Annexure 4.05/1

BACHELOR OF TECHNOLOGY (IGDTUW)
(Information Technology)
(Teaching and Examination Scheme) – Proposed
FIFTH SEMESTER

Sl. No.	Paper Code	Paper Title	L	P	Credits	Course Category
		THEORY PAPERS				
1	BCS 301	Theory of Computation	4	-	4	DC
2	BIT 303	Computer Graphics & Multimedia	4	-	4	DC
3	BIT 305	Requirement & Estimation Techniques	4	-	4	DC
4	BIT 307	Data Communication & Computer Networks	4	-	4	DC
5	BIT 309	Data Warehousing & Data Mining	4	-	4	DC
6	BAS 311	Human Values & Professional Ethics	3	-	3	HS
		PRACTICAL/VIVA VOCE				
1	BIT 353	Computer Graphics & Multimedia Lab	0	4	2	DC
2	BIT 355	Requirement & Estimation Techniques Lab	0	2	1	DC
3	BIT 357	Data Communication & Computer Networks Lab	0	2	1	DC
4	BIT 359	Data Warehousing & Data Mining Lab	0	2	1	DC
		TOTAL	**23**	**10**	**28**	

SIXTH SEMESTER

Sl. No.	Paper Code	Paper Title	L	P	Credits	Course Category
		THEORY PAPERS				
1	BIT 302	Web & Mobile Technologies	4	-	4	DC
2	BCS 304	Compiler Design	4	-	4	DC
3	BCS 306	Network Programming	4	-	4	DC
4	BCS 308	Cloud Computing	4	-	4	DC
5	BIT 310	Artificial Intelligence	4	-	4	DC
6	BAS 312	Engineering Economics	3	-	3	HS

PRACTICAL/VIVA VOCE						
1	BIT 352	Web & Mobile Technologies Lab	0	2	1	DC
2	BCS 354	Compiler Design Lab	0	2	1	DC
3	BCS 356	Network Programming Lab	0	2	1	DC
4	BCS 358	Cloud Computing Lab	0	2	1	DC
5	BIT 360	Artificial Intelligence Lab	0	2	1	DC
		TOTAL	**23**	**10**	**28**	

NOTE: 4-6 weeks training will be held after sixth semester. However, Viva-Voce will be conducted in the seventh semester.

Paper Code: BCS 301	L	P	C
Paper Title: Theory of Computation	4	0	4

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

Unit-I

Introduction: Alphabets, Strings and Languages, Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, **Simplified notation:** State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem.

[10 Hrs]

Unit-II

Regular expression (RE): Definition, Operators of regular expression and there precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages, Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, **FA with output:** Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

[10 Hrs]

Unit-III

Context free grammar (CFG) and Context Freee Languages (CFL): Definition, Examples, Derivation , Derivation trees, Ambiguity in Grammer, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, **Normal forms for CFGs:** CNF and GNF, Closure properties of CFLs, **Decision Properties of CFLs:** Emptiness, Finiteness and Memership, Pumping lemma for CFLs,

Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA.

[10 Hrs]

Unit-IV

Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs. Applications of TOC, Introduction to recursive function theory.

[10 Hrs]

TEXT BOOKS:

1. Peter Linz, "An Introduction to Formal Language and Automata", forth edition.2010.
2. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education. Second Edition, Copyright © Year 2001.

REFERENCE BOOKS:

1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science : Automata, Languages and Computation", PHI., Third Edition Year 2008.
2. Martin J. C., "Introduction to Languages and Theory of Computations", TMH Forth Edition, Year 2011.
3. Papadimitrou, C. and Lewis, C.L., "Elements of the Theory of Computation", PHI, 2nd Edition, Year 2008

Paper Code: BIT 303 L P C

Paper Title: Computer Graphics and Multimedia 4 0 4

INSTRUCTIONS TO PAPER SETTERS:	MAXIMUM MARKS: 60
1.	Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2.	Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.

UNIT I

Introduction and Overview of Graphics Systems: use of Computer graphics, introduction to CRT and TFT Displays, Raster and Random Scan Displays, Flat Panel Displays, TFT Displays.

Scan Conversion Algorithms: Scan Converting Lines (DDA, Bresenham), Scan Converting Circles (Mid-point, Bresenham), Scan Converting Ellipses (Midpoint).

Clipping: 2D Clipping, Cohen-Sutherland Subdivision Line Clipping Algorithm.

