Bachelor of Science in Computer Science

Course Description

Semester 1:

Course Code	HUM110
Course Title	**Islamic Studies**
Course Objectives	The subject introduces Islamic thought in comparison with other major world religions.
Course Outline	The topics included are beliefs and actions: Islam and other world religions, basic sources of teaching, obligations towards God, self and others, and Islamic teachings of collectivism.

Course Code	HUM100
Course Title	**English Comprehension and Composition**
Course Objectives	The course will help students in developing the competencies to understand English and express themselves effectively in the same language both in writing and speaking. This course is designed to improve students' abilities to paraphrase, summarize, and synthesize and to correctly and effectively express them. Students learn to write more effectively through a variety of assignments that highlight the writing and revision process, effective sentence formation, paragraph development, and the format of essays. This course will emphasize the use of correct grammar, spelling, punctuation, and mechanics. Students will be required to apply these skills to all writing assignments
Course Outline	This course will cover enhancing comprehension skills, basic Grammar, Advanced Sentence Structures (Dangling modifiers, Parallelism, Sentence fragments, Run-on sentences, Misplaced modifiers) Pre-writing Techniques(Free-writing, note keeping, brain storming, mind mapping, journalistic questions), Paragraph Writing(Definition, unity, topical sentence and supporting details), Essay Writing, Précis Writing, Message Composition, Word Skills, Presentation Skills.

Course Code	EEE121
Course Title	**Electric Circuit Analysis I**
Course Objectives	This is the very first undergraduate course which is aimed to build an understanding of the concepts and ideas explicitly involved in the introductory electric circuit theory. The course is designed to emphasize the relationship between conceptual understandings and practical problem-solving techniques involved in the circuit theory. In short, the course will provide students with a strong foundation of electric circuit knowledge and practices.
Course Outline	Introduction, Basic Concepts of Electrical Quantities and their System of Units, Charge, Current, Voltage, Power & Energy, Circuit Elements, Simple Resistive Circuits, Constant Voltage & Constant Current Sources, Ohm's Law, Kirchoff's Laws, Analysis of Single-Loop and Single-Node Circuits, Resistance & Source Combinations, Current and Voltage Division, Nodal Analysis, Mesh Analysis, Linearity and Superposition, Source Transformation, Thevenin's and Norton's Theorems, Maximum Power Transfer Theorem, Reciprocity Theorem, Inductor, Capacitor & their Combinations, Calculations of Current, Voltage & Power, Source Free RL & RC Circuits, Unit Step Function, Driven RL Circuits, Natural & Forced Response of RL and RC Circuits, Transient and Steady-State Analysis, Time-Constants, Natural and Forced Response of Parallel and Series RLC Circuits, Transient and Steady-State Analysis, Over-Damped, Critically Damped and Under Damped RLC Responses.

Course Code	MTH104
Course Title	**Calculus and Analytical Geometry**
Course Objectives	At the end of this course the students will be able to manipulate, differentiate, and integrate exponential functions, logarithmic functions, inverse trigonometric functions, and hyperbolic trigonometric functions. Apply L'Hôpital's rule to find limits of indeterminate forms, use integration by parts, trigonometric substitution, partial fractions, determine convergence and divergence of infinite series. Use Maclaurin and Taylor series to approximate functions, find power series and determine radius and interval of convergence.
Course Outline	Inequalities, Functions, Shifting Graphs, Limits of Function, Continuity, Derivative of a Function, Application of Derivatives, Integration, Indefinite Integrals, Definite Integrals, Application of Integral,

	Area , arc-length, Transcendental Functions, L'Hopital's rule, Techniques of Integration, Improper integrals, Infinite Series, Limit of sequences of Numbers, Convergence and Divergence Tests, Alternating Series Test, Absolute and Conditional Convergence, Power series, Taylor's Series and Maclaurin Series, Convergence of Taylor Series: Error Estimates, Applications of Power Series.

