BACHELOR OF TECHNOLOGY (IGDTUW)
(Information Technology)
(Teaching and Examination Scheme)

SEVENTH SEMESTER

Sl. No.	Paper Code	Paper Title	L	P	Credits	Course Category
THEORY PAPERS						
1	BIT 401	Software Testing	4	-	4	DC
2	BIT 403	Big Data Analytics	4	-	4	DC
ELECTIVES - I (Choose Any One)						
1	BCS 403	Mobile Computing	4	-	4	DE
2	BIT 405	Agile Computing and Design Patterns				
3	BIT 407	Machine Learning and Pattern Recognition				
4	BIT 409	**Latest Topics using e-Learning Mode				
5	BIT 411	Information Retrieval Techniques				
6	BCS 411	**Introduction to e-Commerce and m-Commerce				
7	BIT 413	**Internet Technologies				
ELECTIVES - II (Choose Any One)						
1	BMA 417	Process Improvement Techniques	3	-	3	HS
2	BAS 419	Financial Accounting				
PRACTICAL/VIVA VOCE						
1	BIT 451	Software Testing Lab	0	2	1	DC
2	BIT 453	Big Data Analytics Lab	0	2	1	DC
3	BIT 455	Practical based on Electives – I	0	2	1	DE
4	BIT 457	*Minor Project	0	8	4	DC
5	BIT 459	***Practical Training	-	-	2	DC
6	BAS 461	Disaster Management	-	2	1	ES
		TOTAL	**15**	**14**	**25**	

*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.

** Any of these subjects may be chosen in e-Learning mode and supervised by internal Faculty-in-Charge.

*** The students will undergo 4-6 weeks training after sixth semester. The viva-voce of the same will be conducted in the seventh semester.

BACHELOR OF TECHNOLOGY (IGDTUW)
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EIGHTH SEMESTER

Sl. No.	Paper Code	Paper Title	L	P	Credits	Course Category
		THEORY PAPERS				
1	BIT 402	Software Project Management	4	-	4	DC
2	BIT 404	Cyber Security Management	4	-	4	DC
		ELECTIVES - I (Choose any one)				
1	BIT 406	Distributed Systems	4	-	4	DC
2	BIT 408	Natural Language Processing				
3	BIT 410	Secure Software Development				
4	BEC 410	**Digital Image Processing				
5	BCS 412	Wireless Sensor Networks				
6	BIT 414	IPR & Cyber Laws				
7	BIT 416	**High Performance Computer Architecture				
		ELECTIVES - II (Choose Any One)				
1	BAS 420	Business Entrepreneurship	3	-	3	HS
2	BAS 422	Organizational Behavior				
		PRACTICAL/VIVA VOCE				
1	BIT 452	Software Project Management Lab.	0	2	1	DC
2	BIT 454	Cyber Security Management Lab	0	2	1	DC
3	BIT 456	*Major Project	0	12	8	DC
		TOTAL	15	16	25	
		GRAND TOTAL			212	

*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.

** Any of these subjects may be chosen in e-Learning mode and supervised by internal Faculty-in-Charge.

		L	P	C
Paper Code: BIT 401				
Paper Title: Software Testing		4	0	4

INSTRUCTIONS TO PAPER SETTERS:
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 10 marks

UNIT 1
Introduction: Testing Objectives, Software Testing Process, Software Testing Principles, Tester Role in Software Development Organization, Test Case Implementation and Execution.
   Testing Concepts: Levels of Testing, Test Cases Design and Strategy, Test Suit, Test Plan, Testing as a
      Process, Testing and Debugging, Limitations of Testing, Software Testing Tools: Characteristics of Modern Tools, Static Testing Tools, Dynamic Testing Tools, Process Management Tools.
(10Hrs)

UNIT 2
Functional Testing: Boundary Value Analysis, Robustness Testing, Worst case testing, Special Value Testing, Equivalence Class Testing-Weak normal, Strong normal, weak robust and Strong Robust, Decision Table Based Testing, Cause Effect Graphing Technique.
Structural Testing: Control flow testing-Statement, Branch, Condition and Path coverage, Data Flow Testing, Testing strategies, Generation of test cases, Slice-based Testing, Mutation Testing, Integration Testing, Decomposition based Integration, Call Graph based Integration, System Testing: Thread Testing.
(10Hrs)

UNIT 3
Introduction to Object Oriented Testing, State Based Testing, Class Testing, Web Testing, Issues in Object Oriented Testing, Regression testing, Selection of test cases, reducing the number of test cases, Prioritization guidelines. (10Hrs)

UNIT 4
Software Verification Methods, SRS Verification, SDD Verification, Source Code Reviews, Software Project Audit, Debugging Process and Approaches, Software Testing Metrics, Metrics used in Testing, Software Quality and Quality Models. (10Hrs)

TEXT BOOKS
1. Yogesh Singh, "Software Testing", Cambridge University Press, 2011
2. Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Auerbach Publications; 3rd Edition, 2013

REFERENCE BOOKS
1. Ilene Burnstein, "Practical Software Testing: A Process-Oriented Approach", Springer, 2003.
2. Aditya P. Mathur, "Foundations of Software Testing", Prentice Hall 2008

Paper Code: BIT 403
Paper Title: Big Data Analytics

L	**P**	**C**
4	**0**	**4**

INSTRUCTIONS TO PAPER SETTERS:
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 10 marks

Unit I
Introduction – RDBMS Overview, Challenges of Conventional Systems, Intelligent Data Analysis, Nature of Data, Analytic Processes and Tools, Analysis vs Reporting, Modern Data Analytic Tools, Statistical Concepts: Sampling Distributions, Re-Sampling, Statistical Inference, Prediction Error, Accuracy measures, Cutoff, Oversampling & Asymmetric Costs.
Big Data - Volume, Velocity, Variety, Veracity, types & sources of Big Data OLAP & RTAP.
(10 Hrs)

Unit II
Data Exploration & Dimension Reduction: Data Summaries, Data Visualization, Correlation Analysis, Reducing no of categories in Categorical variables, Principal Component Analysis for Classification & Prediction, Multi Variate Regression Analysis, Bayesian Modeling, Support Vector Method, Time Series Analysis.
(10 Hrs)

Unit III
Introduction to Streams Concepts, Stream Data Model and Architecture, Stream Computing, Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Case Study: Real Time Sentiment Analysis/Stock Market Prediction.
(10 Hrs)

Unit IV
Hadoop - The Hadoop Distributed File System – Components of Hadoop, Analyzing the Data with Hadoop, Map Reduce, Map Reduce Types and Formats, Map Reduce Features, NoSQL Database.
Applications on Big Data Using Pig and Hive, Querying Data in Hive through HiveQL
(10 Hrs)

TEXT BOOKS
1. Chris Eaton, Dirk De Roos, Tom Deutsch, George Lapis, Paul Z., "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGraw Hill Publishing, 2011
2. Shmueli, Patel & Bruce, "Data Mining for Business Intelligence", 2nd Edition, Wiley Interscience Publications, 2010.

