Curricula/Syllabi
of
BS Information Technology
for
Punjab University Affiliated Colleges

Scheme Of Studies / Semester-Wise Workload

3rd Semester					
Sr.	**Code**	**Course Title**	**Course Type**	**Prerequisite**	**Cr. Hrs.**
1	CC-211	Object Oriented Programming	Computing Core	Programming Fundamentals	3
2	CC-211L	Object Oriented Programming Lab	Computing Core	Programming Fundamentals	1
3	CC-214	Computer Network	Computing Core		3
4	CC-214L	Computer Network Lab	Computing Core		1
5	EI-231	Computer Organization and Design	IT Elective		3
6	UE-271	Introduction to Psychology	University Elective		3
7	MS-251	Probability and Statistics	Math & Science Foundation		3
8	HQ-003	Translation of Holy Quran	Quran and Sunnah	Translation of Holy Quran	1
Total Credit Hours: 17					

Course Title	**Object Oriented Programming**
Course Code	**CC-211**
Credit Hours	3
Category	Computing core
Prerequisite	CC-112: Programming Fundamentals
Co-Requisite	None
Follow-up	CC-213: Data Structures and Algorithms
Course Description	**Introduction**: Object oriented design, history and advantages of object-oriented design. **Object Oriented Programming:** Terminology and features, classes, objects, data encapsulation, constructors, destructors, access modifiers, const vs non-const functions, static data members & functions, function overloading, operator overloading, identification of classes and their relationships, composition, aggregation, inheritance, multiple inheritance, polymorphism, abstract classes and interfaces. **Generic Programming:** Concepts, function & class templates, standard template library. **Object Streams:** Data and object serialization using object streams. **Exception Handling**.
Text Book(s)	1. H. M. Deitel, P. J. Deitel, C++ How to Program, 5th Ed., Prentice Hall, 2005, ISBN: 0-13-185757-6.
Reference Material	1. R. Lafore, Object-Oriented Programming in C++, 4th Ed., Sams publishing, 2002, ISBN: 0-672-32308-7. 2. Victor Shtern, Core C++ A Software Engineering Approach, 1st Ed., Prentice Hall PTR, 2000, ISBN: 0-13-085729-7. 3. Stephen Parata, C++ Primer Plus, 5th Ed., Sams Publishing, 2005, ISBN: 0-672-32697-3. 4. Bjarne Stroustrup, The C++ Programming Language, 4th Ed., Addison Wesley, 2013, ISBN: 0-321-56384-0.

Course Title	**Object Oriented Programming Lab**
Course Code	**CC-211L**
Credit Hours	1
Category	Computing core
Prerequisite	CC-112: Programming Fundamentals
Co-Requisite	None
Follow-up	CC-213: Data Structures and Algorithms
Course Description	**Implementation:** the concepts studied in "CC-211 Object Oriented Programming", **Review:** Data Driven Programming. **Classes and Objects:** Defining Classes and Object Initialization, setter/getter, Constructor/Destructor. **Resource Management:** Allocation/De-Allocation, const data members and function. **Composition**: Aggregation, Friend function/classes, Generalization, Multilevel/Multiple Inheritance, Runtime Polymorphism, Singleton/Proxy/Adapter Pattern, Ad Hoc Polymorphism. **Templates**. **Stream I/O**. **File Processing**. **Exception Handling**.
Text Book(s)	1. H. M. Deitel, P. J. Deitel, C++ How to Program, 5th Ed., Prentice Hall, 2005, ISBN: 0-13-185757-6.
Reference Material	1. R. Lafore, Object-Oriented Programming in C++, 4th Ed., Sams publishing, 2002, ISBN: 0-672-32308-7. 2. Victor Shtern, Core C++ A Software Engineering Approach, 1st Ed., Prentice Hall PTR, 2000, ISBN: 0-13-085729-7. 3. Stephen Parata, C++ Primer Plus, 5th Ed., Sams Publishing, 2005, ISBN: 0-672-32697-3. 4. Bjarne Stroustrup, The C++ Programming Language, 4th Ed., Addison Wesley, 2013, ISBN: 0-321-56384-0.

Course Title	**Computer Networks**
Course Code	**CC-214**
Credit Hours	3
Category	Computing Core
Prerequisite	None
Co-Requisite	None
Follow-up	None
Course Description	**Introduction**: Protocols architecture, basic concepts of networking, network topologies. **Layered Architecture**: Physical layer functionality, data link layer functionality, multiple access techniques, circuit switching and packet switching, LAN technologies, wireless networks, MAC addressing, networking devices, network layer protocols**,** IPv4 and IPv6, IP addressing, subnetting, CIDR, routing protocols, transport layer protocols, ports and sockets, connection establishment, flow and congestion control, application layer protocols, latest trends in computer networks.
Text Book(s)	1. James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 6th Edition, Pearson, 2012, ISBN: 0132856204.
Reference Material	1. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition, Prentice Hall, 2010, ISBN: 9332518742. 2. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2013, ISBN: 0133506487. 3. Behrouz A. Forouzan, Data Communication and Computer Networks, 5th Edition, McGraw-Hill, 2012, ISBN: 0073376221.

