic situation. The practical part anchored in a scientific experimental methodology of acting aims at describing, explaining and critically analysing concrete teaching - learning situations.

EDUC 253 INSTRUCTIONAL COMPUTER APPLICATIONS IN EDUCATION

3.0: 3 cr.

This practical course aims to introduce students to the effective use of information and communication technology in education (ICT): software for Presentation, Audacity, HotPotatoes and the interactive white board (IWB). Learners will be able to have a better control on the search tools using the advanced features. From a methodological point of view, the course is based on active methods, interdisciplinary, problem-based learning and project-based learning.

EDUC 258 TEACHING MATHEMATICS IN INTERMEDIATE AND SECONDARY SCHOOL I

3.0: 3 cr.

This course introduces students to major concepts of mathematics in intermediate and secondary school. It provides perspectives on trends in mathematics education and the process of doing mathematics. This course develops the core ideas of learning, teaching, planning, and assessment. It also helps students to develop pedagogical strategies that serve as a resource for teaching now and in the future.

CO-Requisite: EDUC 217

EDUC 268 TEACHING BIOLOGY AT THE INTERMEDIATE AND SECONDARY LEVEL

3.0: 3 cr.

This course intends to introduce students to the major concepts tackled in the national curriculum for Biology and Chemistry at the intermediate level. Another aim is to develop the didactic skills related to the teaching of this discipline. Students will learn to recognize how concepts related to the discipline are developmentally constructed in learners' minds. They will be able to choose the strategies and tools to facilitate this construction. In addition, students will learn to develop interdisciplinary activities that reinforce the learning of the discipline. Methodologically the course exposes students to educational problems related to the discipline and encourages them to propose hypothetical solutions. Students will be asked to observe classes, and to prepare and give model lessons in preparation for the practicum courses.

EDUC 269 TEACHING CHEMISTRY AT THE INTERMEDIATE AND SECONDARY LEVEL

3.0: 3 cr.

This course is designed to provide you with an understanding of how to teach chemistry at the intermediate and secondary level. There should be lots of opportunities to draw on what you've already learned in all your previous education courses. Through class discussions, readings and writing assignments, you will be introduced to the goals of chemistry teaching, how to select the appropriate teaching strategies and resources to achieve these goals and how to assess students.

EDUC 275 CLASSROOM MANAGEMENT

3.0: 3 cr.

This course explores the role of the teacher as a moral agent who reflects ethical actions, decisions and professional practice in the classroom. The course also reviews and analyzes ways that a teacher can establish a positive classroom atmosphere through the review and analysis of several theoretical frameworks for behavior intervention. Students become aware of the role of the teacher as a relational-agent responsible for managing the components of the classroom environment in order to establish the appropriate atmosphere for facilitating learning and development. Methodologically the course exposes students to minor and major managerial issues and encourages them to propose hypothetical solutions or interventions.

Pre-Requisites: EDUC 217

EDUC 277 TEFL**3.0: 3 cr.**

This course intends to introduce students to the major concepts tackled in the curriculum for the English language, both oral and written skills, at the intermediate and secondary levels.

Co-Requisites: EDUC 217

EDUC 281 SELECTED TOPICS IN ENGLISH**3.0: 3 cr.**

This course intends to delve into issues related to the teaching of English at the intermediate and secondary levels. The course will deal with current issues for example the use of ICT in the teaching of English, and the use of drama and literature as teaching tools among other themes. The course will also explore ways to integrate the language skills effectively. Methodologically the course exposes students to educational

problems related to the discipline and encourages them to propose hypothetical solutions. Students will be asked to observe classes, and to prepare and give model lessons in preparation for the practicum courses.

EDUC 284 TEACHING MATHEMATICS IN INTERMEDIATE AND SECONDARY SCHOOL II**3.0: 3 cr.**

This course is the second course in teaching mathematics in intermediate and secondary classes. It builds upon the content in EDUC 258 and moves beyond planning lessons to planning whole units. This course reinforces the core ideas of learning, teaching, planning, and assessment. It also sheds light on the importance of using technology in mathematics classes. Project based learning is introduced with emphasis on STEM project based learning lessons.