REFERENCE BOOKS
1. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

2. Michael Minelli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
3. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
4. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.

Paper Code: BCS 403   **L   P   C**

Paper Title: **Mobile Computing**   **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: Mobile Computing, Motivations, concepts, and challenges of mobile computing, Architecture of Mobile Computing. Mobile computing environments, challenges and applications .Various Communication Radio Technologies, Security and Privacy issues.

(10 Hrs)

UNIT II
Wireless System and Standards: Cellular concept, frequency allocation. Global System for Mobile Communication GSM architecture and its interfacing, call routing in GSM, location management, HLRVLR, Mobility Management, Handoffs. Introduction to LAN Protocols.

(10 Hrs)

UNIT III
Data Management: Introduction, GPRS and Packet Data Network, GPRS Network architecture, operation and Data Services, Applications and Limitations of GPRS. CDMA and 3G: Introduction, Spread spectrum technology, CDMA versus GSM, 3G &4G Networks. Introduction to Dynamic routing algorithms

(10 Hrs)

UNIT IV
Emerging Technologies: Bluetooth technology, protocols and interfacing, Voice over IP and its Application. IPV6, Mobile IP. Location Based Services, Context aware Computing, data broadcasting and file management CODA file system. QoS issues in mobile Computing.

(10 Hrs)

TEXT BOOKS
1. Asoke K Telukder, Roopa R Yavagal, " Mobile Computing", TMH, 2011.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007
3. YiBing Lin & Imrich Chlamtac, "Wireless and Mobile Networks Architectures", John Wiley & Sons, 2001.

REFERENCE BOOKS
1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University Press, October 2004.
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", McGrawHill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.

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		L	P	C
Paper Code: BIT 405				
Paper Title: Agile Development and Design Framework		**4**	**0**	**4**

INSTRUCTIONS TO PAPER SETTERS:
  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 10 marks**

UNIT I
Need of Agile Approach, Iterative development, Risk Driven and Client-Driven iterative planning, Time boxed iterative development, Evolutionary and adaptive development, Evolutionary requirements analysis, Early "Top Ten" high-level requirements and skilful analysis, Evolutionary and adaptive planning, Incremental delivery, Evolutionary delivery.

(10 Hours)

UNIT II
Agile development, Classification of methods, The agile manifesto and principles, Agile project management, Embrace communication and feedback, Simple practices and project tools, Empirical Vs defined and prescriptive process, Principle-based versus Rule-Based Processes, Sustainable discipline: The human touch, Team as a complex adaptive system, Meeting the requirements challenge iteratively.

(10 Hours)

UNIT III
Method overview, Lifecycle, Work products, Roles and Practices values, Process mixtures, Adoption strategies. Overview of Scrum, eXtreme Programming (XP), Kanban, Feature-Driven Development, Project Checkup, Dynamic Systems Development Method (DSDM), Enterprise Agility, Team Dynamics and Collaboration

(10 Hours)

UNIT IV
Design Pattern: The Catalog of Design Patterns, Organizing the Catalog, Selection of appropriate Design Pattern. Overview of Creational, Structural and Behavioral Design Frameworks, Case Study.

(10 Hours)

TEXT BOOKS
1. Greene Jennifer, Learning Agile, O'Reilly, 2014
2. Erich Gamma, Design Pattern, Pearson Education, 2015

REFERENCE BOOKS
1. Mark Lines and Scott Ambler, "Disciplined Agile Delivery: A Practitioner's Guide to Agile Software Delivery in the Enterprise", IBM Press, 2012
2. Elisabeth Hendrickson, "Agile Testing" Quality Tree Software Inc 2008.
3. Craig Larman "Agile and Iterative Development – A Manager's Guide" Pearson Education – 2004.

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Paper Title: Machine Learning and Pattern Recognition
Paper code: BIT 407

L	P	C
4	0	4

INSTRUCTIONS TO PAPER SETTERS:
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 10 marks

UNIT I
Introduction to Machine Learning, Well-posed learning problems, Types of Machine Learning, Applications of Machine Learning.
Basics of pattern recognition, Features, Feature Vectors, Learning Models: Supervised versus Unsupervised learning, Bayesian decision theory, Bayesian Classifiers, Challenges in Bayesian decision theory.   (10 hours)

UNIT II
Dimension reduction methods, Linear Discriminant Analysis, Fisher Discriminant Analysis, Principal Component Analysis, Parameter estimation methods: Maximum Likelihood & Bayesian Estimation; Overview of Nonparametric density estimation, Parzen Windows, nearest neighbor methods.   (10 hours)

UNIT III
Mixture Densities, ML estimation and EM algorithm, Convergence of EM algorithm; Gaussian mixture models; Discrete Markov Processes, Hidden Markov Models, Three Basic Problems of HMMs.   (10 hours)

UNIT IV
Decision Trees: Classification Tree, Regression Tree, Classification and Regression Tree (CART) Bagging, Random Forest, Decision tree advantages and limitations, K-Nearest Neighbour method, Introduction to Support vector machines, Overview of Artificial Neural Networks, Back propagation, Radial Basis Function Network.   (10 hours)

TEXT BOOKS
1. R. O. Duda, P. E. Hart and D. G. Stork, Pattern Classification, John Wiley, 2012.
2. Stephen Marsland, "Machine Learning –An Algorithmic Perspective", CRC Press, 2009.

REFERENCE BOOKS
1.   C. M. Bishop, "Pattern Recognition and Machine Learning", 2nd Edition, Springer, 2011.
2.   Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012.
3.   Tom M. Mitchell, "Machine Learning: A Guide to Current Research", Springer; Soft cover reprint of the original 1st ed. 1986 Edition (2011)
4.   S. Theodoridis and K. Koutroumbas, "Pattern Recognition", Academic Press, 4th Ed., 2009

Paper Code: BIT 409
Paper Title: Latest Topics using e-Learning Mode (Open Source Technologies)

	L	P	C
	4	0	4

INSTRUCTIONS TO PAPER SETTERS:

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 10 marks

UNIT I

Introduction: Open Source Definition, Free Software vs. Open Source Software, Public Domain Software, Open Source History, Initiatives, Principle and Methodologies. Open Standards.
Open Source Development Model Licenses and Patents: License, Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copy lefts, Patents Economics of FOSS: Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization.   (10 Hours)

