

## Course Descriptions

## وصف المقررات

Department: Electronics Engineering

القسم: الهندسة الإلكترونية

Program: Bachelor of Communications and  
Informatics Engineering

البرنامج: بكالوريوس هندسة الاتصالات  
والمعلوماتية

## University Requirements

## متطلبات الجامعة

BUST01 Skill of Holy Quran Recitation & Tajweed	(2P) 1 credits
يعد هذا المقرر من المقررات المهمة؛ كونه متعلق بكلام الله تعالى ثم إنه من متطلبات الجامعة، وهو مقرر نظري وتطبيقي يقوم الطالب فيه بتلاوة وحفظ نصف جزء عم من سورة (الطارق- الناس)، ودراسة الآداب التي ينبغي أن يتحلى بها قارئ القرآن، وفهم وتطبيق هذه الأحكام عند قراءة القرآن الكريم، وتستخدم طريقتي الحوار والمناقشة في التدريس، ويتم تقييم الطالب من خلال تلاوته للقرآن أثناء اللقاءات التعليمية، والقيام بالتكليفات المصاحبة - الصفية واللا صفية - مع الامتحان النصفى والنهائي.	
BUST02 English Language (1)	(8P) 4 credits
The current course provides students with the language basics of everyday English to help them communicate in different real life situations. The course focuses more on real life conversations and the basic grammars that will help each one in his/her major. Moreover, the course provides students with plenty of writing and speaking practices. The updates of the book allow students to be posted with the latest language uses and functions that are easy and useable in real life situations.	
BUST03 Arabic Language	(2L,4P) 4 credits
يهتم المقرر بتنمية المهارات اللغوية الأساسية للطالب كونه من متطلبات الجامعة، ويتناول جملة من النشاطات الاتصالية والدروس اللغوية والإملائية والتركيبية ويحتوي على معارف ونصوص وتدريب لغوية، ويتألف من كتابين: الأول يركز على مهارتي الاستماع والتحدث، والثاني يركز على مهارتي القراءة والكتابة، مع احتواء كل من الكتابين على أساسيات التركيب النحوي وبعض القواعد الإملائية، ويعتمد المقرر أسلوب التدريبات والتطبيقات العملية لكل طالب، بالإضافة إلى النصوص التطبيقية في CD المرفق بالكتاب مع الامتحان النصفى والنهائي.	
BUST04 Leadership Skills Development	(1L) 1 credits
يهدف المقرر الى تنمية بعض المهارات القيادية والإدارية لدى الدارسين، وتنمية فرص التميز لديهم، من خلال تعريفهم بسمات الشخصية القيادية والإدارية، وأهم طرق واساليب التحول من التبعية الى القيادة، وتعريفهم بأهم استراتيجيات التميز والتفاعل القيادي، إضافة الى تنمية بعض مهارات وأخلاقيات القيادة والإدارة المتعلقة بالتخطيط وإدارة الذات والآخرين، وطرق واساليب اتخاذ القرارات الفعالة، واساليب التحفيز، واساليب التحفيز، ومهارات قيادة التغيير، وأخلاقيات الإدارة والقيادة.	
BUST05 Islamic Culture	(4L) 4 credits
يعد مقرر الثقافة الإسلامية من أهم المقررات الدراسية وذلك للدور الذي يساهم فيه هذا المقرر في تكوين الشخصية المسلمة القادرة على قراءة ماضيها وفهم واقعها والإسهام الإيجابي في بناء المستقبل بناءً يوافق شرع الله ويلبي احتياجات العصر من غير إفراط ولا تقريط (بوسطية). ويتم أخذ هذا المقرر بطريقة الحوار والمناقشة، كما يكلف فيه الطلبة بالبحوث التي تخدم أهداف المقرر. ويتم تقييم الطلبة عن طريق المشاركة الصفية واللاصفية والأعمال التي يكلف بها الطلبة والاختبارات النصفية والنهائية.	