2D-Transformation: representation of Points, Transformations and Matrix, Transformation of Straight Line, 2D Rotation, Reflection, Scaling, Combined Transformations, Translation and Homogeneous Coordinates, Translation, Rotation about an Arbitrary Point, Reflection through an Arbitrary Line, Window-to-Viewport Transformation.

[10Hrs]

UNIT II

3D-Transformation: representation of Points, 3D Scaling, 3D Shearing, 3D Rotation, 3D Translation, 3D Reflection, Multiple Transformations, Rotation about an Axis Parallel to a Coordinate Axis, Rotation about an Arbitrary Axis in Space.

Dimensional Perspective Geometry: Geometric Projection, Orthographic Projections, Oblique Projections, Perspective Transformations, Single-Point Perspective Transformation, Two-Point Perspective Transformation, Three-Point Perspective Transformation.

Solid Modeling: representing Solids, Regularized Boolean Set Operation, Primitive Instancing, Sweep Representations, Boundary Representations, Spatial Partitioning Representations, Constructive Solid Geometry, Comparison of Representations.

[10Hrs]

UNIT III

Representing Curves & Surfaces: Polygon meshes, Parametric Meshes, Cubic Curves, Geometric and Parametric Continuities, Hermite, Bezier (4-point, 5-point, general), B-Spline,

Quadric Surface.

Illumination and Shading: Modeling Light Intensities, Ambient light, Diffused light, Specular reflection, Attenuation factor, Reflection vector.

Shading Models: Constant shading, Flat shading, Gouraud shading, Phong shading.

Color concepts: RGB color model, YIQ color model, CMY color model, HSV color model, HLS color model.

Hidden-Surface Removal: Hidden Surfaces and Lines, Back-Face Detection, A-buffer, Z-Buffers Algorithm, Scan-line Algorithm, The Painter's Algorithm, Area subdivision.

Introduction to Multimedia: Multimedia, Multimedia Terms, introduction to making Multimedia, the stages of project, the requirements to make good Multimedia, Multimedia Applications.

[10Hrs]

UNIT IV

Multimedia: Multimedia Hardware, Software and Authoring Tools.

Graphics File Formats: TIFF, MIDI, JPEG, MPEG, RTF.

Multimedia building blocks: Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects.

Data Compression: Different Compression algorithms for Text, Audio, Video and Images.

[10Hrs]

Text Books:

1. Foley, Van Dam, Feiner, Hughes, "Computer Graphics Principles & Practice", 2013.
2. D.Hearn & Baker, "Computer Graphics, Prentice Hall of India", 1994.
3. Tay Vaughan, "Multimedia: Making it Work", TMH, 2000.
4. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI, PTR, 2000.

Reference Books:

1. Rogers & Adams, "Mathematical Elements for Computer Graphics", McGraw Hill, 1989.
2. Rogers, "Procedural Element of Computer Graphics", McGraw Hill, 2001.
3. R. Plastock and G Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, Mc Graw Hill, 1986.
4. Steve Heath, "Multimedia & Communication Systems", Focal Press, UK, 1999.

Paper Code: BIT 305 | **L** | **T** | **C**
Paper Title: Requirement and Estimation Techniques | **4** | **0** | **4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks**

UNIT - I

Software Requirements: Why has Requirement Engineering Become so important? Industrial Challenges in Requirements, Requirement Engineering artifact modeling, Eliciting requirements, Interviewing, IBIS, CORE, FODA, SSM, Model Driven Requirements Engineering, MDRE Processes, Elicitation and Analysis Model Heuristics, Determining Model Completeness, Quality Attribute Requirements.

[10 Hrs]

UNIT - II

Requirements Management, Change Management, Requirements Management Activities, Traceability, Creation of Requirements Management, Requirement-Driven System Testing, Process, Software Measurement, Why Measurement, Measurement Foundations, Making Measurement a success, Simple effective Measurement Process, Planning the Measurement Process, Planning with Measurement Frameworks, ISO 15939, CMMI, GQM Approach, CAME Approach.

