Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
Absorption Scheme for New course(C.B.S.) to Old course of Seventh Semester
B. E. (Information Technology)

As per Old course scheme of RTM, Nagpur University					**As per New course(C.B.S.) scheme of RTM, Nagpur University**		
Sr. No	**Sub Code**	**Subjects**	**Th/ Pr**		**Subject Code**	**Subjects**	**Th/ Pr**
1	8IT47	Distributed Databases and Object Oriented Databases	Th		BEIT701T	Data Warehousing and Mining	Th
2	8IT47	Distributed Databases and Object Oriented Databases	Pr		BEIT701P	Data Warehousing and Mining	Pr
3	7IT43	Computer System Security	Th		BEIT702T	Computer System Security	Th
4	7IT41	Computer Network and Internet	Pr		BEIT702P	Computer System Security	Pr
5	7IT44	Elective-I Artificial Intelligence	Th		BEIT703T	Artificial Intelligence	Th
6	8IT51	Elective-II Mobile Communication	Th		BEIT704T1	Elective-I Mobile Computing	Th
7	7IT45	Elective-II Multimedia Systems	Th		BEIT704T2	Elective-I Multimedia Systems	Th
8	-----	------	-----		BEIT704T3	Elective-I Bio-informatics	Th
9	-----	------	-----		BEIT704T4	Elective-I Compiler Design	Th
10	-----	------	-----		BEIT705T1	Elective-II Software Testing and Quality Assurance	Th
11	8IT51	Elective-II Parallel Processing	Th		BEIT705T2	Elective-II Cluster and Grid Computing	Th
12	7IT42	Digital Signal Processing	Th		BEIT705T3	Elective-II Digital Signal Processing	Th
13	-----	------	-----		BEIT705T4	Elective-II Digital Forensic for Information Technology	Th
14	7IT46	Mini Project	Pr		BEIT706P	Seminar on Project	Pr
15	7IT42	Digital Signal Processing	Pr		-----	------	-----
16	7IT44	Elective-I Operation Research	Th		-----	------	-----
17	7IT44	Elective-I VLSI Design	Th		-----	------	-----
18	7IT45	Elective-II Fuzzy System and Neural Networks	Th		-----	------	-----
19	7IT45	Elective-II Digital Image Processing	Th		-----	------	-----
20	7IT45	Elective-II CAD/CAM	Th		-----	------	-----
21	7IT45	Elective-II Management Information Systems	Th		-----	------	-----
22	7IT41	Computer Network and Internet	Th		-----	------	-----

Members,
BOS (CE/IT)

Chairman,
BOS (CE/IT)

BEIT701T DATA WAREHOUSING AND MINING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to Data Warehousing:

Evolution of decision support systems, Failure of past decision support system, Operational v/s decision support systems, Data warehousing lifecycle, Architecture, Building blocks, Components of DW, Data Marts and Metadata

UNIT II:

Data Preprocessing:

Why preprocess the data?, Descriptive data summarization, Data cleaning, Data integration and transformation, Data reduction, Data Discretization and Concept Hierarchy Generation.

UNIT III:

OLAP Analytical Processing:

OLAP in Data warehouse, Demand for online analytical processing, need for multidimensional analysis, limitations of other analysis methods, OLAP definitions and rules, OLAP characteristics, major features and functions. OLAP models- ROLAP, MOLAP, HOLAP, Differentiation, Data cubes and operations on cubes

UNIT IV:

Introduction of Data Mining:

Motivation, Importance, Data Mining functionalities, KDD and Data Mining, Data Mining v/s Query tools, Interesting patterns, Architecture, Classification of Data Mining systems, Major issues from Data warehousing and Data Mining, Applications of Data Mining.

UNIT V:

Mining Frequent Patterns and Association:

Basic Concepts: Market Basket analysis, motivating example, Frequent Item sets, Closed Item sets and Association rules, Frequent Pattern Mining Efficient and Scalable Frequent Item set. Mining Methods: Apriori Algorithm, Generating Association rules from Frequent Item sets, mining various kinds of association rules.

UNIT VI:

Business Intelligence and Big Data:

BI-Defining Business Intelligence, Important factors in BI, BI Architecture, BI framework, Development of BI system, BI applications in Marketing, Logistics and Production, Retail Industry. Big Data: - Understanding the challenges of Big data, Big data meets hadoop. Hadoop: Meeting Big data challenges, Hadoop Ecosystem, Core components, developing applications with Hadoop.

