Course Descriptions

First: University Requirements

1. Mandatory Courses:

وصف المساق	الرقم	اسم المساق
تنمية قدرات اللغة العربية لدى الطلبة وصياغتها بالشكل السليم، ويشتمل على ثلاثة فروع في اللغة العربية هي: أولاً: مختارات من الأدب العربي القديم ، ثانياً: موضوعات ميسرة في البلاغة العربية وثالثاً: موضوعات نحوية تبدأ بأقسام الكلمة والجملة وشبه الجملة، والمبتدأ والخبر، وكان وأخواتها والفاعل ونائب الفاعل،	ARAB301	**لغة عربية 1**
مختارات من الأدب الحديث، وشعر التفعيلة والاستعانة بالنصوص الفلسطينية العربية الحديثة. وفي قسمه الثاني: يدرس موضوعات بلاغية من علم المعاني. وفي قسمه الأخير يتناول موضوعات نحوية وصرفية ومعجمية المنادي والتمييز والحال والميزان الصرفي والمضارع رفعاً ونصباً وجزماً، وطرق الكشف في المعاجم خاصة لسان العرب والقاموس المحيط والمعجم الوسيط.	ARAB302	**لغة عربية 2**
يهدف هذا المساق إلى تنمية قدرات الطالب في اللغة الإنجليزية وفهم المفردات من خلال النص وتحديد الأفكار والتفاصيل المتعلقة بها، والاستنتاج، والتمييز بين التفسير الحرفي وغير الحرفي، ثم تنمية مهارة تلخيص الفكرة العامة. مع التركيز على طريقة أخذ الملاحظات، وبناء حصيلة مفردات، وتعبئة النماذج، وكتابة التلخيص وكتابة الإعلانات .والتركيز على القواعد النحوية للأفعال، وأشكال الكلمة، والجمل الشرطية، وصيغ السؤال.	ENGL304	**اللغة الإنجليزية1**
يتناول هذا المساق مراجعة للجملة والفقرة .ويتم تدريب الطلبة على كتابة الجملة الافتتاحية، وتطويرها إلى فقرة مترابطة، باستعمال عدة طرق .كما يتم تدريب الطلبة على تعبئة الطلبات بأنواعها، كتابة السيرة الذاتية، والرسالة المرفقة .وإجراء مراجعات قواعدية كجزء من هذا المقرر .إضافة إلى التعرض لكتابة المقال في الجزء الأخير من هذا المقرر.	ENGL305	**اللغة الإنجليزية2**
التعريف بالحاسوب وأجياله، مكونات الحاسوب، وتشمل الدراسة العملية تعريف سطح المكتب ومكوناته، محتويات لوحة التحكم، مقدمة في نظام التشغيل Windows. التعريف بالملفات والمجلدات وطرق إنشائها وحذفها واسترجاعها، مستكشف ويندوز، والتعامل مع الانترنت والبريد الالكتروني و استخدام محركات البحث المختلفة بالإضافة إلى استخدام برامج Office الرئيسة والتعرف على المكتبات الإلكترونية.	CSCI309	**مقدمة في علوم الحاسوب والإنترنت**
دراسة في علوم القرآن الكريم وأحكام التلاوة والتجويد، وفي الحديث الشريف، والسيرة النبوية الشريفة. ويهدف المساق إلى التعريف بأهم مصدرين من مصادر التشريع الإسلامي وهي القرآن الكريم والحديث النبوي الشريف.	ISLM307	**دراسات اسلامية**

