Appendix - IV

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH DEGREE COURSE IN

INFORMATION TECHNOLOGY

(2015 ADMISSIONS)

SCHEME OF EXAMINATIONS & SYLLABUS

III to VIII Semesters

SEMESTER I [Stream B]

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	Cred	Marks		Total
						CA	ESE	
GE 1101B	Computer Programming	3	1	0	3	40	60	100
AS 1102B	Engineering Chemistry	3	1	0	3	40	60	100
GE 1103B	Engineering Graphics	2	1	3	5	40	60	100
GE 1104B	Basic Electrical Engineering	3	0	0	3	40	60	100
GE 1105B	Basic Electronics Engineering	3	0	0	3	40	60	100
AS 1106B	Environmental Studies	3	1	0	3	40	60	100
GE 11L1B	Electrical Engineering Workshop	0	0	3	1	25	25	50
GE 11L2B	Computer Programming Laboratory	0	0	3	1	25	25	50
	TOTAL	**17**	**4**	**9**	**22**			

CA – Continuous Assessment, ESE – End Semester Examination

SEMESTER II [Stream B]

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
AS 1201B	Calculus	3	1	0	3	40	60	100
AS 1202B	Engineering Physics	3	1	0	3	40	60	100
GE 1203B	Engineering Mechanics	4	1	0	4	40	60	100
GE 1204B	Basic Civil Engineering	3	0	0	3	40	60	100
GE 1205B	Basic Mechanical Engineering	3	0	0	3	40	60	100
HS 1206B	Technical Communication and Professional Ethics	2	1	0	2	40	60	100
GE 12L1B	Civil Engineering Workshop	0	0	3	1	25	25	50
GE 12L2B	Mechanical Engineering Workshop	0	0	3	1	25	25	50
HS 12L3B	Language Lab	0	0	1	1	25	25	50
GE 12L4B	NSS / Nature conservation	0	0	1	1	50	-	50
	TOTAL	**18**	**4**	**8**	**22**			

CA – Continuous Assessment, ESE – End Semester Examination

SEMESTER III

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/	C	Marks	Total

				Wk		CA	ESE	
AS 15-1301 *	Linear Algebra and Transform Techniques	3	1	0	3	40	60	100
IT 15-1302	Logic Design and Electronic Circuits	3	1	0	3	40	60	100
CS/IT 15-1303	Discrete Computational Structures	3	1	0	3	40	60	100
CS/IT 15-1304	Object Oriented Programming	3	1	0	3	40	60	100
IT 15-1305	Computer Organization	3	1	0	3	40	60	100
IT 15-1306	Data Communication & Networking	3	1	0	3	40	60	100
IT 15-13L1	Logic Design and Electronic Circuits Laboratory	0	0	3	2	25	25	50
CS/IT 15-13L2	Object Oriented Programming Laboratory	0	0	3	2	25	25	50
	TOTAL	**18**	**6**	**6**	**22**			

* Common for all branches

SEMESTER IV

Code No.	Subject	L Hrs/ Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
AS 15-1401 *	Complex Variables and Partial Differential Equations	3	1	0	3	40	60	100
IT 15-1402	Formal Languages, Automata and Computation	3	1	0	3	40	60	100
IT 15-1403	System Programming	3	1	0	3	40	60	100
IT 15-1404	Microprocessor and Microcontroller Architecture	3	1	0	3	40	60	100
CS/IT 15-1405	Data structures and Algorithms	3	1	0	3	40	60	100
IT 15-1406	Database Management Systems	3	1	0	3	40	60	100
IT 15-14L1	PC Hardware & Microprocessor Lab	0	0	3	2	25	25	50
CS/IT 15-14L2	Data structures Laboratory	0	0	3	2	25	25	50
	TOTAL	**18**	**6**	**6**	**22**			

* Common for all branches

SEMESTER V

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
AS 15-1501 *	Numerical and Statistical Methods	3	1	0	3	40	60	100
CS/IT15-1502	Operating Systems	3	1	0	3	40	60	100
IT 15-1503	Knowledge Engineering	3	1	0	3	40	60	100
IT 15-1504	Design and Analysis of Algorithms	3	1	0	3	40	60	100
IT 15-1505	Software Engineering	3	1	0	3	40	60	100
IT 15-1506	Internet Programming	3	1	0	3	40	60	100
IT 15-15L1	Operating System & Network Programming Lab	0	0	3	2	25	25	50
IT 15-15L2	Mini Project – RDBMS based	0	0	3	2	50	-	50
	TOTAL	**18**	**6**	**6**	**22**			

* Common for all branches

SEMESTER VI

Code No.	Subject	L Hrs/ Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
IT 15-1601	Financial Management & E-banking	3	1	0	3	40	60	100
CS/IT15-1602	Compiler Construction	3	1	0	3	40	60	100
IT 15-1603	Object Oriented Modeling & Design	3	1	0	3	40	60	100
IT 15-1604	Cloud Computing	3	1	0	3	40	60	100
IT 15-1605	Big Data Analytics	3	1	0	3	40	60	100
IT 15-1606	Elective I	3	1	0	3	40	60	100
IT 15-16 L1	Cloud and Distributed Computing Laboratory	0	0	3	2	25	25	50
IT 15-16 L2	Mini Project – Android based Internet Project	0	0	3	2	50	-	50
	TOTAL	**18**	**6**	**6**	**22**			

IT15-1606 E1. Multimedia Computing
IT15-1606 E2. Wireless networking
IT15-1606 E3. Soft Computing
IT15-1606 E4. Software Quality & Testing
IT15-1606 E5. Advanced Computer Architecture

SEMESTER VII

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
GE 15-1701	Principles of Management	3	1	0	3	40	60	100
IT 15-1702	Operations Research	3	1	0	3	40	60	100
IT 15-1703	Computer Graphics	3	1	0	3	40	60	100
IT 15-1704	Internet of Things	3	1	0	3	40	60	100
IT 15-1705	Elective II	3	1	0	3	40	60	100
IT 15-17 L1	Computer Graphics Laboratory	0	0	3	2	25	25	50
IT 15-17 L2	Mini Project – Multimedia Project	0	0	3	2	50	-	50
GE 15-17 L3	Entrepreneurship Development	0	0	2	2	50	-	50
IT 15-17 L4	Project Phase I & Industrial Internship**	0	0	2	1	50	-	50
	TOTAL	**15**	**5**	**10**	**22**			

**Industrial Internship for a minimum duration of two weeks during May- June vacation before the commencement of 7th Semester classes is desirable

IT15-1705 E1. Game Design
IT15-1705 E2. Mobile computing
IT15-1705 E3. Agile Project Management
IT15-1705 E4. Data Mining
IT15-1705 E5. Human Computer Interaction

SEMESTER VIII

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
IT 15-1801	Electronic Business and Services	3	1	0	3	40	60	100
IT 15-1802	Real Time Systems	3	1	0	3	40	60	100
IT 15-1803	Security & Cyber Laws	3	1	0	3	40	60	100
IT 15-1804	Elective III	3	1	0	3	40	60	100
IT 15-18 L1	Seminar	3	1	3	2	50	-	50
IT 15-18 L2	Project Phase II	0	0	12	6	200	-	200
IT 15-18 L3	Comprehensive Viva voce	0	0	0	2	-	50	50
	TOTAL	**12**	**4**	**15**	**22**			

IT15-1804 E1. Social Computing
IT15-1804 E2. Service Oriented Architecture
IT15-1804 E3. Recommender System
IT15-1804 E4. Randomized Algorithms
IT15-1804 E5. Bio Computing

LIST OF OPTIONAL SUBJECTS

Sl. No:	Subject	L	T	P	No: of Hours/Semester	CA Marks
1	Personality Enrichment	1	2		30	50
2	General Aptitude	1	2		30	50
3	Foreign Language	1	2		30	50
4	Advanced Computer Programming	1		2	30	50
5	Healthy Living	1		2	30	50
6	Theatre Arts	1		2	30	50
7	Imaging Devices	1		2	30	50
8	Disaster Management	1		2	30	50

One or more optional subjects may be offered in any semester outside regular teaching hours and the students may opt to study them if they wish. The course may be conducted by using experts from inside or outside the University on Self Supporting manner. The Fee may be fixed based on the expenses in a non-profit manner with the students of the department given a subsidised rate of fee and those from outside may also be allowed at a higher fee. The regular students may be issued the mark list with the optional subject included in current semester and the outsiders may be issued a certificate separately.

AS 15-1301 LINEAR ALGEBRA AND TRANSFORM TECHNIQUES

Course Objectives:
To acquire fundamental knowledge in linear algebra and transform techniques and apply in engineering disciplines.

Course Outcomes:
On completion of this course the student will be able to
1. Solve linear system of equations and to determine Eigen values and vectors of a matrix.
2. Understand the concept of vector space and sub space.
3. Determine Fourier series expansion of functions and transform.
4. Solve linear differential equation and integral equation using Laplace transform.

Module I

Linear Algebra 1:Rank of a matrix, solution of linear system of equations- existence, uniqueness, general form-Eigen values and Eigen vectors- properties of Eigen values-Diagonalization of a matrix-Cayley Hamilton theorem (without proof) Verification Finding inverse and power of a matrix using it-Quadratic form-orthogonal reduction of quadratic form to Canonical form.

Module II

Linear Algebra2.Vector space-subspace-Linear dependence and independence-Spanning of a subspace- Basis and Dimension .Inner product- Inner product spaces - Orthogonal and Orthonormal basis –Gram- Schmidt Orthogonalization process. Linear Transformation.

Module III

Fourier analysis: Periodic function, Fourier series, Functions of arbitrary period, Even and odd functions, Half Range Expansion, Harmonic analysis, Complex Fourier Series, Fourier Integrals, Fourier Cosine and Sine Transform, Fourier Transform.

Module IV

Laplace Transforms: Gamma functions and Beta function-Definition and properties, Laplace transforms. Inverse Laplace Transform, Shifting theorem, Transform of Derivative and Integrals, Solution of differential equation and integral equation using Laplace transform, Convolution, Unit step function, Second Shifting theorem, Laplace transform of periodic function.

References:

1. Kreyszig, E. (2011). Advanced engineering mathematics (10th ed.). John Wiley, New York
2. Grewal, B.S, & Grewal, J.S (2013). Higher engineering mathematics (43rd ed.). Khanna, Delhi.
3. Hoffman, K., &Kunze, R. (1961). Linear algebra, Prentice-Hall. Englewood Cliffs, N.J.
4. Hsiung, C.Y, & Mao, G.Y (1998). Linear algebra. World Scientific, Singapore
5. Venkataraman,M.K (1999). Linear Algebra, The National Co

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1302 LOGIC DESIGN AND ELECTRONIC CIRCUITS

Course Objectives:
To understand the conversion of number system and logic circuits,different types of sequential circuits and to have a better understanding of the wave shaping circuits.
Course Outcomes:
On completion of this course the student will be able to

1. Represent different number systems, circuits and logic gates
2. Design Combinational and Sequential circuits
3. Design amplifiers and pulse circuits
4. AnalyseLogic families.

Module I

Number system: Binary-HEX and other number systems - conversion from one radix to another - Boolean algebra – ASCII – EBCDIC – Grey Code - Excess 3 code – Code Conversion – Parity checking.
Boolean algebra and logic gates: axiomatic definition of Boolean algebra, basic theorems and properties, Boolean functions – canonical and standard forms, Logic operations– Digital logic gates.
Gate level minimization: K Map – 2,3,4,5 variable maps – POS simplification – Don't care conditions- NAND and NOR implementation- XOR function- Quine Mc Clusky Technique.

Module II

Combinational logic: Combinational circuits – Analysis procedure – design procedure- Binary adder – Subtractor- Binary multiplier – Magnitude comparator – Decoders- Encoders-Multiplexers and demultiplexers.
Sequential circuits: Flip-flops–RS, JK, T and D flip flops – conversions–shift registers- counters - asynchronous counter– synchronous counter– up-down counter- ring counter- Johnson counter.
Logic families-TTL, RTL, ECL, CMOS- tri state logic–specification- noise consideration.
RAM, ROM, PROM, EPROM, BJT RAM CELLS – MOSRAMS.

Module III

Synchronous sequential circuits: Analysis of clocked sequential circuits- State reduction and analysis- Design procedure.
Asynchronous Sequential circuits: Analysis procedure- Circuits with Latches- Hazards.

Module IV

Pulse Circuits: Pulse shaping using RC circuits–differentiating, integrating circuits - clipping–clamping using diodes and transistors.
Amplification: CE amplifier–Low, Medium & high frequency analysis and design of RC coupled amplifier. FET and JFET- its characteristics, MOSFET.

References:

1. Boylestad, R., &Nashelsky, L. (2013). Electronic devices and circuit theory (11th ed.). Pearson Prentice Hall. Upper Saddle River, N.J.
2. Mano, M. (2008). Digital logic and computer design (4th ed.). Prentice-Hall, Englewood Cliffs, N.J.
3. Kumar, A. (2004). Fundamentals of digital circuits (Eastern economy ed.). Prentice-Hall of India, New Delhi.
4. Taub, H., & Schilling, D. (1983). Digital integrated electronics (10. print., internat. student ed.). McGraw-Hill, Auckland New Zealand.
5. Millman, J., &Halkias, C. (1998). Integrated electronics: Analog and digital circuits and systems (3rd ed.). Tata McGraw-Hill, New Delhi

Note: Continuous assessment:
I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5
End semester evaluation:
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)
Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules
PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

CS/IT 15-1303 DISCRETE COMPUTATIONAL STRUCTURES

Course Objectives

1. To focus on mathematical principles central to computer science including sets, logic and proofs
2. To learn how to apply the concepts of discrete mathematics in computer science problems

Course Outcomes:
On completion of this course the student will be able to

1. understand sets, relations, functions and discrete structures
2. apply propositional logic and first order logic to solve problems
3. understand discrete mathematical structures
4. formulate and solve graph problems
5. formulate and solve recurrence relations

Module I

Logics and Proofs: Propositional Logic, Connectives, Propositional Equivalences, Quantifiers, Proofs: Direct-Contraposition - Contradiction - Resolution - mathematical induction, Sets, Relations: properties - Representation - Composition of Relation - Equivalence Relation, Function: Types - Composition of Function.

Module II

Algorithms: Introduction - The Growth of Functions - Complexity of Algorithms, Recursive algorithms, counting: Basics of counting - The Pigeonhole Principle, Recurrence relations - Order of Recurrence Relation - Linear Recurrence Relation with Constant Coefficients - Linear Homogeneous Recurrence Relation with Constant Coefficients.

Module III

Graphs: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homomorphism of graphs, Euler and Hamiltonian paths and graphs, shortest path in weighted graphs-Dijkstra's Algorithm Trees: Introduction to trees - Spanning Trees - Minimum Spanning Tree - Kruskal's Algorithm.

Module IV

Algebraic Structures: Semigroups and Monoids, groups, subgroups, homomorphism, rings, fields. Posets, Hasse Diagrams, Lattice: Bounded Lattice - Sub lattice - Distributive Lattice - Isomorphic Lattice.

References

1. Rosen, K. (2012). Discrete mathematics & its applications: With combinatorics and graph theory (7th ed.). McGraw-Hill.New Delhi
2. Veerarajan, T. (2007). Discrete mathematics with graph theory and combinatorics. Tata McGraw-Hill.New Delhi
3. Grimaldi, R. (1999). Discrete and combinatorial mathematics: An applied introduction (4th ed.). Addison-Wesley Longman. Reading, Mass.
4. Gupta, S. (n.d.). Discrete mathematics and structures (Sixth ed.).

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

CS/IT 15-1304 OBJECT ORIENTED PROGRAMMING

Course Objectives

1. To understand clearly the difference between object oriented programming and procedural programming
2. To learn and apply advanced C++ features such as function overloading, operator overloading, inheritance, virtual functions etc in programs
3. To build C++ classes using appropriate encapsulation and other design principles

Course Outcomes:
On completion of this course the student will be able to

1. Understand and apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems using C++
2. Study the principles of operator overloading, function overloading etc and to develop C++ programs.
3. Get a deep knowledge of various types of inheritances and dynamic binding.
4. Get a clear understanding of secondary storage and data retrieval.

Module I

Procedure oriented programming-Object oriented programming paradigm – Basic concepts of object oriented programming-Benefits of OOP –console I/O operations – formatted and unformatted –managing output with manipulators. Functions in C++ -call and return by reference – inline functions - default arguments – const arguments – function overloading –friend functions.

Module II

Classes and objects – Specifying a class – Defining member functions – Memory allocation for objects – Static data members – Static member functions – Arrays of objects – const member functions – Constructors and Destructors – Constructors- default, parameterised, with default arguments. copy constructor – destructors –operator overloading – overloading unary operators - overloading binary operators - overloading binary operators using friends – manipulation of strings using operators – Type conversions – basic to class, class to basic, class to class.

Module III

Inheritance: Defining derived classes, Single inheritance, Multilevel inheritance, multiple inheritance, Hierarchical inheritance - Hybrid inheritance – virtual base classes – Abstract classes – Constructors in derived classes –pointers - pointers to objects - this pointer – pointers to derived classes – virtual functions – pure virtual functions .