Text Books:

1. Data Mining (Concepts and Techniques) - Han and Kamber
2. Data Mining and Business Intelligence - Shinde and Chandrashekhar, Dreamtech Press
3. Professional Hadoop Solutions - Lublinsky, Smith, Yakubovich, Wiley

Reference Books:

1. Introduction to Data Mining – Tan, Steinbach, Vipin Kumar, Pearson Education.
2. Fundamentals of Data Warehouses, Jarke, Vassiliou, 2nd Edition, Springer.
3. Data Warehousing in Real World - Anahory, Murray, Pearson Education
4. Data Warehousing - Paulraj Ponniah

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BEIT701P DATA WAREHOUSING AND MINING

(Practical Credit: 01)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on DATA WAREHOUSING AND MINING syllabus (subject code: BEIT701T)
2. Practicals have to be performed on any open source tool.
3. There should be at the most two practicals per unit

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BEIT702T COMPUTER SYSTEM SECURITY

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction:

Need of information security, OSI security Architecture, Attacks, services, mechanism, Model of network security, Classical Encryption Techniques: Symmetric, Asymmetric, cipher model; substitution – Ceasor cipher, monoalphabetic, play fair; Transposition-Railfence, columnar; Steganography, S-DES, DES, TDES, AES; Block cipher principle, Mode, strength of DES.

UNIT II:

Differential and linear Cryptanalysis, Blowfish, RC2, RC5, IDEA, CAST-128, Characteristic of advance symmetric block cipher, Euler function, Chinese remainder theorem, Discrete logarithm, confidentiality using conventional encryption, placement of encryption function traffic, confidentiality, key distribution, random number generator.

UNIT III:

Public key cryptography- principles, RSA algorithm, key management, Diffie-Hellman key exchange, elliptic curve cryptography, Message Authentication, hash function Authentication requirements, functions, codes, hash functions, Security of hash function and MACs, Hash and MAC algorithm, MD5, Message Digest algorithm.

UNIT IV:

Secure hash algorithm (SHA-1), RIPEMD-160, HMAC, digital signatures and Authentication protocol-digital signature, authentication protocol, digital signature standard. Network Security practices, authentication applications-Kerberos, x.509 directory authentication service, Kerberos encryption technique

UNIT V:

E-mail security-Pretty Good Privacy, S/MIME, data compression using ZIP, radix-64 conversion, PGP random number generation, IP Security-Overview, Architecture, authentication header, Encapsulating security payload, combining security association, key management.

UNIT VI:

Web Security requirements, secure socket layer and transport layer security, secure electronic transaction, network management security-basic concepts of SNMP, SNMP V1, community facility, SNMP V3; System security-intruders, viruses and worms and related threads firewall-design principles, trusted system, DOS.

Text Books:

1. Forouzan, ''Cryptography and Network Security", Tata-McGraw hill.
2. William Stallings, "Cryptography and Network Security: Principle and Practice", Fifth Edition, Pearson.
3. Atul Kahate, "Cryptography and Network Security", Tata-McGraw hill.

Reference Books:

1. Josef Pieprzyk, Thomas Hardjono, Jennifer Seberry, "Fundamentals of computer Security", Springer.

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BEIT702P COMPUTER SYSTEM SECURITY

(Practical Credit: 01)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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Note:

1. Practicals are based on COMPUTER SYSTEM SECURITY syllabus (subject code: BEIT702T)
2. There should be at the most two practicals per unit

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BEIT703T ARTIFICIAL INTELLIGENCE

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

History and Application of AI, the Turing Test approach, AI Problems and AI Techniques, Defining problem as state space representation, Production system, Problem characteristics, monotonic and non-monotonic production systems, Solving problems by searching-Toy problems, Real-World problems.

UNIT II:

Uniformed Search Strategies:

Breadth-first search, Depth-first search, Comparing uniformed search techniques.