[10 Hrs]

UNIT - III

Software Estimation techniques and Estimate Planning, Executing the estimate, Software sizing, Planning and controlling the project via the Estimate, SLOC, Logical SLOC counting Details, Function Point Sizing, International Function Point User Group Counting Standards Basic Process, SEER-Function Based Sizing, COSMIC Full Function Point Approach

[10 Hrs]

UNIT -IV

Software Cost Estimation Methods: heuristic approach, parametric approach COCOMO, COCOMO II, Strategy and rationale, Development Effort Estimates, Software Economies and Diseconomies of Scale, Cost Factors, Application Composition Model, Early Design Model, Post-Architecture Model, Case study, Software Cost-Estimating Research Issues

[10 Hrs]

TEXT BOOKS:

1. Brian Berenbach, Daniel Paulish, Juergen Kazmeier, Arnold Rudorfer : Software & Systems Requirements Engineering: In Practice Hardcover, McGraw Hill Publications, 2009
2. Daniel D. Galorath and Michael W. Evans, Software Sizing, Estimation and Risk Management, Auerbach Publications, 2006

REFERENCE BOOKS:

1. M. A. Parthasarathy: Practical Software Estimation: Function Point Methods for Insourced and Outsourced Projects, Addison-Wesley Professional,2007
2. Capres Jones, Estimating Software Costs, Tata McGraw Hill, 2nd Edition, 2009
3. Christof Ebert and Reiner Dumke, Software Measurement: Establish, Extract, Evaluate, Execute, Springer, 2007

Paper Code: BIT 307 | **L** | **P** | **C**

Paper Title: Data Communication & Computer Networks | **4** | **0** | **4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

3. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
4. **Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT – I

Introduction, goals and applications of Networks, Layering Concept, OSI Reference Model vs TCP/IP Protocol Suite, Networks Topology.

Physical Layer: Signals, Digital Transmission, Analog to Digital & Digital to Digital conversion, Analog Transmission, Digital to Analog & Analog to Analog conversion, Multiplexing (FDM & TDM), Media (Guided and Unguided), Switching (Packet based & Circuit based), Hub & Repeater, Sampling theorem (Nyquist-Shannon Theorem).

Network Traffic Capturing: Wireshark (Windows) and tcpdump (Linux)

[10Hrs]

UNIT – II

Data Link Layer: Addressing, Error Detection & Correction, General concepts, Checksum & CRC, Medium Access (Aloha, CSMA, CSMA/CD & CA), Protocols (Ethernet, ARP & RARP), Switch (Learning & Filtering Mechanism), Wireless Access (Bluetooth, Wifi).

Network Layer: IP Addressing & Subnets, basic Routing (or Forwarding) Mechanism, IPv4 frame format and functions, Routing protocols (RIP, OSPF & BGP) and Distance Vector & Link State algorithms.

Linux Network Commands: arp, route, ifconfig, netstat, traceroute, ping.

[10Hrs]

UNIT – III

Transport Layer: Port Addresses, Protocols (Simple, Stop n Wait, Go Back N & Selective Repeat), UDP services & applications, TCP header format, connection setup & termination, state transition diagram, flow control, error control, congestion control & timers.

[10Hrs]

UNIT – IV

Application Layer: Web & HTTP, FTP, Email, Telnet, SSH, DNS.
Advanced Protocols: SNMP, RTP, SIP, BitTorrent, Wireshark (Case Studies).

[10Hrs]

TEXT BOOKS:

1. Forouzan, "Data Communication and Networking", TMH, 5th Edition, 2013.
2. A.S. Tanenbaum, "Computer Networks", PHI, 4th Edition, 2002.
3. W. Stallings, "Data and Computer Communication", Macmillan Press, 2013.
4. Comer, "Computer Networks and Internet", PHI, 2008.
5. Comer, "Internetworking with TCP/IP", PHI, 2008.

REFERNCE BOOKS:

1. W. Stallings, "Data and Computer Communication", McMillan, 2010.
2. J. Martin, "Computer Network and Distributed Data Processing", PHI, 2008.
3. W. Stallings, "Local Networks", McMillan, 2013.
4. S. Keshav, "An Engineering Approach to Computer Networking, Pearson", 2001.

Code No.: BIT 309 | **L** | **P** | **C**
Paper: Data Warehousing and Data Mining | **4** | **0** | **4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

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2. **Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT – I

The Compelling Need for data warehousing, Data warehouse – The building Blocks Defining the business requirements, Requirements definition (scope and content), Principles of dimensional modeling, Dimensional Modeling.

OLAP in the Data Warehouse: Demand for Online analytical processing, need for multidimensional analysis, OLAP characteristics, features and functions, dimensional analysis, hyper cubes, Drill-down and roll-up, slice-and-dice, rotation.