Module IV

Working with files – classes for fstream operations- opening and closing of file – detecting end of file – file modes – file pointers and manipulators – sequential input and output operations – random access – Templates – Exception handling – Manipulating strings

References

1. Balagurusamy, E. (2013). Object oriented programming with C++ (6th ed.). Tata McGraw-Hill. New Delhi
2. Lafore, R., &Lafore, R. (2002). Object-oriented programming in C++ (4th ed.). SamsPub.Indianapolis, Ind.
3. Stroustrup, B. (2013). The C++ programming language (4th ed.). Reading, Mass.: Addison-Wesley.
4. Kamthane, A. (2003). Object-oriented programming with ANSI and Turbo C++. Pearson Education.Delhi, India
5. Schildt, H. (2012). C++ the complete reference (5th ed.). Osborne McGraw-Hill. Berkeley

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1305 COMPUTER ORGANIZATION

Course Objectives:
To understand the functional units of a computer and their internal organization

Course Outcomes:
On completion of this course the student will be able to

1. Learn the about the basic functional units of a computer and its operational concepts
2. Learn the execution of a complete instruction and arithmetic operations.
3. Understanding of internal organization of memory chips and different memories (static and dynamic)
4. Analyze different interrupts, buses and I/O interface circuits

Module I

Basic structure of computers -Functional units -Basic operational concepts -Bus structures -Instructions & instruction sequencing. Hardware and software -Addressing modes -Assembly language – Stacks & Subroutines

Module II

Processing Unit – Fundamental concepts –Execution of a complete instruction - Hardwired control unit- microprogrammed control - control signals -microinstructions- microprogram sequencing- Branch address modification- Pre-fetching of micro instructions- Emulation.
Computer arithmetic - logic design for fast adders - multiplication - Booth' s algorithm Fast multiplication - integer division - floating point numbers and operations.

Module III

Memory organization-Semiconductor RAM memories- internal organization of memory chips- Static and Dynamic memories -cache memories - mapping functions- replacement algorithms - virtual memory - address translations –performance considerations – interleaving - Secondary storage.

Module IV

Input-output organizations - interrupts – Enabling & Disabling interrupts -handling multiple devices - device identification - vectored interrupts - interrupt nesting – Simultaneous requests – DMA - Buses - I/O interface circuits –Standard I/O interfaces.
Basic Concepts of Pipelining and Embedded systems.

References:

1. Hamacher, V., &Vranesic, Z. (1990). Computer organization (3rd ed.). McGraw-Hill. New York
2. Stallings, W. (2000). Computer organization and architecture: Designing for performance (5th ed.). Prentice Hall. Upper Saddle River, N.J.
3. Tanenbaum, A. (1984). Structured computer organization (2nd ed.). Prentice-Hall. Englewood Cliffs, N.J.
4. Patterson, D., & Hennessy, J. (2011). Computer Organization and Design, Revised Fourth Edition the Hardware/Software Interface. (4th ed.). Elsevier Science.
5. Hayes, J. (1978). Computer architecture and organization. McGraw-Hill. New York

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1306 DATA COMMUNICATION & NETWORKING

Course Objectives:
To enable seamless exchange of data between any points in the world.

Course Outcomes:
On completion of this course the student will be able to

1. Learn the basics of data communication and computer networks
2. Know about different types of networks
3. Learn with a solid foundation in fundamentals required to have a better understanding of the Internet.
4. Understand the working of network protocols and standards

Module I

Introduction –Data Communications, Networks, The Internet, Protocols and Standards. Network Models- ISO/OSI Reference Model, TCP/IP Reference Model.
Physical Layer and Media:- Data and Signals- Analog and Digital, Transmission Impairments, Data Rate Limits, Performance, Digital-to-Digital Conversion ,Analog-to-Digital Conversion, Digital-to- Analog Conversion, Analog-to-Analog Conversion, Bandwidth Utilization -Multiplexing, Spread Spectrum, Transmission Media –Guided and Unguided Media, Switching-Circuit-Switched Network, Datagram Network, Virtual Circuit Network.

Module II

Data Link Layer : Error Detection And Correction-Types of Errors, Redundancy, Detection Vs Correction, Forward Error Correction Vs Retransmission, Block coding, Cyclic Codes- CRC, Polynomials, Checksum.
Data Link Control- Framing, Flow and Error Control, Protocols, Noiseless and Noisy channel, HDLC, Point-to- Point Protocols. Multiple Access- Random Access, channelization.Wired LANs-Ethernet, Wireless LANs-IEEE 802.11, Bluetooth.Connecting Devices- Virtual LANs.

Module III

Introduction to Network Layer – Logical Addressing, Internet Protocol -IPV4, IPV6, Address Mapping, Error Reporting, Multicasting, Delivery, Forwarding and Routing, Routing Algorithms – Distance Vector Routing, Link State Routing. Unicast Routing Protocols.

Module IV

Transport Layer: Process to Process Delivery– Port Addressing, TCP&UDP-Segment Format, TCP Connection, Congestion Control and Quality of service.
Application Layer Services: Domain Name System, Remote Logging, Electronic Mail, File transfer, WWW & HTTP, Network Management: SNMP, Dynamic Host Configuration, Peer to Peer Networks.

References:

1. Forouzan, B., &Fegan, S. (2007). Data communications and networking (4th ed.). McGraw-Hill Higher Education. Boston
2. Kurose, J., & Ross, K. (2013). Computer networking: A top-down approach (6th ed.). Pearson. Boston
3. Tanenbaum, A., &Wetherall, D. (2011). Computer networks (5th ed.). Pearson Prentice Hall. Boston
4. Comer, D. (2009). Computer networks and internets (5th ed.). Pearson/Prentice Hall. Upper Saddle River, N.J
5. Stallings, W. (2000). Data and computer communications (6th ed.). Prentice Hall. Upper Saddle River, N.J.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-13L1 & LOGIC DESIGN &ELECTRONIC CIRCUITS LABORATORY

Course Objectives**:**
Understand and implement multimeters, signal generator, CRO etc, and measurement of electric quantities, characteristics of active devices, rectifying circuits and regulators and designed the circuits for low frequency regulators and integrating circuits.

Course Outcomes:
On completion of this course the student will be able to

1. Understand the scientific and engineering fundamentals related to electronic devices and circuits.
2. Enable students as to comprehend, analyze, design electronic circuits.
3. Come across with different IC's
4. Design counters using different methods
5. Get a basic in circuit design using PCB

A. DIGITAL

1. Transfer characteristics and specifications of TTL and MOS gate.
2. Design of half adder and Full adder using NAND gates, set up R-S & J-K flip flops using NAND gates.
3. Asynchronous UP/DOWN counter using J-K F/Fs.
4. Study of shift registers and design of Ring counter using it.
5. Study of IC counter 7490, 7492, 7493 and 74192.
6. Study of MUX IC's and DEMUX IC's (74151, 74150, 74153)
7. Design of Johnson Counter

B. ANALOG

8. Study of Multimeters, Signal Generators, CRO etc and measurement of electrical quantities.
9. Testing of active and passive components – Resistors, Capacitors, Inductors, Transformers, Diodes, and Transistors etc.
10. Characteristics of active devices:
11. Forward and reversed characteristics of a diode measurement of forward resistance.
12. Common base characteristics of a transistor – measurements of current gain, input resistance and output resistance, maximum ratings of the transistor.
13. Common emitter characteristics of a transistor – measurement of current gain, input resistance and output resistance, relation between and study of the effect of leakage current, maximum ratings of the transistor.
14. Rectifying circuits: FW Rectifier – HW Rectifier – FW Bridge Rectifier Filter circuits – capacitor filter , inductor filter and FT section filter (Measurement of ripple factor maximum ratings of the devices)
15. Study of RC and RLC circuits – Frequency response, pulse response, Filter Characteristics, Differentiating circuit and integrating circuit.
16. Clipping and clamping circuits using diodes/transistors

C. Circuit design using PCB

17. Familiarization

References:

1. Boylestad, R., &Nashelsky, L. (2013). Electronic devices and circuit theory (11th ed.). Pearson Prentice Hall. Upper Saddle River, N.J.
2. Mano, M. (2008). Digital logic and computer design (4th ed.). Prentice-Hall, Englewood Cliffs, N.J.
3. Kumar, A. (2004). Fundamentals of digital circuits (Eastern economy ed.). Prentice-Hall of India, New Delhi.

Note:
1. Continuous assessment: 25 marks
For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions. Marks for continuous assessment of laboratory courses shall be:
a) Practical records/Outputs: 10 marks
b) Regular Lab work: 10 marks
c) Test: 5 marks
2. End semester assessment: 25 marks.

The end semester assessment will consist of an examination and a viva voce.
A candidate shall secure a minimum of 50% marks in the aggregate and 45% minimum in the end semester examination for a pass.

CS/IT 15-13L2 OBJECT ORIENTED PROGRAMMING LABORATORY

Course Objectives

1. To differentiate the programming techniques of structured and OOPS programming
2. To familiarize with the implementation of various OOPS concepts in C++

Course Outcomes:
On completion of this course the student will be able to

1. Implement concepts like function overloading, operator overloading etc.
2. implement different types of inheritance structures
3. implement virtual functions and dynamic programming
4. implement file processing

A: Programming in Object oriented environment. Implement the following using C++

1. Programs to differentiate between struct and class
2. Programs to implement data abstraction, data encapsulation and information hiding
3. Programs to implement different Inheritance structures - Single, multiple, multilevel, hierarchical
4. Programs to implement Operator overloading and function overloading
5. Programs to implement virtual functions and dynamic binding.
6. Programs to implement Pointers and arrays
7. Programs to implement Files

References

1. Balagurusamy, E. (2013). Object oriented programming with C++ (6th ed.). Tata McGraw-Hill. New Delhi
2. Lafore, R., &Lafore, R. (2002). Object-oriented programming in C++ (4th ed.). SamsPub.Indianapolis, Ind.
3. Stroustrup, B. (2013). The C++ programming language (4th ed.). Reading, Mass.: Addison-Wesley.
4. Kamthane, A. (2003). Object-oriented programming with ANSI and Turbo C++. Pearson Education.Delhi, India
5. Schildt, H. (2012). C++ the complete reference (5th ed.). Osborne McGraw-Hill. Berkeley

Note:
1. Continuous assessment: 25 marks
For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions. Marks for continuous assessment of laboratory courses shall be:
a) Practical records/Outputs: 10 marks
b) Regular Lab work: 10 marks
c) Test: 5 marks

2. End semester assessment: 25 marks.
The end semester assessment will consist of an examination and a viva voce.

A candidate shall secure a minimum of 50% marks in the aggregate and 45% minimum in the end semester examination for a pass.

AS 15-1401 COMPLEX VARIABLES AND PARTIAL DIFFERENTIAL EQUATIONS

Course Objectives:
To understand and use complex variables, function integrals, partial differential equation in Engineering discipline.

Course Outcomes:
On completion of this course the student will be able to

1. Transform a region to another region using conformal mapping.
2. Evaluate real integrals using residue theorem.
3. Formation and solution of partial differential equation.
4. Determine solution of partial differential equation for vibrating string and heat conduction

Module I

Analytic function- Cauchy-Riemann equation (Cartesian and polar)-Harmonic function-construction of analytic function given real or imaginary parts- Conformal mapping of standard elementary function and bilinear transformation.

Module II

Cauchy's integral theorem, Cauchy's integral formula and for derivatives-Taylor's and Laurent's expansion (without proof)-Singularities-Residues-Cauchy's Residues theorem- Contour integration involving unit circle.

Module III

Formation of partial differential equation eliminating arbitrary constants and function—Solution of first order equation-four standard types- Lagrange's equation—Linear homogeneous partial differential equation with constant coefficient.

Module IV

One dimensional wave equation, D'Alembert's solution and one dimensional heat flow equation —solution by the method of separation of variables- application of Fourier series solution. Solution of Laplace's equation over a rectangular region by the method of separation of variables

References:

1. Kreyszig, E. (2011). Advanced engineering mathematics (10th ed.). John Wiley, New York
2. Grewal, B.S, & Grewal, J.S (2013). Higher engineering mathematics (43rd ed.). Khanna, Delhi.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1402 FORMAL LANGUAGES, AUTOMATA AND COMPUTATION

Course Objectives:
Introduce the concepts Automata theory, theory of computation and formal language classes and their relationships.
Course Outcomes:
On completion of this course the student will be able to

1. Learn the concepts in automata theory and formal languages.
2. Learn the closure properties and pumping lemmas of formal languages and automata.
3. Acquire a fundamental concepts regarding decidable and undecidable problems.
4. Learn the relationship between different formal languages.

Module I

Finite Automata and Regular Expression: NFA ,DFA, Equivalence of NFA and DFA, Equivalence of NFA and NFA with epsilon moves, regular expression, Equivalence of regular expression and finite automata, Finite automata with output , Equivalence of finite automata with output (Moore and Mealy Machines), Equivalence of Moore and Mealy machines ,Applications of Finite automata.
Properties of Regular sets: Pumping Lemma, closure properties, My Hill Nerode theorem

Module II

Context Free Grammars and languages: Definitions, Derivations parse Trees, Ambiguity, Simplification of CFG, Normal forms of CFG - Chomsky Normal form, Greibach Normal Form.
Push Down Automata: Definition of PDA & DPDA, Languages of PDA, Equivalence of PDA and CFL, Applications of CFG, pumping lemma for CFL, Closure Properties, and Decision algorithms.

Module III

Turing machine: TM model, Computational Languages and Functions, Techniques for construction of TM, NDTM.
Undecidability: Decidable & undecidable problems, properties of recursive and recursively enumerable languages, UniversalTM and an undecidable problem

Module IV

Chomsky Hierarchy : Regular Grammars, equivalence of regular grammar and FA , Unrestricted Grammars, equivalence of unrestricted grammar and TM , Context Sensitive Languages (CSL) and Linear Bounded Automaton(LBA), Equivalence of LBA and CSL, Relation between languages.

References:

1. Hopcroft, J., & Ullman, J. (1979). Introduction to automata theory, languages, and computation. Addison-Wesley. Reading, Mass.
2. Martin, J. (2011) Introduction to languages and the theory of computation (3rd ed.). McGraw-Hill. New York
3. Mishra KLP,&Chandrasekaran N. (2006). Theory of Computer Science: Automata, Languages and Computation. (3rd ed.). PHI Learning.
4. Lewis, H., & Papadimitriou, C. (1981). Elements of the theory of computation. Prentice-Hall. Englewood Cliffs, N.J.
5. Sipser, M. (2013). Introduction to the theory of computation (3rd ed.).Course Technology Cengage Learning. Australia

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1403 SYSTEM PROGRAMMING

Course Objectives:
To understand assemblers, linkers, loaders, macro processors and operating systems.

Course Outcomes:
On completion of this course the student will be able to

1. Design an assembler – two pass and one pass
2. Design a macro processor and loaders
3. Explain the basic functions of an operating system.
4. Know about different operating systems.

Module I

Introduction to System Software - Assemblers: Overview of the assembly process - Machine dependent assembler features-Machine independent assembler features-Design of two pass assembler-single pass assembler.

Module II

Loaders and linkers –Basic Loader functions-Machine Dependent Loader Features-Machine Independent Loader Features-Loader Design Options

Module III

Macro Processors-Basic Macro Processor Functions-Machine Independent Macro Processor Features-Macro Processor Design Options

Module IV

Operating Systems – Basic Operating Systems functions – Types of Operating Systems –User Interface – Run-time Environment. Operating Systems Design Options – Hierarchical Structures – Virtual Machines – Multiprocessor Operating Systems – Distributed Operating Systems – Object Oriented Operating Systems.

References

1. Beck. (1997) System Software: An Introduction To Systems Programming. (3rd edn.). Pearson Education India.
2. Dhamdhere, D. (1999). Systems programming and operating systems (2nd rev. ed.). Tata McGraw-Hill. New Delhi
3. Donovan, J. (2001). Systems programming. Tata McGraw-Hill Education.
4. Pal, S. (2011). Systems programming. Oxford University Press. New Delhi

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1404 MICROPROCESSOR AND MICROCONTROLLER ARCHITECTURE

Objectives:

1. To understand the basic principles of a Microprocessor based System
2. To understand the Intel 8086 microprocessor architecture and its programming
3. To Study the different Interfacing chips and devices
4. To introduce the concept of 8051 micro controller and its programming

Course Outcomes:

On completion of this course the student will be able to

1. Describe the terms related to a microprocessor based system
2. Explain the 8086 microprocessor architecture
3. Program the 8086 microprocessor with interfacing devices
4. Describe the features of 8051 microcontroller and its program

Module I

Introduction to Computer System – Computer and its Organization, Programming System, Microprocessors, Buses, Tristate Bus, Clock Generation, I/O Interfacing, Data Transfer Schemes, Architectural Advancements of Microprocessors, Evolution of Microprocessors.

Intel 8086 Hardware Architecture- Architecture, Pin Description, External Memory Addressing, Bus Cycles, 8086 system configuration, Interrupt Processing, Direct Memory Access.

Module II

Programmer's Model of 8086, Operand Types, Addressing Modes, Assembler Directives, Instruction Set – Data Transfer, Arithmetic, Logical, Control Transfer, Miscellaneous. Programming Exercises.

Module III

Peripheral Interfacing – Generation of I/O ports, Programmable Peripheral Interface 8255, Sample -and -Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display controller 8279, Programmable Interval Timers 8253 and 8254, DAC and ADC , CRT & Printer Terminal Interface.

Module IV

8051 Microcontroller – Hardware Architecture – Memory Organisation, Pins and Signals, timing and control, Port Operation, Interfacing, Interrupts.