UNIT II

Open Source Ethics: Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source.
Open Source Operating Systems: Different open source operating systems, Google Chrome OS, BSD, Linux Distributions – Fedora and Ubuntu, Installation, Disk Partitioning, Boot loader, Using Linux – Shell, File system familiarity, Linux Administration – Managing users, services and software, Network Connectivity, Configurations and Security.   (10 Hours)

UNIT III

Open Source Web Technologies: Two Tier and Three Tier Web based Application Architecture, LAMP Terminologies, Advantages, Apache, Web server conceptual working, Installation and Configuration, httpd.conf file, Logging, Security, Running a website.
MySQL Installation, Configuration, Administration, Common SQL queries, PHP, Dynamic content, Server side scripting, Installation, Configuration, Administration, Language syntax, Built-in functions, PHP and MySQL connectivity.   (10 Hours)

UNIT IV

Introduction to XHTML and XML, Cascading Style Sheets, Client Side Scripting: Java Script, PHP, Form processing and business logic, stream processing and regular expressions, viewing client/server environment variables, connecting to database and handling of cookies, Accessing databases with PHP.
Case Studies: Mozilla (Firefox), Wikipedia, Joomla, Open Office, GCC.   (10 Hours)

TEXT BOOKS

1. Julie C. Meloni, "Teach Yourself PHP, MySQL & Apache All in One", SAMS, 5th Ed., 2012.
2. Tim Boronczyk, Beginning PHP6, Apache, MySQL Web Development, Wiley Pub., 2009.

REFERENCE BOOKS

1. Rosebrock E., Filson E., "Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP Working Together", SYBEX Inc.
2. Deitel, "Internet and World wide web, How to program" 4th Edition, Prentice Hall 2008

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Paper Title: Information Retrieval Techniques
Paper code: BIT 411

	L	P	C
	4	0	4

INSTRUCTIONS TO PAPER SETTERS:

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 10 marks

Unit-1
Introduction to information retrieval, Mathematical basics, Vector spaces and similarity, Basic IR Models: Boolean and vector-space retrieval models, Ranked retrieval, Text-similarity metrics, TF-IDF (term frequency/inverse document frequency) weighting, cosine similarity.
Pre-processing: Simple tokenizing, Stop-word removal, and stemming, Basic Searching and Indexing: inverted indices and files, efficient processing with sparse vectors.

Unit II
Text representation and properties: Porter stemmer; morphology; index term selection; using thesauri; Metadata and markup languages (SGML, HTML, XML, DTD) and schema Web linking technologies.

Unit III
Search Engines, Spidering, Web Crawling, Meta-crawlers, Directed spidering, link analysis, Static ranking: Page Rank HITS, shopping agents, Query log analysis, Adversarial IR.
Information Extraction and Integration: Extracting data from text, XML, Ontologies, Thesauri, Semantic Web, collecting and integrating specialized information on the web.

Unit IV
Indexing: Concept, Principles/general theory of indexing, Content Analysis: Meaning, Purpose. Applications of indexing, Text classification, Performance metrics: recall, precision, and F-measure, Evaluations on benchmark text collections, Recommender Systems: Information filtering, User Interfaces, Adaptive filtering, Collaborative filtering, User Interfaces and content-based recommendation of documents and products.

TEXT BOOKS
1. Ricardo Baeza-Yate, Berthier Ribeiro-Neto, "Modern Information Retrieval", Pearson Education, 2nd edition, 2010.
2. Christopher D. Manning and Prabhakar Raghavan, Introduction to Information Retrieval, Cambridge Press, 2008.

REFERENCE BOOKS
1. Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Pearson Pearson; 2nd edition, 2008.

2. David A. Grossman, Ophir Frieder, "Information Retrieval: Algorithms, and Heuristics", Springer, 2012

3. Charles T. Meadow, Bert R. Boyce, Donald H. Kraft, "Text Information Retrieval Systems", Emerald Group Publishing Limited; 3rd edition 2007

Paper Code: BCS-411   **L P C**
Paper Title: Introduction To E-Commerce and M-Commerce   **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 10 marks

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UNIT 1
Electronic Commerce Introduction:- Definition of E- Commerce ,Electronic commerce and Physical Commerce, Architectural framework, Impact of E-commerce on business, different type of ecommerce, some e-commerce scenario, Economic potential of electronic commerce, Advantages and Disadvantages , Incentives for engaging in electronic commerce, forces behind E-Commerce.   **(10Hrs)**

UNIT 2
 E-business strategy: Introduction, Characteristics of e-Business, Business models, E-Business vs E-commerce, , e-business Requirements, impacts of ebusiness, Strategic positioning, Levels of e-business strategies, Strategic planning process, Success factors for implementation of e-business strategies, CRM, MRP. ERP:- Introduction, need of ERP, Modules of ERP   **(10Hrs)**

UNIT 3
Electronic Payment Methods: Overview, SET Protocol for credit card payment, E-cash, E-check, Micropayment system, Credit card, magnetic strip card,Smart cards, Electronics Data Interchange, ECommerce Law. Security Architecture, Encryption techniques, Symmetric & Asymmetric encryption, Digital Signatures, Virtual Private Network, IPsec, Threats, Firewalls.
                                                              (10Hrs)
UNIT-4
M-Commerce: Introduction, Attributes, customer and provider views, Architecture, Infrastructure of m-commerce, Requirement of the m-commerce, characteristics, Mobile Information device, Mobile Computing Applications, Mobile wallet,Mobile payments, Mobile portals, , Pros and Cons of m-commerce , Secure Transaction Processes: Wireless Application Protocol, Bluetooth, The role of emerging wireless LANs and 3G/4G wireless networks.
(10Hrs)

TEXT BOOKS
1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison Wesley.
2. Brian Mennecke and Troy Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group, 2003.
3. Dave Chaffey, "E-Business and E-Commerce Management", Third Edition, 2009, Pearson Education.

REFERENCE BOOKS
1. E-Commerce Fundamentals and application (Henry Chan), 1st edition, 2001, Wiley publication
2. Bajaj and Nag, "E-Commerce the cutting edge of Business", 2nd edition, 2005, TMH
3. P. Loshin, John Vacca, "Electronic commerce", Firewall Media, 1st Ed., 2005, New Delhi
4. "Enterprise resource Planning- Concepts and Practice",V.K. Garg and N. K. Venkita Krishna, 1998, PHI.