دراسة القضية الفلسطينية بمختلف مراحل تطورها، ابتداءً من ظهور الحركة الصهيونية فالاستعمار الاستيطاني الصهيوني في فلسطين، فلسطين تحت الانتداب البريطاني فوعد بلفور حتى قيام دولة إسرائيل، وحال فلسطينيي الشتات، الكيانية الفلسطينية ومنظمة التحرير الفلسطينية، القوى السياسية الفلسطينية، فلسطين والانتفاضة الأولى حتى معاهدة أوسلو. كما يركز المقرر على أبرز القضايا الفلسطينية: كاللاجئين، قضية القدس، حق العودة، عرب الداخل، أزمة المياه، الجدار الأمني الفاصل.	PALS308	دراسات فلسطينية
2. University Elective Courses		
مقدمة في الإسعافات الأولية، أساسيات الإسعافات الأولية، مراحل التقييم، كيفية حماية المسعف، ومن المواضيع التي يتم التعرف على الطرق الطبية السليمة للتعامل معها في مساق الإسعافات الأولية هي: الحروق و أنواعها، النزيف، الصدمات، الغثيان، الكسور، نزيف الأنف، التشنجات، الحمل، الاعتداءات الجسدية، الصدمات، الجلطات وغيرها من المواضيع الهامة.	FAID312	الاسعافات الأولية
يهتم المساق بصحة الأم خلال فترة الحمل والرضاعة، وما المطلوب من الأم مراعاته والالتزام به خلال هذه الفترات. ثم التعريف بصحة الطفل بعد الولادة ولمدة الخمس سنوات الأولى من عمره. وكذلك لمحة عن الصحة النفسية للأم و الطفل في فترة الحمل حتى دخول الطفل للمدرسة.	MCHH313	صحة الأم والطفل
يشمل المساق ثلاثة عناصر أساسية وهي: – العقيدة: معنى الألوهية والدين والرسالة والمعجزات والقضاء والقدر والبعث والجزاء، والإيمان – مميزات وخصائص الدين الإسلامي من حيث الشمول وصلاحيته للدنيا والآخرة، ولكل زمان ومكان، ثم نظرة الإسلام للإنسان، والمبادئ التي قررها الإسلام. – تنظيم حياة المسلمين فيما بينهم وبين غيرهم من الشعوب، وتوضيح مبدأ الشورى وأهميته، وكذلك التكافل الاجتماعي، والعلاقات الدولية في الإسلام، وعلاقة الإسلام بالعلم والفرق بين التوكل والتواكل، ونظرة الإسلام إلى المال، وتوضيح معنى الأمر بالمعروف والنهى عن المنكر.	ISLM314	الثقافة الاسلامية
يهدف هذا المساق إلى تعريف الطالب بالمفاهيم المركزية والمسائل الأساسية المتعلقة بالديمقراطية وحقوق الإنسان والقانون الدولي الإنساني، حدود وإشكالات هذه الحقوق والمبادئ، تطبيق النظام الديمقراطي وحقوق الإنسان والقانون الدولي الإنساني.	CUST315	**دراسات ثقافية: الديمقراطية، حقوق الإنسان، والقانون الدولي الإنساني**

Second : Faculty Requirements

1. Mandatory:

Calculus 1

Limits and Continuity , Derivatives and its applications , Integration and its applications , exponential and logarithmic functions**,** Function, Differentiation Rules, , Definite and indefinite integrals, Fundamental theorem of calculus.

Calculus 2   Prereq. (calculus (1)

Transcendental functions , Techniques of integration , sequences, Infinite series , Parametric equations and polar coordinates , Conic sections , Simulation using MATLAB.

General Physics 1

Physical quantities, units, vectors and scalars, motion in one dimension, motion in two dimensions, Newton's laws of motion and dynamics, work and energy, conservation of energy, conservation of linear momentum and collision, center of mass and moment of inertia, rotational kinematics, and angular momentum.

General Physics 1 lab   Prereq. (general physics (1))

Experiments in mechanics, heat, and optics. Measurement devices, Parallelogram of forces, friction, spiral spring, gravitational acceleration, rigidity, linear expansion, specific heat, mechanical equivalent of heat, and experiments in geometrical optics.

General Physics 2   Prereq. (general physics (1))

Electric charges and fields, Gauss' law, electric potential, capacitors, current resistance and circuits, magnetic fields, Ampere's law, Faraday's law, and finally inductance.

General Physics 2 lab   Prereq. (general physics (2))

Experiments in General Physics II (electricity and magnetism). Measurement devices, Electric field lines and equipotential surfaces, Ohm's law, Wheatstone bridge, effect of temperature on resistance, mechanical equivalent of heat, capacitors, effect of magnetic field, Faraday's law, inductance, and eddy currents.