8051 Instruction Set and Programming. 8051 based System Design Case Studies.

References:

1. KrishnaKant. (2007). Microprocessors and microcontrollers - architecture: Programming and system design 8085, 8086, 8051, 8096. India: Prentice Hall.
2. Brey, B. (2009). The Intel microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro processor, Pentium II, Pentium III, and Pentium 4 : Architecture, programming, and interfacing (8th ed.). Prentice Hall. Upper Saddle River, N.J.
3. Antonakos, J. (2007). The Intel microprocessor family: Hardware and software principles and applications. Clifton Park, NY: Thomson Delmar Learning.
4. Rafiquzzaman, M. (1990). Microprocessors and microcomputer-based system design. CRC Press. Boca Raton, Fla.
5. Hall, D. (1986). Microprocessors and interfacing: Programming and hardware. Gregg Division, McGraw-Hill. New York

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

CS/IT 15-1405 DATA STRUCTURES AND ALGORITHMS

Course Objectives

1. To identify, understand and determine the usage of various data structures, their design, operations and associated algorithms
2. To study the basic algorithm techniques for various types of sorting and searching

Course Outcomes:
On completion of this course the student will be able to

1. Master the implementation of linked data structures such as linked lists and binary trees
2. Familiarize with advanced data structures such as balanced search trees, hash tables, spatial data structures etc.
3. Familiarize with several sorting algorithms including quicksort, merge sort and heapsort
4. familiarize with some graph algorithms such as shortest path and minimum spanning tree

Module I

Introduction to Data structures - Arrays & sparse matrices – representation, Searching - linear, binary – Sorting – selection, bubble, insertion, quick, merge, heap- Hash tables – Hashing functions -Associative arrays

Module II

Linked lists – singly, doubly and circular lists, Application of linked lists – Polynomial manipulation, Stacks – Implementation of stacks using arrays and lists – Typical problems – Conversion of infix to postfix – Evaluation of postfix expression . Queues and Deques – implementation, priority queues

Module III

Trees, Definition and mathematical properties. Representation – sequential, lists - Binary trees – Binary tree traversals – pre-order, in-order & post-order, Expression trees. Threaded binary trees.Binary Search trees.AVL trees-tries - Spatial data structures- k-d tree.

Module IV

Graphs – Graph representation using adjacency matrices and lists – Graph traversals – DFS, BFS - shortest path – Dijkstra's algorithm, Minimum spanning tree – Kruskal Algorithm, Prims algorithm – Tree based indexing, B trees and B+ trees.

References

1. Lafore, R., &Lafore, R. (2003). Data structures & algorithms in Java (2nd ed.). Sams. Indianapolis, Ind.
2. Drozdek, A. (2001). Data structures and algorithms in Java. Brooks/Cole Pub. Pacific Grove, CA
3. Sahni, S. (2000). Data structures, algorithms, and applications in Java. Boston: McGraw-Hill.
4. Langsam, Y., &Augenstein, M., & Tanenbaum A (2003). Data structures using Java. Pearson Prentice Hall. Upper Saddle River, N.J.
5. Shaffer, C. (2011). Data structures & algorithm analysis in Java (3rd ed., Dover ed.). Dover Publications. Mineola, NY

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

CS/IT 15-1406 DATABASE MANAGEMENT SYSTEMS

Course Objectives

1. To understand different database models,query language, effective manipulation of memory space for database files
2. To understand the normalization and to protect the data and the database from unauthorized access and manipulation

Course Outcomes:

On completion of this course the student will be able to

1. define the terminology, features, classifications, and characteristics embodied in database systems
2. analyze an information storage problem and derive an information model expressed in the form of entity relation diagram and other optional analysis forms, such as a data dictionary
3. demonstrate an understanding of the relational data model
4. transform an information model into a relational database schema and use a data definition language and/or utilities to implement the schema using a DBMS
5. formulate solutions to a broad range of query problems using relational algebra
6. formulate solutions to a broad range of query and data update problems using SQL
7. demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database
8. use an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain, and query a database
9. use a desktop database package to create, populate, maintain, and query a database

Module I

Introduction: Characteristics of the Database approach – Data models, schemas and instances – DBMS architecture – Data independence – Database languages and interfaces – Database administrator – Data modeling using Entity - Relationship (ER), Entity sets, attributes and keys - Relationships, Relationship types, roles and structural constraints - Weak Entity types - Enhanced Entity-Relationship (EER) and object modeling. Sub classes, super classes and inheritance - Specialization and generalization.

Module II

Record storage and file organizations: Placing file records on disks – Fixed length and variable length records- Spanned Vs Unspanned records - Heap files, Sorted files. Hashing Techniques- Internal, External. Indexed structures for files – single level ordered index, multi- level indexes.

Module III

The Relational model: Concepts-Relational model constraints – The Relational Algebra. Functional Dependencies – Basic definition – Trivial and Nontrivial dependencies – First, Second and Third normal forms – Boyce-Codd normal form. SQL – Commands – Group By & Order By – Cursor – Procedure & Function – Trigger – View-Introduction to SQL variants-PL/SQL, XML query language-Introduction to query optimization.

Module IV

Transaction Management- Concurrency Control-Lost Updates- Uncommitted Data-Inconsistent Retrievals- The Scheduler-Concurrency Control with Locking Methods –Concurrency Control with Time Stamping- Concurrency Control with Optimistic Methods- Database Recovery Management. Introduction to object oriented databases, Active databases.

References

1. Elmasri, R. (2013). Fundamentals of Database Systems: Pearson New International Edition (6th ed., international ed.). Pearson. Harlow
2. Coronel, C., & Morris, S. (2011). Database systems: Design, implementation, and management (9th ed.). Course Technology Cengage Learning. Australia
3. Silberschatz, A., &Korth, H. (2011). Database system concepts (6th ed.). McGraw-Hill. New York
4. Connolly, T., & Beg, C. Database systems: A practical approach to design, implementation, and management (Sixth ed.).
5. Date, C., & Kannan, A. (2006). An introduction to database systems (8th ed.).Dorling Kindersley. Noida
6. Dunham, M. (2003). Data mining introductory and advanced topics. Prentice Hall/Pearson Education. Upper Saddle River, N.J.
7. Molina, H., & Ullman, J. (2014). Database systems the complete book : Pearson new international edition (Second ed.). Pearson Education Limited. Essex

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10, Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-14L1 PC HARDWARE & MICROPROCESSOR LAB

Course Objectives:

1. Familiarization of PC components
2. Able to understand microprocessor trainer kit, able to interface 8086 microprocessor with various peripherals like 8255 and 8279, able to interface 8086 microprocessor with various peripherals
3. Write assembly language programs for various problems like Arithmetic Logic programme, Waveform generation, Stepper motor control
4. Discuss the operation of various interfacing devices like 8279, 8255 etc, discuss about Interface

Course Outcomes:
On completion of this course the student will be able to

1. Learn the basic components of PC.
2. Familiarizes to Troubleshooting, Maintenance and Assembling a PC.
3. Learn the fundamentals of assembly level programming using 8086 microprocessors
4. Study the standard microprocessor interfaces.

A: PC HARDWARE

1. Study of SMPS, TTL and composite type monitor circuits, Emulator, Logic state analyser, Serial port, Parallel port, Motherboard, CGA card, Floppy disk controller, Hard disk controller, Printer Interface, Keyboard Interface
2. Hard Disk drive: Partitioning, Familiarisation of disk maintenance, Software Tools. Installations.
3. Troubleshooting and maintenance: Preventive and maintenance, Common maintenance problems
4. Familiarisation: Device drivers, Motherboard components and other add on cards.
5. Assembling a PC

B: MICROPROCESSOR

6. Study of typical microprocessor trainer kit
7. Simple Programming examples using 8086 instruction set to understand the use of various instructions and addressing modes – Monitor routines – at least 20 examples
8. Programming examples to initialise 8251 and to understand it's I/O operations
9. Programming examples to initialise 8255 and to understand it's I/O operations
10. Programming examples to initialise 8279 and to understand it's I/O operations
11. A/D and D/A counter Interface
12. Interface and programming of 8255 (e.g. Traffic light control, burglar alarm, stop water)

References:

1. Bhurchandi, K., & Ray, A. (2013). Advanced microprocessors and peripherals (3rd ed.). Tata McGraw Hill Education Private. New Delhi

Note:
1. Continuous assessment: 25 marks
For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions. Marks for continuous assessment of laboratory courses shall be:
a) Practical records/Outputs: 10 marks
b) Regular Lab work: 10 marks
c) Test: 5 marks

2. End semester assessment: 25 marks. The end semester assessment will consist of an examination and a viva voce.
A candidate shall secure a minimum of 50% marks in the aggregate and 45% minimum in the end semester examination for a pass.

CS/IT 15-14L2 DATA STRUCTURES LABORATORY

Course Objectives

1. To design and apply appropriate data structure using simple algorithms for modeling and solving computing problems

Course Outcomes:

On completion of this course the student will be able to

1. Understand and implement both array based and linked-list based data structures, including singly and doubly linked-lists.
2. Understand and implement the stack data structure and stack operations
3. Understand and implement general tree data structures, including binary tree, priority queue and circular queue.
4. Understand and implement graph data structures and various sorting techniques.

A: Programming in Object oriented environment.Implement the following using Java.

1. Simple programming exercises
2. Searching and Sorting
3. Linked Lists- Singly and doubly
4. Stacks – various applications
5. Queues-Linear and circular
6. Trees –Binary search tree and threaded binary trees
7. Graphs- Traversals ,Minimum spanning trees

References

1. Lafore, R., &Lafore, R. (2003). Data structures & algorithms in Java (2nd ed.). Sams. Indianapolis, Ind.
2. Drozdek, A. (2001). Data structures and algorithms in Java. Brooks/Cole Pub. Pacific Grove, CA
3. Sahni, S. (2000). Data structures, algorithms, and applications in Java. Boston: McGraw-Hill.
4. Langsam, Y., &Augenstein, M., & Tanenbaum A (2003). Data structures using Java. Pearson Prentice Hall. Upper Saddle River, N.J.
5. Shaffer, C. (2011). Data structures & algorithm analysis in Java (3rd ed., Dover ed.). Dover Publications. Mineola, NY

Note:

1. Continuous assessment: 25 marks

For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions. Marks for continuous assessment of laboratory courses shall be:

a) Practical records/Outputs: 10 marks

b) Regular Lab work: 10 marks

c) Test: 5 marks

2. End semester assessment: 25 marks. The end semester assessment will consist of an examination and a viva voce.

A candidate shall secure a minimum of 50% marks in the aggregate and 45% minimum in the end semester examination for a pass.

IT 15 -1501 NUMERICAL AND STATISTICAL METHODS.

Course Objectives:
To understand the concept of probability, statistics and numerical methods which arise in engineering application.

Course Outcomes:
On completion of this course the student will be able to:
1. Solve algebraic and transcendental equations by numerical methods
2. Perform numerical differentiation and integration
3. Find the mean and variance of a probability distribution including the binomial distribution.
4. Use statistical tests in testing hypotheses on data

Module I

Numerical solution of algebraic and transcendental equation by -Regula-falsi method, Newton Raphson's method. Gauss Seidal iteration method to solve a system of equations and convergence (without proof) Newton's forward and backward interpolation formula .Lagrange interpolation, Newton's divided difference and central differences

Module II

Numerical differentiation at the tabulated points with forward, backward and central differences. Numerical integration with trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule. Taylor series method. Euler method, Modified Euler method, Runge –Kutta method of second and fourth order for solving 1st order ordinary differential equation.

Module III

Random variable (discrete and continuous) Expectation-mean and variance of probability distribution.Binomial, Poisson and Normal distribution and Fitting of this Distribution to the given data. Curve fitting-fitting of straight line, parabola, exponential.

Module IV

Population and Sample-Sampling Distribution (of mean and variance) Testing of Hypothesis-level of significance, Ztest statistic, Chi square test for variance, for goodness of fit and F-test

References:

1. Kreyszig, E. (2011). Advanced engineering mathematics (10th ed.). John Wiley, New York
2. Grewal, B.S, & Grewal, J.S (2013). Higher engineering mathematics (43rd ed.). Khanna, Delhi.
3. Kandasamy, P., &Thilagavathy, K. (2003). Numerical methods. New Delhi: S. Chand & Company.
4. Johnson, R., & Miller, I. (2014). Miller and Freund's probability and statistics for engineers (8th ed., Pearson new international ed.). Pearson.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

CS/IT 15-1502 OPERATING SYSTEMS

Course Objectives

1. To study the basic concepts, structure and functions of operating systems.
2. To learn about processes, threads and scheduling algorithms
3. To understand the principles of concurrency and deadlocks
4. To learn various memory management schemes, I/O management and file systems.
5. To give an overview about Real time operating systems.

Course Outcomes:

On completion of this course the student will be able to

1. Design various scheduling algorithms
2. Apply the principles of concurrency
3. Design deadlock, prevention and avoidance algorithms
4. Compare and contrast various memory management schemes
5. Design and Implement a prototype file system
6. Attain basic knowledge about Real time operating systems

Module I

Introduction to Operating Systems: Operating system concepts – System calls – Operating System Structure. Processes - Process Concept - Process Scheduling – Inter-process Communication – Process Synchronization - Race Conditions - Critical Sections – Mutual Exclusion - Busy Waiting - Sleep And Wakeup -Semaphores. CPU Scheduling - Scheduling Criteria - Scheduling Algorithms - First come First Served - Shortest Job First - Priority scheduling - Round Robin Scheduling - Multiple queues scheduling – Guaranteed scheduling - Two- level scheduling.

Module II

Memory management. Multiprogramming and memory usage - Swapping - multiprogramming with fixed and variable partitions - Memory management with bitmaps, linked lists, Buddy system - Allocation of swap space. Virtual memory - paging and page tables, Associative memory - Inverted page tables. Page replacement algorithms – Segmentation.

Module III

Deadlocks - Conditions for deadlock. Deadlock Characterization - Methods for handling deadlocks - Deadlock prevention - Deadlock avoidance - resource trajectories - safe and unsafe states – Banker's algorithms. Deadlock detection and recovery - Two phase locking – Non-resource deadlocks - Starvation.

Module IV

File systems and Input/output. Files - Directories - File system implementation - Directory Implementation - Security and Protection mechanisms.Principles of I/O hardware - I/O devices - Device controllers - DMA.Principles of I/O software - Interrupt handlers - Device drivers - Disk scheduling - Clocks and terminals.I/O Buffering - RAID- Disk Cache.

Real time Operating Systems - Introduction - Types of RTOS - Characteristics - Functions - Applications of Real Time Systems – Scheduling in RTOS - Resource allocation in RTOS - Other issues in RTOS.

Case Study: UNIX / LINUX operating system.

References

1. Silberschatz, A., & Galvin, P. (2012). Operating system concepts (9th ed.). John Wiley and Sons.
2. Tanenbaum, A. (2014). Modern operating systems (4th ed.). Pearson Education.
3. Stallings, W. (2014). Operating systems: Internals and design principles (8th ed.). Pearson Education.
4. Dhamdhere, D. (2012). Operating systems: A concept-based approach (3rd ed.). New Delhi: Tata McGraw-Hill Pub.
5. Mall, R. (2008). Real-time systems theory and practice. New Delhi, India: Dorling Kindersley.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1503 KNOWLEDGE ENGINEERING

Course Objectives:

1. Understand Problem spaces, search spaces and Production systems.
2. Understand how to represent knowledge and methods of learning in an artificial intelligent system.

Course Outcomes:

On completion of this course the student will be able to

1. To provide students basics of Knowledge representation techniques
2. Learn the problem solving strategies which are common to AI applications.
3. Acquire different learning methods
4. Acquire the basics of Neural Networks

Module I

Problems and Search: Define Artificial Intelligence and AI Problems, Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the design of search programs.

Heuristic Search Techniques: Generate-and- Test, Hill Climbing, Best-First Search: OR Graphs, A* algorithm. Problem Reduction: AND-OR Graphs, AO* algorithm,Means-Ends Analysis.

Game Playing: Minimax search procedure, Alpha-beta cutoffs.

Module II

Knowledge Representation using Logic: Propositional and Predicate Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution: Conversion to Clause Form, Resolution in Propositional Logic, Unification Algorithm, Resolution in Predicate Logic.Representing Knowledge Using Rules: Procedural versus Declarative knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, and Control Knowledge.

Module III

Symbolic Reasoning under Uncertainty: Introduction to Nonmonotonic Reasoning, Logics for Non-monotonic Reasoning, Implementation Issues, Augmenting a Problem solver, Implementation: Depth-First Search & Breadth First Search.Statistical Reasoning:- Probability and Baye's Theorem, Certainty Factors and Rule-Based Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic. Weak Slot-and-Filler Structures:- Semantic Nets, Frames.

Strong Slot-and Filler Structures: Conceptual Dependency, Scripts, CYC.

Module IV

Learning: Need of learning, Rote learning, Learning by Taking Advice, Learning in Problem-solving, Learning from example: induction, Explanation-based learning

Connectionist Models: Learning in Neural Networks, Perceptrons, Backpropagation Network, Applications of Neural Networks.

References:

1. Rich, E., & Knight, K. (2008). Artificial Intelligence (3rd ed.). Tata McGraw Hill India.
2. Patterson, D. (1990). Introduction to artificial intelligence and expert systems. Prentice Hall.Englewood Cliffs, N.J.
3. Konar, A. (2000). Artificial intelligence and soft computing: Behavioral and cognitive modeling of the human brain. CRC Press.Boca Raton, Fla.
4. Akerkar, R. (2005). Introduction to artificial intelligence (Eastern Economy ed.). Prentice-Hall of India Private. New Delhi
5. Chaitanya, V., Sangal, R., &Bharati, A. (1996). Natural language processing: A Paninian perspective (Eastern economy ed.). Prentice-Hall of India.New Delhi

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)

II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)

Assignments – Maximum marks: 10

Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1504 DESIGN AND ANALYSIS OF ALGORITHMS

Course Objectives:

To make students realize the importance of algorithm optimization in programming.