OLAP models: MOLAP model, ROLAP model, HOLAP model, ROLAP versus MOLAP, OLAP implementation considerations.

[10 Hrs]

UNIT – II

Data Mining Basics: Data Mining Definition, The knowledge discovery process, OLAP versus data mining, data mining and the data warehouse, Process of data mining. Data Mining Applications, Benefits of data mining.

Associations and Correlations – Association rule mining, Apriori algorithm, improving efficiency, kinds of association rules, multilevel, multi- dimensional.

[10 Hrs]

UNIT –III

Classification and Regression: types of classification algorithm, Bayesian, rule based, decision tree, KNN.

Cluster analysis: Overview of grid based, model based, density based, partioning based, hierarchical based clustering methods.

[10 Hrs]

UNIT –IV

Major Data Mining Techniques: Cluster detection, K-means algorithm, link analysis, neural networks, genetic algorithms, fuzzy logic. Web Mining, Sentiment Analysis, Opinion Mining

[10 Hrs]

TEXT BOOKS:

1. M.H. Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education,2008
2. Jiawei Han, Micheline Kamber, and Jian Pei, Data Mining: Concepts and Techniques, 3rd Edition, Morgan Kaufmann, 2011.

REFERENCES BOOKS:

1. Pieter Adriaans, Dolf Zantinge , "Data Mining", Pearson Education Asia, 2001
2. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley, 2nd edition, 2007
3. M Berry and G. Linoff, "Mastering Data Mining", JohnWiley, 3rd edition , 2011
4. Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2004.

Paper Code: BAS 311 | **L** | **P** | **C**
Paper Title: Human Values and Professional Ethics | **3** | **0** | **3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

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UNIT–I

Human Values: Morals, Values and Ethics, Integrity, Work Ethic, Respect for Others, Living Peacefully, Caring, Sharing, Honesty, Valuing Time, Co-operation, Commitment, Empathy, Self-Confidence, Character, Spirituality. **Indian values (on the conceptual framework of Vedas):** Purusharth, Niskama karma, Religion and Human Values, Towards a World Religion, Ethical Living and Harmony in Life.

[8 Hrs]

UNIT–II

Ethics and Engineering Profession: Profession and Professionalism, Ethical Theories: Kohlberg's Theory, Gilligan's Theory, Feminist Consequentialism, Moral Dilemmas, Types of Enquiry, Uses of Ethical Theories, Engineering Profession, **Engineering Professionals:** Training, Skill Set, Life Skills. **Engineering Ethics:** Making Senses and Issues, Ethical Obligations of Engineers, Ethical Codes for Engineers. **[7 Hrs]**

UNIT-III

Engineering as a Social Experimentation, Safety Responsibility and Rights: Engineering as experimentation, Engineers as responsible Experimenters, Concept of Safety and Risk, Engineer's Responsibility for Safety, **Risk :** Benefit Analysis, **Case Studies:** The challenger case study, The Three Mile Island, Fukushima Nuclear Disaster, Bhopal Gas Tragedy, Disaster Management, Professional Rights, Employee Rights, Intellectual Property Rights (IPRs), Human Rights and Human Responsibilities. Major Ethical Issues.

[8 Hrs]

UNIT–IV

Ethics and Global Issues: Ethics in Global Scenario, Multinational corporations, Environmental ethics, computer ethics, Business Ethics, Corporate Social responsibility, Weapons Development, Research Ethics.

[7 Hrs]

TEXT BOOKS:

1. Govindarajan M., Natarajan S., Senthil Kumar V. S., "Engineering Ethics", Prentice Hall, New Delhi, 2004.
2. Subramaniam R., "Professional Ethics", Oxford University Press, New Delhi, 2013.

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3. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw-Hill, New York 1996.
4. RR Gaur, R Sangal, GP Bagaria, "A Foundation Course in Human values and Professional Ethics", Excel Books Pvt. Ltd, New Delhi 2009.
5. A.N.Tripathi, "Human Values", New Age International Publishers, New Delhi, 2nd Edition, 2004.

REFERENCE BOOKS:

1. B.P. Banerjee, "Foundation of Ethics and Management", Excel Books, 2005.
2. Fleddermann, Charles D., "Engineering Ethics", Pearson Education. 2004.
3. Harris, Charles E., Protchard, Michael S. And Rabins, Michael, J., Wadsworth, "Engineering Ethics- Concepts and Cases", Thompson Learning, 2000
4. Boatright, John R., "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
5. Swami Ranganathananda, "Universal Message of the Bhagavad Gita: An exposition of the Gita in the light of modern thought and modern needs", Vol. I – III, Advaita Ashrama (Publication Department), Kolkata. 2000.
6. Peter Singer, "Practical Ethics", Oxford University Press, 1993.