Course Code	CSC 103
Course Title	**Introduction to Computers and Programming**
Course Objectives	This course will provides an overview of computer hardware and software; and helps them to understand Programming in C with emphasis on modular and structured programming technique; Problem solving and algorithm development; Simple engineering and scientific problems.
Course Outline	This course covers computer hardware and software, C Programming language, flow charts, data types, variables, decision making if/else, switch, loops: for loop, while loop, do-while loop, arrays, multidimensional arrays, user defined functions, passing arrays to functions, recursive functions, structures, array of structures, string, pointers, preprocessor bit wise operators and File I/O (reading, writing, appending, modifying file content).

Course Code	MGT101
Course Title	**Introduction to Management**
Course Objectives	This course will provide students an understanding of the complexity of organizations and management.
Course Outline	The course covers both micro & macro perspectives which include the Manager's role, the historical context of organization & management, the external environmental and competitive analysis, putting an organization together. It purports to inculcate the problem solving process approach and to develop the strategic and tactical thinking amongst the students

Semester: 2

Course Code	HUM111
Course Title	**Pakistan Studies**
Course Objectives	The course seeks to provide an appreciation and understanding of the cultural, historical and socio-political heritage of Pakistan. Also how the constitution of Pakistan was formed and what type of constitutional issues were faced at the initial stages.
Course Outline	The course will cover culture, society and religion of Pakistan, Political and Constitutional Development (Shaping of the state structure; Objective Resolution; Constitutions of 1956, 1962 and 1973; Democracy and Authoritarianism), Cultural issues, Socio–Economic and Environmental issues in Pakistan (Unemployment; Double standard of education; Poverty; Gender issues; Population growth; Human right issues; Pollution issues.), Foreign Policy of Pakistan, Pakistan in the comity of the nations.

Course Code	EEE231
Course Title	**Electronics I**
Course Objectives	This is a fundamental level course in electronic devices and circuit theory. The main objective of this course is to make students understand the construction, operation and modeling of semiconductor devices and to inculcate in them the ability to analyze and design various electronic circuits.
Course Outline	Solid State Theory, Introduction to Semiconductors Devices, Intrinsic and Extrinsic Semi-conductors, Electron Hole Pairs, Distribution of Electrons and Holes in a Semi-conductors, P.N. Junction Diode, Forward and Reverse Biasing, of a Diode, V-I Characteristics, Ideal & Practical Diodes, DC Load Line & Quiescent Conditions, Small Signal Analysis of Diodes, Dynamic Resistance, AC Resistance, Capacitance and Switching Response, Diode Circuits & Applications, Rectifiers and Clipping Circuits, Special Diodes and their Applications, Zener Diodes, LED, Photo Diode, Tunnel Diode, Temperature Effects and Derating Curves, BJT Transistors, Biasing Techniques, Common Base, Common Emitter (CE) and Emitter Follower (CC) Configurations, Current Flow Mechanism, Equivalent Circuits, Current Amplification, Power Calculations, Theory of the Operation of the FETs and

	MOSFETs, Types of FETs, FET Amplifiers and Biasing Techniques, Temperature Effects in BJTs & FETs, Bias Stability, Q Point Variations, Stability Factor Analysis and Control.

Course Code	**MTH105**
Course Title	**Multivariable Calculus**
Course Objectives	At the end of this course the students will be able to understand the graphs, their behaviors, the limits, differentiation and integration of the functions of more then one independent variable. Students will learn about 3-dimensions problems. Also they will use some new coordinate systems like cylindrical polar coordinates and spherical polar coordinates. It also include applications of integration like area, volume, line integrals etc.
Course Outline	Parameterization of Plane Curves, Polar coordinates, Graphing in Polar coordinates, Vectors in the Plane, Cartesian Coordinates and Vectors in Plane & Space, Dot Products and Cross Products, Cylindrical & Spherical Coordinates, Introduction to Vector Valued Function, Functions of Several Variables, Limits and Continuity, Differentiability, Partial Derivatives, Directional Derivatives, Maxima, Minima, Lagrange Mu ltipliers, Double Integrals, Implicit Function Theorem, Applications, Triple Integrals, Triple Integrals in Cylindrical & Spherical Coordinates, Line Integrals.