(Information Technology)
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Paper Code: BIT 413		L	P	C
Paper: ** Internet Technologies (E-learning Mode)		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Max. 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

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UNIT - I
Internet and web technology: History, Evolution, Reference model, Domain name systems, services, Connectivity, Protocols.
Email: Protocols, working, operations, features, providers
Website: Overview, designing, development, design practices and pitfalls, publishing, URL registration, website hosting, Search engine optimization   (10 Hrs)

UNIT - II
World Wide Web :WWW, web pages, browsers, architecture, Internet collaboration, Usenet Newsgroup, Online education, Social Networking, HTTP protocol.
Designing web pages: HTML 5.0, forms, CSS 3, web 2.0, Web 3.0, XML vs HTML.
Case study: Web based project using HTML5 and CSS 3
                                                                                        (10 Hrs)

UNIT - III
Internet Programming: Client Server programming in Java, JAVA applets, Applet Architecture, Parameters to Applet, Embedding Applets in Web page,
Introduction to JAVA script: JavaScript Programming, JavaScript object model, event handling, forms handling, cookies, Images, applications, DHTML(combining html, css and javascript)
                                                                                        (10 Hrs)

UNIT - IV
E-Commerce and security issues including symmetric and asymmetric key, encryption and digital signature, authentication, Access control, Emerging trends, Internet telephony, virtual reality over the web, etc. Intranet and extranet, firewall design issues, Internet Anonymity, Security and privacy   (10 Hrs)

TEXT BOOKS
1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, "Internet and World Wide Web, How to Program", Pearson Education, 4th Edition, 2009.
2. Achyut S Godbole, Atul Kahate, "Web Technologies: TCP/IP to Internet Application Architectures", Mc Graw Hill, Third Edition, 2013.

REFERENCE BOOKS
1. "Web Technologies: HTML, Javascript, PHP, Java, JSP, XML and Ajax -Black Book",
    Dreamtech Press, 2009.
2. Uttam K. Roy, "Web Technologies" , Oxford University Press, First Edition, 2010.

Paper Code: BMA 417   **L   P   C**
Paper Title: Process Improvement Techniques   **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.
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 10 marks

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UNIT I
Principles of Management: approaches to management thoughts, scientific management, functions of management. Organization, Organization structure and organization design, The Process View of Organizations   Service and manufacturing processes   Nature of service processes, process structure in services, Process structure in Manufacturing, Value Chain Core and support processes, adding value with processes.   **(8Hrs)**

UNIT II
Productivity, Value analysis and Value Engineering Concept, Procedure, Application and role in Productivity. Process Improvement Techniques**,** Total Quality Management(TQM), Basic Concept of Total Quality (TQ), Statistical Process Control, Programmes; Quality Improvement Teams; Marketing Aspect of T.Q.; Total Quality of Services; Total Quality and Safety; Six Sigma.   **(7Hrs)**

UNIT III
Benchmarking: Process and Benefits, Enterprise Resource Planning(ERP), Business Reengineering, Simulating business process   Application, simulation process, discrete event simulation, computer simulation.   **(8Hrs)**

UNIT IV
Constraint Management   theory of constraints, process layout   designing flexible flow layouts; Lean Systems   Toyota production system, characteristics of lean systems, continuous improvement, Kanban system Value stream mapping, JIT, Process Synchronization and Improvement.   *(7Hrs)*

TEXT BOOKS
1. Manuel Laguna, Johan Marklund, "Business Process Modelling, Simulation and Design", Pearson Education, 2011.
2. Poornima M.Charantimath, "Total Quality Management", Pearson Education, First Indian Reprint 2003.
3. Shankar R., "Industrial Engineering and Management", Galgotia Publication, 2002.
4. Mathur, K and Solow D., "Management Science", Englewood Cliffs New Jersey, Prentice Hall Inc. 1994.

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REFERENCE BOOKS

1. Raví Anupindi, Sunil Chopra, Sudhakar Deshmukh,Jan A. Van Mieghem, and Eitan Zemel, "Managing Business Process Flows: Principles of Operations Management" Pearson Education, 2006
2. Douglas C. Montgomory, "Introduction to Statistical Quality Control", Wiley Student Edition, Wiley India Pvt Limited, 2008.
3. James R. Evans and William M. Lindsay, "The Management and Control of Quality", sixth Edition, Thomson, 2005.

		L	**P**	**C**
Paper Code: BAS 419				
Paper Title: Financial Accounting		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.
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 10 marks

UNIT I
Introduction to Accounting, concept and objectives of accounting and bookkeeping, conventions and principles, Accounting Equation, International Accounting principles and standards, Matching of Indian Accounting Standards with International Accounting Standards, debit and credit entries, double entry principle, journal and journal entries; accounting of sole proprietorship. **(8Hrs)**

UNIT II
Ledger posting and trial balance ,preparation of final accounts, Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet, Policies related with depreciation, inventory and intangible assets like copyright, trademark, patents and goodwill. **(7Hrs)**

UNIT III
Analysis of financial statement: Ratio Analysis solvency ratios, profitability ratios, activity ratios, liquidity ratios, Funds Flow Statement: Meaning, Concept of Gross and Net Working Capital, Preparation of Schedule of Changes in Working Capital, Preparation of Funds Flow Statement and its analysis. **(8Hrs)**

UNIT IV
 Cash Flow Statement: Various cash and non cash transactions, flow of cash, preparation of Cash Flow Statement and its uses. **(7Hrs)**

TEXT BOOKS
1. Maheshwari & Maheshwari, "An Introduction to Accountancy", Vikas Publishing House, 2009.
2. Maheshwari S.N., "Principles of Management Accounting", 11th Edition, Sultan Chand & Sons, 2001.
3. V.K. Gupta & R.L. Gupta, "Financial Accounting", Sultan Chand & Sons, 2014.
4. Ghosh T.P. "Financial Accounting for Managers", Taxman, 2009.

REFERENCE BOOKS
1. Narayanswami, "Financial Accounting: A Managerial Perspective", PHI, 2014
2. Ramchandran & Kakani, " Financial Accounting for Management", TMH, 2011.
3. Ashish K. Bhattacharya, "Financial Accounting for Managers", PHI, New Delhi, 2006.

Paper Code: BAS 461   **L P C**
Paper: **Disaster Management**   **0 2 1**

Objective: The course will focus on the areas of disaster management and preparedness, the relationship of different disaster management activities with mock drills and use of ICT for managing disaster.

                                                                 Total Hrs: 20

UNIT I
Concepts and definitions of disaster   hazard, vulnerability, resilience, risks, Difference between accidents and disasters Categories of disasters Natural disasters   earthquake, cyclone and hurricane, flood, tsunami, fire, Man made disasters   technological, armed conflict and civil strife**,** Nuclear and gas leakage disasters, Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams. Strategic Planning for Disaster Preparedness, Recovery and Management of Disasters.

                                                                 (12Hrs)

UNIT II
Technology disasters, Business Continuity Planning and Recovery, Disaster Policy of India (Salient Features). Use of ICT, mobile technology, alarms etc. for managing disaster.