Paper Code: BIT 353	**L**	**P**	**C**
Paper Title: Computer Graphics & Multimedia Lab	**0**	**4**	**2**

Practical will be based on Computer Graphics & Multimedia.
(Special Instructions: Minimum Eight Experiments from Computer Graphics & Eight Experiments from Multimedia must be performed)

Paper Code: BIT 355	**L**	**P**	**C**
Paper Title: Requirement & Estimation Techniques Lab	**0**	**2**	**1**

Practical will be based on Requirement & Estimation Techniques.

Paper Code: BIT 357	**L**	**P**	**C**
Paper Title: Data Communication & Computer Networks Lab	**0**	**2**	**1**

Practical will be based on Data Communication & Computer Networks.

Paper Code: BIT 359	**L**	**P**	**C**
Paper Title: Data Warehousing & Data Mining Lab	**0**	**2**	**1**

Practical will be based on Data Warehousing & Data Mining.

(NOTE: Minimum eight experiments must be performed.)

Paper Code: BIT 302	L	P	C
Paper Title: Web and Mobile Technologies	4	0	4

INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 60

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UNIT I

Introduction to the Internet, the World Wide Web: the idea of Hypertext and Hypermedia, how the web works, browser working, MIME types, Plug-ins and helper applications.

Introduction to HTML 5.0: basic tags of HTML, tables, frames, forms, separating style from structure with Style Sheets, inline style and internal style specifications within HTML, external Linked style specification using CSS.

Introduction to XML: XML vs. HTML, uses of XML, simple XML, XML key components, DTD and schemas, using XML with application.

[10 Hrs]

UNIT II

Client Side Programming: introduction to JavaScript, JavaScript programming, variables, functions, conditions, loops, JavaScript object model, event handling, forms handling, Cookies, hidden fields, images, applications.

Server Side Programming: introduction to PHP, basics of PHP, PHP file handling, PHP file upload, PHP sessions, PHP cookies, PHP error handling, PHP MySQL introduction, PHP MySQL insert into, PHP MySQL select, PHP MySQL, where clause, PHP MySQL update, PHP MySQL delete.

[10 Hrs]

UNIT III

DHTML: combining HTML, CSS and JavaScript, DHTML, Document Object Model (DOM).

Web Services: components and working of Web Services, Web Services architecture, introduction to Service Oriented architecture, SOAP, WSDL, UDDI, AJAX, overview of Mobile Computing, overview of Cloud Computing.

Mobile Technologies: introduction, applications of Mobile Technology, concepts of Multiplexing and Modulation, Spread Spectrum, SDMA, TDMA, FDMA, CDMA, GSM, Bluetooth, EDGE, UMTS, 4G Networking.

[10 Hrs]

UNIT IV

Mobile Operating Systems: introduction to various Mobile OS, features of a Mobile OS, history of Mobile OS, Mobile OS structure, Mobile OS platforms, future of Mobile OS, case study of Android.

Mobile Commerce: history of Mobile Commerce, services and applications, Mobile marketing and advertising, Mobile Commerce life-cycle, Mobile Entertainment Services, SyncML.

MANET: types of MANET's, security in MANET, Smart Cards, future of Mobile Technologies.

[10 Hrs]

TEXT BOOKS:

1. Deitel, "Internet and World Wide Web, How to Program", PHI, 2008.
2. Ivan Bay Ross, "HTML, DHTML, JavaScript, Perl CGI ",PBP, 3rd Edition,2005.
3. Ethan Cerami, "Web Services", O'Reilly Media, 2002.
4. Ron Schneider man, "The Mobile Technology Question and Answer Book: A Survival Guide for Business Managers", 2002.

REFERENCE BOOKS:

1. Rick Dranell, "HTML4 unleashed", Techmedia Publication, 2000.
2. Jochen Schiller, "Mobile Communications". Addison-Wesley, 2004.