Course Code	**CSC102**
Course Title	**Discrete Structures**
Course Objectives	The course will help students to understand mathematical concepts for the mastery of some of the higher level computer science courses. Main purpose is to introduce the basic concepts (familiarity with mathematical notations, understanding of mathematical proofs) and applications of discrete mathematics.
Course Outline	This course introduces fundamental mathematical structures necessary for program logic and data structures. It covers topics on set theory, propositional and first order logic, proof techniques, graphs and tree structures, notions of implication, converse, inverse, contra

	positive, negation, and contradiction finite probability space , counting arguments, sum and product rule, inclusion-exclusion principle, number theory and discrete probability.

Course Code	HUM102
Course Title	**Report Writing Skills**
Course Objectives	This course has been specifically designed to meet the writing needs of students aiming for a specialization in areas of Management. The aims and objectives of this particular course are to introduce course participants the importance, needs, varieties, and technicalities of business reports. Also Their reading skills are further enhanced through exposure to a variety of graphical sources such as charts, graphs and diagrams. Students are taught presentation skills culminating in a PowerPoint presentation based on their term report
Course Outline	The course introduces fundamental of Technical Communication (Theories of Communication, ABC & Objectives of Technical Communication, 7 Cs of effective communication), writing process (stage 1, stage 2, stage 3), presentation skills, overview of technical documents (Writing memoranda & e-mails, overview of formal letters), basics of writing reports (Defining reports, determining the purpose & factors, gathering the information needed, interpreting the findings, Writing Short Informal Reports, Writing Long Reports, Understanding plagiarism, Referencing sources), designing the final project and presentation.

Course Code	CSC241
Course Title	**Object Oriented Programming**
Course Objectives	The course will help students to understand object oriented approach by developing solutions for range of problems using object oriented programming. They will also design and implement simple and multi threaded applications.
Course Outline	This course covers the concepts of object oriented programming paradigm, encapsulation, inheritance, polymorphism, abstract classes and interfaces, overloading and overriding, exception handling, packages, object-oriented design, event-driven programming,

	recursion, use of stacks, queues and lists from API.

Semester: 3

Course Code	HUM103
Course Title	Communication Skills
Course Objectives	This course is designed to develop student's reading, writing, listening and speaking skills at an advanced level through language experience, free writing, drafting, peer response, revising and editing.
Course Outline	This course will enable the students to organize messages that are appropriate to the audience and situation. Students improve oral communication skills for professional and social interaction through extensive pronunciation and conversational practice. Individual pronunciation assessments help students refine their language skills. Practice includes forming and communicating opinions on contemporary issues, developing formal and informal oral presentations and reports, giving and following directions. Through readings and written exercises, students learn how to form, communicate, and support their opinions and ideas in academic and professional settings. Students strengthen their reading skills and expand their vocabularies by reading and discussing a variety of adapted and authentic texts. They also may present findings in research reports.

Course Code	CSC271
Course Title	Data Base Systems
Course Objectives	Main objective of this course is to develop understanding of all the concepts of Database Modeling & Development; to construct and model real world Database system using Oracle, SQL and Developer.
Course Outline	Data/Information & Processing; File based systems; Data Processing Modes; Types of Databases; Components of DBMS; History and objectives of the development of DBMS; Types of data models; Roles in the database environment; Database Architecture; Relational Algebra & Relational Calculus; Terminology of Relational Model;

Associations/Relationships; Types of Keys; Data Integrity; Views; Indexes; Design & Administration; Database system development life cycle; Phases and types of database design; Data Administration & Database Administration; ER-Modeling using UML; Normalization; Handling Problematic & Redundant data; Functional Dependencies; Transitive Dependencies; Identifying Normal Forms; Writing SQL Commands; Creating & Indexing the Tables; Formatting Query Results into Reports; Usage of SQL-Plus.