                                                                 (8Hrs)

TEXT BOOKS
1. Alexander David, Introduction in Confronting Catastrophe, Oxford University Press, 2000.
 2. Kapur, Anu & others, Disasters in India Studies of grim reality, Rawat Publishers, Jaipur, 2005.
 3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011

REFERENCE BOOKS
 1. Andharia J. Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008.
2. Govt. of India: Disaster Management Act 2005, Government of India, New Delhi.

BACHELOR OF TECHNOLOGY (IGDTUW)
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Paper Code: BIT 402   **L   P   C**
Paper: Software Project Management   **4   0   4**

INSTRUCTIONS TO PAPER SETTERS:	Max. 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 10 marks

UNIT - I
Introduction: Introduction to software project management activities, Attributes of a project, Project life cycle, Project Management process, Project selection, Preparing a request for proposal, Soliciting proposals, Proposal preparation, Pricing considerations, Proposal submission and follow up, Customer evaluation of proposals. (10 hours)

UNIT - II
Project Management Organizational Structures - Functional type organization, Project type organizations, Matrix-type organization, Project Planning - Project objective, Work breakdown structure, Developing the network plan, Network principles, Preparing the network diagram, Critical path analysis, PERT ,Project Scheduling- Activity duration estimates, Project schedule calculations. (10 hours)

Unit III
Schedule Control- Project control process, Effects of actual schedule performance, Incorporating project changes into the schedule, Updating the project schedule, Approaches to schedule control, Resource Considerations- Resource constrained planning, Planned resource utilization, Resource leveling, Resource limited scheduling. (10 hours)

Unit IV
Risk Management – Risk, Categories of risk, A framework for dealing with risk, Evaluating risks to the schedule, Monte Carlo simulation and critical chain concepts. Project Cost Planning and Performance – Project cost estimates, Project budgeting, Determining the actual cost, Determining the value of work performed, Cost performance analysis, Cost forecasting, Cost control, Software project metrics, Project control and closure, Project Management Issues with regard to New Technologies, Case Study & use of software project management tool.
(10 hours)

TEXT BOOKS:
1. Clements and Gido, Effective Project Management, Cengage Learning, 2012
2. Bob Hughes, Mike Cotterell, Rajib Mall"Software Project Management", Fifth Edition, McGraw Hill, 2013

REFERENCE BOOKS:
1. A Guide to the Project Management Body of Knowledge (PMBOK Guide), 5th Edition, Project Management Institute, 2013
2. Samuel J. Mantel, Jr. et al, Project Management, Wiley India, Eighth Edition, 2012
3. Jeffrey K. Pinto, Project Management – Achieving Competitive Advantage, 3rd Edition Pearson Education, 2013

		L	P	C
Paper Code: BIT 404				
Paper: Cyber Security Management		4	0	4

INSTRUCTIONS TO PAPER SETTERS: Max. 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
Importance of Information Protection, The evolution of Information Security, Justifying Security Investment, Security Methodology, Building Security Program, Security Goals, Services and Mechanism, Attributes of Information Security, Confidentiality, Integrity, Authentication, Availability and Non repudiation, Principle of least privilege, Access Control, Secure Design Principles, Defense Models: The Lollipop Model, The Onion Model.

(10 Hours)

UNIT – II
Cryptography Basics, Symmetric Vs asymmetric Cryptography, Key management, Public Key cryptography and Applications, Message Authentication Code, Message Digest, Properties of message authentication code, Hash Function, Properties of Hash Function, Secured Hash Algorithm, Digital Signatures   (10 Hours)

UNIT - III
Security issues in network protocols: TCP/IP, DNS and routing, Security features and issues of IPv6, Application of cryptography in network security: SSL/TLS, IPSec, SSH, Wireless network security, e-mail security, S/MIME, PGP, Network defence tools: Firewalls, IDS/IPS, VPN, Network Admission Control (NAC), Unwanted Network traffic, Denial of service, Bots and Botnets, Anonymity networks, Onion routing, Security issues in Software Defined Networking (SDN), Data Security, Securing databases, Information rights management

(10 Hours)

UNIT - IV
Risk Analysis **:** Threat Definition, Threat Vectors, Threat Sources and Targets, Types of Attacks, Malicious Mobile Codes, Advance persistent threats, Manual Attacks, Risk Analysis, Incident and disaster response, Compliance with standard regulation and laws, Information security standards, COBIT, ISO 27000 series, NIST, Vulnerabilities, Cyber laws, Indian IT Act, Case study: Recent security attacks in critical information infrastructures and its management.

(10 Hours)

TEXT BOOKS
1. Mark Rhodes, "The complete reference Information security", 2nd Edition, McGraw Hill, 2013.
2. William Stallings, "Cryptography and Network security: Principles and Practices", 6th Edition, Pearson Education, 2014.

REFERENCE BOOKS

1. B A Forouzan, Debdeep Mukhopadhyay, " Cryptography and Network Security", 3rd Edition, McGraw Hill Education, 2015
2. Matt Bishop, "Computer Security: Art and Science", 1st Edition, 2002, Addison Wesley.
3. Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies, "Security in Computing", 5th Edition, Prentice Hall, 2015.

Paper Code: BIT 406   **L   P   C**
Paper: Distributed Systems   **4   0   4**

INSTRUCTIONS TO PAPER SETTERS: Max. 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 10 marks**

UNIT I
Introduction: Introduction to Distributed Systems, Design Goals, Types of Distributed systems, **System Models:** Architectural models and Fundamental models for distributed and mobile computing systems, Characterization of Distributed Systems, Distributed file systems, Middleware, Client/Server Computing, client/server model, Limitation of Distributed system, Absence of global clock, Shared Memory, Logical Clocks, Lamport's & Vectors Logical Clocks, Causal Ordering of Messages, Global State, Termination detection.

(10 hours)

UNIT - II
Distributed Deadlock Detection, system model, resource vs. communication deadlocks, deadlock prevention, avoidance, detection & resolution, path pushing algorithms, edge chasing algorithms. Communication: Layered protocols, Remote procedural call, RMI, Remote objects, Message oriented communication, Stream oriented communication, Multicast communication. CORBA, Distributed COM, Basic Algorithms in Message Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, PVM and MPI, Distributed objects and communication between distributed objects.

(10 hours)

UNIT III
Synchronization: Clock synchronization, Election algorithms, Distributed transactions, Distributed File Systems: Architecture, Design Issues, Implementation. Distributed Scheduling Security in distributed systems: secure channels, authentication, integrity and confidentiality, access control, security management.