Course Title	**Computer Networks Lab**
Course Code	**CC-214L**
Credit Hours	1
Category	Computing Core
Prerequisite	None
Co-Requisite	None
Follow-up	None
Course Description	**Introduction to Networks and its Components:** Network components, transmission modes, types of connections, physical and logical topologies, performance evaluation parameters for topologies, network types (PAN, LAN, WAN, MAN), data transmission media, guided media vs unguided media. **Network Addressing:** Physical and logical addresses, IP addressing, class-full addresses, private addresses, loop back addresses, IP Sub-netting and super-netting. **Setting Network Connectivity:** Different types of cables available for setting up a small Local Area Network, connectors, corss-over, and straight through cables etc. mastering Ethernet cables (using pin arrangement of T568-A or T568-B) and checking their correctness, Setting up point-to-point connection between 2 computers. Assigning the IP address to computers and finding out the IP addresses using ipconfig command. Test connectivity between computers using ping command. Sharing data between computers. **Setting Activity Directory on Domain Controller:** Installation of Activity Directory on Domain Controller, Manage and Active Directory Forest and domain. Design and OU, Identify GP requirement for OU. Design an OU structure for the purpose of delegating authority. Design a security group strategy, define administrative access requirements, define user roles. Specify account requirements for users, computers, administrators, and services. Design an AD naming strategy, Design a strategy for GP implementation. Design the Administration of GPOs. Installation and configuration of File server. Installation and configuration of Quota server. **Setting Additional Domain Controller:** Installation of Activity Directory on Additional domain controller, Domain synchronization between Domain Controller and Additional domain controller. AD users and group management in Client and Server environment. Design a user and computer authentication strategy. Design a user and computer account strategy. Installation and configuration of Domain name server. Configuration of forward look up zone. Configuration of reverse looks up zone. Concept of AD integrated zone, primary zone, secondary zone and stub zone. **Linux OS:** Installation of Linux OS and concept of file systems. Usage of basic commands. User management and its permissions. **Sever Management:** Installation of various servers and their configuration like Samba file server in work group. Samba file server in domain environment. DHCP server, DNS server, NAT server. **Networking Devices and Protocols:** Exposition and discussion of various networking devices including Hubs, Switches, Routers, Bridges, Gateways, Repeaters, Amplifiers, Network Interface Cards, Modems, Wireless access points, and BRouters. Exposition and discussion of different protocols working at each layer of OSI and TCP/IP Model. PPP, ARP, RARP, ICMP, UDP, TCP, TELNET, BOOTP, SMTP, SMB, NETBIOS, Exposition and discussion of well-known services and ports. **Wireless Access Points:** Installation and configuration of WAP, Installation and configuration if

	wireless Router, manageable and non-manageable Cisco switches, configuration of manageable Cisco switches, concept and configuration of VLAN, switch modes and operations. Installation, configuration, sharing, and managing printing quota for users of network printer. **Network Commands:** Understanding and practicing various networking commands, Ping (ICMP, Echo request, TTL, RTT), Traceroute, Finger, Hostname, Telnet, Netstat, Nslookup, Route, whois, ipconfig/ ifconfig, pathping, arp, rarp and netstat etc. Data backup technique and procedures. **Network Simulation:** Setting up WAN on simulator, identifying necessary devices to build a WAN, learning the configuration of the router in order to connect at least 2 LANs, learning static and dynamic routing protocols, understanding and implementing RIP (Routing Information Protocol), understanding and implementing IGRP, ACL's configuration on routers.
Text Book(s)	1. T. Lammle, CCNA Cisco Certified Network Associate Deluxe Study Guide, 6th Edition, Sybex, 2011, ISBN: 978-0-470-90108-3.
Reference Material	1. R. Perlman, Interconnections: Bridges, Routers, Switches, and Internetworking Protocols, 2nd Edition, Addison-Wesley, 1999, ISBN: 0201634481.

4. INFORMATION TECHNOLOGY DOMAIN ELECTIVE COURSES

Course Title	**Computer Organization and Design**
Course Code	**EI-231**
Credit hours	3
Category	IT Elective
Prerequisite	None
Co-Requisite	None
Follow-up	None
Course Description	**Introduction**: Digital Systems, Binary Representation, Binary Codes, Boolean Algebra (Basic concepts, properties and theorems), Boolean functions, Canonical and Standard Forms of Boolean functions, Simplification of Boolean functions. **Digital Logic Circuits:** Gates, Circuits, Two-level and Multi-level Logic Circuits, Combinational Circuits, Small Scale Integration (SSI), Design Procedure of Combinational Circuits, Adders, Subtractors, Code Convertors, Analysis of Combinational Circuits, Medium Scale Integration (MSI), Parallel Adder, Magnitude Comparator, Decoder, Demultiplexer, Encoder, Multiplexer, Design of Bus System, ROM Design, Programmable Logic Array (PLA), Sequential Circuits, Latches, Flip-Flops, Design and Analysis of Sequential Circuits, Design of Counters, Registers, Register Transfer, Shift Registers, Micro-operations, RAM Design. **Basic Computer Organization & Design**: ALU Design, Control Unit Design, Microprogram Control, Computer instruction format, Instruction Set, Instruction Cycle, Instruction Pipeline, Memory Unit, Cache Memory, I/O Operations, Interrupts.
Text Book(s)	1. M. Morris Mano, Digital Logic and Computer Design, 3rd Edition, Pearson, 1979, ISBN: 0132145103.
Reference Material	1. Thomas L. Floyd, Digital Fundamentals, 10th Edition, Prentice Hall, 2008, ISBN: 0132359235.