Informed search strategies:

Generate-and-test, Hill climbing, best-first search, problem reduction, constraint satisfaction, Mean-ends analysis

UNIT III:

Knowledge Representation:

Issues in knowledge representation, Approaches to knowledge representation, introduction to ontology

Logic and Inferences:

Formal logic, history of logic and knowledge, propositional logic, resolution method in propositional logic

UNIT IV:

Structural Knowledge Representation:

Frames, scripts, predicate logic, semantic network, example of knowledge representation schemes, Truth maintenance system. Transition networks: RTN, ATN. Basic techniques of NLP, application of NLP

UNIT V:

Expert system:

Knowledge acquisition methods, knowledge engineering process, goals in knowledge system development, basic architecture of expert system, problem domain versus knowledge domain, Development of ES and life cycle of ES. Advantages of expert system, structure of Rule based expert system, characteristics of conventional system and expert system.

UNIT VI:

Statistical Reasoning:

Probability and Bayes theorem, Certainty factor, Dempster-Shafer theory, Fuzzy logic: crisp sets, application of fuzzy logic.

Text Books:

1. Artificial Intelligence (Third Edition) McGraw-Hill Elaine Rich, Kevin Knight.
2. A First course in Artificial Intelligence (McGraw-Hill) Deepak Khemani.
3. Artificial Intelligence A modern approach (Second Edition) Pearson, Stuart Russell, and Peter Norvig.

Reference Books:

1. Fuzzy Logic with Engineering application (Third edition) Timothy J.Rose

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ELECTIVE: I

BEIT704T1 MOBILE COMPUTING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to Mobile Computing:

Wireless Communication and examples, Applications cellular communication (1G to 4G Networks), GSM (Mobile services, system architecture protocol, Localization and Calling, Handover, Security)

UNIT II:

Mobile Computing Architecture:

Internet the ubiquitous network, Architecture for Mobile Computing three tier architecture, Design consideration for Mobile Computing, Mobile Computing, Mobile Computing through Internet.

UNIT III:

Wireless LAN:

Wireless LAN advantages, Applications, IEEE 802.11 standards, System Architecture, Protocol Architecture, Physical layer, Medium access control layer, MAC management roaming.

UNIT IV:

Mobility Management and Control:

Mobile agents, characteristics, requirement for Mobile Agent system, Platform (Aglet object Model, Agent Tcl architecture)

UNIT V:

Wireless Application Protocol:

WAP model, architecture, wireless datagram protocol, wireless transaction protocol, wireless session protocols.

UNIT VI:

Introduction to Android:

Layer android components, Mapping applications to process, Android development basics, Hardware tools, Android SDK features.

Text Books:

1. Mobile Communications: 2nd Edition, Jochen Schiller, Pearson Education.
2. Wireless Communication-Principles and Practice-2nd Edition, Theodore S. Rappaport, PHI Publications

Reference Books:

1. Mobile Computing- Technology, Applications and services creation-Ashok K. Talukder, Roopa R. Yavagal, TMH.
2. Mobile Computing-Theory and Practice-Kumkum Garg-Pearson Publications

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ELECTIVE: I

BEIT704T2 **MULTIMEDIA SYSTEMS**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction : Definition of multimedia, Multimedia Basics, Where to use Multimedia, Multimedia Elements, Multimedia Applications

Multimedia Systems Architecture: Multimedia Workstation Architecture, High resolution Graphic displays, Multimedia Architecture Based on interface bus, Network architecture for Multimedia systems.

Evolving Technologies For Multimedia Systems: Hyper Speech, HDTV and UDTV, 3D Technologies and Holography, Virtual Reality, Video conferencing.

UNIT II:

Hardware: Macintosh Versus Windows Platform, Connections, Memory and Storage Devices, Input Devices, Output Hardware, Communication Devices

Basic Software Tools : Text Editing, Word Processing, OCR Software, Painting and Drawing Tools, 3D Modeling and Animation Tools, Image Editing, Sound Editing, Animation, Video, Digital Movie tools, Movie Editors, Compressing Movie Files

Making instant Multimedia : Linking Multimedia Object, office suites, word processors , spread sheets, databases, presentation tools, power point

Multimedia authoring tools: Types of authoring tools, card and page based authoring tools, Icon based authoring tools, and Time based authoring tools.

UNIT III:

Text: About Fonts and Faces, Using Text in Multimedia, Designing with Text, Hypermedia and Hypertext, The Power of Hypertext, Using Hypertext, Hypermedia Structures, Hypertext tools.