(10 hours)

UNIT IV
Distributed Shared Memory: Introduction, Consistency models, Page based distributed shared memory, Introduction to parallel processing, Design of parallel algorithms and Parallel Databases, Parallel Query Evaluation, Fault tolerance: basic concepts and failure models, process resilience, reliable client-server and group communication, distributed commit, recovery mechanisms.

(10 hours)

TEXT BOOKS:
  1. Tannenbaum, A, Maarten Van Steen. Distributed Systems, Principles and Paradigm, Pearson Education; Second edition, 2015.
  2. Coulouris, Dollimore and Kindberg, "Distributed Systems: concepts and designs", Addison Wesley; 5th ed., 2011

REFERENCE BOOKS:
1. Sukumar Ghosh , "Distributed Systems: An Algorithmic Approach" Chapman and Hall/CRC; 2 edition, 2014
2. Mukesh Singhal and N. G. Shivaratri,Singhal and Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 2001
3. Andrew S. Tanenbaum," Distributed Operating Systems", Pearson Education; 1 edition (2002)
4. Attiya, Welch, "Distributed Computing", Wiley India, 2006
5. Gerald Tel, "Distributed Algorithms", Cambridge University Press, 2nd edition, 2004

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	L	**P**	**C**
Paper Code: BIT 408			
Paper Title: Natural Language Processing	**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 NLP: General Characteristics of Natural language, Brief history and Challenges: ambiguity, incompleteness, imprecision, Language structure, NLP tasks in syntax, semantics and pragmatics, Machine Learning and NLP.
Word and Word Forms: Regular Expressions, Morphology, and Finite State Transducers, Word class and POS Tagging, Shallow Parsing, Introduction to Phonology.   (10 Hrs)

UNIT – II
Grammars and Parsing: Grammars and sentence structure, Overview of CFG, Parsing with Context-Free Grammars, Lexicalized and Probabilistic Parsing, Brief Introduction to Semantics & Pragmatics, Lexical semantics.   (10 Hrs)

UNIT- III
Machine Translation: Introduction, Challenges in Machine Translation, Classical Approaches to machine Translation, Introduction to Statistical Machine Translation, Introduction to IBM Models 1 and 2, N-Grams and Language Models, Markov Process, Tri-Gram Language Models, Evaluation of Machine Translation.   (10 Hrs)

UNIT-IV
Statistical Techniques: Elementary Probability theory, Essential information theory, Hidden Markov Model, Expectation Maximization.
Applications of Statistical Techniques: POS Tagging, Named Entity Recognition and Word Sense Disambiguation..   (10 Hrs)

TEXT BOOKS
1. Jurafsky, Dan and Martin, James, Speech and Language Processing, Second Edition, Prentice Hall, 2008
2. Akshar Bhartati, Sangal and Chaitanya, "Natural Language Processing", Eastern Economy Edition, PHI, New Delhi, 1996.

REFERENCE BOOKS
1. An introduction to Linguistics: language grammar and semantics by P.Syal and D.V.Jindal, Eastern Economy Edition, PHI, 2007.
2. Allen James, "Natural Language Understanding", 2nd Ed., Pearson Education, 1995.
3. Philipp Koehn, "Statistical Machine Translation", Cambridge University Press.

		L	P	C
Paper Code: BIT 410				
Paper: Secure Software Development		4	0	4

INSTRUCTIONS TO PAPER SETTERS: **Max. 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 security Fundamentals: Introduction to Software Vulnerability, A brief overview of Buffer overflow, format string problems, Cross site scripting, SQL injection, securing files and file system, Three pillars of software security, Seven Touch points of software security
Secure software development life-cycle: Software development life cycle (Microsoft, McAfee, OWASP etc), development team, Quality and Security, Application Guidelines, ISC^2 Ten best practices of secure software development   (10 Hours)

UNIT II
Security Requirements: Requirements Engineering for Secure Software, Concepts of Misuse and Abuse, SQUARE Process Model, SQUARE Sample Outputs, Requirements Elicitation and Prioritization, Object Modeling, Threat Modeling.
Secure Coding Standards: Development tools, IDEs tools, Versioning tools, Networking tools, Coding in the cube: Functions, procedures and code blocks, Structuring for Validation, Structured Programming, Debugging, Coding and applying security requirements during maintenance.   (10 Hours)

UNIT III
Secure Software architecture, Design and Risk Management Framework: The Critical Role of Architecture and Design, Issues and Challenges, Software Security Practices , Architectural Risk Analysis, Software Characterization, Threat Analysis, Architectural Vulnerability Assessment, Risk Likelihood Determination, Risk Impact Determination, Risk Mitigation Planning, Recapping Architectural Risk Analysis.
Security code analysis and review: Code review with a tool (fortify, coverty etc), Code analysis, Coding Practices   (10 Hours)

UNIT IV
Security testing: Software Security Testing, Contrasting Software Testing and Software Security Testing, Functional Testing, Risk-Based Testing, Security Testing Considerations Throughout the SDLC, Unit Testing, Testing Libraries and Executable Files, Integration Testing, System Testing, Penetration testing, Classification of security defects, Measurement of secure performance, Managing the overall Testing Process
Security and Complexity: System Assembly Challenges, Taxonomy of Coding errors, Governance, and Managing for More Secure Software.   (10 Hours)

TEXT BOOKS
1. Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, "Software Security Engineering: A Guide for Project Managers", Addison Wesley, 2013.
2. Gary McGraw, "Software security: Build Security In", Addison-Wesley Professional, 2006.

REFERENCE BOOKS
1. Jason Grembi, "Secure Software Development : A security Programmer's Guide", Cengage Learning, 2009.
2. Richard Sinn, "Software security Technologies", Cengage Learning, 2008.
3. Mano Paul, "Official (ISC)^2: Guide to the CSSLP CBK", Taylor and Francis, 2nd Ed., 2014.

	L	P	C
Paper Code: BEC 410			
Paper: Digital Image Processing	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: Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Perspective Projection, Spatial Domain Filtering, Image Sensing and Acquisition, sampling and quantization, Basic Relationships between Pixels.
Image Enhancement: Gray level transformation, Histogram Processing, Enhancement using arithmetic and logical operator, Spatial filtering, contrast intensification, smoothing and sharpening spatial filters, Spatial filter enhancements.

(10Hours)

UNIT II
Filtering in the Frequency domain: Introduction to Hotelling Transform, Fourier Transforms and properties, FFT (Decimation in Frequency and Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Frequency domain filtering, correspondence between filtering in spatial and frequency domain, smoothing and sharpening frequency domain filters, Homomorphic filtering.
Image Restoration: Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Constrained Least Squares Filtering, Geometric Mean Filter, Geometric Transformations, Restoration by Singular value decomposition.