Pre-requisite: EDUC 258

EDUC 285 TEACHING PHYSICS AT THE INTERMEDIATE AND SECONDARY LEVELS**3.0: 3 cr.**

This course intends to introduce students to the major concepts tackled in the curriculum for Physics at the intermediate and secondary levels.

EDUC 287 TEACHING BUSINESS**3.0: 3 cr.**

This course presents various teaching and learning methodologies with an application to business disciplines. After an initial revision of the main topics covered in a business curriculum (economics, finance, accounting, management, marketing, etc.), the course will expose students to various didactic theories and practices from a general perspective, with an application to business disciplines. Special emphasis will be placed on teaching skills related to problem solving abilities in the workplace as well as the fundamental role of ICT in teaching business.

EDUC 289 INTERVENTION FOR STUDENTS WITH LEARNING DISABILITIES**3.0: 3 cr.**

This course aims to enhance the ability of students to meet the needs of students with learning disabilities through providing a background of effective interventions for those students. The students will be exposed to different approaches and resources that are used to help students struggling with math skills, reading comprehension, and writing.

Co-Requisites: EDUC 217

EDUC 290 STUDIES IN SPECIAL EDUCATION**3.0: 3 cr.**

This course prepares students to identify diverse learning needs of school students who have a range of abilities, disabilities and impairments. It develops students' knowledge and understanding of implications of disabilities from an educational and developmental perspective. Students are introduced to international policies, legislation and research influencing classroom practices for children with special needs. They explore theories and research relating to disability and investigate common approaches to the education of children with special needs including inclusive education, and differentiated instruction. They also learn how environments, curricula and pedagogies can be modified to support learner's diverse needs. Students develop

an understanding of the importance of partnership with families and support staff to enhance the learning outcomes of children with special learning. Students will complete 10-12 hours of the practicum experience in this course and will include selected assignments for the Teaching Diploma e-portfolio. (The Teaching Diploma e-portfolio and the practicum components are clearly delineated in the University of Balamand Dubai Department of Education's Practicum Handbook)

Pre-Requisites: EDUC 217

PRAC 258 PRACTICE OF TEACHING IN THE INTERMEDIATE AND SECONDARY LEVELS

6 cr.

The purpose of this course is to prepare students to take on the responsibility of teaching the intermediate and secondary levels. They will be responsible for a class throughout a semester and will teach their subject of specialization. Students will also be required to maintain a portfolio of lesson plans and reflective journal entries. The Practicum Policy Book will be referred to.

PSYC 254 PSYCHOLOGY AND EDUCATION

3.0: 3 cr.

This course introduces students to the vast spectrum of learning theories and their application in the family as well as in the community and school settings. It focuses on the continuous and dynamic relationship between familial guidance and educational pedagogy. Methodologically the course will utilize a comparative critical analysis of major learning theories such as behavioral theories, gestalt theories, social cognitive theories, cognitive theories and socio-affective theories.

GENERAL EDUCATION COURSE DESCRIPTION

BIOL 005 UOP BIOLOGY

3.0: 0 cr.

This foundation course in Biology aims to introduce students to the basic concepts of functional characteristics of living systems, the human systems and the interactions of living things among each other's and with the environment.

BUSN 101 INTRODUCTION TO BUSINESS

3.0: 3 cr.

This is a survey of the major fields in business administration. Topics covered include an overview of management, marketing, finance, accounting, data processing and economics.

CHEM 005 UOP CHEMISTRY

3.0: 0 cr.

This foundation course in Chemistry aims to develop the ability of students to solve chemical problems in varied contexts. It covers the following topics: Atomic theory of matter, mole concept, calculations with chemical formulas and equations, stoichiometry, introduction to quantum chemistry.

COMP 200 COMPUTER APPLICATIONS

2.0: 2 cr.

This course orients the student to the use of the computer as a productivity tool. It is an introductory course in data processing. The course offers a basic understanding of computers, their uses and limitations. It includes word processing, presentation preparation and spreadsheet analysis.