<b>BUST06 English Language (2)</b>	<b>(8P) 4 credits</b>
<p>The current course provides students with the language basics of everyday English to help them communicate in different real life situations. The course focuses on real life conversations and the basic grammars that will help each one in his major.</p> <p>Moreover, the course provides students with plenty of writing and speaking practices. The updates of the book allow students to be posted with the latest language uses and functions that are easy and useable in real life situations.</p>	
<b>BUST07 Communications Skills</b>	<b>(1L) 1 credits</b>
<p>يهدف مهارات الاتصال إلى إمام الطالب بالنظريات والمفاهيم الأساسية في مجال الاتصال الإنساني، وتنمية المهارات الأساسية في مجال التواصل الجيد مع الذات ومع الآخرين، وتعزيز ممارستها في حياته اليومية والعملية باستخدام أساليب جديّة تعتمد على التدريب والتقويم المتنوع والفعال، بما يساهم في إنجاح حياته الخاصة والعملية على حد سواء.</p>	
<b>BUST08 Critical Thinking</b>	<b>(1L) 1 credits</b>
<p>التفكير الناقد مادة هدفها الأساسي بناء وتنمية مهارة الطلاب الذهنية في مجال التعامل مع الآراء والأفكار المقروءة أو المسموعة أو المرئية لإبداء الرأي المؤيد أو المعارض استناداً إلى المهارات الذهنية المنظمة، والمهارات المعرفية والخبرات والتجارب.</p> <p>يتضمن العديد من الموضوعات الرئيسية كمفهوم التفكير الناقد وفائدته العملية والتعليمية وفي الفصل الدراسي، ومعاييره، ومواقفه ومقوماته الأساسية والمساعدة، وكيفية بناء حجج مقنعة بالاستناد إلى الاستدلال الناقد، مع بيان صور المغالطات والخدع البلاغية، ثم توجت المادة بخاتمة تضمنت تطبيق مهارات التفكير على بعض الظواهر والمجالات الحيوية في الحياة، والطريقة المثلى لتدريسها تكاد تنحصر في الجانب النظري من خلال المحاضرات والمداخلات والمناقشات المستفيضة، مع تعزيز ذلك بقدر كبير من الأساليب التدريسية، كلعب بعض الأدوار، وعرض مقاطع فيديو بالصوت والصورة، وإجراء بعض المناظرات، خصص لتدريسها والتدريب على بعض مفاهيمها 14 ساعة في الفصل الدراسي الواحد، وتدرس بنظام الساعة (زمن المحاضرة ساعة واحدة).</p>	
<b>BUST09 Computer Skills</b>	<b>(6P) 3 credits</b>
<p>This course provides a student by basic skills for using computer at studying environment, library, and at home. It presents the knowledge of basic computer and information technology concepts. The course provides the knowledge needed to operate and utilize the operating system and office software package, and to use the computer for Internet access and electronic communication.</p>	
<b>BUST10 Research Methodology</b>	<b>(2L) 2 credits</b>
<p>يُعد هذا المقرر من أهم المقررات الدراسية كونه يمكن الطالب الجامعي من المهارات التي تساعده على إنجاز بحث التخرج، وهو يعمل على إكسابه مجموعة من المعلومات والمعارف حول العلم والمعرفة، والبحث العلمي ومناهجه، وينمي الاتجاهات الإيجابية لدى المتعلم تجاه البحث العلمي، ويتحقق ذلك من خلال مجموعة من الأنشطة الفاعلة (طرائق وأساليب تدريس، ووسائل) كطريقة الحوار والمناقشة، والتعلم الذاتي، والبحث، والتطبيقات، مع استخدام البايوربينت عند العرض، وتقييم الطالب من خلال المشاركة الصفية والتكليفات المصاحبة – الصفية واللاصفية – والاختبار النصفى والنهائى.</p>	
<b>Faculty Requirements</b>	
<b>متطلبات الكلية</b>	
<b>BENG01 Mathematics</b>	<b>(2L, 2T) 3 credits</b>
<p>Course discusses the principles of Linear Equations and Applications, Linear Inequalities, Absolute Value in Equations and Inequalities, Quadratic Equations and Applications, Laws of Power and Logarithm, Power and Logarithm Equations, Functions, type of Functions, limited and continuity.</p>	