Paper Code: BCS 304
Paper Title: Compiler Design

L	P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

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Unit-I

Introduction: Introduction to Translators (interpreter, compiler & cross-compiler), Phases of compilation and overview, Introduction to GCC. **Lexical Analysis (scanner):** Regular language, finite automata, regular expression and their applications to lexical analysis, from regular expression to finite automata, Implementation of lexical analyzers, lexical-analyzer generator, LEX-compiler, Formal grammars and their application to syntax analysis, ambiguity, YACC. **[10 Hrs]**

Unit-II

Syntax Analysis (Parser): Context-free language and grammar, **Basic Parsing Techniques:** Parsers, Top down parsing, Shift reduce parsing, operator grammar, operator precedence parsing, predictive parsers. LL(1) grammar, LR(0), SLR(1), LR(1), LALR(1) grammars and Bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (yacc,bison). **[10 Hrs]**

Unit-III

Syntax-directed Translation: Syntax-directed Translation schemes, Implementation of Syntax-directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. **Semantic Analysis:** Attribute grammar, syntax directed definition, evaluation and flow of attribute in a syntax tree. **[10 Hrs]**

Unit-IV

Symbol Table: Data structure for symbols tables, representing scope information, symbol attributes and management. **Run-time environment:** Procedure activation, parameter passing, value return, memory allocation, and scope. **Error Detection & Recovery:** Lexical Phase errors, syntactic phase errors semantic errors.

Intermediate Code Generation: Translation of different language features, different types of intermediate codes.

Code Improvement (optimization): Analysis: control-flow, data-flow dependence etc., Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc. **[10 Hrs]**

TEXT BOOKS:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education, 2007.
2. Andrew N. Appel, "Modern Compiler Implementation in C", Cambridge University Press, 2007.

REFERENCE BOOKS:

1. Keith D. Cooper and Linda Torczon, "Engineering a Compiler", Elsevier, 2004.
2. Steven S. Muchnik, "Advanced Compiler Design and Implementation", Elsevier, 2008.
3. Randy Allen and Ken Kennedy, "Optimizing Compilers for Modern Architectures", Elsevier, 2009.
4. John R. Levine, Tony Mason, Doug Brown, "lex & yacc ", O'reilly, 2nd Edition, 1992.

Paper Code: BCS 306
Paper Title: Network Programming

L	P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.

Unit-I

Introduction: Overview of UNIX OS, Environment of a UNIX process, Process control, Process relationships Signals, Interprocess Communication, overview of TCP/IP protocols, Case study-Java RMI. **[10 Hrs]**

Unit-II

Socket: Introduction to Socket Programming, **Introduction to Sockets:** Socket address Structures, Byte ordering functions, address conversion functions, Elementary TCP Sockets, socket, connect, bind, listen, accept, read, write, close functions, Iterative Server Concurrent Server, APACHE Web Server. **[10 Hrs]**

Unit-III

Advanced Socket: IPV4 and IPV6 interoperability, threaded servers, thread creation and termination, TCP echo server using threads, Mutexes, condition variables, raw sockets, raw socket creation, raw socket output, raw socket input, ping program, trace route program. **[10 Hrs]**

Unit-IV

Remote procedure call concept (RPC): RPC models, analogy between RPC of client and server, remote programs and procedures, their multiple versions and mutual exclusion communication semantics, RPC retransmits, dynamic port mapping ,authentication, Network file system, concept of data link access, debugging techniques,Routing sockets, broadcasting to mobile network. **[10 Hrs]**

TEXT BOOKS:

1. W.Richard Stevens, "Unix Network programming", Addison-Wesley Professional,3rd edition, 2003.
2. Douglas E.Comer, "Internet working with TCP/IP", Addison-Wesley, Vol-1, 2014.
3. Kevin R. Fall, W.Richard Stevens, "TCP/IP Illustrated: The Protocols", Addison-Wesley Professional Computing Series, 2nd Edition, 2011.

REFERENCE BOOKS:

1. W. Richard Stevens, B. Fenner, A.M. Rudoff, "Unix Network Programming – The Sockets Networking API", 3rd edition, Pearson, 2004.
2. W. Richard Stevens, S.A Rago, "Programming in the Unix environment", 2nd edition, Pearson, 2005.