Course Code	EEE241
Course Title	**Digital Logic Design**
Course Objectives	This is a basic course which concentrates on the basic methods of digital hardware designing. The students will learn different techniques to design simple to moderate level hardware. The course contains extensive lab work, in which students will learn to design atIC level. Students will also learn designing using VHDL.
Course Outline	Introduction to Digital Computer and Systems, Number Systems, Binary Arithmetic, Boolean Algebra, Algebraic Manipulation, Canonical and Standard Form & Conversions, Logical Operations and Gates, Simplification of Functions, Karnaugh Map Methods, Two Level Implementations, Don't Care Conditions, Prime Implicants, Combinational Logic Design, Arithmetic Operations and Circuits, Analysis Procedures, Multilevel NAND/NOR Circuits, Decoders, Encoders, Multiplexers, Demultiplexers, Memory Types, Read Only Memory, Random Access Memory, Programmable Logic Array (PLA), Sequential Logic, Flip-Flops, Clocked Sequential Circuits, State Machine Concept, Design of Sequential Circuits using State Machines, Counters and their Design, Synchronous Counters, Asynchronous Counters, Shift Registers etc.

Course Code	MTH242
Course Title	**Differential Equations**
Course Objectives	At the end of this course the students will be able to apply ordinary differential equations to his respective branch of engineering. To illuminate the partial significance of differential equations, maximum emphasis is to be laid on their applications to physical sciences and engineering. Higher order Differential Equations are not only

	introduced but also its applications are illustrated through examples. The last part of this course has special significance with respect to hydrodynamics and heat transfer problems and hence needs to be explained through examples from these disciplines.
Course Outline	Mathematical and Physical meaning of first order differential equations and its applications, Linear Differential Equations, Second Order Linear Homogeneous Differential Equations with Constant Coefficients, Second Order Linear Non-homogeneous Differential Equations with Constant Coefficients, Higher Order Linear Differential Equations, Bessel Equation, Legendre's Equation, System of Simultaneous Linear Differential Equations, Series Solution of Differential Equations Nonlinear Systems of Differential Equations, Partial Differential Equations, First Order Partial Differential Equations, Solution using Method of Separation of Variables, Classifications of Linear Second Order Partial Differential Equations, Two Dimensional Partial Differential Equations and their Solutions.

Course Code	**CSC211**
Course Title	**Data Structures**
Course Objectives	The course is designed to teach students structures and schemes, which allow them to write programs to efficiently manipulate, store, and retrieve data.
Course Outline	The topics cover: Introduction to design patterns; Basic algorithms analysis; Fundamental data structures - implementation strategies for stacks, queues and linked lists; Recursion; Implementation strategies for tree and graph algorithms; Hash tables; Applications of data structures (e.g. data compression and memory management). A special emphasis is placed on programming and hands-on experience, meant to reinforce the theoretical aspects covered in lectures.

Semester: 4

Course Code	CSC291
Course Title	**Software Engineering I**
Course Objectives	The main objective of this course is to construct a solid foundation for understanding and application of principles, techniques and technologies utilized in the development of good software systems by individual or teams.
Course Outline	What is software engineering? Software lifecycle and process models, Software engineering tools and programming environments, Overview of software project management, Software requirements specification, Software design, Using APIs, Software verification and validation, and Software evolution. Software engineering tools for modeling such as: Visual Paradigm UML or Rational Rose will be covered in lab extensively covering flow-oriented modeling, behavioral modeling, scenario-base modeling and class modeling.

Course Code	CSC221
Course Title	**Computer Organization and Assembly Language**
Course Objectives	To introduce the organization of computer systems and usage of Assembly Language for optimization and control. Emphases should be given to expose the low level logic employed for problem solving while using Assembly language as a tool.
Course Outline	Introduction of Computer Organization, Data Representation; Integer Arithmetic; Two's Complement (Multiplication and division); Floating Point Representation; Floating Point Arithmetic; Instruction Representation; Machine Instruction Characteristics; Type of Operands; Pentium And Power PC Data types; Objectives and perspectives of Assembly language, microprocessor bus structure: address, data and control, memory organization and structure (segmented and linear models), addressing modes, introduction to Assembler and debugger; Introduction to registers and flags; Data Movement, Arithmetic and Logic, Programme Control, Subroutines, Stack and its operation, Peripheral Control; Interrupts, Interfacing with high level languages, Real-time application.