Engineering Drawing

Drawing technique; the graphic language, instruments and their use, types of lines, and littering. Geometrical constructions: dividing straight lines into equal parts and constructing perpendiculars, constructing angles and dividing them into equal parts, finding the center of an Arc, tangency constructions, drawing lines tangent to a circle, conjunctions of lines, compound curves and non-circular curves. Projection drawing methods of graphic representation, projections of a point, straight line, planes, and objects, Scale and Dimensioning. Axonometric projections:

isometric projection the geometrical construction and to discover the third view for two given views . Electrical symbols , Auto Cad applications on Electrical schemes

Liner Algebra and Differential Equations   Prereq. (calculus (2)

Linear equations, matrices, determinants, vector spaces and subspaces, linear transformation, eigenvalues and eigenvectors, similarity of square matrices, diagonalization. First order differential equation. The existence and uniqueness theorem differential equation of Higher order. Using lab face transform in solving differential equation. Power series solution of Differential.

Introduction to Engineering

This course provides the incoming freshman with an overview of engineering based on a 'hands-on' experience with a client-centered engineering design project, which includes: 1) a team-based design project, 2) a survey of engineering disciplines, and 3) an introduction to computer tools and lab techniques.

Engineering Workshop

This Workshop gives the students new skills in mechanical and electrical measurement, metal planning, sawing, failing threading, cutting, arc shielding . Working and measuring tools , Machining , Joining of materials.

2. Elective Faculty Requirement

Engineering Management

Introduction to management, history, important of management, characteristics of management. Berocratic management and scientific management . Management process. Managements education. Institutions structures. Management of human resources. Project managements, networks, critical path. Inventory systems, economic order quantity. Profit and cross income. Types of costs, break even point analysis. Depreciation methods and specifications, capital return from assets. Decision methods, taking decision using quantity tools. Interest formulas, judging attractiveness of proposed investment using different methods, depreciation, inflation, sensitivity analysis, increment cost and sunk cost. Retirement and replacement. Introduction to Engineering Economic (concepts of the behavior of profit maximizing, short run cost & out put decisions , cost & out put decision in the long run)financial Statements, inventories , depreciation methods ,Economic Feasibility studies.

Engineering Economics

This course addresses principles and practices of interpreting financial information and performing engineering-related economic analyses. This course focuses on the practical use of economic information for decision making. The four course modules are: 1) Basic Accounting Concepts; 2) Management Concepts; 3)Pricing and Product Decisions; and 4) Systems.

Communication Skills

This course aims at providing students with the basics of communication process , different definition of communication skills , elements of communication process, factors affecting communication process , types of communication , principles of good communication process , purposes of communication process , barriers of communication process , methods of effective communication process , access communication, how to write a C.V., how to manage a formal meeting , time management , how to write a respond to sales-letters, and case studies in the field , interviews .

Advanced Computer Skills

1. Departmental Mandatory Courses
Electrical Circuits

This course introduces Circuit variables, basic circuit elements, basic circuit law, Ohm's law, Kirchhoff's laws, resistive circuits, network theorems, node-voltage, mesh-current, Thevenin and Norton equivalents, inductance, capacitance, sinusoidal steady-state analysis, three-phase circuits, applications of Laplace transform to circuit analysis.

Electrical Circuits Lab
Hands-on experience consisting of experiments based on topics covered in Electrical Circuits course.

Electronics
This course covers the Boolean algebra, logic switches and their applications, characteristics of PN junction, the diode, diode applications, half-wave & full-wave rectifiers, zener diode and its applications., bipolar junction transistor, construction, basic operation, characteristics and parameters, transistor as amplifier. Transistor bias circuits, DC operating point, base bias, emitter bias, voltage-divider bias, collector-feedback bias, field-effect transistor and Biasing, junction field-effect transistor (JFET), JFET characteristics, parameters, and biasing, power amplifier (class A, B, and C) and their applications, silicon-controlled rectifiers (SCR) and applications, Diac and triac. Introduction to operational amplifiers.

Electronics Lab
Hands-on experience consisting of experiments based on topics covered in Electronics coursee.