Images: Making Still Images, Bitmaps, 1 bit images, 8-bit gray level images, 8-bit color images, Dithering, 24 bit color images, Vector Drawing, Vector-Drawn Objects vs. Bitmaps, 3-D Drawing and Rendering, Color, Understanding Natural Light and Color, Computerized Color, Color Palettes, Color Look-up table.

Sound : The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Adding Sound to Your Multimedia Project, Audio Recording, Keeping Track of Your Sounds, Audio CDs, Sound for Your Mobile, Sound for the Internet.

Animation: the Power of Motion, Principles of Animation, Animation by Computer, Animation Techniques.

Video: Using Video, How Video Works and Is Displayed, Analog Video, Digital Video, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Editing Video.

UNIT IV:

Data Compression: Need for Data compression, General Data compression Scheme, Compression standards, Non-lossy compression for images, Lossy compression for Photographs and video, Hardware Vs Software Compression.

Compression Schemes and standards:(Only Concepts of) Binary image compression, Color, Gray Scale image compression, JPEG, video image compression, Multimedia Standards for Video, Requirements for Full-motion Video Compression, MPEG, Audio compression, Fractal compression, advantages / disadvantages.

UNIT V:

Data and File Format Standards: Popular File Formats: RTF, RIFF, GIF, PNG, TIFF, MIDI, JPEG, JFIF, AVI, WAV, BMP, WMF, MIX, MPEG standards - TWAIN. **Multimedia Databases**, Storage and Retrieval, Database Management systems, Database Organization and Transaction management for multimedia systems.

Multimedia Skills: The Team, Project Manager, Multimedia Designer, Interface Designer, Writer, Video Specialist, Audio Specialist, Multimedia Programmer, Producer of Multimedia for the Web.

UNIT VI:

Designing and Producing: Designing, Designing the Structure, and Designing the User Interface, Producing, Tracking, Copyrights, Virtual reality designing and modeling (VRML).

The Internet and Multimedia: The Bandwidth Bottleneck, Internet Services, MIME Types, Multimedia on the Web, Web Page Makers and Site Builders, Plug-ins and Delivery Vehicles.

Designing for the World Wide Web: Developing for the Web, The Desktop Workspace and the Small, Device Workspace, Text for the Web, Images for the Web, GIF and PNG Images, JPEG Images, Clickable Buttons, Client-Side Image Maps, Sound for the Web, Animation for the Web, GIF89a - Video for the Web.

Delivering: Testing-Preparing for Delivery, File Archives, Delivering on CD-ROM, Delivering on DVD.

Text Books:

1. Multimedia: Making It Work By Tay Vaughan Eighth Edition, TMH
2. Fundamental of Multimedia - Ze-Nian Li & M. S. Drew ,PHI
3. Multimedia Systems Design - Prabhat k. Andleigh, Kiran Thakra
4. Multimedia Systems - John F. Koegel Buford

Reference Books:

1. Computer Graphics Multimedia and Animation - Malay K. Pakhira PHI, New Delhi - Second edition.
2. Principles of Multimedia by Ranjan Parekh - 2nd Edition TMH.
3. Computer Graphics and Multimedia - Anirban Mukhapathyay, Aruop Chattopadhyay - Vikas Publishing Ltd - Second Edition
4. Multimedia Technology and Applications- David Hillman Galgotia Publications Pvt Ltd.- Second Edition

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ELECTIVE: I

BEIT704T3 BIO-INFORMATICS

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction:

Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary and reference systems, finding new type of data online.

UNIT II:

Molecular Biology and Bioinformatics:

Systems approach in biology, Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, Overview of the bioinformatics applications.

UNIT III:

The Information Molecules and Information Flow:

Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, -Translation, Genes- the functional elements in DNA, Analyzing DNA,DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.

UNIT IV:

Perl:

Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, Understanding and Using Biological Databases, Java clients, CORBA, Introduction to biostatics.

UNIT V:

Nucleotide sequence data:

Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.

UNIT VI:

Biological data types and their special requirements:

Sequences, macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and relationships: alignments, regular expressions, hierarchies and graphical models.