<b>BENG02 Engineering Drawing</b>	<b>(3L) 3 credits</b>
The general aim of this course is to provide students with theoretical and practical background in Engineering Drawing. This Course focuses on principles, terminologies, tools of Engineering Drawing to enhance the positive ability of students in being more precise in Drawing and measurements. Teaching strategies this course are lectures and activation the hand skill of student through practical assignment in class as well as home works. Assessment tasks are homework assignment and exams. This course does not have any pre-requests.	
<b>BENG03 Physics</b>	<b>(2L, 2T, 2P) 4 credits</b>
The importance of this course is to provide students with physical background of the variable ways to solve real problems. This Course includes physical quantities, vectors, Newton's Laws of Motion, physical prosperities of materials, Waves and sounds, Electricity, Magnetism, Light and Optics. The course carried out using the lectures and self-learning and discussion, Miniature education, solve problems, experiments used to teach this course, We will use strategies assessment Quizzes, Written Examinations, oral examinations, notes, and micro-reports and there are no pre-requests.	
<b>BENG04 Calculus</b>	<b>(2L, 2T) 3 credits</b>
Course discusses the principle of limited and show the theories of limited and continue, how to procedure differentiation and its special rules with the study of implicit functions differential, defined the integration and the link between the processes of differentiation and integration, integration rules, methods of integration and its practical applications.	
<b>BENG05 Statistics &amp; Probability</b>	<b>(2L, 2P) 3 credits</b>
The Course discusses: displaying the data, measures of central tendency, measures of dispersion, correlation, simple regression, types of random variables and some probability distributions.	
<b>BENG06 Engineering Mechanics</b>	<b>(2L, 2T) 3 credits</b>
This course is a combination of Engineering Mechanics (Statics) and Engineering Mechanics (Dynamics). From the Statics point of view, it provides a basic understanding of the part of mechanics which is concerned with the equilibrium of bodies under the action of forces. Topics covered include basic concepts of mechanics and vectors; forces and force systems and their external effects on bodies, principally the conditions of equilibrium of two and three-dimensional systems; free body diagrams and equilibrium of particles and bodies; moments; couples; structural analysis and trusses. From the dynamics point of view, it provides the kinematics and kinetics motion of particles and rigid bodies. The formulation and solution of mechanic problems will help the students developing the ability of logic thinking and effective communication. The analysis will be introduced by examples and assignments.	



Compulsory Department Requirements

متطلبات القسم الإجبارية

<b>BEL001 Differential Equations</b>	<b>(2L, 2T) 3 credits</b>
<p>This course will provide students with the fundamental concept of Ordinary Differential Equations (ODE) and foundational knowledge. The course will focus on the following: Basic concepts of Differential Equations: Definition, Types, order, and power of (ODE). Solutions of Differential Equations of order one; Separate, Homogeneous and inhomogeneous, Exact and inexact, linear and nonlinear, General Solutions of Homogeneous differential equations of order two by use characteristic equation, Partial Solution of Inhomogeneous Differential Equations of order two by operator differentiation. Some methods will be used in the teaching of this course, such as lectures, problem-solving, Brainstorming, micro- assignments, and micro-report.</p>	
<b>BEL002 Linear Algebra</b>	<b>(2L, 2T) 3 credits</b>
<p>This course will provide students with the fundamental concept of linear algebra and foundational knowledge for some engineering courses. This course discusses the basic concepts of matrices; matrix operations, transpose, inverse; determinants; solution of linear systems; eigenvalues and eigenvectors, and their practical applications, the basic concept of graph theory. Some methods will be used in the teaching of this course, such as lectures, problem-solving, Brainstorming, micro- assignments, and micro-report.</p>	
<b>BEL003 Signals and Systems</b>	<b>(2L, 2T,2P) 4 credits</b>
<p>This course is an introduction to analog signal processing. It covers the fundamentals of Continuous signals and systems analysis - Classification of Signals and their Operations, Classification of Systems, Systems Response, and Systems Stability. The representations of linear, time-invariant systems are presented in both Differential Equation Model and Convolution-integral Model. Continuous signals and systems representation is developed in the frequency domain through the Fourier series and transform. Laplace transform is also applied to the analysis of continuous signals and systems through their definition and properties. Engineering Applications are drawn broadly, including feedback and control, communications, and signal processing. The course also provides practical materials using Matlab to help students to write codes related to signals and systems analysis. The major teaching strategies include lectures, tutorials and Laboratory works. The course pre-requisite is Differential Equations (BEL001).</p>	
<b>BEL004 Engineering physics</b>	<b>(2L, 2T) 3 credits</b>
<p>The general importance of this course is to provide students with the major concepts of Electrostatics and Magneto statics phenomena. It demonstrates various ways of calculating electric field, magnetic fields, electric and magnetic forces, electric potential, electric flux, magnetic flux. The course carried out using the lectures and Problems solving, assignments, lab experiments, Simulation Experiments and self-learning used to teach this course. Evaluation via Written and Oral Examinations, Assignments evaluation, Quizzes, Reports and observation. The prerequisite of this course is physics.</p>	