Digital Logic Design
This course provides students with a solid Ideas and techniques for Binary number system, Digital circuits, Boolean algebra and switching theory, Manipulation and minimization of Boolean functions, Combinational circuit analysis and design, multiplexers, decoders, adders, Sequential circuit analysis and design, basic flip-flops, clocking, and edge-triggering, registers, counters, timing sequences, state assignment and reduction techniques, Register transfer level operations.

Digital Logic Design Lab
Hands-on experience in using digital electronics by way of logic gates and integrated circuits, practical construction, testing, and implementation of combinational and sequential logic circuits.

Programming I
This course covers the fundamental concepts of problem solving using a computer, Problem solving through computer programming, Emphasis on object-oriented computer programming, including data types, control structures, structured programming, and modular algorithm design, Use of existing libraries, Extending classes and polymorphism.
Programming I Lab
Lab assignments on topics covered in Programming I course.

Programming II
This course is designed to allow students to experience how a real world computer application ECOMs to life. This course builds on their previous programming skills and includes more advanced GUI techniques. In addition to smaller projects, students will work together to complete a large programming project of their choosing by the end of the semester. After many weeks of coding, they will complete an online help file, present their work to the class, and create WebPages showcasing their work.

Programming II Lab
Lab assignments on topics covered in Programming II course.

Data Structures
This course presents an overview of fundamental theories and knowledge in data structures and the associated algorithms. It introduces the concepts and techniques of structuring and operating on abstract data types in problem solving. In addition, this course also discusses sorting, searching and graph algorithms, and the complexity. More advanced topics in memory management and allocation such as stacks, heaps, linked lists, trees, recursion, traversing trees and hash tables. Other algorithms covered will include compression and encryption

Discrete Mathematics

Sets, relations and functions, application to data structure and graph representations, partial ordered sets, trees, algebraic structures, lattices and Boolean algebra, semi groups, groups, introduction to grammars and machines and languages, error correcting codes.

Computer Organization and Assembly Language
This course introduces computing systems below that of a high-level programming language. The material covered can be broadly separated into the categories of assembly language programming and computer organization. Under the heading of assembly language programming students will be introduced to the i386 instruction set, low-level programming, the Linux memory model, as well as the internal workings of compilers, assemblers and linkers. Topics under computer organization include basic computer architecture: system bus, memory hierarchy, and input/output devices.

Computer Organization and Assembly Language Lab
Lab assignments on topics covered in Computer Organization and Assembly Language course.

Computer Architecture

data and information representation and processing, machine-level representation of programs, instruction set architecture, pipelining, optimization program performance, memory hierarchy, cache memories, virtual memory.

Software Engineering

Problem solving strategies, requirement analysis, design and implementation of software systems, data modeling and mapping, traditional, Object oriented and components oriented design strategies, storage structures, user interfaces, concurrent systems.

Digital Electronics

This course covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, medium scale integration (MSI) and large scale integration (LSI) circuits, analog to digital (AD) and digital to analog (DA) conversion, and other related topics. Upon completion, students should be able to construct, analyze, verify, and troubleshoot digital circuits using appropriate techniques and test equipment.

Digital Electronics Lab

Hands-on experience consisting of experiments based on topics covered in Digital Electronics course.

Object Oriented Programming

Programming 2 Abstraction, approaches to modular program design, principles of abstract data type, basic concept of objects: local variables and methods. Inheritance. Polymorphism. Overview of object oriented programming environments using Java through programming assignments.

Operating System

This course introduces the *design* and *use* of modern, process oriented operating systems. Topics include: Basic concepts of operating systems and system programming. Processes and interprocess communication/synchronization, Virtual memory, program loading and linking, File and I/O subsystems. Utility programs, Study of a real operating system.

Computer networks

This course covers the introduction to Computer Networks, network requirements and layered architectures. ISO reference model. Data encoding/framing, error detection and correction, DLL protocols (stop wait & sliding windows), Ethernet and FDDI. Network layer and WANs, IP and routing, cell switching and ATM, bridges, internetworking – the global internet. End to End Protocols, UDP, TCP, and RPC. Application layer, security, the domain name system (DNS), and the WWW protocols.

Database Management System

Relational model of data, relational algebra, SQL, query optimization, entity-relationship data model, normalization, physical database design, concurrency control in DBMSs, crash recovery, client-server architectures, an introduction to object databases.