CSIS 100 BASIC COMPUTER APPLICATIONS

2.4: 2 cr.

The course is intended to help the students master a number of software packages used in problem solving and daily operations in their different fields. The applications covered are mainly: word processing, spreadsheets, internet and presentations. The course employs a combination of lecture-based delivery of material and experimental hands-on problem solving workshops.

CSIS 206 PRINCIPLES OF PROGRAMMING

3.0: 3 cr.

This course is designed to introduce students to the concept of computing and programming principles. It is intended to establish concrete skills in the constructs and algorithmic methods as an essential part of the

software development process. The topics include: algorithms, procedural programming, data representation, basic programming control structures (sequence, selection and repetition), functional decomposition, functions call and arrays.

CSIS 101 COMPUTER LITERACY

3.0: 3 cr.

This course helps the student become a power user of several software packages used in daily problem solving. Topics covered include: personal productivity tools, statistical software for data analysis, database querying and Internet use. The course employs a combination of lecture-based delivery of material and experimental hands-on problem solving workshops.

CSPR 205 PSYCHOLOGICAL BASES OF BEHAVIOR

3.0: 3 cr.

The course explores human nature in all its aspects, including the nature of mind, the human brain, neural bases of sensory processing and behavior; perception and cognition; language acquisition; child development; consciousness, memory and the emotions; personality; psychopathology and deviant behavior. The issues will be contextualized within the framework of larger debates concerning the respective roles of nature and nurture in human development; how we understand the human ‘Self’ and human differences and the relation of the human Self to society. The course is designed primarily for pre-MCAT science majors.

CSPR 206 SOCIAL BASES OF BEHAVIOR

3.0: 3 cr.

This course will focus upon the ways social processes, norms and cultures influence human behavior. The course will provide a foundation for understanding social structures and institutions, and how and why individuals interact within and among societies. It will cover the components of social structure, focusing on theoretical approaches to studying society including functionalism, conflict theory, symbolic interactionism and social constructionism. The course may also address specific social institutions such as education, the family, religion, government, health and medicine as well as introduce analytical tools such as demographic characteristics and processes; structures and structural shifts; social class, theories of stratification, social mobility and poverty. The course is designed primarily for pre-MCAT science majors.

EDUC 213 FOUNDATIONS OF EDUCATION

3.0: 3 cr.

This course introduces students to the evolution of education throughout history. The course will use a comparative approach to enable the students to become conscious of existing bonds between the different components of an educational operation and the socio-historical context of its development. The Lebanese system will receive specific emphasis and analysis. Pioneers of educational theory such as Rousseau, Dewey, Montessori, Freinet, etc. will be critically analyzed for their relationship with their context.

EDUC 217 GENERAL DIDACTIC

3.0: 3 cr.

The objective of this course is to become acquainted with didactic terminology and concepts. It includes a theoretical and practical part. The theoretical part anchored in a scientific experimental methodology of thinking consists of developing the different concepts: didactic triangle, didactic transposition, didactic contract, didactic mediation and didactic situation. The practical part anchored in a scientific experimental methodology of acting aims at describing, explaining and critically analysing concrete teaching - learning situations.

EDUC 275 CLASSROOM MANAGEMENT

3.0: 3 cr.

This course explores the role of the teacher as a moral agent who reflects ethical actions, decisions and professional practice in the classroom. The course also reviews and analyzes ways that a teacher can establish a positive classroom atmosphere through the review and analysis of several theoretical frameworks for behavior intervention. Students become aware of the role of the teacher as a relational-agent responsible for managing the components of the classroom environment in order to establish the appropriate atmosphere for facilitating learning and development. Methodologically the course exposes students to minor and major managerial issues and encourages them to propose hypothetical solutions or interventions.

Pre-Requisites: EDUC 217

ENGL 001 INTENSIVE ENGLISH I**10.10: 10 cr.**

This course focuses on developing the student's ability to read, write, and speak using English as the language of communication. The student is also exposed to the techniques and skills needed for effective communication. This course assumes an Intermediate level of English upon successful completion. (TOEFL score between 410 and 447, or SAT score between 290 and 319).