Course Code	MTH262
Course Title	**Statistics and Probability Theory**
Course Objectives	At the end of this course the students of Computer Sciences and Bio Informatics will be able to understand data analysis, modeling and predictions in their respective fields. The content of this course covers all the descriptive statistics and probability models along with some basic touch of regression analysis.
Course Outline	Introduction to statistics and statistical methods, Frequency Distributions & Representation of data, Measure of Central tendency, Measures of Dispersion, Probability theory, Counting Rules, Conditional Probability, Law of total probability and Bays Rule, Concept of Discrete and Continuous Random varia ble, Cumulative distributions, Joint probability Distributions, Uniform, Binomial and, Poisson, & Geometric Distributions, Uniform & Normal Distribution, Gamma, Exponential distributions, Simple linear Regression and fitting of Curves. Correlation study.Testing about population Mean, proportion for one sample and two samples.Confidence interval for population Mean, proportion for one sample and two samples.

Course Code	MTH231
Course Title	**Linear Algebra**
Course Objectives	The objective of the course is to provide a rigorous approach towards the solutions of linear models which involves more than one variable. The techniques discussed in this course can be implemented on a wide range of applications from physical world. The matrix algebra will be helpful in performing and understanding of matrix computations on a machine. The eigenvalues, eigenvectors, inner product spaces, orthogonality are useful concepts for the analysis of dynamical systems.
Course Outline	Systems of linear equations and matrices, determinants; vector and inner product spaces(Subspaces, Basis, Null Space, Column Space, Dimension and Rank, Change of Basis, Applications), Dynamical Systems (Eigenvalue and Eigenvectors of a Matrix, Diagonalization,

Eigenvectos and Linear Transformations, Applications to Dynamical System) matrix representations of linear transformations(Linear Independence, The Matrix of Linear Tranasformation, Linear Models in Science, and Engineering.), eigen values and eigen vectors, Cayley-Hamlton Theorem. Inner Product Spaces (Length, Orthognal Sets, Orthonormal Basis, orthogonal Projections, The Gram-Schmidt Process, Applications to linear Models).

Course Code	CSC201
Course Title	**Design and Analysis of Algorithms**
Course Objectives	This course will provide students the comprehensive knowledge of algorithms with an understanding of the principles and techniques used in the design and analysis of algorithms.
Course Outline	The course includes Algorithms and Problem Solving Basic Algorithmic Analysis; Advanced Algorithmic Analysis; Advanced Data Structures Algorithms Strategies & Analysis of Fundamental Computing Algorithms; Solving recurrences; Greedy Algorithms; Dynamic programming; Graphs Terminology, Traversal algorithms; MST, Prim's Algorithm, Dijikstra's Algorithm, Kruskul Algorithm; Basic Computability; The Complexity Classes P and NP.

Semester: 5

Course Code	CSC253
Course Title	**Computer Graphics**
Course Objectives	To develop good concepts of computer drawing Graphics techniques with knowledge of OpenGL.
Course Outline	Introduction to Computer Graphics; Introduction to OpenGL; Vectors Review; Matrices Review; Graphics Pipeline; Line Drawing Algorithm, Bresenham; Clipping of Line, Cohen Sutherland; Aliasing; Anti-aliasing technique; 2D Transformation; Homogeneous 2D Transformation; 3D Transformation; Homogeneous 3D Transformation; Drawing Circles, Arcs Drawing Curves; Hierarchical Modeling; Projections; Camera Concepts; Back Face Detection; Light Sources; Material Properties;

	Texture Mapping; Environmental Mapping; Ray Tracing; Graphics in Games; Graphics in Movies