Signals and Linear Systems

Classification, analysis and design of systems in both the time- and frequency-domains. Continuous-time linear systems: Fourier Series, Fourier Transform, bilateral Laplace Transform. Discrete-time linear systems: difference equations, Discrete-Time Fourier Transform, bilateral z-Transform. Sampling, quantization, and discrete-time processing of continuous-time signals. Discrete-time nonlinear systems: median-type filters, threshold decomposition. System design examples such as the compact disc player and AM radio

Probability Theory and Statistics

Statistical ideas. Frequency distributions and their properties. Sampling. Logic of statistical inference. Estimation and tests of significance. Prediction and modeling. Introduction to probability. Finite sample spaces. Conditional probability and independence. One dimensional random variables. Functions of random variables. Discrete random variables. Continuous random variables. Random sample and statistics. Clustering and Classification

Embedded Systems

Assembly Language Programming. Input / Output. Interrupts Timers Serial Communication. Analog/Digital Conversion Real-Time Operating Systems. PLC fundamentals, PLC Networking.

System Analysis and Design

This course embodies the general scientific principles commonly known as software engineering. It discusses the software life-cycle, using a large software system as model. Topics covered include requirements-specification analysis, requirements-type languages and specification checking using mathematical techniques. The design phase is analyzed by considering program design language techniques and fast prototyping. A study of the implementation phase, involving validation and verification methods is included. Maintenance and enhancement techniques are developed.

Human Computer Interaction

The user interface development process, including user and task analysis, design, prototyping and evaluation. Human memory, perception, and motor abilities as they relate to user interface design. Students design a low-tech prototype of a user interface. Students prepare written documents describing their activities and present the final results to the class.

Computer Security

This course covers fundamental issues and first principles of security and information assurance. The course will look at the security policies, models and mechanisms related to confidentiality, integrity, authentication, identification, and availability issues related to information and information systems. Other topics covered include basics of cryptography (e.g., digital signatures) and network security (e.g., intrusion detection and prevention), risk management, security assurance and secure design principles, as well as e-commerce security. Issues such as organizational security policy, legal and ethical issues in security, standards and methodologies for security evaluation and certification will also be covered.

Data Communications

This course presents analog and digital data transmission, transmission media, Modulation Techniques, Data encoding, asynchronous and synchronous transmissions, USART, RS232-C, RS-449 standards, Data link configuration and control, error control, multiplexing and de-multiplexing.

Wireless communication

This course presents an Evolution of Wireless Communications, Wireless communications principles, Wireless standards and KPI's, Outdoor propagation models, Fading channels, Overview of Fading channel models (Rayleigh, Ricean etc.). Fading channel characterization. Jitter and ISI, Point-to-point communication: transmission, reception, detection, diversity and channel uncertainty; Cellular systems: multiple access techniques; Satellite Communications and its link budgets. Types of satellites; Microwave links; Capacity of wireless channels, Overview of compression techniques & channel coding, Spatial multiplexing; Capacity and multiplexing architectures; multiuser communication. Wireless networks and associated technologies.

Computer Graphics

This course presents a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms. Emphasis is on learning the software and on applying basic design skills to the computer generated image. Students are instructed in the fundamentals of drawing on the computer, and working with type through a series of realistic graphic design projects. Students are expected to have some computer experience and be familiar with basic functions of the computer before beginning the class.

Data Mining

The quantity and variety of online data is increasing very rapidly. The data mining process includes data selection and cleaning, machine learning techniques to ``learn'' knowledge that is ``hidden'' in data, and the reporting and visualization of the resulting knowledge. This course will cover these issues and will illustrate the whole process by examples of practical applications from the life sciences, computer science, and commerce. Several machine learning topics including classification, prediction, and clustering will be covered. Students will learn and use the open source R statistical software, see http://www.r-project.org, and machine learning packages.