Course Outcomes:

On completion of this course the student will be able to

1. Analyze algorithms and problems.
2. Learn Divide-and-Conquer paradigm,Dynamic Programming paradigm, Greedy paradigm & Backtracking paradigm.Explain when an algorithmic design situation calls for them.
3. Explain different searching and sorting methods , graph and graph traversals and their analysis.
4. Knowledge on Complexity Theory

Module I

Analyzing Algorithms and problems. Classifying functions by their asymptotic growth rate. Recursive procedures.Recurrence equations - Substitution Method, Changing variables, Recursion Tree, Master Theorem. Design Techniques- Divide and Conquer, Dynamic Programming, Greedy, Backtracking

Module II

Analysis of searching and sorting. Insertion sort, Quick sort, Merge sort and Heap sort. Binomial Heaps and Fibonacci Heaps, Lower bounds for sorting by comparison of keys. Comparison of sorting algorithms.Amortized Time Analysis.Red-Black Trees – Insertion & Deletion.

Module III

Graphs and graph traversals. Strongly connected components of a Directed graph.Biconnected components of an undirected graph.Transitive closure of a Binary relation.Warshalls algorithm for Transitive closure. All pair shortest path in graphs. Dynamic programming.Constructing optimal binary search trees.

Module IV

Complexity Theory - Introduction.P and NP.NP-Complete problems.Approximation algorithms. Bin packing, Graph coloring. Traveling salesperson Problem.

References:

1. Cormen, T., &Leiserson, C. (2009). Introduction to algorithms (3rd ed.). Mit Press. Cambridge (Inglaterra)
2. Levitin, A. (2013). Introduction to the design & analysis of algorithms (3rd ed.). Pearson. Boston
3. Aho, A., & Hopcroft, J. (1974). The design and analysis of computer algorithms. Reading, Mass.: Addison-Wesley Pub.
4. Horowitz, E. (1984). Fundamentals of Programming Languages (Second ed.). Springer Berlin Heidelberg.Berlin, Heidelberg
5. Kingston, J. (1990). Algorithms and data structures: Design, correctness, analysis. Addison-Wesley Pub. Sydney
6. Baase, S., &Gelder, A. (2009). Computer algorithms: Introduction to design and analysis (3.rd ed.).Pearson Education. Delhi
7. Knuth, D. (1998). ˜Theœ art of computer programming, Volume 3, Sorting and searching (Second ed.). Addison-Wesley.Upper Saddle River, NJ

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1505 SOFTWARE ENGINEERING

Course Objectives:

Students get the knowledge on engineering aspects of developing software including software life cycles, requirement analysis, structured design, software quality and estimation.

Course Outcomes:

On completion of this course the student will be able to

1. learnengineering aspects required for building software in a systematic way.
2. Formally specify the requirements and choose an appropriate life cycle model.
3. Get the knowledge in software quality management.
4. Acquire a basic knowledge in software project management and using case tools.

Module I

Software Life Cycle - Waterfall model – Prototyping – Spiral model – pros and cons of each model. Requirements Analysis - SRS – DFD – ER Diagrams – Decision tables – Decision Trees – Formal specification techniques: Axiomatic and Algebraic specifications - Petri Nets

Module II

Software Design: Design Heuristics – Cohesion and Coupling

Design Methodologies - Structured analysis and design, Architectural Design, Interface design, Component Level design.

Software Reuse and Software Maintenance issues.

Module III

Introduction to Software Quality Management - Software Testing - Objectives of testing – Functional and Structural testing –Generation of test data - Test Plan - Unit testing – Integration testing – System testing – Test reporting.

Overview of SQA Planning – Reviews and Audits – Software configuration management - Quality Standards - Study of ISO9000 & CMM

Module IV

Software Project Management - Brief study of various phases of Project Management – Planning – Organizing – Staffing – Directing and Controlling

Software Project Cost Estimation – COCOMO model – Software Project Scheduling

CASE tools: CASE definitions – CASE Classifications – Analysis and Design Workbenches, Testing Workbenches

References:

1. Mall, R. (2014). Fundamentals of software engineering. Prentice-Hall Of India.
2. Pressman, R. (2014). Software engineering: A practitioner's approach (8th ed.). McGraw-Hill Education.
3. Jalote, P. (2008). A concise introduction to software engineering. Springer. London
4. Limaye, M. (2011). Software quality assurance. Tata McGraw-Hill Education. New Delhi
5. Limaye, M. (2009). Software testing: Principles, techniques and tools. New Delhi: Tata McGraw-Hill Education Private.
6. Mathur, A. (2008). Foundations of software testing fundamental algorithms and techniques : An undergraduate and graduate text, a reference for the practicing software engineer. Delhi: Pearson Education.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1506 INTERNET PROGRAMMING

Course Objectives:
Get familiar with web programming, client and server side scripting.

Course Outcomes:
On completion of this course the student will be able to

1. Acquire basics of Internet programming.
2. Acquire a solid foundation in fundamentals required to create and manage websites, blogs etc.
3. Learn Database driven web application
4. Learn Ruby introduction.

Module I

Fundamentals of Web: Internet, WWW, W3C, Web Browsers and Web Servers, Web 2.0
HTML 5: Basic syntax, Standard document structure, Basic text markup, Images, Hypertext Links, Lists, Tables, Forms, Frames.

Module II

Javascript: Overview of Javascript, Screen output and keyboard input, Input with Dialogs, Memory concepts, operators, decision making, control statements, counter controlled repetition, Arrays, Functions, objects, events.
Document Object Model (DOM): DOM nodes and trees, DOM tree, DOM Collections, dynamic styles.

Module III

XML: Structuring data, XML namespaces, DTD, XML Schema
PHP: PHP basics, string processing, regular expressions, form processing and business logic, connecting to database, using cookies, dynamic content

Module IV

Ruby on Rails: Ruby introduction, Rails framework, Database driven web application

References:

1. Deitel, H., &Deitel, P. (2014). Internet and World Wide Web: How to program (5th ed.). Pearson Education.
2. Duckett, J. (2011). HTML & CSS: Design and build websites. Wiley. Indianapolis, IN
3. Sebesta, R. (2005). Programming the World Wide Web (3rd ed.). Pearson/Addison-Wesley.Boston
4. Bates, C. (2006). Web programming: Building Internet applications (3rd ed.). Wiley. Chichester, England
5. Bai, X. (2003). The web warrior guide to Web programming. Thomson/Course Technology. Australia

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-15L1 OPERATING SYSTEM & NETWORK PROGRAMMING LAB

Course Objectives:

1. Understand of inter process communication, shared memory, message passing, semaphores.
2. Understand the operating system as a resource manager.
3. Understand benefits of computer networking, establishment of IP addressing for network clients, function and configuration of TCP/IP protocols and name resolution and the difference on different remote access methods

Course Outcomes:
On completion of this course the student will be able to:

1. Have a basic knowledge in UNIX/LINUX shell scripts and execute various shell programs.
2. Analyze and evaluate different process scheduling techniques.
3. Develop Port programming, Routing algorithms.
4. Handle common network troubleshooting techniques.

Part A: OS Lab

1. UNIX programming
2. Shell Scripting
3. System commands like fork, join ,pipe, getpid()etc
4. File attributes using stat system call
5. IPC using shared memory, semaphores and message queues.
6. UNIX command simulation eg. ls, mvetc
7. Operating System programming
8. Process Scheduling – FCFS, SJF, Priority etc
9. Memory Management Schemes – MVT and MFT
10. Deadlock – Detection and Avoidance
11. File Management

Part B: Computer Network Lab

12. Familiarisation/Introduction to:
    (a) Network components such as Modem, Gateways, Routers, Switches, Cables etc.
    (b) Various network softwares, services and applications.
    (c) Network trouble shooting Techniques.
13. Serial Port Programming
14. Parallel Port Programming
15. TCP socket Programming
16. UDP socket Programming
17. TCP Chatting
18. UDP Chatting
19. Implementation of Routing Algorithms
20. RPC Programming

Note:
1. Continuous assessment: 25 marks
For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions. Marks for continuous assessment of laboratory courses shall be:
a) Practical records/Outputs: 10 marks
b) Regular Lab work: 10 marks
c) Test: 5 marks

2. End semester assessment: 25 marks. The end semester assessment will consist of an examination and a viva voce.

A candidate shall secure a minimum of 50% marks in the aggregate and 45% minimum in the end semester examination for a pass.

IT 15-15L2 MINI PROJECT – RDBMS BASED

Course Objectives:
Students are able to design and implement database projects using software like mySQL, PostgreSQL.

Course Outcomes:
On completion of this course the student will be able to:

1. Design & Implement Database Systems.
2. Analyze query processing and optimization
3. Apply normalization theory
4. Acquire various transaction processing, concurrency control mechanisms and database protection mechanisms.

Project Description

It is required to design and develop a RDBMS prototype that implements the concepts and basic functionalities of a typical RDBMS. The RDBMS will have capabilities of creating schemas and tables, inserting and manipulating data, and conducting queries. A basic web-application/desktop application will be created with your DBMS as the back-end. The project is developed in 5 manageable increments:

Increment 1: Design of Database

Design and define database, create schema and tables, with necessary attributes. Each of these attributes will have a name and a data-type. Implementation of primary keys and foreign keys is required. Normalize the tables.

Increment 2: Data Definition

Implement the above database design into the database software of your choice. The interface may be web-based or otherwise (ease of use & presentation will contribute towards grade).

Increment 3: Data Manipulation

Develop data input and manipulation capabilities into your DBMS. External software (e.g. web-application) should be able to use the functions provided by you to insert and manipulate data into particular tables of a particular schema. Data entered should be checked for compatibility with the data-type of the attributes. Checking primary keys and foreign keys for consistency is optional (bonus).

Increment 4: Querying

Your DBMS should be enhanced to support querying. Embedded queries are optional (bonus). The input can be SQL or any other self-defined method, and the output should be shown on the interface or returned to the calling function in an appropriate format (e.g. two dimensional array). Primitive querying such as the following should be supported: Complex joins may be supported.

SELECT X.x, Y.y FROM X, Y WHERE X.x = Y.y AND Y.y = 10;

Increment 5: Web-Application/Desktop Application

Create a website/ desktop application that is able to interact with the database in the back-end. The design and functionalities of the website/ desktop application will also be evaluated.

Presentation

You will be required to present your project. Your presentation should include a description of your design (e.g. using diagrams) in each increment, difficulties encountered and solved in the design and implementation processes, tools used, advanced techniques supported by your DBMS, and a demonstration of your web-application that is based on your DBMS. A full report should be submitted at this time. The report should include in detail (i.e. diagrams and explanation) your design of each increment, tools used, difficulties encountered, and testing mechanisms. An ER-diagram for your web-application should also be given. Design details of your web-application are not required.

Notes
All modules developed should have an extensible design for further additions.
All code should be fully documented.
You may use any programming language that you wish. Recommended: Java
For each increment, submit software files and a brief report containing general design outline, tools used and difficulties faced.

1. Intermediate assessment: 20 marks.
Work knowledge and Involvement: 15 marks
Attendance and Regularity: 5 marks

2. End semester assessment: 30 marks. The end semester assessment will consist of project presentation and a viva voce.
Level of completion and demonstration of Functionality and specifications: 13 marks
End-Semester presentation & Oral examination: 10 marks
Project Report: 7 marks

IT 15-1601 FINANCIAL MANAGEMENT & E-BANKING

Course Objectives:
To provide students with a solid foundation in fundamentals required for finance management.
Course Outcomes:
On completion of this course the student will be able to

1. Acquire the separation of ownership and control, Accounting concepts and conventions, Accounting equation, Balance sheet and Bookkeeping, Division of the ledger.
2. Acquire the Cost Accounting, Classifying costs, Budgeting, Standard costing, Variance analysis and Marginal costing.
3. Acquire the Meaning, Importance , Definition of terms, Funds and Flow, Sources and use of funds, changes in working capital.
4. Prepare the funds flow statements and Cost Reduction.

Module I

The basic concepts of Accounting: The separation of ownership and control, The users of accounts, Computers and users of accounts, Accounting concepts and conventions, Accounting equation, Balance sheet, Classifying items, The processing function. Book-Keeping: The double-entry system, Double-entry of expenses, Asset of stock, Capital and revenue expenditure, Balancing accounts on computers, The trial balance, The final accounts, Depreciation, Bad debts and provision for bad debts, Division of the ledger, Books of original entry, Source documents, Accounting systems, Interpretation of accounts.

Module II

Costing: Cost Accounting, Classifying costs, Break-even analysis, Break-even graphs, Marginal costing. Ratio Analysis: Ratio meaning, profitability ratios, profit in relation to sales, profit in relation to investments, Liquid ratios, Solvency ratios, other ratios, Activity ratios, Eps, DuPont Financial analysis, ratios for predicting bankruptcy, Inter-firm comparison, ratios limitations.

Module III

Fund Flow Statement: Meaning, Importance, Definition of terms, Funds and Flow, Sources and use of funds, Changes in working capital, Preparation of funds flow statements, cash flow statements, Sources and uses, preparation. Cost Reduction: Difference between cost control and cost reduction, Prerequisites for an effective cost reduction, Concept of value analysis- crux of the cost reduction, steps involved in introducing a cost reduction program, some examples of cost reduction, Common limitations.

Module IV

E-BANKING - Changing Dynamics in the Banking Industry, Changing Consumer Needs, Cost, Demographic Trends, Regulatory Reform, and Technology Based Financial services products. Home Banking Implementation Approaches, Home Banking Using Bank's Proprietary Software, Banking via the PC Using Dial-Up Software, Banking via Online Services, Banking via the Web: Security First Network Bank. Open versus Closed Models, Management Issues in Online Banking, Differentiating Products and Services, Managing Financial Supply Chains, Pricing Issues in Online Banking, Marketing Issues: Attracting Customers, Keeping Customers, Back- Office Support for Online Banking, Integrating Telephone Call Centers with the Web.

References

1. Dhameja, N., Sastry, K., &Dhameja, K. (2014). Finance and accounting for managerial competitiveness (Revised and enlarged ed.). S. Chand & Company. New Delhi
2. Brigham, E., & Houston, J. (2004). Fundamentals of financial management (10th ed.).Thomson/South-Western. Mason, Ohio.
3. Shukla, M., & Grewal, T. (1967). Advanced accounts, (6th rev. and enl. ed.).S. Chand. Delhi.
4. Kalakota, R., &Whinston, A. (1997). Electronic commerce: A manager's guide. Addison-Wesley.Reading, Mass.
5. Khan, M., & Jain, P. (2000). Theory and problems in financial management (2nd ed.). Tata McGraw-Hill. New Delhi.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10, Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

CS/IT 15-1602 COMPILER CONSTRUCTION

Course Objectives

1. To introduce the concepts and principles of compiler design
2. To provide understanding of grammar for syntax and semantic verification of programming statements
3. To enrich the knowledge in various phases of compiler- lexical analysis, syntax and semantic analysis intermediate code generation, code optimization, machine code generation and use of symbol table

Course Outcomes:
On completion of this course the student will be able to

1. understand different phases of a compiler and their functions
2. design scanners and parsers using top-down and bottom-up parsers and build abstract syntax trees
3. Gain knowledge of LEX tool & YACC tool to develop scanner and parser.
4. use symbol tables for type checking and other semantic checks
5. understand different types of intermediate codes in compilers
6. understand various forms of code optimization techniques to improve the performance of a program
7. determine code generation techniques

Module I

Compiler: Introduction – Analysis of the source program – phases of a compiler – Lexical analysis – Role of the lexical analyser – Input Buffering -- Specification of tokens – Recognition of tokens – Lexical analysergenerators.

Module II

Syntax Analysis – Role of the parser – Context free grammars – Top-down parsing – Bottom-up parsing – Operator precedence parsing – LR parsers (SLR, Canonical LR, LALR) – Parser generators.

Module III

Syntax-directed translation – Syntax-directed definitions – S-attributed definitions – L-attributed definition – Top-down and bottom-up translation – Type checking – Type systems – Specification of a type checker. Run time environment – Source language issues – Storage organization – Storage allocation strategies – Access to nonlocal names – Symbol tables.

Module IV

Intermediate code generation – Intermediate languages – Declarations – Assignment Statement – Boolean expression – Procedure calls - Code optimization – Introduction – Sources of optimization – Introduction to data flow analysis. Code generator – Issues in the design of a code generator, the target machine, A simple code generator.

References

1. Aho, A. (2013). Compilers: Principles, Techniques, and Tools. (2nd ed.). Pearson. Harlow.
2. Louden, K. (2004). Compiler Construction Principles And Practice. Thomson.
3. Cooper, K., &Torczon, L. (2004). Engineering a compiler. Morgan Kaufmann.San Francisco, Calif.
4. Muchnick, S. (1997). Advanced compiler design and implementation.Morgan Kaufmann. San Francisco, Calif.:

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1603 OBJECT ORIENTED MODELING & DESIGN

Course Objectives:

1. Understand Object Oriented Modelling and Design Principles using UML notations.

Course Outcomes:

On completion of this course the student will be able to

1. Acquire basics of use case modelling.
2. Acquire the skills to develop static structural aspects of a system based on UML.
3. Acquire knowledge on interaction modelling
4. Acquire expertise on representing the states of an object
5. Acquire knowledge in Object Constraint Language (OCL).

Module I

Introduction to UML and Unified Process. Use case modeling: Actors and Use cases, Use case specification, Actor generalization, Use case generalization. Objects and classes, Relationships, Inheritance and Polymorphism, Packages.

Module II

Use case realization: Interactions, Sequence diagrams, Communication diagrams, Interaction occurrences. Activity diagrams: Activity semantics, activity partitions, Sending signals and accepting events, Interaction overview diagrams.

Module III

Design: Design workflow, well-formed design classes, Refining analysis relationships. Interfaces and components. State machine diagrams, Composite states, submachine states.