<b>BEL005 Electrical Circuits (1)</b>	<b>(2L, 2T, 2P) 4 credits</b>
<p>Electrical circuits (1) is one of the department requirement courses. This course provides the students with the basic concepts and properties of DC electrical circuits and networks. It helps the students to develop their skills to understand the strategies and methods to analyze the circuits in DC. Moreover, it supports students with practical skills to implement the circuits and simulate them via computer programs. Thus, the course contains the fundamentals of common DC electrical circuits, Resistive Network Analysis, inductors and Capacitors Circuits. In addition, it includes transient analysis of R-C and R-L circuits and introduction to alternating current (AC). The teaching strategies include lecture, tutorial, practical, simulations, projects and discussion, problem-solving, research and self-studying. The prerequisite course is BENG03.</p>	
<b>BEL006 Electrical Circuits (2)</b>	<b>(2L, 2T, 2P) 4 credits</b>
<p>Electrical circuits (2) is a department requirement course. This course provides the students with the basic concept and properties of ac electrical circuits and networks. It helps the students to develop their skills to understand strategies and methods to analyze the circuits in AC. Moreover, it supports students with practical skills to implement the circuits and simulate them via computer programs. The course contains the fundamentals response of RL, RC and RLC elements to a sinusoidal voltage or current, and frequency response of the basic elements. Moreover, it includes complex numbers analysis, Phasor analysis, series-parallel AC circuits analysis, and other methods and theories to analyze AC circuits using mesh, nodal, superposition, Thevenin's, maximum power. Dependent sources, independent sources, active power, reactive power, apparent power and polyphase systems are also covered during this course. The teaching strategies include lecture, tutorial, practical, simulations, mini-projects and ..etc. The prerequisite course is BEL005.</p>	
<b>BEL007 Electronics (1)</b>	<b>(2L, 2T, 2P) 4 credits</b>
<p>This course provides students with the concepts of conductors, insulators semiconductors materials and basics of electronic devices structure. The course provides the students with ability to understand the characteristics of diode and its operation theory, diode models, diode applications, special-purpose diodes. In addition, this course provides students with the concepts of BJT, JFET and MOSFET transistors and their DC biasing methods. The main teaching strategies include lecture, tutorial, practical, dialogue, discussion and project. The course pre-requisite is Electrical Circuits (1) (BEL005).</p>	
<b>BEL008 Electronics (2)</b>	<b>(2L, 2T, 2P) 4 credits</b>
<p>This course provides students with concepts of common electronic amplifier circuits and some linear (ICs), such as operational amplifier Op-Amp and its fundamental circuits that are required in electronic circuits design. Analyze different types of BJT amplifiers and Op-Amp circuits are presented. The course includes DC and AC analysis of common-emitter CE, common-collector CC, common-base CB and differential amplifiers. In addition, it covers the basics of Op-Amp and its characteristics, modes and parameters. The course also covers Op-Amp with negative feedback and the effects on its parameters, describe and analyze Op-Amp applications circuits, frequency response of Op-Amp and CE amplifier. The main teaching strategies include lectures, tutorials, practical, dialogue, discussion, and project. The course pre-requisites are Electrical Circuits (2) (BEL006) and Electronics (1) (BEL007).</p>	