Distributed Systems

real-time, agent-oriented, heterogeneous, multi-computer, multi-processor; coupling schemes: loose, tight; networking, ATM, frame relay, clustering, software protocols; communication strategies, client/server approaches

VLSI Design

CMOS technology and circuit design, implementation of combinational and sequential logic VL SI design methodologies, CAD tools for layout, simulation, and validation. Combinational logic structures Semiconductor memories and array structures. Chip input/output circuits
Circuit characterization and performance. Alternative circuit structures/low power design

Research Methodologies

This course provides an overview of research methods, designs, and techniques. Course content will include applying public information and research-based knowledge of issues and trends and use appropriate assessment strategies and research methodologies to address authentic issues in education. Students will also explore the use of action research as a means to improve teaching and learning.

Computer Ethics

Societies function based on normative ethics utilizing common sense to distinguish between ethical and unethical behavior. Most of us are not aware of the underlying theories when arriving at ethical judgments about right and wrong. However, the fast pace of progress in information technologies and digital entertainment creates an environment, in which ethical challenges are particularly complex. In the eyes of many, the use of computer or games and movies are violent, offensive and immoral. This course will concentrate on analyzing the impact of digital entertainment on an individual and society. Implications of certain values embedded on computer graphics, games and movies will be discussed. Elements of the ethical code of conduct for a game or movie creator will be formulated. The issue of balancing individual creativity vs. cultural impact, particularly on children, will be discusse.

Summer Training

The student train in one in the field for two 8 weeks to identify the reality of working life in the area of specialization.

Graduation Project I

The students under the supervision of a staff member will undertake a small independent project. The objective is to provide students integration and application of the knowledge gained throughout their courses in an actual problem.

Graduation Project 2

The students under the supervision of a staff member will undertake a major independent project. The objective is to enhance students understanding and applying their knowledge on a difficult engineering problem.

Engineering Mathematics   Prereq. (Linear Algebra and differential equations)

High order differential equations– Fourier transform – Laplace transform - partial differential equations – complex analysis , geometric representation, polar representation, exponential representation – complex plane – derivate – linear integral.

Technical English Language

Nature, types, levels and style of technical writing: Common errors in usage. Formal, informal and laboratory reports. Selection and presentation of graphic aids. Statistics in technical writing , Proposal writing, presentations and CV's. Interview Techniques

1.Elective Program Requirement

Computer Systems Simulation

Introduction to simulation as a general scientific problem solving technique. Methodology of simulation and use of computers. Classifications of simulation models. Introduction to simulation programming languages.

Advance Operating Systems

UNIX internals, device driver development. Network interfacing, client-server and daemon applications. Process structure, file system, memory management, terminal I/O, network interface, character and block device drivers, graphic interfaces.

Artificial Intelligence

Problem solving with computers, knowledge representation, control strategies, searching strategies, predicate calculus and rule-base deduction, goal directed planning applications, programming languages for AI, robotics systems.

Network Programming

Sockets Programming. TCP Programming. TELNET, HTTP, DNS and address conversion. Buffer Overflow. Web Programming (CGI). SMTP, POP, IMAP, FTP. RPC Programming. Java Network Programming. CORBA.

Mobile Computing

This course is offered for those who are interested in understanding and building systems support mechanisms for mobile computing systems including client-server web/database/file systems, and mobile ad hoc and sensor networks for achieveing the goal of anytime, anywhere computing in wireless mobile environments. The technologies involved to realize such a system will be covered and the fundamental concepts of mobile computing are introduced. These include mobility and service management, data management, routing in mobile ad hoc and sensor networks, and security issues for mobile systems. While mobile computing covers many topics, in this course our main focus will be on mobility, data and service management, and security issues in mobile computing environments. Students are expected to be familiar with basic concepts in Operating Systems and Networks in this class.

Real Time System

An embedded system is a computer system designed to perform one or a few dedicated functions. It is embedded in the sense that it is part of a complete device, often including electrical hardware and mechanical parts. For reasons of safety and usability, some embedded systems have strict constraints on non-functional behavior such as computational delay and periodicity. Such systems are referred to as real-time systems. Examples of real-time systems are control systems for cars, aircraft and space vehicles as well as computer games and multimedia applications. This course is intended to give basic knowledge about methods for the design and analysis of real-time systems.

Special Topics in Computer Engineering 1

This Course Covers Current Trends in Computer Engineering