(10Hours)

UNIT III
Image Compression: Encoder-Decoder model, Types of redundancies, Lossy and Lossless compression, Entropy of an information source, Shannon's 1st Theorem, Introduction to different codings -- Huffman Coding, Arithmetic Coding, LZW coding, Transform Coding, Sub-image size selection, blocking artifacts, DCT implementation using FFT, Run length coding, Symbol-based coding, Bit-plane encoding, Bit-allocation, Zonal Coding, Threshold Coding, JPEG, Lossless predictive coding, Lossy predictive coding, Motion Compensation, Introduction to Wavelet based Image Compression.

(10Hours)

UNIT IV
Image Segmentation: Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, contour detection, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, Moving averages, Multivariable thresholding, Region-based segmentation, Watershed algorithm, Use of motion in segmentation.
Morphological Image Processing:

Basics, SE, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform, Boundary Detection, Hole filling, Connected components, convex hull, thinning, thickening, skeletons, pruning, Geodesic Dilation, Erosion, Reconstruction by dilation and erosion.

(10Hours)

TEXT BOOKS
1. Rafael C Gonzalez and Richard E Woods, "Digital Image Processing," Pearson Education, 3rd Edition, 2007.
2. Anil K Jain, "Fundamentals of Digital Image Processing," PHI.
3. Kenneth R. Castleman, "Digital Image Processing," Pearson Education, 2015.

REFERENCE BOOKS
1. B. Chanda and D. Dutta Majumder, "Digital Image Processing and Analysis," Second Edition, PHI, 2013

BACHELOR OF TECHNOLOGY (IGDTUW)
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(Teaching and Examination Scheme)

Paper Code: BCS-412   **L   P   C**

Paper Title : **Wireless Sensor Networks**   **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: Mobile Ad-hoc Networks (MANETs), Introduction to Sensor Networks, Constraints and Challenges, Advantage of Sensor Networks, Applications of Sensor Networks.
Architecture: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems, Network Architecture -Sensor Network Scenarios, Optimization Goals, Gateway Concepts.   **(10 Hrs)**
UNIT II
Networking Sensors: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, classification of MAC protocols, MAC protocols for sensor network, location discovery, S-MAC, IEEE 802.15.4. Routing Protocols- Energy-Efficient Routing, Geographic Routing.   **(10 Hrs)**
UNIT III
Infrastructure Establishment: Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control. Case study of WSN's for different applications.   **(10 Hrs)**
UNIT IV
Platform, Tool and Security: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators. Security issues in Sensor Networks. Future Research Direction.   **(10 Hrs)**

Text Books
1.Holger Karl & Andreas Willig, Protocols And Architectures for Wireless Sensor Networks , John Wiley, 2005.
2.Feng Zhao & Leonidas J. Guibas, Wireless Sensor Networks- An Information Processing Approach, Elsevier, 2007.
3.C.Siva Ram Murthy and B.S.Manoj, Ad hoc Wireless Networks Architectures and Protocols, Pearson Education,. 2nd edition

Reference Books
1.Dr.Xerenium, Shen, Dr. Yi Pan , Fundamentals of Wireless Sensor Networks, Theory and Practice,
2.Wiley Series on wireless Communication and Mobile Computing, 1st Edition, 2010.
3.KazemSohraby, Daniel Minoli, &TaiebZnati, Wireless Sensor Networks- Technology, Protocols, And Applications, John Wiley, 2007.
4.BhaskarKrishnamachari , Networking Wireless Sensors, Cambridge university press, 2005.
Anna Hac, Wireless Sensor Network Designs, John Wiley, 2003.

Paper Code: BIT414   **L   P   C**
Paper: IPR and Cyber Laws   **4   0   4**

INSTRUCTIONS TO PAPER SETTERS:
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 10 marks**

UNIT 1
Introduction to Intellectual Property Rights, Evolution of Intellectual Property Laws, Standards and Concepts in Intellectual Property, Introduction and need for intellectual property right (IPR), Types of IPR, Legislation covering IPRS in India, Patent and kind of inventions protected by a patent. Understanding Cyber Laws, Scope of cyber laws, Need for Cyber Laws, law and legal system, Jurisprudence of Indian Cyber Law, Security threat to cyber space and e-commerce.
(10 Hrs)

UNIT 2
Introduction to Geographical Indications, New Plant Varieties, Unfair Competitions. Plant Breeder and TRIPS agreement, Copy Rights, Rights covered by copyright, Protection of copyright, Trademarks, Rights of trademark, signs used in trademarks, Types of trademark function, Protection of trademark, Registration of trademark, Domain name and how does it relate to trademarks, cases related to IPR Infringement   (10 Hrs)

UNIT 3
Components of Cyber Law, Introduction of relevant provisions of Indian Penal Code, Indian Evidence Act, Bankers Book Evidence Act, Reserve Bank of India Act, etc. related to cyber security.
Obscenity and pornography on Cyber space, hacking, punishment for violation of Privacy under IT Act, Ministerial Order on blocking of websites, Cyber laws in US, Cyber laws in Global Prospective, MLAT (mutual legal assistance treaty) International Treaty for Cyber laws.
(10 Hrs)

UNIT 4
Information Technology Act – a brief overview, Indian IT ACT, 2000 and its amendments, Legal issues pertaining to Device, Mobile Apps and Social Media, IT Act Grey Areas, Protection of IPR in Indian Cyber Space, Plagiarism Issues.   (10 Hrs)

TEXT BOOKS
1. Harish Chander,“ Cyber Laws and IT Protection”, 1st edition, PHI Learning, 2012.
2. Pavan Duggal, “Law Relating to iPads, Tablets, Smartphones & Smart Devices”, Universal Law Publishing, 2013.

REFERENCE BOOKS
1. Vivek Sood, "Cyber Law Simplified", McGraw Hill Education, 13th Reprint, 2014.
2. B.L. Wadhera, "Law Relating to Intellectual Property", 5th Edition, Universal law Publishing, 2013.
3. P Ganguli, " Intellectual Property Rights : Unleashing the Knowledge Economy", Universal Law Publishing, 6th Reprint, 2015

		L	P	C
Paper Code: BIT 416				
Paper Title: High Performance Computer Architecture		4	0	4

INSTRUCTIONS TO PAPER SETTERS:
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 10 marks

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UNIT – I
Overview of Parallel Processing and Pipelining Processing, Necessity of high performance, Constraints of conventional architecture, Parallelism in uni-processor system, Evolution of parallel processors, future trends, Architectural Classification, Applications of parallel processing, Instruction level Parallelism and Thread Level Parallelism, Principles of scalable performance: Performance Metrics and Measures, Speedup Performance Laws. Amdahl's Law, Gustafson's Law. Flynn's classification.   (10 Hrs)