<b>BEL009 Logic Design</b>	<b>(2L, 2T, 2P) 4 credits</b>
<p>This course is considered as an introduction to the basics of the digital design and systems. Also, it provides students the ability to understand the internal operation of the digital circuits and their design. In addition, it usually employed in digital computers, control systems, digital communications, and many other applications .</p> <p>This course includes the number systems, logic gates, simplification methods, and design basic and simple digital circuits.</p> <p>This course depends on lectures, tutorials, practical part, weakly homework, and a practical project that includes the most of the course's subjects.</p>	
<b>BEL010 Microprocessors and Assembly Language</b>	<b>(2L, 2P) 3 credits</b>
<p>This course covers many topics in Intel microprocessor (8086/8088) such as microprocessor hardware architecture, addressing modes, and instructions' set. It concerns on programming microprocessors using assembly language. The purpose of this course is to understand the microprocessor's main components, which will guide to program it correctly .</p> <p>Understanding of this course will be enhanced by examples and practicing in microprocessor lab. The prerequisite of this course are fundamentals of logic design and Fundamentals of Computer Programming.</p>	
<b>BEL011 Computer Programming</b>	<b>(2L, 2P) 3 credits</b>
<p>This course provides students with a comprehensive study of structure-based programming using the C program language. This course gives a base concept of programming which can be useful to solve different engineering problems. This C programming course starts with an introduction to Computers, the Internet, and the Web and gradually progresses to the vital concepts of C programming. Programming topics include an introduction to C Programming, Structured Program Development, Program Iteration Control, Functions, Arrays, and Pointers. The course also provides practical materials to help the students to write and test their codes using a suitable programming simulation. The major teaching strategies include lectures and Laboratory works.</p>	
<b>BEL012 Embedded Systems</b>	<b>(2L,2P) 3 credit</b>
<p>This course covers theoretical and practical topics of Microcontrollers such as Microprocessor registers, memory, input/output ports, timers and interrupts. This course demonstrates ATMEL 8051 programming in Assembly and C languages. The purpose of this course is to design a simple control system that serves the daily life's necessities .</p> <p>Understanding of this course will be enhanced by practicing in Microcontroller lab. The prerequisite of this course is Microprocessors and Assembly Language.</p>	
<b>BEL013 Field Training</b>	<b>(2P) 1 credit</b>
<p>The field-training course is designed to introduce students to the professional practice of electronic engineering programs and to provide opportunities for students to practice what they learn in real-life environments.</p>	



<b>BEL014 Measurements and Instrumentation</b>	<b>(2L, 2P) 3 credits</b>
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This course commences with a review of concepts and principles of basic systems of units, measurement standards and types of error in measurement. The course then covers different electrical and electronic instruments in analog and/or digital varieties (e.g. multi-meters, oscilloscopes and signal generators). Finally, transducers/sensor and signal conditioning circuit design are included. The main teaching strategies include lecture, tutorial, practical. The course pre-requisites are electrical circuits (1), electrical circuits (2) and electronics (1).

<b>BEL015 Graduation Project (1)</b>	<b>(3L) 3 credits</b>
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The graduation project provides the student a practical application of all engineering subjects. It is executed through weekly meeting of the project group with supervisor, This course contains proposal for project plane, internet literature survey, data acquisition, analysis of project theories, experimental analysis of project using available-data, and writing up a summary report about the previous stages, The supervisor will evaluate the report and give primary marks of the first semester. This course is part of fulfilment of B.Sc. requirements. Pre-requests are BUST10 and 70% of the Total C.H.

<b>BEL016 Graduation Project (2)</b>	<b>(3L) 3 credits</b>
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This course is a continuation to the graduation project-1, It is also executed through weekly meeting of project group with the supervisor, The student should introduce new theoretical analysis, or start to build project hardware (if any), or conduct new type of simulation such as ( digital or analogue computer simulation) ...etc, The next stage is to test the project stuff and check its validity, then perform final measurements and obtain output results. He must establish a new conclusion about the project. The final copy of these should be completed, and reviewed by the supervisor, so to be ready for the final seminar with the project committee-exam. The supervisor will evaluate that copy and give primary mark of the second semester. This course is part of fulfilment of B.Sc. program. Pre-requests are BUST10 and 70% of the Total C.H.