Course Title	**Introduction to Psychology**
Course Code	**UE-271**
Credit Hours	3
Category	Social Science Related University Elective
Prerequisite	None
Co-Requisite	None
Follow Up	None
Course Description	Introduction to Psychology, Definition of the term Psychology, Psychology and Soul, Relationship of Psychology with Philosophy and deep roots of Psychology in Philosophy, Differentiate between Psychologists, Psychoanalyst and Psychiatrist, Different school of thought in Psychology, An overview of important methods in Psychology, Observational method, Clinical method, Development method, Introspection method, Different branches of Psychology, Child Psychology, Clinical Psychology, Applied Psychology, Individual Psychology, Criminal Psychology, Position of Sigmund Freud as the father of modern Psychology, Conscious / Unconscious / Subconscious, Psychodynamic theories, ID, Ego, Super Ego, Memory, Differentiate between STM and LTM, Forgetting, Causes of Forgetting, Disorders, Sleep and Behavioral disorders, Overview of composite Psychology, Perception, Various processes in Perception, Perception and its various characteristics, Attention, Attention as selective process, Internal and External determinants of attention, Intelligence and Intelligence test, Artificial Intelligence, Computer in any case cannot replace human mind, Cognitive Psychology, Learning, Various process and methods of learning, Nervous System, Definition and part, Types of Nerves, Mental Processes, Brain, Sensation, Types of Sensation, Personality and its Structure, Development, Basis and factors of Development, Social Psychology, Social Cognition, Impression Formation, Dream, Nature Of Dream, Dream as Supernatural Phenomena.
Text Book(s)	1. Samuel E. Wood, Ellen Green Wood, Denise Boyd, The World of Psychology, 7th Edition, Pearson, 2014, ISBN-13: 978-0205763733, ISBN-10: 0205763731.

Course Title	**Probability and Statistics**
Course Code	**MS-251**
Credit Hours	3
Category	Math & Science Foundation
Prerequisite	None
Co-Requisite	None
Follow-up	None
Course Description	**Introduction:** Statistics and Data Analysis, Statistical Inference, Samples, Populations, and the Role of Probability. Sampling Procedures, Discrete and Continuous Data, Statistical Modeling, Types of Statistical Studies. **Probability:** Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule. Random Variables and Probability Distributions. **Mathematical Expectation:** Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem. **Probability Distributions:** Discrete Probability Distributions, Continuous Probability Distributions. **Fundamental Sampling Distributions:** Sampling Distributions and Data Descriptions, Random Sampling, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem. Sampling Distribution of S2, t-Distribution, F-Quantile and Probability Plots. **Single Sample & One- and Two-Sample Estimation Problems**: Single Sample & One- and Two-Sample Tests of Hypotheses. The Use of P-Values for Decision Making in Testing Hypotheses (Single Sample & One- and Two-Sample Tests). **Regression**: Linear Regression and Correlation, Least Squares and the Fitted Model, Multiple Linear Regression and Certain, Nonlinear Regression Models, Linear Regression Model Using Matrices, Properties of the Least Squares Estimators.
Text Book(s)	1. Dimitri P. Bertsekas, John Tsitsiklis, Introduction to probability, Athena Scientific, 2nd Edition, 2008, ISBN: 978-1886529236. 2. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, Cengage Learning, 9th Edition, 2015, ISBN: 978-1305251809. 3. R.E. Walpole, R.H. Myers and S.L Myers, "Probability and Statistics for Engineers and Scientists", 9th Edition.
Reference Material	1. MIT open courseware: https://ocw.mit.edu/courses/mathematics/18-05-introduction-to-probability-and-statistics-spring-2014/

Course Title	**Translation of Holy Quran**
Course Code	**HQ-003**
Credit Hours	0
Category	Quran and Sunnah
Prerequisite	HQ-002: Translation of Holy Quran
Follow-up	HQ-004: Translation of Holy Quran
Course Description	**Surah Al-A'raf to Surah Yunus (سورۃالاعراف تا سورۃیونس)**:Translation of Verses into English or Urdu language (آیات کا انگریزی یا اردو زبان میں ترجمہ),Meaning of Qur'anic words into English or Urdu language (انگریزی یا اردو زبان میں قرآنی الفاظ کے معانی), **Attached pronouns(ضمائر متصلہ)**:Use attached pronouns with word and give their meanings (لفظ کے ساتھ ضمائر متصلہ لگائیں اور ان کے معنی بتائیں).