Module IV

Implementation workflow, Deployment, Introduction to OCL: Need of OCL, OCL expression syntax, Types of OCL expressions. Introduction to Software Architecture, Architecture description language (ADL)

References:

1. Arlow, J., & Neustadt, I. (2005). UML 2 and the unified process: Practical object-oriented analysis and design (2nd ed.). Addison-Wesley.
2. Blaha, M., & Rumbaugh, J. (2005). Object-oriented modeling and design with UML (2nd ed.). Pearson Education.Upper Saddle River, NJ
3. Larman, C. (2005). Applying UML and patterns: An introduction to object-oriented analysis and design and iterative development (3rd ed.). Prentice Hall PTR. Upper Saddle River, N.J.
4. Booch, G., & Rumbaugh, J. (1999). The unified modeling language user guide. Addison-Wesley. Reading, Mass.
5. Bruegge, B., &Dutoit, A. (2003). Object-oriented software engineering: Using UML, patterns and Java (2nd ed.). Prentice Hall. Upper Saddle River, NJ
6. Jacobson, I., &Booch, G. (1999). The unified software development process. Addison-Wesley. Reading, Mass

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1604 CLOUD COMPUTING

Objectives:

1. Understand the concepts behind cloud computing

Course Outcomes:

On completion of this course the student will be able to

1. Get the basic concepts and the fundamentals in distributed computing.
2. Learn the concepts of Virtualization
3. Learn the concept of cloud platform architecture
4. Learn the fundamentals of software oriented architecture

Module I

Distributed System Models and Enabling Technologies: Scalable Computing over the Internet, Technologies for Network-Based Systems, System Models for Distributed and Cloud Computing, Software Environments for Distributed Systems and Clouds, Performance, Security, and Energy Efficiency.

Module II

Virtual Machines and Virtualization of Clusters and Data Centers: Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Center Automation

Module III

Cloud Platform Architecture over Virtualized Data Centers: Cloud Computing and Service Models, Data-Center Design and Interconnection Networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms: GAE, AWS, and Azure, Inter-cloud Resource Management, Cloud Security and Trust Management.

Module IV

Service-Oriented Architectures for Distributed Computing: Services and Service-Oriented Architecture, Message-Oriented Middleware, Portals and Science Gateways, Discovery, Registries, Metadata, and Databases, Workflow in Service-Oriented Architectures

References:

1. Hwang, K., & Fox, G. (2012). Distributed and cloud computing: From parallel processing to the Internet of things. Morgan Kaufmann.Amsterdam
2. Erl, T., &Puttini, R. (2013). Cloud computing: Concepts, technology, & architecture. Prentice Hall.
3. Buyya, R., Broberg, J. &Goscinski, A. (2011). Cloud computing principles and paradigms. Wiley.Hoboken, N.J.
4. Furht, B. (2010). Handbook of cloud computing. Springer. New York

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1605 BIG DATA ANALYTICS

Objectives:

1. To understand the basic concepts of big data, methodologies for analyzing structured and unstructured data.

Course Outcomes:

On completion of this course the student will be able to

1. Define the concept of Big Data.
2. Learn how to analyze big data for specific results.
3. Learn how to use clustering, classification and regression on Big Data.
4. Learn MapReduce and Hadoop.

Module I

Introduction to Big Data Analytics: Big Data Overview, State of the Practice in Analytics, Key Roles for the New Big Data Ecosystem

Data Analytics Lifecycle: Overview, Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize

Module II

Clustering - Overview of Clustering, K-means, Additional Algorithms

Association Rules: Overview, Apriori Algorithm, Evaluation of Candidate Rules, Applications of Association Rules, Validation and Testing

Module III

Regression: Linear Regression, Logistic Regression, Additional Regression Models

Classification: Decision Trees, Decision Tree Algorithms, Naïve Bayes, Bayes' Theorem, Diagnostics of Classifiers

Module IV

MapReduce and Hadoop: Analytics for Unstructured Data, MapReduce, Apache Hadoop, the Hadoop Ecosystem, Pig, Hive, HBase, Mahout, NoSQL

Text Books

1. EMC Education Services. (2015). Data science et big data analytics: Discovering, analyzing, visualizing and presenting data. John Wiley & Sons.
2. Minelli, M., & Chambers, M. (2012). Big Data, Big Analytics Emerging Business Intelligence and Analytic Trends for Today's Businesses. (Online-Ausg. ed.). Wiley.Somerset.
3. Dean, J. (2014). Big data, data mining and machine learning value creation for business leaders and practitioners. John Wiley and Sons.Hoboken, New Jersey.
4. Jannach, D., &Zanker, M. (2010). Recommender Systems an Introduction. Cambridge University Press. Leiden.

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)

II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)

Assignments – Maximum marks: 10

Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15 -16 L1 CLOUD AND DISTRIBUTED COMPUTING LABORATORY

Course Objectives:
Students will be familiar with Linux OS and its commands. Students will have an idea on cloud, setting up cloud environment and its various services. In addition, they will be familiar to develop applications on a distributed environment.

Course Outcomes:
On completion of this course the student will be able to

1. Learn the basics of Linux OS commands
2. Install of Openstack Cloud Environment
3. Learn basics of Openstack commands

A: OpenStack Installation for Ubuntu Environment

1. Add the Identity service
2. Add the Image service
3. Add the Compute service
4. Add the Networking service
5. Add the dashboard
6. Add the Block Storage service
7. Add the Object Storage service
8. Launch an instance

B:Openstack commands

9. Keystone (Image Services)
10. Nova (Compute)
11. Glance (Image Service)
12. Neutron (Networking)
13. Cinder (Block Storage)
14. Swift (Object Store)

C: Programming in Distributed environment. Implementations may be done using Python, Scala or Java.

15. Resilient Distributed Dataset operations and passing functions
16. Working with Key/Value Pairs and transformations
17. Broadcast Variables and Piping to External Programs
18. Using Spark SQL in Applications

References

1. White, T. (2009). Hadoop the definitive guide. O'Reilly Media. Sebastopol, Calif.
2. Grover, M., &Malaska, T. (2015). Hadoop application architectures. O'Reilly.
3. Karau, H., &Konwinski, A. (2015). Learning Spark: Lightening fast data analysis (3rd release. ed.). O'Reilly. Beijing.
4. Ryza, S., &Laserson, U. (2015). Advanced analytics with Spark.

Note:
1. Continuous assessment: 25 marks
For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions.
Marks for continuous assessment of laboratory courses shall be:
a) Practical records/Outputs: 10 marks
b) Regular Lab work: 10 marks
c) Test: 5 marks

2. End semester assessment: 25 marks. The end semester assessment will consist of an examination and a viva voce.

A candidate shall secure a minimum of 50% marks in the aggregate and 45% minimum in the end semester examination for a pass.

IT 15-16 L2 MINI PROJECT – ANDROID BASED INTERNET PROJECT

Course Objectives
To familiarize students with android programming and make them develop an android application which makes use of some of the android services.

Course Outcomes:
On completion of this course the student will be able to

1. Develop an android application with a good understanding of the Android services that they have used in their project.

Part A Students shall develop an Android application making use of the **services** from the following list**:**,

Alertdialog, Loading Spinner, Login Screen, ProgressBar, Navigation, Progress Circle, Push Notification, Session Management, Spelling Checker, TextureView, WebView Layout, Widgets, XML Parsers, Localization, RSS Reader, SharedPreferences, JSON Parser

Part B Students shall develop an Android application making use of **minimum of three services** from the following list**:**,

Mutlimedia – Animations, Audio Capture, AudioManager, Camera, Image Effects, ImageSwitcher, MediaPlayer, JetPlayer,
Networking – Bluetooth, Network Connection, SIP Protocol, WiFi
Social Services – Facebook Integration, Google Maps Linkedin Integration, Twitter Integration
User Inferface – Auto Complete, Multitouch, Clipboard, Custom Fonts, Gestures, UI Design, UI Patterns, UI Testing
Database - PHP/MySQL, Data Backup, SQLite Database, Internal Storage
Sensors,

Intermediate 1: Determine the Objective

Perform and document System requirement analysis and Software requirement analysis activities.
Description of the expected software features, constraints, interfaces and other attributes.
Prepare the Software Requirements Specifications (SRS) to document the agreed requirements; to provide the basis for design; to provide the basis for system test

Intermediate 2: Design the application

Description of how the software will meet the requirements. Also describes the rationale for design decisions taken.
Design document including database design, UI design, Data definition, Manifest file as appropriate to the work.
Prepare the Software Design Description (SDD) to document the design and design decisions in order to provide the basis for implementation and unit test.
Description of the plan and specifications to verify and validate the software and the results.
Prepare the Software Test Documentation (STD) to document how the software will be tested, and record the results.

Intermediate 3: Develop and refine the application

Create the application using the chosen languages, databases and platform.
Test the application using the test document
Demonstrate the application.

References:

1. Hohensee, B., & Dharma, A. (2014). Android for beginners: Developing apps using Android Studio. Babelcube.
2. Gerber, A., & Craig, C. (2015). Learn Android Studio build Android apps quickly and effectively. Apress.
3. Phillips, B., & Hardy, B. (2013). Android programming: The Big Nerd Ranch guide (2nd ed.). Addison-Wesley Professional.

Notes:
All modules developed should have an extensible design for further additions.
All code should be fully documented.
For each increment, submit software files and a brief report containing general design outline, tools used and difficulties faced.

Intermediate assessment: 20 marks.
Work knowledge and Involvement: 15 marks
Attendance and Regularity: 5 marks
End semester assessment: 30 marks. The end semester assessment will consist of project presentation and a viva voce.
Level of completion and demonstration of Functionality and specifications: 13 marks
End-Semester presentation & Oral examination: 10 marks
Project Report: 7 marks

GE 15-1701 PRINCIPLES OF MANAGEMENT

Course Objectives:

To identify and analyse problems by applying the principles of management

Course Outcomes:

On completion of the course, the student will be able:

1. To inculcate the ability of formulating, analysing, and solving management problems through the application of scientific management.
2. To introduce the importance of Productivity and Project Management.
3. To get exposed to personnel, marketing and financial management.
4. To understand the principles of economics and IPR aspects

Module I

Basic concept of Management: Introduction, definitions of managements, characteristics of management, levels of management, management skills, Scientific management - Contributions of Gilbreth and Gantt.
Functions of Management: Planning, forecasting, organizing, staffing, directing, motivating, controlling, co-coordinating, communicating, decision making.
Organization: Introduction, definition of organization, system approach applied to organization, necessity of organization, elements of organization, process of organization, principles of organization, formal and informal organization, organization structure, types of organization structure.
Forms of Business Organization: Concept of ownership organization, types of ownership, Individual ownership, partnership, joint stock company, private and limited company, co-operative organizations, state ownership, public corporation.

Module II

Productivity and Production: Measurement of productivity, productivity index productivity improvement procedure, Organization by product function. Inventory control: Classification, Functions, inventory models, inventory costs, EOQ, Materials Requirement Planning – Objectives, Functions and methods. Project Management: Functions, Characteristics and feasibility studies.

Module III

Personnel Management: Introduction, definition, objectives, characteristics, functions, principles and organization of personnel management, Recruitment and training methods.
Markets and Marketing: Introduction, the market, marketing information, market segmentation, consumer and industrial markets, pricing, sales, physical distribution, consumer behaviour and advertisement.
Financial Management: the basic concepts of financial accounts, inflation, profitability, budgets and controls, cost accounting, valuation of stock, allocation of overheads, standard costing, marginal costing, Break even point.

Module IV

Economics: Principles of economics, problem of scarcity, demand, supply, utility, time value of money, inflation and deflation, determination of price, Consumer Optimization, Consumer Response, Consumer Demand Curve.
IPR Aspects: General introduction to IPR, eligibility for patent, patent information and prior art search, procedure for filing patent application, rights of patent owner and duration, ownership of patent and commercialization, assignment, licensing and technology transfer, designs and Utility models.

References:

1. Mazda, F. (1998). Engineering management. Addison Wesley. Harlow, England.
2. Koontz, H., & Donnell, C. (1986). Essentials of management (4th ed.). McGraw-Hill. New York.
3. Kotler, P. (1997). Marketing management: Analysis, planning, implementation, and control (9.ed. ed.). Prentice-Hall.
4. Chandra, P. (1984). Financial management: Theory and practice. Tata McGraw-Hill. New Delhi.
5. Monks, J. (1987). Operations management: Theory and problems. McGraw-Hill.
6. Cornish, W., & Llewelyn, D. (2007). Intellectual property: Patents, copyright, trade marks and allied rights (6th [rev.] ed.). London: Sweet & Maxwell.
7. WIPO intellectual property handbook: Policy, law and use. (2001). Geneva: WIPO.
8. Hunt, D., Nguyen, L., & Rogers, M. (2013). Patent searching tools & techniques. Wiley.
9. Sullivan, N. (1995). Technology transfer: Making the most of your intellectual property. Cambridge University Press.
10. Lipsey, R., & Sparks, G. (1979). Economics (3d ed.). New York: Harper & Row.
11. Case, K., & Fair, R. (1999). Principles of economics (5th ed.). Prentice Hall.
12. Mankiw, N. (2008). Principles of economics (5th ed.). Cengage Learning.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1702 OPERATIONS RESEARCH

Course Objectives:
Understand Operations Research models and apply them to real-life problems.

Course Outcomes:
On completion of this course the student will be able to

1. Recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry.
2. Review of the properties of matrices and matrix operations, partitioning of matrices, vectors and Euclidean spaces, able to study Statement of LP problem, slack and surplus variables, basic feasible solutions, Charne's M method, two phase method and Von Neumans' theorem
3. Know about the transportation problem, stepping stone algorithm, U-N method, inequality constraints, degeneracy in transportation problem and Koening's method
4. Acquire the basic structure of queueing models, exponential and poisson distribution, the birth and death process , queueing models based on Poissons input and exponential services time.

Module I

Linear Algebra: Review of the properties of matrices and matrix operations, partitioning of matrices, vectors and Euclidean spaces, unit vectors, sum vectors, linear dependence, bases, spanning set, rank, product form of inverse, simultaneous equations, basic solutions, point sets, lines and hyper planes, convex sets, extreme points, fundamental theorem of linear programming.

Module II

Linear Programming : Statement of LP problem, slack and surplus variables, basic feasible solutions, reduction of feasible solutions to basic feasible solutions, artificial variables, optimality conditions, unbounded solutions, Charne's M method, two phase method, degeneracy, duality. Rectangular zero sum games: Von Neumans' theorem, saddle points, pure and mixed strategies, and formulation of primal and dual LP problem for mixed strategies, dominance graphical solution.

Module III

Transportation, Assignment & Game problems : the transportation problem, the coefficient matrix and its properties , basic set of column vectors , linear combination of basic vectors, the tableau format, stepping stone algorithm, U-N method , inequality constraints, degeneracy in transportation problem , Koening's method

Module IV

Queueing theory : Basic structure of queueing models, exponential and Poisson distribution, the birth and death process , queueing models based on Poisson input and exponential services time, the basic model with constant arrival rate and service rate, finite queue, limited source Q models involving non exponential distributions, single service model with Poisson arrival and any services time distribution , Poisson arrival with constant service time , Poisson arrival with constant service time , Poisson arrival and Erlang service time priority disciplines.

References

1. Taha, H. (1992). Operations research, an introduction (5th ed.). MacMillan Pub.
2. Hadley, G. (1962). Linear programming. Addison-Wesley Pub.
3. Hillier, F., & Lieberman, G. (1974). Operation research (2nd ed.).Holden-Day. San Francisco.
4. Sasieni, M., &Yaspan, A. (1959). Operations research-methods and problems. New York: Wiley.
5. Nair, N. (2002). Resource management. New Delhi: Vikas Publishing House PVT.
6. Kothari, C. (1982). An introduction to operational research.Vikas Pub. House. New Delhi.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1703 COMPUTER GRAPHICS

Course Objectives:
Basic understanding of the core concepts of computer graphics.

Course Outcomes:
On completion of this course the student will be able to

1. Acquire the fundamental principles that underline the computer graphics algorithms
2. Develop, design and implement two and three dimensional graphical structures
3. Learn graphics programming using OpenGL, the most common computer graphics library.
4. Know about computer animation

Module I

Computer–Aided Design, Virtual-Reality Environments, Data Visualization, Computer art, Entertainment, Education & Training, Visualization, Image- Processing, Graphical User Interfaces, Overview of graphic systems.

Points and Lines, Line drawing algorithms, Circle Generation algorithms, Ellipse generating algorithms, Parallel curve algorithms, Attributes of output primitives.

Module II

Basic transformations, Matrix representations and homogeneous co-ordinates, Composite transformations, other transformations, Raster methods for transformations.The viewing Pipe-Line, Viewing Co-ordinate reference frame, Window-to-viewport co-ordinate transformation, 2-D viewing functions, Clipping operations.

Module III

3-D Display methods, 3-D Graphics packages. Polygon surfaces, Curved lines and surfaces, spline representations, Bezier curves and surfaces, B-spline curves and surfaces, Beta splines, Relational splines,

Conversion between spline representations, Displaying spline curves, Sweep representations, Constructive Solid-Geometry Methods, Octrees, BSP trees, Fractal Geometry methods. OpenGL primitives-Functions, pipeline, sample programs for drawing 2-D, 3-D objects; event handling and view manipulations

Module IV

Transformation, Rotation scaling, Other transformations , composite Transformations, 3-D Transformation functions, Modeling and co-ordinate transformations, 3-D Viewing concepts, .Classification of visible surface detection algorithms, Back-face detection, Depth-Buffer method, A-Buffer method, Scan-Line method, Depth- Sorting method, BSP- Tree method, Area subdivision method, Octree methods, Ray-Casting methods, Curved surfaces, Wireframe methods, Visibility-Detection functions, Illumination models and surface rendering methods, colour applications, Computer Animation.