Course Code	CSC322
Course Title	**Operating Systems Concepts**
Course Objectives	In this course students will be taught the fundamentals of operating systems. Different models of operating systems will be introduced.
Course Outline	This course introduces the fundamentals of operating systems design and implementation. Topics include history and evolution of operating systems; Types of operating systems; Operating system structures; Process management: processes (Process Scheduling; Operations on Processes. Examples of IPC Systems; Communication in Client-Server Systems. Concurrency/Multithreading Models; Multithreading synchronization issues; Thread Libraries; Operating System Example), threads, CPU scheduling, process synchronization; Memory management(File Concept; Access Methods; Directory Structure; File-System Mounting; File Sharing; Protection. File-System Structure; File-System Implementation; Directory Implementation; Allocation Methods; Free-Space Management; Mass Storage Structures) and virtual memory; File systems; I/O systems; Security and protection; Distributed systems; Case studies.

Course Code	CSC392
Course Title	**Software Engineering II**
Course Objectives	The course will focus on more theoretical and advanced aspects of software engineering.
Course Outline	Formal methods of software specification, construction and verification; Clean-room Software Engineering., Advanced topics like Component Based Software Engineering; agile software development methods, System modeling: Context models, interaction models, structural models, behavioral models. Software architecture; Reengineering and re-factoring; reusability; software estimation; quality assurance, Software design principles and techniques: Object-oriented design using the UML , Object Constraint Language OCL , Software Testing principles and techniques: Development testing, test-driven development, release testing, user testing, software standards are

important part of this course; additional topics concerning the software engineering issues pertinent to local software industry may be added. Objective is to have an appreciation of the practical aspects of the software engineering principles and skills taught in this course and technical documentation.

Course Code	CSC339
Course Title	**Computer Communication and Network**
Course Objectives	The course will cover computer networks in a top down manner starting from the application layer to data link layer. The course will be taught in the Internet perspective and will therefore cover the layers of the TCP/IP suite.
Course Outline	Introduction and overview of internet, Client Server Programs, Access Networks and Physical Media. Concepts of Delay Loss and Throughput: Queuing delay, End to End delay, throughput in Packet switched Networks, Protocol layers and their service models. Application Layer, Transport Layer, Network Layer, Link Layer and Local area networks. Wireless and Mobile Networks. Security in Computer Networks. Network Security and Management

Semester: 6

Course Code	CSC336
Course Title	**Web Engineering**
Course Objectives	To make students learn about the latest tools, technologies and developments in the area of Web Technologies
Course Outline	The course covers basics of web engineering, web client and web server, DNS, web architecture, HTML, Tables and CSS, CSS forums, Scripting Languages, Dynamic web pages, PHP (Getting Form Data, Handling User Request, Functions Getting Form Data, Handling User Request Functions).

Course Code	CSC312
Course Title	**Automata Theory**
Course Objectives	The objective is to give the student an understanding of the mathematical description of computational networks, the limitations of mechanical computation, and the formal specification of languages.
Course Outline	To study and mathematically model various abstract computing machines that serve as models for computations and examine the relationship between these automata and formal languages. Regular expressions, NFAs. Core concepts of Regular Languages and Finite Automata; Decidability for Regular Languages; Non-regular Languages; Context-free Languages and Pushdown Automata; Decidability for Context-free Languages; Non-context-free Languages; Turing Machines and Their Languages are important part of the course. Transducers (automata with output).

Course Code	MGT131
Course Title	**Financial Accounting**
Course Objectives	The major objectives of this course are to develop an understanding of the concepts, principles and conventions upon which financial accounting is based, and analyzing business transactions, their recording and preparing of end result through trial balance and adjusting entries leading to periodic financial statements.
Course Outline	Financial Accounting is principally concerned with the construction and interpretation of financial reports prepared for external parties to the issuing firm or entity. The course further examines notes and accounts receivables; plant assets; liabilities; partnerships; corporations; international transactions; cash flow statements; and a review of the budget process and responsibility accounting. Consideration will be given to accounting techniques and the formulation of financial reports; however, the course will focus on understanding accounting policies, their rationale and the implications for users of the financial accounting information. The user orientation approach will include interpretation and assessment of financial statements.