Text Books:

1. O'Reilly, "Developing Bio informatics computer skills", Indian Edition's publication.
2. Rastogi, Mendiratta, Rastogi, "Bioinformatics concepts, skills & Applications", CBS Publishers.
3. Rashidi, Hooman and Lukas K. Buehler, "Bioinformatics Basic Applications" CRC Press.
4. "Bioinformatics" , Addison Wesley, Stephen Misner & Stephen Krawetz, "Bioinformatics- Methods & Protocols"

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ELECTIVE: I

BEIT704T4 COMPILER DESIGN

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction To Compilers:

Compilers and translators, structure of realistic compiler, types of compilers, cross compiler, Bootstrapping, Compiler writing tools, Design of Lexical Analyzer, FLEX tool, Parser generator tool: YACC

UNIT II:

Syntax Analysis:

Specification of syntax of programming languages using CFG, Top-Down parser -predictive parser, recursive descent parser, design of LL(1) parser, Bottom-up parsing techniques, LR parsing algorithm, Design of SLR, LARL, CLR parsers, Examples on LL and LR parsers

UNIT III:

Syntax Directed Translation:

Study of syntax directed definition and syntax directed translation schemes, evaluation orders of SDD's , implementation of SDTS, intermediate: postfix syntax tree, TAC, Translation of expression ,Control structures, declaration procedure calls and array reference

UNIT IV:

Storage Allocation And Error Handling:

Runtime Memory Management – Storage Organization, Storage allocation strategies, symbol table management and organization.

Error Detection And Recovery:

Lexical, syntactic, semantic errors, error recovery for LL and LR parsers

UNIT V:

Code Optimization: Principle sources of optimization, importance code optimization techniques, loop optimization, control flow analysis, data flow analysis, loop invariant compilation, induction variable removal, elimination of common Subexpression.

UNIT VI:

Code Generation: Problem in code generation, simple code generator, code generation algorithm, register allocation and assignment, code generation from DAG, heuristic ordering of DAGs, Labeling algorithm, peephole optimization

Text Books:

1. Principle of compiler Design: Alfred V. Aho and Jeffery D. Ullman, Narosa Pub.
2. Compilers Principles, Techniques, and Tools: Alfred Aho, Ravi Sethi, J. D. Ullman, 2nd Edition, Pearson
3. Principles and Practice of Compiler Writing: Aho, Sethi and Ullman, Addiison Wesley.
4. Compiler Construction: K. V. N. Sunitha, Pearson Education
5. Compiler Design: O.G. Kakde, 4th Edition, University Science Press.

Reference Books:

1. Principles of Compiler Design: V. Raghavan, TMH.
2. Fundamentals of Compiler Design: A. K. Pandey, S. K. Kataria and Sons, N. Delhi

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ELECTIVE: II

BEIT705T1 SOFTWARE TESTING AND QUALITY ASSURANCE

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Basic concepts of Testing: Need of Testing, Basic concepts- errors, faults, defects, failures, objective of testing, central issue in testing, Testing activities, V-Model, Sources of information for test cases, Monitoring and Measuring Test Execution, Test tools and Automation, Limitation of Testing.

UNIT II:

Unit Testing: Concepts of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing, Debugging, Unit Testing in Extreme Programming, Tools for Unit Testing.

UNIT III:

Control Flow Testing: Outline of Control Flow Testing, Control Flow Graphs, Path in Control Flow Graph, Path selection criteria, All path coverage criteria, Statement coverage, Path coverage, Predicate coverage criteria, Generating Test input, Examples of Data selection.

UNIT IV:

Data Flow and System Integration Testing: Introduction Data flow testing, Data flow graph, Data flow testing criteria, Comparison of Data flow test selection criteria. Fundamentals of System Integration: Types of interfaces and interface errors, System integration testing, Software and Hardware integration, Test plan, Off-the shelf component integration and testing.

UNIT V:

System Test Categories and Test Design: Taxonomy of system test, Basic Test, Functionality test, Robustness test, Performance test, Scalability test, Stress test, Load and Stability test, Reliability test, Regression test, Documentation Test. Test Design: Test cases, Necessity of test case documentation, Test case design methods, Functional specification based test case design, Use case bases, Application based test case design, Level of test execution.

UNIT VI:

Acceptance Testing and Software Quality: Types of acceptance testing, Acceptance criteria, Acceptance test plan and execution, Special Tests: Client server testing, Web application testing and Mobile application testing, fire view of software quality, ISO-9126 quality characteristics, ISO-9000:2000 software quality standard, ISO - 9000:2000

fundamentals.