Compulsory Program Requirements

متطلبات البرنامج الإجبارية

<b>BCM001 Wave Propagation &amp; Antennas</b>	<b>(2L,2T,2P) 4 credits</b>
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The course explores further propagation and polarization of waves in conducting media and insulators. It explores and apparent a different shape of hollow waves guided as rectangular and circular wave-guides. This course also explores different topics like antennas and properties of the ionosphere and troposphere. In addition, it is usually employed in RADAR, wireless communication, navigation and many other applications. This course includes the basic propagation modes and antenna parameters; ground wave propagation; sky wave propagation; space (terrestrial) wave propagation; statistical models and diversity principles; propagation models in mobile radio systems; antenna engineering in LF, MF, HF, VHF and UHF systems; reflector antennas, linear and planar antenna arrays. This course depends on lectures, tutorials and weakly homework that includes the most of the course's subjects. In addition, it depends on computer skills and mathematics as prerequisites.

<b>BCM002 Communication Electronics</b>	<b>(2L,2T,2P) 4 credits</b>
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عميد الكلية  
د.محمود عبدالعزيز الرميمة

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رئيس القسم  
د.محمد مسعد السويدي



The course provides the communication-engineering students with the concepts of theory of operation of basic analog RF communication circuits, which considered the base of wireless communication in either receivers or transmitters. In addition, the course enable the students to understand the cooperation between tuned circuits, oscillators, basic passive filters, PLL&synthesizers, RF power amplifiers, AM&FM modulators. In addition, the course provides the students with ability to analyze the different types oscillators, AM&FM and RF power circuits. The course includes six main topics: tuned circuits, passive filters, oscillators, phased locked loop, radio frequency power amplifiers, and AM&FM modulating circuits.

**BCM003 Communication Theory**

**(2L,2T,2P) 4 credits**

This course provides the basic concepts of communication theory and data communication systems. It provides students the ability to understand the various transmission media, digital and analog signals, modulation, multiplexing, switching, and media access control. This course depends on experiments in communication laboratory, simulation program and a practical project that includes the most of the course's subjects.

**BCM004 Digital Communication**

**(2L,2T,2P) 4 credits**

This course provides student with basics and advanced techniques for digital communication, which are the basic elements of modern communication systems. It presents the basic elements to implement any communication system and different digital technique as source coding, channel coding, digital modulation, noise and wireless channel. The course requires communication theory (BCM003), data communication & networks (BCM005) and digital signal processing (BEL012) as a pre-requisite. Within this course the student take experiments in communication laboratory and simulation program to simulate the concept of digital communication like MATLAB program.

**BCM005 Data Communication and Computer Networks**

**(2L,2T,2P) 4 credits**

This course provides the basic concepts of data communication and computer networks. It provides students the ability to understand two famous networks models TCP/IP and ISO OSI and their layers' functions. The course studies in details the main network layer functions and protocols such as routing, logical addressing, and internetworking. The course applies the concepts of data communication into practical networks such as Ethernet, Wi-Fi and ATM networks. This course depends on experiments in communication laboratory and simulation program that includes the most of the course's subjects

**BCM006 Mobile Communication Systems**

**(2L,2P) 3 credits**

This course provides the main concepts of mobile and cellular communication components and systems. It provides students the ability to understand the cellular systems architecture and evolution. It provides the student with the ability to plan the capacity, coverage, frequency and interference for GSM networks as example. This course depends on experiments in communication laboratory, simulation program and a practical project that includes the most of the course's subjects.

**BCM007 Satellites and Radar Communication Systems**

**(2L,2T) 3 credits**





This course provides the main concepts of satellites and radar communication components and systems. It provides students the ability to understand the satellites and radar systems architecture and evolution. It provides the student with the ability to understand the mathematical basics behind the work theory of satellite and radar systems and their coverage and capacity. This course depends on lectures, weakly homework, and a practical project that includes the most of the course's subjects.

### BCM008 Microwaves Engineering

(2L,2T) 3 credits

This course will provide all students with the fundamental concepts associated with RF/microwave circuits and components.

Important topics include: radio-frequency (RF) / microwave transmission lines, RF matching networks, microwave resonators, microwave coupler and power dividers, microwave filters, and simulation of RF / microwave circuits.