References:

1. Hearn, D., & Baker, M. (2011). Computer graphics with OpenGL (4th ed., International ed.). Upper Saddle River, N.J.: Pearson Education.
2. Hughes, J. (2013). Computer graphics: Principles and practice (3rd ed.). Addison-Wesley.
3. Hill, F., & Kelley, S. (2007). Computer graphics: Using OpenGL (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1704 INTERNET OF THINGS

Course Objectives:
Understand the building blocks of Internet of Things and characteristics.

Course Outcomes:
On completion of this course the student will be able to

1. Identify the main components composing the Internet of Things
2. Acquire the concept of the Internet of Things in terms of models
3. Familiarise how tools and technologies that are used to create new Internet of Things solutions
4. Explore the interconnection and integration of physical world and cyberspace.

Module I

Introduction to Internet of Things : Definition & Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates

Module II

IoT and M2M: M2M, Difference between IoT and M2M, SDN and NFV for IoT
IoT System Management with NETCONF-YANG: Need for IoT Systems Management, Simple Network Management Protocol (SNMP), Network Operator Requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG

Module III

IoT Platforms Design Methodology: IoT Design Methodology - 10 steps, Python Packages of Interest for IoT
IoT Physical Devices & Endpoints: What is an IoT Device, Raspberry Pi, pcDuino ,BeagleBone Black, Cubieboard.
Experimental Case Study using Raspberry Pi and Python

Module IV

IoT Physical Servers & Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs, WAMP - AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework - Django, Designing a RESTful Web API
Data Analytics for IoT: Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis , Hadoop YARN

References:

1. Bahga, A., &Madisetti, V. (2014). Internet of things: A hands-on approach. VPT.
2. McEwen, A., &Cassimally, H. (2014). Designing the internet of things. Chichester: Wiley.
3. Pfister, C. (2011). Getting started with the Internet of things. Sebastapool, Calif.: O'Reilly Media.
4. Norris, D. (2015). The Internet of things: Do-it-yourself projects with Arduino, Raspberry Pi, and Beaglebone Black. Tab Electronics.
5. Greengard, S. (2015). The internet of things. The MIT Press.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-17L1 COMPUTER GRAPHICS LABORATORY

Course Objective:

1. Implementation of graphics programming mainly using OpenGL.
2. Understanding of GP-GPU

Course Outcomes:
On completion of this course the student will be able to

1. Create 3D graphical scenes using open graphics library suits
2. Perform image manipulation, enhancement
3. Create animations
4. Create a multimedia presentation/Game/Project
5. Develop applications using GP-GPU

A: Implement the Exercises Using C / OpenGL / Java

1. Implementation of Algorithms for drawing 2D Primitives
    a. Line (DDA, Bresenham) – all slopes
    b. Circle (Midpoint)
2. 2D Geometric transformations
    a. Translation
    b. Rotation
    c. Scaling
    d. Reflection
    e. Shear
    f. Window-Viewport
3. Clipping

B: Implement the Exercises Using OpenGL

4. 3D Transformations - Translation, Rotation, Scaling
5. 3D Projections – Parallel, Perspective
6. Creating 3D Scenes
7. 2D Animation – To create Interactive animation using any authoring tool

C: Develop Applications Using GP-GPU

8. Load the GP-GPU processor device with 10,000 random numbers, sort them using CUDA program and get the sorted output on the host machine and print the output.

Reference:

1. Hearn, D., & Baker, M. (2011). Computer graphics with OpenGL (4th ed., International ed.). Upper Saddle River, N.J.: Pearson Education.
2. Hughes, J. (2013). Computer graphics: Principles and practice (3rd ed.). Addison-Wesley.
3. Hill, F., & Kelley, S. (2007). Computer graphics: Using OpenGL (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall

Note:
1. Continuous assessment: 25 marks
For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions. Marks for continuous assessment of laboratory courses shall be:
a) Practical records/Outputs: 10 marks
b) Regular Lab work: 10 marks
c) Test: 5 marks

2. End semester assessment: 25 marks. The end semester assessment will consist of an examination and a viva voce.

A candidate shall secure a minimum of 50% marks in the aggregate and 45% minimum in the end semester examination for a pass.

IT 15-17L2 MINI PROJECT – MULTIMEDIA PROJECT

Course Objectives:
Graduates will able to develop the project with innovative design concepts, analyze, design and develop the application at different stages of development.

Course Outcomes:
On completion of this course the student will be able to

1. Use current techniques, skill and tools necessary for animation, Frame and Video Capturing and special Effects Authoring and Presentation and will be able to work in a team in the atmosphere of a professional industry.
2. Implement Multimedia project involving Interactive Computer Graphics technology, working with audio and video capturing. Projects can be done using software's like Blender with Python scripting, OpenCV, Kinect, OpenGL, DirectX etc.

The projects can be of any of the following type

1. Development of Augmented Reality in the areas like education, marketing, advertisement in magazines, movies, astronomy, map, navigator, 3D games, weather condition, Healthcare etc.
2. Development of Virtual Reality in the areas like Military, Education, Healthcare, Entertainment, Fashion, Business, Scientific visualization, Construction, Film, Telecommunication etc.
3. Motion Capturing in Interactive Graphics
4. Lossless and Lossy Media Encoding and Compression
5. Development of media player in multimedia framework like gstreamer, ffmpegetc
6. Real Time communication using media and IP streaming

Intermediate 1: Determine the Objective

Perform and document System requirement analysis and Software requirement analysis activities.

Description of the expected software features, constraints, interfaces and other attributes.

Prepare the Software Requirements Specifications (SRS) to document the agreed requirements; to provide the basis for design; to provide the basis for system test

Intermediate 2: Design the application

Description of how the software will meet the requirements. Also describes the rationale for design decisions taken.

Design document including database design, UI design, Data definition, Manifest file as appropriate to the work.

Prepare the Software Design Description (SDD) to document the design and design decisions in order to provide the basis for implementation and unit test.

Description of the plan and specifications to verify and validate the software and the results.

Prepare the Software Test Documentation (STD) to document how the software will be tested, and record the results.

Intermediate 3: Develop and refine the application

Create the application using the chosen languages, databases and platform.

Test the application using the test document

Demonstrate the application.

Notes: All modules developed should have an extensible design for further additions.
All code should be fully documented.
For each increment, submit software files and a brief report containing general design outline, tools used and difficulties faced.

Intermediate assessment: 20 marks.
Work knowledge and Involvement: 15 marks
Attendance and Regularity: 5 marks

End semester assessment: 30 marks. The end semester assessment will consist of project presentation and a viva voce.
Level of completion and demonstration of Functionality and specifications: 13 marks
End-Semester presentation & Oral examination: 10 marks
Project Report: 7 marks

GE 15-17L3 Entrepreneurship Development

Course Objective:

1. Study of this subject provides an understanding of the scope of an entrepreneur, key areas of development, financial assistance by the institutions, methods of taxation and tax benefits, etc.

Course Outcomes:
On completion of this course the student will be able to

1. Develop awareness about the importance of entrepreneurship opportunities available in the society
2. Get acquainted with the challenges faced by the entrepreneur

Exercises:

1. To study the types of entrepreneurs and the factors affecting entrepreneurial growth.
2. To make an assessment of the major motives influencing an entrepreneur
3. To make an overview of the various stress management techniques
4. How to identify and select a good business opportunity?
5. Preparation of a techno economic feasibility report for a given project
6. Preparation of a preliminary project report for a given project
7. To identify the various sources of finance and management of working capital
8. Carry out the costing and break even analysis of a proposed project
9. Preparation of a PERT / CPM chart for the various activities involved in a project
10. To make a study of the various causes and consequences of sickness in small business and identify corrective measures.

References:

1. Roy, R. (2011). Entrepreneurship (2nd ed.) Oxford University Press. Oxford.
2. Gordon, E., & Natarajan, K. (2009). Entrepreneurship development. Himalaya Pub. House. India.
3. Coulter, M. (2001). Entrepreneurship in action. Prentice Hall. Upper Saddle River, N.J.
4. Jain, P. (1998). Handbook for new entrepreneurs.Oxford University Press. Delhi.
5. Khanka, S. (2010). Entrepreneurial development S.S. Khanka. S.Chand&.Co, New Delhi, India.

Note: There will only be continuous evaluation for this course. The evaluation will be based on the performance of the student in the exercises given above. A minimum of 50% marks is required for a pass.

IT 15-17L4 PROJECT PHASE I & INDUSTRIAL INTERNSHIP

Course Objectives:

To identify a research / industry related problem for the undergraduate project work with the guidance of the respective faculty and prepare a design and work plan

Course Outcomes:

On completion of this course a student will be able to

1. Conduct literature survey in a relevant area of one's course of study and finally identify and concentrate on a particular problem.
2. Formulate a project proposal through extensive study of literature and / or discussion with learned resource persons in industry and around.
3. Generate a proper execution plan of the project work to be carried out in Phase II through thorough deliberations and improve presentation skills

The major project work shall commence in the seventh semester and completed by the end of eighth semester. Students are expected to identify a suitable project and complete the analysis and design phases by the end of seventh semester.

Each batch comprising of 3 to 5 students shall identify a project related to the curriculum of study. At the end of the semester, each student shall submit a project synopsis comprising of the following.

1. Application and feasibility of the project
2. Complete and detailed design specifications.
3. Block level design documentation
4. Detailed design documentation including circuit diagrams and algorithms / circuits
5. Bill of materials in standard format and cost model, if applicable
6. Project implementation action plan using standard presentation tools

******Industrial internship for a minimum duration of two weeks during May / June vacation before the commencement of seventh semester classes is highly desirable. Those who completed the internship should submit a report based on it, along with the project design report.*

Guidelines for evaluation:

1.	Attendance and Regularity	10
2.	Quality and adequacy of design documentation	10
3.	Concepts and completeness of design	10
4.	Theoretical knowledge and individual involvement	10
5.	Quality and contents of project synopsis	10
	Total	50 Marks

Note:
Points (1)-(3) to be evaluated by the respective project guides and project coordinator based on continuous evaluation.
Points (4)-(5) to be evaluated by the final evaluation team comprising of 3 internal examiners including the project guide.

IT 15-1801 ELECTRONIC BUSINESS AND SERVICES

Course Objectives:

1. Understand e-Commerce and e-Business and their types.
2. Understand the main e-Business Models.

Course Outcomes:

On completion of this course the student will be able to

1. Explain the various e-business models, trends and practices
2. Acquire knowledge in e-Marketplaces.
3. Discuss modern computing infrastructures from the perspective of the internet and organisations
4. Discuss and explain theoretical and practical issues of conducting business over the internet and the Web

Module I

E-COMMERCE TO E-BUSINESS: Defining e-business – development of new economy – Types of e-business. E-business markets and models – e-business environment, market places, models – Types of e-business models – Framework for analyzing e business.

E-BUSINESS TREND SPOTTING: Increase Speed of Service - Self-Service – Provide Integrated Solutions-Integrate Sales and Service - Customization and Integration – Customer Service Consistent and Reliable - Service Delivery - Contract Manufacturing - Increase Process Visibility -Employee Retention -Integrated Enterprise Applications - Multichannel Integration

Module II

E-BUSINESS DESIGN: Technology -Constructing an e-Business Design - Self-Diagnosis - Reversing the Value Chain -Choosing a Narrow Focus -Case Study

E-BUSINESS ARCHITECTURE: Functional Integrated Apps -Integrating Application Clusters into an e-Business Architecture –Aligning the e-Business Design with Application Integration.

Module III

CUSTOMER RELATIONSHIP MANAGEMENT: Integrating Processes to Build Relationships -Customer Relationship Management -Definition -Organizing around the Customer - CRM Architecture -CRM Infrastructure -Implementing CRM -CRM Trends - Building a CRM Infrastructure SELLING CHAIN MANAGEMENT: Transforming Sales into Interactive Order Acquisition -Defining Selling-Chain Management - Business Forces Driving the Need for Selling -Technology Forces Driving the Need for Selling -Managing the Order Acquisition Process. ENTERPRISE RESOURCE PLANNING: The e-Business Backbone -ERP Decision - Enterprise Architecture Planning- ERP Implementation.

Module IV

SUPPLY CHAIN MANAGEMENT: Inter-enterprise Fusion -Defining Supply Chain Management – Basics of Internet-Enabled SCM- e-Supply Chain Fusion- Management Issues

E-PROCUREMENT: The Next Wave of Cost Reduction - Isolated Purchasing to Real- Time Process Integration -Operating Resource Procurement- Lack of Process Integration

BUSINESS INTELLIGENCE- Introduction to Knowledge Management Applications and BI

References:

1. Kalakota, R., & Robinson, M. (2001). E-business 2.0: Roadmap for success.Addison-Wesley. Boston, MA.
2. Combe, C. (2006). Introduction to e-business management and strategy. Butterworth-Heinemann. Amsterdam.
3. Almeida, V. (2000). Scaling for e-business: Technologies, models, performance, and capacity planning. Prentice Hall PTR.
4. Deitel, H., &Deitel, P. (2001). The complete e-business & e-commerce programming training course. Prentice-Hall.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1802 REAL TIME SYSTEMS

Course Objectives:

Understand the basics and design of real time systems, real time communication and real time databases.

Course Outcomes:

On completion of this course the student will be able to

1 Learn Basic Model, Characteristics and applications of real time systems.

2. Learn types of Real Time Tasks, Timing Constraints, Real Time Task Scheduling, Real time Tasks in Multiprocessor and distributed systems, Clocks in distributed real time systems.

3. Learn resource sharing among real time tasks, Priority Inheritance protocol, Highest Locker Protocol, Priority Ceiling Protocol, Windows as a real time operating system, POSIX, Benchmarking real time systems.

4. Learn Real Time communications and Real Time data bases.

Module I

Introduction: Basic Model, Characteristics and applications of real time systems, Safety and Reliability, Types of Real Time Tasks, Timing Constraints. Real Time Task Scheduling: clock driven scheduling, event driven scheduling, Rate monotonic algorithm. Scheduling Real time Tasks in Multiprocessor and distributed systems. Clocks in distributed real time systems.

Module II

Resource sharing among real time tasks, Priority inversion, Priority Inheritance protocol, Highest Locker Protocol, Priority Ceiling Protocol, Handling task dependencies.

Real Time operating system features, Unix as a real time operating system, Windows as a real time operating system, POSIX, Benchmarking real time systems.

Module III

Real Time Communication: Basic concepts, Real time communication in a LAN, Bounded access protocols for LANs, Real time communication over packet switched networks, Routing, Resource reservation, Rate control, QoS Models.

Module IV

Real Time databases: Applications of real time databases, real time database application design issues, characteristics of temporal data, concurrency control in real time databases, locking based concurrency control protocols, optimistic concurrency control protocols, speculative control protocols.

Reference:

1. Mall, R. (2008). Real-time systems theory and practice. Dorling Kindersley. New Delhi.
2. Liu, J. (2000). Real-Time systems. Prentice Hall.
3. Prasad, K. (2005). Embedded real-time systems. DreamTec. New Delhi.
4. Douglass, B. (2007). Real time UML workshop for embedded systems. Elsevier.
5. Simon, D. (1999). An embedded software primer. Addison-Wesley.

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)

II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)

Assignments – Maximum marks: 10

Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)
Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules
PART B (4 x 10 = 40 marks)
Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1803 SECURITY & CYBER LAWS

Course Objectives:

Students can establish responsibility and accountability for information security in organizations and also be aware of the Cyber laws.

Course Outcomes:

On completion of this course the student will be able to

1. Make aware of various security threats in computing, database, network etc.
2. Get an idea on various Cryptographic techniques to secure the data.
3. Learn the basic security measures in networking.
4. Make aware of the existing Cyber laws and Acts on information security.

Module I

Security Problem in Computing: Characteristics of computer intrusion, Attacks, Computer Criminals

Program Security: Viruses and Other Malicious Code, Targeted Malicious Code, Controls against Program Threats

Module II

Cryptography: Terminology and Background, Substitution Ciphers, Transpositions , Characteristics of good Encryption Algorithms, Data Encryption Standard, AES Encryption Algorithm, Public Key Encryption, The Uses of Encryption

Module III

Data and Networking Security: Security Requirements, Reliability and Integrity, Sensitive Data, Inference

Security in Networks: Threats in Networks, Network Security Controls, Firewalls

Module IV

Security Policies and Cyber Laws: Need for an Information Security Policy, Information Security Standards - ISO , Introducing Various Security Policies and Their Review Process , Introduction to Indian Cyber Law , Objective and Scope of the IT Act, 2000 , Intellectual Property Issues , Overview of Intellectual-Property- Related Legislation in India , Patent, Copyright, Law Related to Semiconductor Layout and Design, Software License

References:

1. Pfleeger, C. (2006). Security in computing (4th ed.). Prentice Hall PTR.
2. Tripathi,S. Goel,R. &Shukla,P. Introduction to Information Security and Cyber Laws.Wiley India.
3. Pachghare, V.(2008). Cryptography and Information Security Prentice Hall India.
4. Stallings, W. (1999). Cryptography and network security: Principles and practice (2nd ed.). Prentice Hall.
5. Chander, H. (2012). Cyber Laws And It Protection. PHI Learning Pvt. Ltd

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-18 L1 SEMINAR

Course Objective
To encourage and motivate the students to read and collect recent and relevant information from their area of interest confined to the relevant discipline from technical publications including peer reviewed journals, conferences, books, project reports, etc., prepare a report based on a central theme and present it before a peer audience.