Text Books:

1. Software Testing and Quality Assurance by Kshirsager Naik and Priyadarshini Tripathi (Wiley)
2. Software Testing Concepts and Tools by Nageswara Rao Pusuluri (Dream Tech Press)
3. Software Testing Principles, Techniques and tools, 1st Edition, by M. G. Limaye McGraw Hills

Reference Books:

1. "Foundations of Software Testing" 2E by Aditya P. Mathur , Pearson Education
2. Effective Methods for Software Testing- William E Perry, (Wiley). 2. Software Testing Tools by Dr. K. V. K. K. Prasad (Dream Tech)

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ELECTIVE: II

BEIT705T2 CLUSTER AND GRID COMPUTING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to Cluster Computing, Cluster Middleware: An Introduction, Early Cluster Architecture and High Throughput Computing Clusters, Networking, Protocols and I/O for Clusters, Setting Up and Administering a Cluster

UNIT II:

Cluster Technology for High Availability, Performance Models and Simulation, Process Scheduling, Load Sharing and Load Balancing, Distributed Shared Memory, Case Studies of Cluster Systems: Beowulf, COMPaS, NanOS and PARAM

UNIT III:

Introduction to Grid Architecture, Characterization of Grid, and Grid related standard bodies, Grid types, Topologies, Components and Layers, Comparison with other approaches.

UNIT IV:

System Infrastructure, Traditional paradigms for distributed computing, Web Services, Grid standards: OGSA and WSRF, Introduction to Globus Toolkit 3 and GT 4

UNIT V:

Semantic Grid and Autonomic Computing , Metadata and Ontology in semantic Web , Semantic Web Services, Layered Structure of Semantic Grid , Semantic Grid Activities , Autonomic Computing

UNIT VI:

Basic Services: Grid Security, Grid Monitoring, GMA, Review criteria overview of Grid Monitoring system – Autopilot. Grid Scheduling and Resource Management: Scheduling Paradigms, working of Scheduling

Text Books:

1. Grid and Cluster Computing, Prabhu C.S.R, PHI Learning Private Limited
2. The Grid (Chapter 1,2,3,4,5) Core Technologies by Maozhen Li, Mark Baker (John Wiley and Sons)
3. Cloud Computing for Dummies (Chapter 6,7) by Judith Hurwitz, R.Bloor, M. Kanfman, F. Halper (Wiley India Edition)
4. Cloud Security and Privacy (Chapter 8) by Tim Malhar, S.Kumaraswammy, S.Latif (SPD,O'REILLY)

Reference Books:

1. A networking Approach To Grid Computing by Daniel Minoli (Chapter 1) (John Wiley and Sons, INC Publication)
2. Cloud Computing: A Practical Approach by J. Vette, Toby J. Vette, Robert Elsenpeter (Tata McGraw Hill)
3. Distributed and Cloud Computing, First Edition, Geoffrey C. Fox,Kai Hwang,Jack J. Dongarra, Elsevier India Pvt. Ltd.-New Delhi
4. Distributed Systems: Principles and Paradigms, Second Edition, Andrew S. Tanenbaum, Maarten Van Steen, Person Eduction
5. High Performance Cluster Computing: Architectures and Systems, Vol. 1, Prentice Hall
6. In search of clusters (2nd ed.), Gregory F. Pfister, IBM, Austin, TX, Prentice-Hall

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ELECTIVE: II

BEIT705T3 DIGITAL SIGNAL PROCESSING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Basic elements of DSP and its requirement, advantage of digital over analog signal processing, Discrete time Signals and Systems, Classification of discrete time Systems, Response of LTI System to various inputs, Sampling Theorem, sampling process and reconstruction , Linear Convolution, Correlation(Auto and Cross).

UNIT II:

Z-Transform: Definition, Properties of Z-Transform, ROC's of Finite length and Infinite length Signals, Theorem of Z-Transform (Initial value and Final value Theorem), system function of LTI system, Relation of Z-Transform with Laplace and Fourier Transform.

Inverse Z-Transform: Power Series expansion, Partial fraction Expansion method causality and stability.