Paper Code: BCS 308
Paper Title: Cloud Computing

L	P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

1. **Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.**
2. **Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

Unit-I

Introduction to Computing and Cloud Computing: Trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing. Concept and Evolution of cloud computing paradigm. Business driver for adopting cloud computing. Introduction to Cloud Computing, Benefits and challenges of cloud computing. Various types of cloud computing. **Cloud Computing Architecture:** Cloud delivery model, SPI framework, SPI evolution, SPI vs. traditional IT Model. **Infrastructure as a Service (IaaS):** IaaS service providers, Amazon EC2, GoGrid, Microsoft soft implementation and support, Amazon EC service level agreement, recent developments, Benefits. **Software as a Service (SaaS):** SaaS service providers, Google App Engine, Salesforce.com and google platfrom, Benefits, Operational benefits, Economic benefits, Evaluating SaaS. **Platform as a Service (PaaS):** PaaS service providers, Right Scale, Salesforce.com, Rackspace, Force.com , Services and Benefits.

[10 Hrs]

Unit-II

Virtualization: Virtualization concept and Operating System, Need of virtualization, cost, administration, fast deployment, reduce infrastructure cost, limitations. **Types of hardware virtualization:** Full virtualization, partial virtualization, para virtualization. **Desktop virtualization:** Software virtualization, Memory virtualization, Storage virtualization, Data virtualization, Network virtualization. **Microsoft Implementation:** Microsoft Hyper V, VMware features and infrastructure, Virtual Box, Thin client.

[10 Hrs]

Unit-III

Cloud deployment model: Public clouds, Private clouds, Community clouds, Hybrid clouds, Advantages of Cloud computing, Performance and Resource management, load balancing, Energy model. **[10 Hrs]**

Unit-IV

Best Practice Cloud IT Model: Analysis of Case Studies when deciding to adopt cloud computing architecture, How to decide if the cloud is right for your requirements. Cloud based service, applications and development platform deployment so as to improve the total cost of ownership (TCO), Security aspects in cloud. **[10 Hrs]**

TEXT BOOKS:

1. Barrie Sosinky, "Cloud Computing". Wiley Publishing House, 2011.
2. Michael J. Kavis, "Architecting the cloud: Design decision for cloud computing". John Wiley & Sons, 2014.
3. Rajkumar Buyya &James Broberg ,"Cloud Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing)", Wiley-Blackwell, 2011.

REFERENCE BOOKS:

1. Anthony T.Velte, Toby J. Velte Robert Elsenpeter, "Cloud computing a practical approach", McGraw-Hill Osborne, 2009.
2. Thomas Erl, Ricardo Puttini, "Cloud Computing: Concepts, Technology & Architecture", Prentice Hall, Pearson Publications, 2013.

Paper Code: BIT 310
Paper Title: Artificial Intelligence

L	P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 60**

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2. **Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks.**

UNIT–I

Introduction: What is AI? Philosophical Perspective, Weak vs Strong AI, Scope of AI, Intelligent Agent concept, Agents & Environment, Good Behavior, Nature of Environments & Structure of Agents.

Problem Solving (Informed and Uninformed Search): Problem Solving Agents, Uninformed Search - BFS, DFS, Depth limited & Bidirectional search, Informed Search Techniques, Hill climbing, Best-first search, Branch and bound, A* algorithm. **[10 Hrs]**

UNIT–II

Adversarial Search (Game Playing): Game Tree, Minimax Algorithm, Alpha Beta Pruning. **Knowledge and Reasoning:** Logical Agents, Overview and Knowledge base, Propositional Logic, Predicate Logic, Unification, Resolution, Forward Chaining, Backward Chaining. **Structured Knowledge Representation:** Semantic Nets, Slots, Exceptions, Conceptual dependency. **[10 Hrs]**

UNIT–III

Handling Uncertainty: Probability Notion, Axioms of Probability, Non-Monotonic Reasoning, Probabilistic reasoning, Use of certainty factors, Fuzzy logic. **Learning:** Forms of learning, Inductive Learning, Decision Trees, Statistical Learning, Naïve Bayes, Clustering & Nearest Neighbor, Neural Networks, Genetic Algorithms. **[10 Hrs]**

UNIT–IV

Natural Language Processing: Introduction, Syntactic Processing, Semantic Processing, Pragmatic Processing. **Expert Systems:** Overview, Characteristics & Design, Types of Expert Systems, MYCIN, Dendral, Knowledge acquisition. **[10 Hrs]**

TEXT BOOKS:

1. Stuart J. Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson 2nd Edition, 2009.
2. E. Rich and K. Knight, "Artificial Intelligence", TMH, 2nd Ed., 1992.
3. Ela Kumar, "Artificial Intelligence", I. K. International Publishing House, 2011.