Course Code	MTH375
Course Title	**Numerical Computations**
Course Objectives	At the end of this course the students will learn the concept of root finding for nonlinear equations, interpolation and approximation of functions by simpler computational building blocks (polynomials and splines), Numerical differentiation and divided differences, numerical quadrature and integration. Study the numerical solutions of ordinary differential equations and boundary value problems. An important component of numerical analysis is computational implementation of algorithms which are developed in the course in order to observe the issues of accuracy, computational work effort, and stability. Exercises will include computational experiments in a programming language of the student's choice.
Course Outline	Introduction to Numerical Analysis, error Analysis, Numerical Solutions to Non- Linear equations, Numerical Solution to the system of Linear equations, Iterative methods, Introduction to Interpolation, Spline interpolation, Numerical differentiation, Numerical integration and Differential Equations.

*******Elective 1

Semester: 7

Course Code	CSC462
Course Title	**Artificial Intelligence**
Course Objectives	To enhance basic searching and knowledge representation techniques. Discuss various decision-making strategies and applications in Computer Science. Introduce the limitations of current technology.
Course Outline	Fundamentals of AI, its history and definitions, Problem solving methodologies, example problems, general purpose search algorithm and its variants for uniformed and informed searches. Knowledge-based agents, propositional logic (PL), inference in PL and reasoning patterns in PL, Counting arguments, Sum and product rule, Inclusion-

	exclusion principle, Arithmetic and geometric progressions, Fibonacci numbers, The pigeonhole principle, Permutations and combinations, Basic definitions, Pascal's identity, The binomial theorem, Solving recurrence relations, Common examples, The Master theorem, First-order Logic (FOL), representation, syntax and semantics

Course Code	CSC441
Course Title	**Compiler Construction**
Course Objectives	To enable the students practically build and understand the complexity and issues related with design and construction of compilers.
Course Outline	Basics of Compiler, Phases of compiler; Implementation techniques; Formal languages; Lexical tokens; FSM and lexical tables; Lex; Grammars, Languages, and push down machines; Ambiguities in programming languages; Parsing problem; Relation and closures; Simple grammars; Quasi simple grammar; LL 1 grammars; Parsing arithmetic expressions; Syntax directed translation; Attributed grammars; Translating control structures; Shift reduce Parsing; LR Parsing with tables; Yaac; Arrays; Introduction to code generation; Converting atoms to instructions; Single pass vs. multiple pass; Register allocation; Optimization; Case studies using any sample compiler e.g. MiniC.

Course Code	CSC456
Course Title	**Human Computer Interaction**
Course Objectives	To introduce students how humans interact with computers and how they can make their applications more users friendly.
Course Outline	Basics of HCI, Relationship with other disciplines ,Goals of HCI, Why study HCI – non software/software perspective, Human input-output channels, Vision, hearing, touch, memory, thinking, emotion, psychology and the design of interactive systems, Interaction devices, PACT: A framework for designing interactive systems, The process of human-centered interactive systems design, Task analysis, Understanding requirements, Envisionment , Visual user interface design, Multimodal user interface design , Designing websites , Evaluation

*******Elective 2	

Semester: 8

Course Code	HUM220
Course Title	Introduction to Psychology
Course Objectives	It is a study of the theories of human behavior, the psychological basis of behavior, the concept of mental health and processes of adjustment.
Course Outline	This course will cover the basic needs of psychological issues of individual life. It is related with the personality development, motivational parameters, types of memory, organization behaviors, stress management in organization etc. this field will provide the understudying of psychological issues as well as personality aspects(memory, perception ,motivation and emotion, stress coping and health, personality, group dynamic).

*******Elective Institutional 1
*******Elective Institutional 2

******* List of Elective and Elective Institutional courses is given in the scheme of studies. Each Elective course is of 3 cr. hrs each.