UNIT III:

Frequency Domain description of signal and system, Definition of Fourier transform and properties of Fourier transform, inverse Fourier transform, Definition of discrete Fourier transform and properties of DFT, inverse IDFT, DFT's of typical time signals, Circular Convolution using DFT and IDFT.

UNIT IV:

Design of IIR filter from Analog filter using approximation of derivative, Impulse Invariance, Bilinear Transformation, IIR filter structure: Direct-I, Direct-II, parallel and cascade form

UNIT V:

Design of FIR Filter based on Windows: Rectangular, Hamming, Hanning, Bartlett and blackman Window. FIR filter structure: Direct and cascade form

UNIT VI:

Introduction to FFT algorithm: Decimation in Time-FFT algorithm, Decimation in Frequency-FFT algorithm, Inverse FFT algorithm, Discrete Cosine Transform.

Text Books:

1. J. G. Proakis, Manolakis " Digital Signal Processing : Principle, Algorithms and applications, Pearson Education
2. A. V. Oppenheim, R. W. Schafer, "Discrete Time Signal Processing ", Pearson Education

Reference Books:

1. S. Salivahanana, A Vallaraj, C, Ganapriya" Digital Signal Processing", McGraw Hill

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ELECTIVE: II

BEIT705T4 DIGITAL FORENSIC FOR INFORMATION TECHNOLOGY

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Digital Forensics Fundamentals: What is Digital forensics?, Use of Digital forensics in law enforcement, computer forensics assistance, to human resources/employment proceedings, benefits of professional forensics methodology, steps taken by Digital forensics specialists Cyber Crimes: Definition, motives, and classification of cyber crimes. Modus operandi of cyber crime, types of cyber crimes,

UNIT II:

Computer Forensics Evidence Capture: Data recovery defined, data backup and recovery, the role of backup in data recovery, the data recovery solution Evidence Collection and Data Seizure: evidence, collection options, obstacles, types of evidence, the rules of evidence, volatile evidence, general procedure, collection and archiving, methods of collection, artifacts, collection steps controlling contamination: the chain of custody, Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools

UNIT III:

Duplication and Preservation of Digital Evidence: Preserving the digital crime scene computer evidence processing steps, legal aspects of collecting and preserving computer forensic evidence, Computer Forensics Analysis and Validation: Determining what data to collect and analyze, validating forensic data, addressing data, hiding techniques, and performing remote acquisitions

UNIT IV:

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private sector incident scenes, processing law enforcement crime scenes, preparing for a search securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

UNIT V:

E-mail Investigations: Exploring the role of e-mail in investigations, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools,

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding Acquisition procedures for cell phones and mobile devices, files present in SIM card, device data, external memory dump, evidences in memory card, operators systems,

Android forensics: Procedures for handling an android device, imaging android USB mass

storage devices, logical and physical techniques

UNIT VI:

Working with Windows and DOS Systems: Understanding file systems, exploring Microsoft file structures, examining NTFS disks, understanding whole disc encryption, windows registry, Microsoft startup tasks, MSDOS startup tasks, virtual machines, Current Forensic Tools: Evaluating computer forensic tool needs, computer forensic software Tools, computer forensic hardware tools, validating and testing forensic software

Text Books:

1. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics by John Sammons, Edition 1, Published by Elsevier February 24, 2012, ISBN: 978-1-59749-661-2

Reference Books:

1. Warren G. Kruse II and Jay G. Heiser, "Computer Forensics: Incident Response Essentials", Addison Wesley, 2002.
2. Nelson B, Phillips A, Enfinger F, Stuart C., "Guide to Computer Forensics and Investigations, 2nd ed., Thomson Course Technology, 2006, ISBN: 0-619-21706-5.

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BEIT706P **SEMINAR ON PROJECT**

(Practical Credit: 02)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 00 Marks P (I): 50 Marks

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Note:

1. The topic of Seminar on project should be assigned to the students in the group of maximum five students based on recent trends in Information Technology and allied branches.

2. Senior faculty members should work as guide.

3. The research paper publication / presentation in reputed national and international journals / conferences should be given some weightage while evaluation.

4. Seminar reports should be written using technical research writing tools (e.g. Latex) and submitted to the department for internal evaluation.

5. The project should be carried out upto design phase during this semester.

6. The same project has to be considered and extended for eighth semester project head (BEIT805P).

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