Course Outcomes:
On completion of this course the student will be able to

1. Identify and familiarize with some of the good publications and journals in their field of study.
2. Acquaint oneself with preparation of independent reports, name them based on a central theme and write abstracts, main body, conclusions and reference identifying their intended meaning and style.
3. Understand effective use of tools of presentation, generate confidence in presenting a report before an audience and improve their skills in the same.
4. Develop skills like time management, leadership quality and rapport with an audience.

Students shall individually prepare and submit a seminar report on a topic of current relevance related to the field of Information Technology and trends. The reference shall include standard journals, conference proceedings, reputed magazines and textbooks, technical reports and URLs. The references shall be incorporated in the report following IEEE standards reflecting the state-of-the-art in the topic selected. Each student shall present a seminar for about 30 minutes duration on the selected topic. The report and presentation shall be evaluated by a team of internal experts comprising of 3 teachers based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the seminar report.

Guidelines for evaluation:

1.	Attendance and Regularity	10
2.	Abstract / Topic	5
3.	Report	10
4.	Presentation and oral examination	25
	Total	50 Marks

Note:
Points (1)-(3) to be evaluated by the respective guide based on continuous evaluation.
Points (4) to be evaluated by the final evaluation team comprising of 3 internal examiners including the guide.

IT 15-18L2 PROJECT PHASE II

Course Objectives:

To enable students to apply any piece of theory and experiments which they have learned to a specific problem related to industry / research which is identified with the help of a guide in Phase I and solve it.

Course Outcomes:
On completion of this course a student will be able to

1. Realize various steps involved in conducting a project work, like literature survey, methodology adopted – field study / survey / experiments / numerical work, analysis of the data to arrive at final results and conclusions, etc.
2. Initiate a habit of proper report writing with all of its major components, proper style of writing and preparation of a distinct abstract and carved out conclusions.
3. Conceive the pros and cons of working in a team and the wonderful results which could evolve through team-work.
4. Present and defend self-prepared and corrected report (with the help of project guide) of a self-created work to a peer audience

The project work commencing from the seventh semester shall be completed and the project report shall be submitted by each student by the end of eighth semester. There shall be an internal examination of the project that includes a presentation, demonstration and oral examination of the project work.
Each batch of students shall develop the project designed during the VII semester. The implementation phase shall proceed as follows:

- A detailed algorithm level implementation, test data selection, validation, analysis of outputs and necessary trial run shall be done.
- Integration of hardware and software, if applicable, shall be carried out.
- A detailed project report in the prescribed format shall be submitted at the end of the semester. All test results and relevant design and engineering documentation shall be included in the report.

The work shall be reviewed and evaluated periodically

A committee consisting of the Project Coordinator (appointed by the Head of the Department/Division) Project guide and at least one senior faculty member will carry out the assessment based on at least one interim review and a final review just before the submission of the project report.
The final evaluation of the project shall be done by a team of minimum 3 internal examiners including the project guide and shall include the following.

1. Presentation of the work
2. Oral examination
3. Demonstration of the project against design specifications
4. Quality and content of the project report

Guidelines for evaluation:

1.	Attendance and Regularity	40
2.	Work knowledge and Involvement	40
3.	End semester presentation and oral examination of completion and demonstration	40
4.	Level of functionality/specifications	40
5.	Project Report – Presentation style and content	40
	Total	200 Marks

Note:
Points (1)-(3) to be evaluated by the respective project guides and project coordinator based on continuous evaluation.
Points (4)-(5) to be evaluated by the final evaluation team comprising of 3 internal examiners including the project guide.

IT 15-18L3 COMPREHENSIVE VIVA-VOCE

Course Objectives
To test the student's learning and understanding of the theory and applications of the various concepts taught during the entire course of their programme and to prepare the students to face interviews in both the academic and industrial sectors.

Course Outcomes
On completion of this course the student will be able to

1. Refresh all the subjects covered during the programme
2. Gain good knowledge of theory and practice
3. Develop oral communication skills and positive attitude
4. Face technical interviews with confidence

Each student is required to appear for a viva-voce examination at the end of the complete course work. The examination panel shall comprise of a minimum of one internal examiner and one external examiner, both appointed by the University. The examiners shall evaluate the students in terms of their conceptual grasp of the course of study and practical/analysis skills in the field.

IT15-1606 E1. MULTIMEDIA COMPUTING

Course Objectives:

1. Lays the foundation to build multimedia computing applications comprising of images, videos, and audio.

Course Outcomes:

On completion of this course the student will be able to

1. Familiarize with the common computing fundamentals employed in a variety of multimedia applications.
2. Learn different compression principles, different compression techniques, different multimedia compression standard.
3. Learn the characteristics of multimedia database and how to manage it.
4. Design and develop multimedia systems according to the requirements of multimedia applications

Module I

Introduction to Multimedia-media and Data streams-properties of a multimedia system- Data streams characteristics-information units- Multimedia Hardware platforms-Memory and storage devices-Input and output devices-Multimedia software tools.

Module II

Multimedia Building blocks- Audio: Basic sound concepts- Music-speech-audio file formats- Images and graphics: Basic concepts- computer image processing- Video and Animation: Basic concepts- Animation techniques.

Module III

Data compression: Storage space and coding requirements- source, entropy and Hybrid coding- Basic compression techniques- JPEG- H.261- MPEG- DVI- Multimedia Database systems- Characteristics of Multimedia Database Management system- data analysis- Data structure- operations on data- Integration in a database Model.

Module IV

Multimedia Documents- Hypertext and Hypermedia- document architecture SGML Document architecture ODA- MHEG. Multimedia applications- Introduction- Media Preparation- Media composition- Media Integration- Media communication – Media consumption – Media entertainment- trends

References:

1. Steinmetz, R., &Nahrstedt, K. (1995). Multimedia: Computing, communications, and applications. Prentice Hall.
2. Parekh, R. (2006). Principles of multimedia. Tata McGraw-Hill. New Delhi.
3. Buford, J. (1994). Multimedia systems/Ed.[by] J.F.K. Buford. Addison-Wesley.
4. Vaughan, T. (1996). Multimedia: Making it work (3rd ed.). Osborne/McGraw-Hill.

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1606 E2. WIRELESS NETWORKING

Course Objectives:

1. To learn about the theoretical concepts and principles of wireless networking.

Course Outcomes:

On completion of this course the student will be able to

1. Learn the basic wireless communication techniques.
2. Learn an overview of Satellite and cellular wireless networks
3. Learn an overview of wireless LAN
4. Learn various wireless system standards and their basic operation cases.

Module I

Introduction: Cellular Revolution, Global Cellular Network, Broadband.
Transmission Fundamentals**:** Signals for Conveying Information, Analog and Digital Data Transmission, Channel Capacity, Transmission Media, Multiplexing.
Communication Networks**:** Switching Techniques**,** Circuit Switching**,** Packet Switching**,** Asynchronous Transfer Mode.
Protocols and the TCP/IP Suite: The Need for a Protocol Architecture, The TCP/IP Protocol Architecture, The OSI Model, Internetworking.

Module II

Wireless Communication Technology: Antennas and Propagation, Signal Encoding Techniques, Spread Spectrum, Coding and Error Control.

Module III

Wireless Networking: Satellite Communications, Cellular Wireless Networks, Cordless Systems and Wireless Local Loop, Mobile IP and Wireless Access Protocol.

Module IV

Wireless LANs: Wireless LAN Technology, Wi-Fi and the IEEE 802.11 Wireless LAN Standard, Bluetooth and IEEE 802.15

References:

1. Stallings, W. (2009). Wireless communications & networks (2nd ed.). Pearson.
2. Kurose, J., & Ross, K. (2013). Computer networking: A top-down approach (6th ed.). Pearson. Boston
3. Muller, N. (2001). Bluetooth demystified. McGraw-Hill.
4. Umar, A. (2004). Mobile computing and wireless communications: Applications, networks, platforms, architectures, and security. NGE Solutions.
5. Tse, D., &Viswanath, P. (2005). Fundamentals of wireless communication. Cambridge University Press.

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1606 E3. SOFT COMPUTING

Course Objectives:

1. Familiarize with soft computing concepts such as fuzzy theory, neuro fuzzy and genetic algorithms.

Course Outcomes:

On completion of this course the student will be able to

1. Learn fuzzy set theory,fuzzy rules and inference systems.
2. Learn on neural networks and supervised and unsupervised learning networks.
3. Comprehend neuro fuzzy modeling.
4. Get an introduction to Genetic Algorithms.
5. Able to develop applications using soft computing methods.

Module I

INTRODUCTION: Neuro-Fuzzy and Soft Computing. FUZZY SET THEORY**:** Fuzzy Sets -Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems.

Module II

REGRESSION AND OPTIMIZATION**:** Least-Squares Methods for System Identification - Derivative-Based Optimization- Derivative-Free Optimization.
NEURAL NETWORKS**:** Adaptive Networks - Supervised Learning Neural Networks -Learning from Reinforcement – Unsupervised learning and Other Neural Networks.

Module III

NEURO-FUZZY MODELING**:** ANFIS: Adaptive-Networks-based Fuzzy Inference Systems –Co active Neuro-Fuzzy Modeling: Towards Generalized ANFIS.
ADVANCED NEURO-FUZZY MODELING**:** Classification and Regression Trees -Data Clustering Algorithms - Rule base Structure Identification.

Module IV

NEURO-FUZZY CONTROL: Neuro-Fuzzy Control I -Neuro-Fuzzy Control II
ADVANCED APPLICATIONS**:** ANFIS Application- Fuzzy-Filtered Neural Networks-
Fuzzy Theory and Genetic Algorithms in Game Playing-Soft Computing for Color Recipe Prediction.

References:

1. Jang, J., & Sun, C. (1997). Neuro-fuzzy and soft computing: A computational approach to learning and machine intelligence. Prentice Hall.
2. Yen, J., &Langari, R. (2003). Fuzzy logic: Intelligence, control, and information. Pearson Education.
3. Kosko, B. (1997). Neural networks and fuzzy systems: A dynamical systems approach to machine intelligence. Prentice Hall.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1606 E4. SOFTWARE QUALITY AND TESTING

Course Objectives:

Understanding software testing process, planning, strategy, criteria, and testing methods, as well as software quality assurance concepts & control process.

Course Outcomes:

On completion of this course the student will be able to

1. Learn the fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. Learn about software quality management.
3. Learn different types of testing.
4. Gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Module I

Quality Assurance Basics: Definition of Quality, Total Quality management. Four Dimensions of Quality: Specification Quality, Design Quality, Development Quality, Conformance Quality, Software Product Quality: white box standpoint vs functionality standpoint, Program Quality

Module II

Quality Assurance department: Role, position, organisation and staffing. Software Verification: walkthroughs, inspections, audits, process. Validation: Definition, software designs, product specification, software product.Familiarization with testing tools like Selinium.

Module III

Principles of Testing, Software Development Life Cycle Models. Types of Testing: White Box Testing, Black Box Testing, Integration Testing, System and Acceptance Testing, Performance Testing, Regression Testing, Internationalization (I18n) Testing, Ad hoc Testing, Usability and Accessibility Testing

Module IV

People and organizational issues in testing: Common People Issues, Organization Structures for Testing Teams, Test Planning, Management, Execution, and Reporting. Test Management and automation: Software Test Automation, Test Metrics and Measurements

References:

1. Chemuturi, M. (2011). Mastering software quality assurance best practices, tools and techniques for software developers. J. Ross Pub.
2. Desikan, S., & Ramesh, G. (2006). Software testing principles and practices. Dorling Kindersley (India).
3. Graham, D. (2008). Foundations of software testing: ISTQB certification (Rev. ed.). Course Technology Cengage Learning. Australia.
4. Beizer, B. (2003). Software testing techniques. Dreamtech Press.
5. Myers, G., Sandler, C., Badgett, T., & Thomas, T. (2004). The art of software testing. John Wiley & Sons.
6. Tian, J. (2009). Software quality engineering Testing, quality assurance, and quantifiable improvement. John Wiley & Sons.
7. Kan, S. (2003). Metrics and models in software quality engineering. Addison-Wesley.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1606 E5. ADVANCED COMPUTER ARCHITECTURE

Course Objectives:

1. To understand the working principle of parallel computers.

Course Outcomes:

On completion of this course the student will be able to

1. Learn Parallel computing methods.
2. Learn the different classification of parallel computers
3. Learning about pipelining and superscalar techniques
4. Get a better understanding of parallel programming

Module I

Parallel Computer methods: The state of computing -Multiprocessor and multicomputers-Multivector and SIMD computers-PRAM and VLSI models-Architectural development tracks.

Program and Network properties: Condition of parallelism-Program partitioning and scheduling-Program flow mechanism-System interconnect architecture.

Principles of Scalable Performance: Performance matricides and measures-Parallel processing applications-Speedup performance laws-Scalability analysis and approaches.

Module II

Processors and Memory Hierarchy: Advanced processor technology-Superscalar and vector processors-Memory hierarchy technology-Virtual memory technology.

Bus, Cache and Shared Memory: Bus System-Cache memory organizations-Shared memory organization-Sequential and weak consistency models.

Module III

Pipelining and superscalar techniques: Linear pipeline processors-Nonlinear pipeline processors-Instruction pipeline design-Arithmetic pipeline design.

Parallel and scalable architectures: Multiprocessor system interconnect-Cache coherence and synchronization mechanism-Three generations of multicomputers-Message passing mechanism-Vector processing principles-SIMD computer organization-Principles of multi-threading-Fine grain multicomputers.

Module IV

Parallel programming: Parallel programming models-Parallel language and compilers-Dependency analysis-Code optimization and scheduling-loop parallelization- MPI and PVM libraries.

Instruction level parallelism: Design issue-Models of typical processor-compiler directed instruction level parallelism-Operand forwarding-Tomasulo's algorithm-Branch prediction-Thread level parallelism.

References:

1. Hwang, K. (2011). Advanced computer architecture: Parallelism, scalability, programmability (2nd ed.). McGraw-Hill.
2. Sima, D., & Fountain, T. (2012). Advanced computer architectures: A design space approach. Addison-Wesley.
3. Shiva, S. (2006). Advanced computer architectures. CRC Taylor & Francis.
4. Culler, D., & Singh, J. (2000). Parallel computer architecture: A hardware/software approach. Morgan Kaufmann. San Francisco
5. Rajaraman, V., & Murthy, C. (2004). Parallel computers: Architecture and programming (Eastern economy ed.). New Delhi: Prentice-Hall of India.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1705 E1. GAME DESIGN

Course Objectives:

1. To get subsequent understanding of game design and development, which includes the processes, mechanics, issues in game design, game engine development, modeling, techniques, handling situations, and logic.

Course Outcomes:

On completion of this course the student will be able to

1. Get an essential understanding of game programming, game design principles, gaming engine design and gaming frameworks.
2. Know about the basic gaming platforms and frameworks.
3. Get an exposure to 3D graphics principles and animation techniques
4. Create interactive games.

Module I

3D GRAPHICS FOR GAME PROGRAMMING -Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced Texturing, Character Animation, Physics-based Simulation

Module II

GAME DESIGN PRINCIPLES -Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding

Module III

GAMING ENGINE DESIGN-Renderers, Software Rendering, Hardware Rendering, and Controller based animation,Spatial Sorting, Level of detail, collision detection, standard objects, and physics

Module IV

GAMING PLATFORMS AND FRAMEWORKS -Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity GAME DEVELOPMENT -Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

References:

1. Eberly, D. (2006). 3D game engine architecture engineering real-time applications with Wild Magic (2nd ed.). Morgan Kaufman.
2. Han, J. (2011). 3D graphics for game programming. Chapman and Hall/CRC.
3. McShaffry, M. (2009). Game coding complete (3rd ed.). Course Technology Cengage Learning.

4. Adams, E., &Rollings, A. (2010). Fundamentals of game design (2nd ed.). New Riders.
5. Pedersen, R. (2009). Game design foundations.(2nd ed.) Wordware Pub.
6. Rogers, S. (2014). Level up! the guide to great video game design (2nd ed.). Hoboken: Wiley.
7. Gregory, J. (2009). Game engine architecture. Wellesley, Mass.: A K Peters.
8. Novak, J. (2005). Game development essentials: An introduction. Thomson/Delmar Learning.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1705 E2. MOBILE COMPUTING

Course Objectives:

1. Understanding of wireless and mobile communication network's working, its technical features, and what kinds of applications it can support.

Course Outcomes:

On completion of this course the student will be able to

1. Learn mobile computing architecture and operating system for mobile computing.
2. Organize the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities.
3. Know about the emerging wireless networks.
4. Learn about wireless security.

Module I

Review of wireless and mobile communication -Mobile computing architecture-Pervasive Computing-Voice oriented data Communication, Operating System for Mobile Computing, Mobile Devices, cards and sensors, Mobile computing applications: messaging-SMS-MMS-GPRS applications- Mobile agents.

Module II

Wireless Internet-Mobile IP-wireless web-Web services and mobile web services- Wireless middleware-wireless gateway and mobile application servers-Wireless Access Protocol(WAP)-WAP protocol layers. Mobile database management:-data caching, transaction models, processing queries, Data recovery, QoS .Mobile Transport Layer

Module III

Cellular network- First Generation Networks-Second generation (2G): GSM-CDMA network .data over cellular network-2.5G network-GPRS-GPRS System Architecture and Protocol layers. EDGE. Third generation network(3G) network-MMS-introduction to 4G and 5G systems-Emerging wireless networks: Ultra wide band(UWB)-Free space optics(FSO)-Mobile ad-hoc network(MANET)-Wireless sensor networks-OFDM and Flash OFDM

Module IV

Wireless security-WLAN security-cellular wireless network security-Mobile ad-hoc network security-Internet security protocols: VPNs and IPSec-Wireless middleware security-SSL for wireless web security-WAP security and WTLS. Client programming tools-using XML and UML for mobile computing –J2ME.