REFERENCE BOOKS:

1. P. H. Winston, "Artificial Intelligence", Pearson Education, 3rd Edition, 2002.
2. D. W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.
3. R. J. Schalkoff, "Artificial Intelligence – An Engineering Approach", McGraw Hill Int. Ed. Singapore, 1992.
4. M. Sasikumar, S. Ramani, "Rule Based Expert Systems", Narosa Publishing House, 1994.
5. Tim Johns, "Artificial Intelligence, Application Programming", Wiley Dreamtech, 2005.

Paper Code: BAS 312
Paper Title: Engineering Economics

L	T	C
3	0	3

INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 60

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
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UNIT–I

Introduction: Meaning Nature and Significance of Economics, Economic Process, Micro Economics and Macro Economics. **Economy:** Definition, Types, Central Problems, Economic Development Indicators, Sustainable Development, a Glimpse of Indian Economy, Meaning of Science, Engineering and Technology and their relation with Economics, Role of Engineers in Economic Development. **[7 Hrs]**

UNIT–II

Demand Analysis: Meaning and Law of Demand, Demand Elasticity, Types and Uses, Demand Forecasting: Meaning and Uses, Supply Analysis, Production Function, Cost and Revenue Concepts, Producer's Equilibrium, Law of variable Proportion, Law of Returns to Scale.
Market: Meaning of Market, **Basic Features of Different markets:** Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition, and Price Determination under different Market Conditions. **[8 Hrs]**

UNIT–III

Money and Banking: Money, Meaning, Types and Functions, Bank Definition, Types and Functions, Credit Creation, Role of Central Bank- RBI, Introduction to Indian Financial system. **Inflation:** Meaning, Types, Causes and Measures to Control Inflation, Monetary Policy, Fiscal Policy, Business Cycle, **National Income Concepts:** NNP_{FC} and GDP_{MP}.

[7 Hrs]

UNIT–IV

Financial Economics: Concepts of Time Value of Money, Interest, Cost, Annuity. **Project Evaluation Methods:** NPV, IRR, PI. **Introduction to Financial Management:** Role and Functions, Financial Accounting. **Uses of Important Financial Statements:** Statement of Profit and Loss, Balance Sheet, Cash flow Statement. **Decision making Models (No numerical Applications):** Linear Programming, Input Output Model, Econometric Models. **Introduction to Process Improvement Techniques:** TQM, Six Sigma, Benchmarking. **[8 Hrs]**

TEXT BOOKS:

1. Riggs, Bedworth and Randhawa, "Engineering Economics", McGraw Hill Education India. 1997.
2. K.K. Dewett, "Modern Economic Theory" S.Chand, New Delhi. 2005.
3. Seema Singh, "Economics for Engineering Students", I.K. International Publishing House, New Delhi. 2009.
4. D.N. Kakkar, "Managerial Economics for Engineering", New Age International Publication. 2014.
5. D.N. Dwivedi, "Managerial Economics" Vikas Publishing House. New Delhi. 2008.

REFERENCE BOOKS:

1. C. T. Horngreen, "Cost Accounting ", Pearson Education India. 2012.
2. R. R. Paul, "Money banking and International Trade", Kalyani Publisher, New-Delhi. 2008.
3. S.C. Sharma and T.R. Banga, "Industrial Organization and Engineering Economics". Khanna Pub. 1999.
4. S.N. Maheswari, "Financial and Management Accounting" Sultan Chand & Sons. 2010.
5. Mishra & Puri, "Indian Economy", Himalaya Publishing House, New Delhi. 2000.

Paper Code: BIT 352		L	P	C
Paper Title: Web and Mobile Technologies Lab	**0**	**2**	**1**	

Practical will be based on Web and Mobile Technologies.

Paper Code: BCS 354	L	P	C
Paper Title: Compiler Design Lab	**0**	**2**	**1**

Practical will be based on Compiler Design.

Paper Code: BCS 356	L	P	C
Paper Title: Network Programming Lab	**0**	**2**	**1**

Practical will be based on Network Programming.

Paper Code: BCS 358	L	P	C
Paper Title: Cloud Computing Lab	**0**	**2**	**1**

Practical will be based on Cloud Computing.

Paper Code: BIT 360	L	P	C
Paper Title: Artificial Intelligence Lab	**0**	**2**	**1**

Practical will be based on Artificial Intelligence.

(NOTE: Minimum eight experiments must be performed.)