ENGL 002 INTENSIVE ENGLISH II**10.10: 10 cr.**

This course is a continuation of and focuses on developing the student's ability to read, write and speak using English as the language of communication. This course assumes an Upper Intermediate level of English upon successful completion.

Pre-requisite: ENGL 001 or a TOEFL score between 450 and 477, or SAT score between 320 and 349.

ENGL 003 INTENSIVE ENGLISH III**7.8: 10 cr.**

This course is the final course in the Intensive English sequence and continues to focus on the student's ability to read, write and speak using English as the language of communication. This course assumes an Advanced level of English upon successful completion.

Pre-requisite: ENGL 002 or a TOEFL score between 480 and 523, or SAT score between 350 and 379.

ENTR 201 INNOVATION AND ENTREPRENEURSHIP**3.0: 3 cr.**

This course introduces the students to the systematic processes of the innovation management, new venture creation and entrepreneurship. It focuses on the challenges and important issues of the entrepreneurial cycle associated with recognizing, launching, growing and valuing new business ventures. The entrepreneurship and innovation course is designed for the study of all aspects of starting and running a new venture. It describes the framework conditions for entrepreneurship and analyses the core factors required for successful innovative entrepreneurship. The course explores the analytical techniques needed to recognize emerging business opportunities, understand the various financing choices, apply valuation methodologies, screen a business side, develop a marketable business plan, manage growth in a rapidly evolving environment, and successfully capitalize the value of a business. Students also identify their potential for creating a business or marketable product/idea.

HIST 101 THE TWENTIETH CENTURY**3.0: 3 cr.**

The purpose of this course is to help students gain an understanding of themselves as members of a global community.

Through the examination of diverse world cultures, students will come to appreciate both their heritage and that of other people. By studying the past with emphasis on major themes and developments in history, students will gain a clearer understanding of the present day, and make responsible decisions for the future.

ISLM 101 ISLAMIC STUDIES**3.0: 3 cr.**

This course provides an introduction to some of the major questions preoccupying philosophical thinkers as they relate to our understanding of the nature of the world, the extent to which we can gain knowledge of it, and how we calibrate our existence to it. The course will therefore address themes that may include the status of knowledge and how we attain it; mind and body; reality and truth; rationality and irrationality; skepticism and the problems with belief; the nature of space and time, causation and substance; past, present and future; virtual realities.

LISP 200 LIBRARY USE AND RESEARCH METHODS**1.1: 1 cr.**

This course teaches the fundamentals of library use and research techniques, in addition, it focuses on the uses of the different library resources and their use.

MATH 005 UOP MATH**3.0: 0 cr.**

This foundation course in Math aims to introduce students to the basic ideas concerning: Equations,

inequalities, absolute value, remarkable identities, factorization and binomial formulas are introduced. Trigonometry is introduced in full detail, such as basic formulas, transformation formulas, trigonometric equations and graphs. Notion about limit and study of the indeterminate form are introduced. Fully study derivative. Introduction to antiderivative, indefinite and definite integrals with all basic formulas are introduced.

MCOM 201 AUDIOVISUAL AND ELECTRONIC TECHNIQUES 3.0: 3 cr.

Divided into two parts, this course will trace the historical, economic, technological, political and theoretical developments in media and communications. In addition, students will acquire basic knowledge of production procedures and techniques, with practical experiences of radio, TV and new media technologies.

MCOM 220 JOURNALISTIC FORMS 3.0: 3 cr.

This course introduces students to and trains them in the forms of journalistic reporting (news, reports, interviews, debates, commentaries) as well as the actual operation of news agencies.

MCOM 225 ACTING FOR FILM AND TELEVISION I 3.0: 3 cr.

This course instructs students on the art of performance, covering basic stage acting techniques, to camera performance, and TV broadcasting. Student will be guided through the basic elements required to present, host, and report live and recorded shows and broadcasts.