UNIT – II
Instruction Level Parallelism: Basic concepts of pipelining, Arithmetic pipelines, Instruction pipelines, Hazards in a pipeline: structural, data, and control hazards, Overview of hazard resolution techniques, Dynamic instruction scheduling, Branch prediction techniques, Instruction-level parallelism using software approaches, Superscalar techniques.
Thread Level Parallelism: Centralized vs. distributed shared memory, Interconnection topologies, Synchronization, Memory consistency, Review of modern multiprocessors.
                                                         (10 Hrs)

UNIT – III
Microprocessor Architectures, study and comparison of Loosely and Tightly coupled multiprocessors. Processor characteristics of multiprocessors, Inter Processor communication network, Time shared bus, Crossbar switch, Multiport Memory Model, Memory contention and arbitration techniques, Cache coherency and bus snooping, Massively Parallel Processors (MPP), Cow's and NOW's Cluster and Network of Work Stations), Chip Multiprocessing (CMP).
                                                         (10 Hrs)

UNIT – IV
Study and comparison of Vector and array processors, Basic vector architecture, Issues in Vector Processing, SIMD Computer Organization, Masking and Data network mechanism, Inter PE Communication, Interconnection networks of SIMD, Static Vs Dynamic network.
Parallel Programming Techniques: Message passing program development, Synchronous and asynchronous message passing, Message passing parallel programming, Shared Memory Programming, Data Parallel Programming.   (10 Hrs)

TEXT BOOKS
1. Kai Hwang, "Advanced Computer Architecture", McGraw-Hill, 2010.
2. Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing" McGrawHill International Edition, 3rd Edition.

REFERENCE BOOKS

1. Hennessey and Patterson, "Computer Architecture: A quantitative Approach", 4th Ed., Morgan Kaufmann, 2006.
2. Sima, Terence Fountain, Peter Kacsuk, "Advanced Computer Architecture – A Design Space Approach", Pearson Education, 1997

Paper Code: BAS 420   **L   P   C**

Paper Title: Business Entrepreneurship   **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.**
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 10 marks**

UNIT I

Introduction: The entrepreneur, definition, **characteristics;** leadership, risk taking, decision making and business planning, role of entrepreneur, entrepreneurship and an entrepreneurial perspective, significance of entrepreneurship, Innovation and entrepreneur, entrepreneurial behaviour and psycho theories, social responsibility. **(8Hrs)**

UNIT II

Promotion of a Venture: Opportunities analysis; external environmental analysis, economic, social and technological, competitive factors, fundamentals of feasibility plan, forms of business enterprises, Sole proprietorship, partnership and corporations, legal requirements of establishment of a new unit. **(7Hrs)**

UNIT III

Financial resources, rising of funds and documentation required. Project financing: fixed and working capital requirements, equity financing, securities market, venture capital, debt financing, banks and financial institutions and other non bank financial sources, Government programmes, direct loan assistance and subsidies. **(8Hrs)**

UNIT IV

Managing growth and transition: the organization life cycle; The entrepreneur s perspective, changing roles. Entrepreneurial Development Programmes (EDP): EDP, their role, relevance and achievements; role of government in organizing EDP's critical evaluation **.**

(7Hrs)

TEXT BOOKS

1. Vasant, DCSAI, "Entrepreneurship", Himalaya Publishing House, 2003.
2. Ram Chandran, 'Entrepreneurial Development', Tata McGraw Hill, New Delhi, 2008
3. Pandey I.M.; "Venture Capital The Indian Experience", Prentice Hall of India, 2003.
4. Panda, Shiba Charan, " Entrepreneurship Development", Anmol Publications New Delhi, 2014.

REFERENCE BOOKS

1. Srivastava S.B. " A practical guide to industrial entrepreneurs", Sultan Chand & Sons, New Delhi, 1992.
2. Chandra, Prasana, "Project Preparation, Appraisal, Implementation", TMH, New Delhi, 2002.
3. Holt, David H., "Entrepreneurship: New Venture Creation", Prentice Hall of India, New Delhi, 1992

Paper Code: BAS 422   **L**   **P**   **C**
Paper Title: Organizational Behaviour   **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.**
 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 10 marks**

UNIT I
Introduction to Management and Organizational Behaviour: Introduction Meaning and Nature of Management, Management Functions and Processes. Scientific Management Theories ; Taylor and Scientific Management; Evolution of Organizational Behaviour Classical, Neo Classical and Modern Approaches, Contemporary School of Management Thoughts, Theories of Organization. (8Hrs)

UNIT II
The Individual Behaviour Factors affecting Individual Behaviour, Personality, Learning Process, Motivational Process, Perceptual Process, Attitudes and Values. Group Behaviour: Groups Definition, Types, Theories of Group formation, Group Roles and Norms, Interpersonal relations, Group Dynamics, Leadership Styles & Leadership Development

(7Hrs)

UNIT III

Behaviour in the organization: Introduction, Issues between organizations and individuals. Interpersonal behaviour: Conflict in Organizations: nature of conflict, levels of conflict, conflict management styles. Management of Organizational Conflicts. Employee stress: forms, causes, implications, approaches to stress management. (8Hrs)

UNIT IV

Organizational structure & Design, Organizational Designs; Emerging Design Options Different Organizational Structures; Communication Process, Organizational Culture (creation and sustenance of cultures) , Organizational Ethos, Dimensions of Culture, Model for Managing Change, Forces for Change, resistance to change, Management of resistance.

(7Hrs)

TEXT BOOKS
1. Stephen P. Robinson: Organisational Behaviour, 11th edition, New Delhi 110001 Prentice Hill of India Pvt. Ltd., 2007.
2. L.M.Prasad: Organizational Behaviour, New Delhi, Sultan Chand & Sons, 2001.
3. Udai Pareek, "Understanding Organizational Behavior", 1st Ed, Oxford University Press., 2004.
4. Robbins, S. P., Judge, T. A. and Sanghi. S, "Organizational Behavior", Pearson, 2009.

REFERENCE BOOKS
1. Stoner, et. al., "Management", PHI, 6th Ed., 2002.
2. J. S. Chandan, "Organizational Behaviour", Vikas Publishing House, 2004.
3. Joseph W. Weiss, "Organizational Behaviour & Change, Managing Diversity, Cross Cultural Dynamics & Ethics", Vikas Publishing House, 2nd Ed. 2001.
4. Jit S Chandan: Organisational Behaviour, 3rd edition, 576, Masjid Road, Jangpura, N.D., New Delhi 1100014, Vikas Publishing House Pvt. Ltd., 2006.
5. Fred Luthans, "Organizational Behaviour," McGraw Hill International Edition, 9th Ed., 2002.
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