Successful completion of this course will allow students study to carry out research in the area of RF and microwave circuit design. Students will also gain simulation experience through lab sessions.

This course depends on lectures, tutorials and weakly homework that includes the most of the course's subjects. Also, it depends on computer skills and mathematics as prerequisites.

### BCM009 Telecommunication Switching Systems and Networks

(2L,2P) 3 credits

This course provides the main concepts of switching for both data communication and voice communication networks. It provides students the ability to understand the different types of switching techniques. It provides the student with the ability to understand and design the types of switches. The course requires communication theory (BCM003) and data communication & networks (BCM005) as a pre-requisite. This course depends on lectures, weakly homework, and a practical project that includes the most of the course's subjects.

### BCM010 Engineering Electromagnetic

(2L,2T) 3 credits

This course provides students with fundamental electricity and magnetism concepts and enables them to use these concepts to develop, and design various engineering applications involving electromagnetic fields. To lay the foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles such as fiber optics and electronic electromagnetic structures. The course topics include vector analysis, Coulomb's law and electric field intensity, electric flux density, Gauss' law, and divergence, the steady magnetic field and time-varying fields and Maxwell's equations. The course pre-requisites are Engineering Physics (BEL004) and Physics (BENG03). The main teaching strategies include lecture, tutorial and problem solving.

### BCM011 Digital Signal Processing

(2L,2T) 3 credits

Digital Signal Processing (DSP) is concerned with the representation of signals in digital form, and with the processing of these signals, and the information that they carry. Topics that will be covered in this course include, Discrete signals and systems, Analysis of discrete time LTI System in time domain, Convolution and Correlation, Sampling, Z-transform, Inverse Z-transform and properties, Analysis of LTI System in Z-domain, Frequency-domain characteristics of LTI System, Frequency response of LTI System, Infinite impulse response (IIR) filter design, Finite impulse response (FIR) filter design, and realization of digital filters.

### BCM012 Information Theory and Coding

(2L) 2 credits



**BCM013 Routing and Switching**

**(2P) 1 credits**

This course is a study of Routing and Switching fundamentals, and how the Internet is integrated into the computing environment to enable organizations to share resources, collaborate, and meet organizational goals. The data communication (2) course is required as a pre-request, Networking Technologies, are expanded upon to incorporate the linking of these simple networks to each other and to the Internet, to create an internetwork. Routing and Switching devices such as switches and routers will be examined in detail. Students will focus on techniques to analyze, plan, and manage an enterprise network. In support of these techniques, lab activities will include sub-netting, packet-sniffing, and switch and router configuration.

**BCC001 Advanced Computer Programming**

**(2L,2P) 3 credits**

This course provides the student with the ability to solve interesting real-world problems through programming language (Java). It concentrates on the principles of good software engineering and stresses program clarity. Also, it emphasizes achieving program clarity through the most fundamental capabilities of object-oriented programming such as Inheritance and Polymorphism.

Understanding of this course will be enhanced by examples and practicing in lab. The prerequisite of this course is Fundamentals of Computer Programming.

**Optional Program Requirements**

**متطلبات البرنامج الاختيارية**

**BCML01 Optical Communications**

**(2L, 2P) 3 credits**

This course provides the main concepts of optical fiber communication components and systems. It provides students the ability to understand the fiber optics and light theory. It provides the student with the ability to understand and deal with the different types cables, connectors, transmitters, and receivers. This course depends on lectures, practical part, weakly homework, and a practical project that includes the most of the course's subjects.

**BCML02 Data and Networks Security**

**(3L) 3 credits**

This course provides students with fundamentals of computer networks security. In addition, the course provides the students to understand how to apply different types of security techniques to achieve security for specific application and use firewalls for protecting local system and networks.

The main teaching strategies include lecture, Dialogue and discussion, Self-Study and Problem solving.