PHIL 101 INTRODUCTION TO PHILOSOPHY I 3.0: 3 cr.

This course is a general introduction to the story and history of philosophy. We will focus on the development, beliefs, methods and positions which have been put forward, scrutinized over long periods of time. Topics may include epistemology (the nature and justification of knowledge), metaphysics, ontology (the nature of being), and questions concerning the existence of God, morality and freedom and determinism. Classic, Medieval (Christian and Islamic), modern and contemporary readings are examined.

PHYS 005 UOP PHYSICS 3.0: 0 cr.

This foundation course in Physics aims to develop the ability of students to the basic concepts of: Position, displacement, velocity and acceleration of a mobile. Forces involved in a problem, Newton's second Law. Energy: Kinetic and potential, Work and conservation of mechanical energy. Electric Charge and electrostatic force and field. Electric current, resistors, generators and receivers. Magnetic field and induced electric current.

PSIA 101 INTRODUCTION TO POLITICAL SCIENCES I 3.0: 3 cr.

The course examines political science as an interdisciplinary field of study that focuses on politics in its relation with the economy, culture, society and the global world. It explores major political ideologies such as liberalism, conservatism and socialism as well as issues concerning the historical origin of nations and states, democracy and totalitarianism, violence and revolutions. It also analyzes governments with the aim to explain the rationale behind their actions. It finally looks at the interaction between politics and the economy within the emerging global system and provides an outline of the complex world of international politics.

PSYC 101 INTRODUCTION TO PSYCHOLOGY I 3.0: 3 cr.

This is an introductory course which surveys the development of psychology from its inception up to the present, with emphasis on major concepts and schools. Class lectures and discussions are supplemented with selected readings.

PSYC 200 INTRODUCTION TO PSYCOLOGY 3.0: 3 cr.

This introductory course traces the history and evolution of psychology as a science. It provides a broad perspective on psychology that covers the history, methods of research, major theories and contemporary perspectives in psychology. It explores the applications of the knowledge gained from psychological studies in

the problems and challenges of today's world. It familiarizes the students with the major concepts associated with each school of psychology. It also exposes the student to the major specialty areas within the profession of psychology.

PSYC 229 SOCIAL PSYCHOLOGY

3.0: 3 cr.

This course introduces students to the vast spectrum of social phenomena that influence how people are, what and how they feel, think, and do. It will focus on the continuous inter-structuration among individual and collective realities in understanding personal behavior and everyday life situations. It will introduce students to basic concepts in social psychology (culture; society; socialization, marginalization and discrimination; social cognition; concept of self; social influence; adaptation etc...). Students will also be introduced to investigatory techniques used in social psychology.

PSYC 254 THEORIES OF LEARNING

3.0: 3 cr.

This course introduces students to the vast spectrum of learning theories and their application in the family as well as in the community and school settings. It explores the motivational processes inherent to different learning theories. Methodologically the course will apply a comparative critical analysis of major learning theories such as behavioral models, gestalt models, socio-cognitive models, information processing models; constructivist and socio-constructivist models.

SOCL 101 INTRODUCTION TO SOCIOLOGY I

3.0: 3 cr.

This course serves as an introduction to Sociology. Sociologists study human behavior and the organization of society. Their work assumes that social forces external to individuals shape behavior. More specifically, sociology examines the interactions among social institutions, cultures, groups & individuals. It focuses on how unequal power relations organize the social world & shape individual lives. The science aims to understand and explain what these specific forces are and make valid predictions concerning how they shape behavior within social groups. Using scientifically generated knowledge, sociologists hope to control human behavior through the creation of sound public policy.

SOCL 201 UAE STUDIES

3.0: 3 cr.

This course works to build up the national belonging and appreciation of the UAE national achievements through educating students on the key social aspects of the Emirates society, basic values and its inheritance. It offers the knowledge relevant to UAE history and geography, aspects of internal and external policy, aspects of the social systems and social human development and the country tendency to sustainable energy, economic development, developmental indicators and the country standing in the global competitiveness. In addition it highlights the future developmental strategic plans and the challenges facing the UAE.