References:

1. Kamal, R. (2012). Mobile computing (2nd ed.). Oxford University Press.
2. Talukder, A., &Yavagal, R. (2007). Mobile computing: Technology, applications, and service creation. McGraw Hill.
3. Umar, A. (2004). Mobile computing and wireless communications: Applications, networks, platforms, architectures, and security. NGE Solutions.
4. Hansmann,U., Merk,L., Niclous,M., &Stober. (2006). Principles Of Mobile Computing (2nd ed.). Dreamtech Press
5. Schiller, J. (2000). Mobile communications. Addison-Wesley.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT 15-1705 E3. AGILE PROJECT MANAGEMENT

Course Objectives

To impart a thorough understanding of the principles and practices used in agile software development

Course Outcomes:

On completion of this course the student will be able to

1.Learn the principles behind the agile approach to software development

2.Enable them to positively contribute as an agile team member with a better understanding of various phases.

3.Develop a more advanced, applied level of knowledge to gain an understanding of Agile and the ability to apply relevant project management methods, leading to successful Agile projects

4.Learn the different management styles needed for successful Agile projects compared to traditional projects

Module I

The Agile Revolution, Agile Business Objectives , Agility Defined , Agile Leadership Values, Agile Performance Measurement, Iterative, Feature-Based Delivery Teams over Tasks , Leading Teams , Building Self-Organizing (Self-Disciplined) Teams , Participatory Decision Making

Module II

An Agile Project Management Model , An Agile Enterprise Framework , An Agile Delivery Framework The Envision Phase, Product Vision , Project Objectives and Constraints , Project Community

Module III

The Speculate Phase , Speculating on Product and Project , Product Backlog , Release Planning Advanced Release Planning , Release (Project) Planning , Wish-based Planning (Balancing Capacity and Demand) , Capabilities , Value Point Analysis

Module IV

The Explore Phase , Agile Project Leadership , Iteration Planning and Monitoring , Coaching and Team Development, Collaboration and Coordination, The Adapt and Close Phases ,Adapt , Product, Project, and Team Review and Adaptive Action

References**:**

1. Highsmith, J. (2010). Agile project management: Creating innovative products (2nd ed.). Addison-Wesley.
2. Shore, J., & Warden, S. (2008). The art of agile development. O'Reilly Media.
3. Martin, R. (2003). Agile software development: Principles, patterns, and practices. Prentice Hall.
4. Cohn, M. (2010). Succeeding with agile: Software development using Scrum. Addison-Wesley.
5. Cockburn, A. (2006). Agile software development (2nd ed.). Addison-Wesley.

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1705 E4. DATA MINING

Course Objectives:
1. Understanding of the basic concepts, principles and techniques of data mining.
2. Enabling knowledge in managing and evaluating data mining applications and appropriate use of stored data.

Course Outcomes:
On completion of this course the student will be able to
1. Classify different data mining systems.
2. Know the role of data warehousing and enterprise intelligence.
3. Compare and contrast the dominant data mining algorithms.
4. Design data mining and data warehousing systems and solutions to meet user requirements.

Module I

Definition Data Mining, Data Mining- on the kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

Module II

Data Warehouse and OLAP Technology: Introduction to Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, and from Data Warehouse to Data Mining.

Module III

Data Preprocessing: Reason behind preprocess the data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Module IV

Concept Description: Definition, Data Generalization and Summarization – Based Characterization, Analytical Characterization, Mining Class Comparisons, Mining Descriptive Statistical Measures in Large Databases, Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases.

References:

1. Han, J., &Kamber, M. (2006). Data mining concepts and techniques (2nd ed.). Elsevier.
2. Elayidom,S.M. (2015). Data Mining and Warehousing, Cengage Learning India.
3. Berson, A., & Smith, S. (1997). Data warehousing, data mining, and OLAP. McGraw-Hill.
4. Dunham, M. (2003). Data mining introductory and advanced topics. Prentice Hall/Pearson Education. Upper Saddle River, N.J.
5. Adriaans, P., &Zantinge, D. (1998). Data mining. Addison-Wesley.
6. Tan, P., & Steinbach, M. (2006). Introduction to data mining. Pearson Addison Wesley.
7. Sinha, A. (2001). Data warehousing. Prompt Publications.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1705 E5. HUMAN COMPUTER INTERACTION

Course Objectives:

1. Understanding of principles, and theories influencing human computer interaction. Also come across the requirements and specifications for the design of human computer interaction systems.

Course Outcomes:

On completion of this course the student will be able to

1. Explain the human components functions regarding interaction with computer.
2. Explain Computer components functions regarding interaction with human.
3. Lear Interaction design basics.
4. Get a basic knowledge to design and develop a HCL systems for modern ICT systems.

Module I

MODELS, THEORIES, AND FRAMEWORKS: On the Effective use and Reuse of HCI, Knowledge Macrotheory for Systems of Interactors, Design of MoRAS, Distributed Cognition: Toward a New Foundation for Human- Computer Interaction Research

Module II

USABILITY ENGINEERING METHODS AND CONCEPTS: The Strategic Use of Complex Computer Systems, User Interface Evaluation: How Cognitive Models can Help, HCI in the Global Knowledge – Based Economy: Designing to Support Worker Adaptation, A Reference Task Agenda for HCI, The Maturation of HCI: Moving Beyond Usability Toward Holistic Interaction

Module III

USER INTERFACE SOFTWARE AND TOOLS: Past, Present, and Future of User Interface Software Tools ,Creating Creativity: User Interfaces for Supporting Innovation ,Interaction Spaces for Twenty – First – Century Computing

Module IV

GROUPWARE AND COOPERATIVE ACTIVITY: Computer – Mediated Communications for Group Support: Past and Future, Intellectual Challenge of CSCW: The Gap Between Social Requirements and Technical Feasibility, Social Translucence: Designing Systems That Support Social processes, Transcending the Individual Human Mind: Creating Shared Understanding through Collaborative Design, The Development of Cooperation : Five Years of Participatory Design in the Virtual School, Distance Matters .

References:

1. John M Carroll (2001). Human Computer Interaction. Pearson
2. Alan Dix,Janet Finlay.(2004). Human Computer Interaction. Prentice Hall Pearson
3. Ben Schneiderman.(2009).Designing user interface. 5 edition. Pearson.
4. Kevin Mullet, Darrell Sano. (1994) Designing visual user interface: Communication oriented techniques. 1st edition. Prentice Hall.
5. Jacob Nielson. (1994).Usability Engineering. Morgan Kaufmann Publishers

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module

IT 15-1804 E1. SOCIAL COMPUTING

Course Objectives:

1. Social computing is interactive and collaborative behavior between computer users. Main objective of this course is to introduce the fundamental concepts and computational techniques used in social computing.
2. Get an essential understanding of social computing within the field of information science and technology.

Course Outcomes:
On completion of this course the student will be able to

1. Learn the concepts of computational models underlying social computing.
2. Learn the social learning aspects of knowledge management, agents and social interaction.
3. Learn the security and identity in cyberspace.
4. Learn the services provided by social networks.

Module I

Social Influence and Human Interaction with Technology, Social and Human Elements of Information Security: A Case Study, Computer –Mediated Communication Learning Environments, Online Communities and Social Networking, IT and the Social Construction of Knowledge.

Module II

Social Learning Aspects of Knowledge Management, Agents and Social Interaction: Insights from Social Psychology – Social Perception, Agent-Based Modelling and Social Psychological Theory.

Module III

Cyber-identities and Social Life in Cyberspace, Online Learning, Social Presence, Social Networking- Social Networking Analysis, Social Networking Services. Social Networks in information Systems: Tools and Services.

Module IV

Mobile Social Networks and Services, Social Software, Self-Organization in Social Software for Learning, Mailing Lists and Social Semantic Web.

References:

1. Dasgupta, S. (2010). Social computing concepts, methodologies, tools and applications. Information Science Reference.
2. HLiu, H., Salerno, J., & Young, M. (2010). Social computing, behavioral modeling, and prediction. Springer.
3. Kamal, R. (2012). Mobile computing (2nd ed.). Oxford University Press.
4. Talukder, A., &Yavagal, R. (2007). Mobile computing: Technology, applications, and service creation. McGraw Hill.

Note:
Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1804 E2. SERVICE ORIENTED ARCHITECTURE

Course Objectives

1. To provide fundamental concepts of Service Oriented Architecture..
2. To gain knowledge about SOAP, UDDI and XML to create web services.
3. To know about the Cloud Computing architecture and services.

Course Outcomes:

On completion of this course the student will be able to

1. Design, develop and test Web services.
2. Learn standards related to Web services: Web Services Description Language (WSDL)
3. Learn basic principles of Service-Oriented Architecture and apply these concepts to develop a sample application
4. Learn and evaluate emerging and proposed standards for the main components of Web services architecture.

Module I

SOA BASICS

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation – Service Layers.

Module II

XML AND WEB SERVICES

XML structure – Elements – Creating Well-formed XML - Name Spaces – Schema Elements, Types, Attributes – XSL Transformations – Parser –Web Services Overview – Architecture.

Module III

WSDL, SOAP and UDDI

WSDL - Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments – UDDI.

Module IV

SOA in J2EE and .NET

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) – JAX-RS SOA support in .NET – ASP.NET web services.

References:

1. Erl, T. (2006). Service-oriented architecture: Concepts, technology, and design. Pearson Education.
2. Bieberstein, N., Bose, S., Fiammante, M., Jones, K., & Shah, R. (2006). Service-oriented architecture compass business value, planning, and enterprise roadmap. IBM Press.
3. Carter, S. (2007). The new language of business: SOA & Web 2.0. IBM Press/Pearson.
4. Erl, T. (2004). Service-oriented architecture: A field guide to integrating XML and Web services. Prentice Hall Professional Technical Reference.
5. Chappell, D. (2004). Enterprise service bus. O'Reilly.
6. Weerawarana, S., Curbera, F., Leymann, F., Storey, T., & Ferguson, D. (2005). Web services platform architecture: SOAP, WSDL, WS-Policy, WS-Addressing, WS-BPEL, WS-Reliable Messaging, and more. Prentice Hall PTR.

7. Newcomer, E., &Lomow, G. (2005). Understanding SOA with Web services. Addison-Wesley.

Note: Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation
Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.
PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1804 E3. RECOMMENDER SYSTEM

Course Objectives:

1. An overview of approaches to developing state-of-the-art recommender systems that automate a variety of choice-making strategies with the goal of providing affordable, personal, and high-quality recommendations.

Course Outcomes:

On completion of this course the student will be able to

1. Design an alternative ways to organize existing systems .
2. Aggregate information and used to select, filter, or sort items.
3. Learn different recommendation approaches
4. Evaluate a recommender system

Module I

Introduction to basic concepts: Predictions and Recommendations, Scales and Normalization.
Collaborative recommendation: user -based nearest neighbor recommendation, item-based nearest neighbor recommendation, model-based and preprocessing-based approach

Module II

Content-Based Recommendation: content representation and content similarity, similarity – based retrieval, other text classification methods.
Knowledge-based recommendation: Knowledge representation and reasoning, Interacting with constraint-based recommenders, Interacting with case-based recommenders.

Module III

Hybrid recommendation approaches: Opportunities for hybridization, Monolithic hybridization design, Parallelized hybridization design, Pipelined hybridization design.
Explanations in recommender systems: Explanations in constraint-based recommenders, Explanations in case-based recommenders, Explanations in collaborative filtering recommenders.

Module IV

Evaluating recommender systems: General properties of evaluation research, Popular evaluation designs, Evaluation on historical datasets.
Case study: Personalized game recommendations on the mobile Internet.

References:

1. Jannach, D., &Zanker, M. (2010). Recommender Systems an Introduction. Cambridge University Press. Leiden.
2. Bhasker, B., &Srikumar, K. (2010). Recommender Systems In E-Commerce. Tata McGraw Hill Education Pvt.
3. Santos, O., &Boticario, J. (2011). Educational recommender systems and technologies practices and challenges. IGI Global, USA.
4. Robillard, M., Maalej, W., & Walker, R. (2014). Recommendation systems in software engineering. Springer.

Note:

Continuous assessment:

I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5

End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1804 E4 RANDOMIZED ALGORITHMS

Course Objectives;

1. Understand the tools and techniques required to design randomized algorithms.

Course Outcomes:
On completion of this course the student will be able to

1. Learn about randomized algorithms.
2. Cover: moments and deviations; randomized graph algorithms; Chernoff bounds and their applications; randomized data structures; hashing; martingales; the probabilistic method; Markov chains and random walks
3. Explain the difference between a randomized algorithm and an algorithm with probabilistic inputs
4. Learn to apply randomized algorithms to graph theory.

Module I

Tools and Techniques: Introduction: Min-cut algorithm, Binary Planar partitions, Probabilistic Recurrence, Computation Model and Complexity
Game-theoretic techniques: Game tree evaluation, Minimax principle, randomness and non-uniformity

Module II

Moments and deviations: Occupancy problems, Markov and Chebyshev inequalities, Randomized selection, two-point sampling, Stable marriage problem, coupon collector's problem
Tail inequalities: Chernoff bound, Routing in parallel computer

Module III

The probabilistic method: maximum stability, expanding graphs, Lovasz Local Lemma, Conditional probabilities
Markov chains and random walks: Markov chains, Random walk in graphs, graph connectivity, expanders and rapidly mixing random walks

Module IV

Applications: Data structures: Heaps
Graph algorithm: all pairs shortest paths, min-cut problem, minimum spanning trees

References:

1.Motwani, R., & Raghavan, P. (1995). Randomized algorithms. Cambridge University Press.
2.Mitzenmacher, M., & Upfal, E. (2005). Probability and computing: Randomized algorithms and probabilistic analysis. Cambridge University Press.
3.Hromkovic, J. (2005). Design and analysis of randomized algorithms introduction to design paradigms. Berlin: Springer.
4.Cormen, T., & Leiserson, C. (2009). Introduction to algorithms (3rd ed.). Mit Press. Cambridge (Inglaterra)
5.Granichin, O., & Volkovich, Z. (2014). Randomized algorithms in automatic control and data mining. Springer.

Note:
Continuous assessment:
I Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
II Periodical Test – Maximum marks: 12.5 (2 hours for 40 marks)
Assignments – Maximum marks: 10
Attendance – Maximum marks: 5
End semester evaluation

Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration for 60 marks.

PART A (10 x 2 = 20 marks)

Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules

PART B (4 x 10 = 40 marks)

Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I

Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II

Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III

Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV

IT15-1804 E5. BIO COMPUTING

Course Objectives:

1. Brief introduction to relate biology with computational aspects.

Course Outcomes:

On completion of this course the student will be able to

1. Get an overview of computational problems in the emerging areas of Bioinformatics, Computational Biology, Genomics and software tools.
2. Learn the key methods and tools used in bio computing
3. Explain various techniques involved in RNA structure prediction,microarray, protein structure prediction
4. Explain the Gene structure in Prokaryotes and Eukaryotes.

Module I

Basic Concepts of Molecular Biology: Cells - Chromosomes, DNA, RNA, Proteins, Central dogma of molecular biology, Genomes and Genes - Genetic code, Transcription, Translation and Protein synthesis. Web based genomic and proteomic data bases: NCBI, Gene Bank

Module II

Sequence alignments – Dot plot-Pair-wise sequence alignments - local and global - Sequence similarity and distance measures - Smith-Waterman algorithm, Needleman- Wunch algorithm, Multiple sequence alignment –Sum-of-Pairs measure - Star and tree alignments – PAM and BLOSUM, Phylogenetic analysis

Module III

Informational view of Genomic data, Genomic Signal Processing, DNA Spectrograms, Identification of protein coding regions, Gene expression, Microarrays, Microarray image analysis

Module IV

Gene structure in Prokaryotes and Eukaryotes: Molecular Structure Prediction: Basic concepts and terminologies related to molecular structures, Basic molecular Visualization, RNA secondary structure prediction, Protein folding problem, Protein Threading, Protein Visualization, and Introduction to Drug Discovery.

Case Study: Software Tools: Use of Tools for basic and specialized sequence processing such as: BLAST, FASTA, RasMol, Phylip, ClustalW

References:

1. Setubal, J., &Meidanis, J. (2003). Introduction to computational molecular biology. PWS Pub.
2. Claverie, J., &Notredame C (2003). Bioinformatics - A Beginners Guide. John Wiley & Sons.
3. Lesk, A. (2003). Introduction to bioinformatics. Oxford University Press.
4. Higgins, D. (2000). Bioinformatics sequence, structure, and databanks : A practical approach. Oxford University Press.
5. Bergeron, B. (2003). Bioinformatics computing. Prentice Hall/Professional Technical Reference.

Note: Continuous assessment:
1. I Periodical Test – Maximum marks: 12.5
2. II Periodical Test – Maximum marks: 12.5
3. Assignments – Maximum marks: 10
4. Attendance – Maximum marks: 5
5. Type of Questions for End Semester Exam. End Semester Examination will be of 3 hours duration.
Question No. I (a) to (j) – Ten short answer questions of 2 marks each with at least two questions from each of the four modules (10 x 2 = 20 marks)
PART B (4 x 10 = 40 marks)
Question nos. II, III with sub sections (a), (b) ---- (10 marks each with options to answer either II or III) from Module I
Question nos. IV , V with sub sections (a), (b) ----(10 marks each with options to answer either IV or V) from Module II
Question nos. VI , VII with sub sections (a), (b) ----(10 marks each with options to answer either VI or VII) from Module III
Question nos. VIII , IX with sub sections (a), (b) ----(10 marks each with options to answer either VIII or IX) from Module IV