<b>BCML03 Special Topics in Communications</b>	<b>(3L) 3 credits</b>
<p>To provide graduate level students with an exposure to the specialized theory, technology, and applications of spread spectrum systems. This course is intended as a special study or elective to provide a concept level introduction to the principles of spread spectrum systems and to motivate and illustrate applications in commercial and military systems.</p> <p>This course covers Multiple Access and Multiplexing Techniques; Spread spectrum and Code division multiple access (CDMA) techniques: Direct sequence, Frequency hopping; Multicarrier techniques: Orthogonal frequency division (OFDM) and Multicarrier CDMA (MC-CDMA); Ultra Wideband communications, Wireless Fidelity (Wi-Fi), Radio Frequency Identification (RFID), Blue Tooth.</p> <p>Successful completion of this course will allow students study to carry out research in the area of Wireless Communication Techniques and Systems. This course depends on lectures and weakly homework that includes the most of the course's subjects. Also, it depends on computer skills and mathematics as prerequisites.</p>	
<b>BCML04 Communication Systems Modeling and Simulation</b>	<b>(2L,2P) 3 credits</b>
<p>The purpose of this course is to gain in-depth understanding of the theories, techniques and tools to model, analyze and simulate today's communications systems and networks. Consideration is given to both the Physical Layer (link-level) and the Network Layer (network-level) and the module looks at the theory of modeling and practical applications using standard simulation packages. This module equips the students to understand and apply analytic and simulation techniques appropriate for the representation, analysis and performance evaluation of communications systems and networks.</p> <p>This course includes the basics of simulation and modeling methodology; modeling and simulation of communications channels; LTI systems and nonlinear systems; OFDM wireless networks and network modeling and queuing theory.</p> <p>This course depends on lectures, tutorials; practical part used MATLAB simulation tools as an example to develop the analytical and simulation skills for performance evaluation.</p>	
<b>BCML06 Internet Programming</b>	<b>(2L, 2P) 3 credits</b>
<p>This course aims to provide students with the tools required to become and remain competent and successful Internet developers. To that end, this course introduces a comprehensive introduction to the server-side programming techniques used to develop interactive web sites. Using technologies such as PHP and MySQL, students learn to create web sites that interact with web servers, manage user sessions, and store and retrieve data from databases. Course content is continually updated to reflect the current state of the art in Internet computing. The course pre-requisite is advanced Computer Programming.</p>	
<b>BCML07 Digital Image Processing</b>	<b>(2L, 2P) 3 credits</b>
<p>This course introduces the basic concepts, methodologies, and applications of digital image processing. The topics to be covered are digital image fundamentals: representation, sampling, and quantization, image acquisition, basic relationships between pixels, imaging geometry; image enhancement: in the spatial domain and in the frequency domain, image smoothing and sharpening; image restoration; image segmentation: detection of discontinuities, thresholding, region-oriented segmentation. Understanding of</p>	



this course will be enhanced by examples using Matlab. The major teaching strategies include lectures and assignments. The course pre-requisite is Signals and Systems (BEL003).

**BIEL01 Engineering Management** (3L) 3 credits

This course provides a basic understanding of modern management by examining concepts and theories. Emphasis is placed on studying applied management principles to technological based organizations. Topics will focus on functions of management, management philosophies, organization structures and cultures, globalization, strategic management and ethics. This course depends on lectures, examples, and weekly homework. No prerequisite courses is needed.

**BCC003 Operating Systems** (2L, 2P) 3 credits

The course will start with a brief historical perspective of the evolution of operating systems over the last fifty years, and then cover the major components and structure of most operating systems. This discussion will cover the tradeoffs that can be made between performance and functionality during the design and implementation of an operating system. In addition to OS structure and OS events particular emphasis will be given to these major OS subsystems: process, thread, scheduling, concurrency, deadlock, real and virtual memory management. This course depends on lectures, examples, and weakly assignments. Also, it depends on Fundamentals of Computer Programming as prerequisite course.

**BCC012 Artificial Intelligence** (2L, 2P) 3 credits

This course will provide students introduction to Artificial Intelligence (AI), Soft Computing, Meta-heuristics Algorithms for solving optimization problems such as Genetic Algorithms, Artificial Neural Networks, Fuzzy Sets Theory, Fuzzy Logic, Neuro-Fuzzy Technology, Hybrid Systems and Applications of AI (three to four real life applications). Understanding of this course will be enhanced by examples using Matlab. The major teaching strategies include lectures and assignments. The course pre-requisite is Computer Programming (BEL011).

L=Lecture, T=Tutorial, P=Practical