

**BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE
IN FACULTY OF SCIENCE & TECHNOLOGY)
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM**

III - SEMESTER B.E.(INFORMATION TECHNOLOGY)

Course Code	Course Title	Teaching Scheme				Examination Scheme										
		Hours per week			No. of Credits	Theory						Practical				
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks			Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								Sessional								
ESE	MSE	IE	TW	POE												
3BEIT01	Applied Mathematics III	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
3BEIT02	Computer Architecture & Organization	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
3BEIT03	Data Structure	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
3BEIT04	Digital Circuit & Fundamentals of Microprocessor	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
3BEIT05	Basic Electronics	3	1	0	2	3	80	10	10	100	40	-	-	-	-	
3BEIT06	Data Structure	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
3BEIT07	Digital Circuit & Fundamentals of Microprocessor	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
3BEIT08	Basic Electronics	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
		15	5	06	22	-				500				150		

**BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE
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IV - SEMESTER B.E.(INFORMATION TECHNOLOGY)

Course Code	Course Title	Teaching Scheme				Examination Scheme										
		Hours per week			No. of Credits	Theory						Practical				
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks			Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								Sessional								
ESE	MSE	IE	TW	POE												
4BEIT01	Applied Mathematics IV	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
4BEIT02	Theory Of Computation	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
4BEIT03	Object Oriented Programming	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
4BEIT04	System Programming	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
4BEIT05	Principles Of Communication	3	1	0	2	3	80	10	10	100	40	-	-	-	-	
4BEIT06	Object Oriented Programming	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
4BEIT07	Principles Of Communication	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
4BEIT08	Software Technology Lab-I	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
		15	5	06	22	-				500				150		

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V - SEMESTER B.E.(INFORMATION TECHNOLOGY)

Course Code	Course Title	Teaching Scheme				Examination Scheme										
		Hours per week			No. of Credits	Theory						Practical				
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks			Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								Sessional								
ESE	MSE	IE	TW	POE												
5BEIT01	Operating System	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
5BEIT02	Java Programming	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
5BEIT03	Design & Analysis Of Algorithms	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
5BEIT04	Microprocessor & Microcontroller	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
5BEIT05	Program Elective-I 1.Cyber Security 2.Sensor Networks 3.Computational Intellegence	3	0	0	3	3	80	10	10	100	40	-	-	-	-	
5BEIT06	Java Programming	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
5BEIT07	Microprocessor & Microcontroller	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
5BEIT08	Seminar	0	0	2	2							50		50		
		15	4	06	22	-				500				150		

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TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM**

VI - SEMESTER B.E.(INFORMATION TECHNOLOGY)

Course Code	Course Title	Teaching Scheme				Examination Scheme										
		Hours per week			No. of Credits	Theory						Practical				
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks			Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								Sessional								
ESE	MSE	IE	TW	POE												
6BEIT01	Database Management System	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
6BEIT02	Software Engineering	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
6BEIT03	Web Technology	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
6BEIT04	Professional Management Information System	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
6BEIT05	Program Elective-II 1. Data Analytics 2. Natural Language Processing 3. Artificial Intelligence	3	0	0	3	3	80	10	10	100	40	-	-	-	-	
6BEIT06	Audit Course	0	0	0	5	0	-	-	-	-	-	-	-	-	-	
6BEIT07	Database Management System	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
6BEIT08	Web Technology	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
6BEIT09	Industrial Training	0	0	2	2	-	-	-	-	-	-	50	-	50	25	
		15	4	06	23	-				500				150		

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VII - SEMESTER B.E.(INFORMATION TECHNOLOGY)

Course Code	Course Title	Teaching Scheme				Examination Scheme										
		Hours per week			No. of Credits	Theory						Practical				
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks			Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								Sessional								
ESE	MSE	IE	TW	POE												
7BEIT01	Computer Networks	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
7BEIT02	Software Testing and Quality Assurance	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
7BEIT03	Data Mining & Data Warehousing	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
7BEIT04	Wireless Communication	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
7BEIT05	Core Elective-I 1) Advanced Computing Techniques 2)Information Retrieval System 3) Embedded Systems 4) Software Testing	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
7BEIT06	Computer Networks	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
7BEIT07	Wireless Communication	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
7BEIT08	Project Phase -I	0	0	2	4	-	-	-	-	-	-	25	25	50	25	
		15	5	06	24	-				500				150		

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VIII - SEMESTER B.E.(INFORMATION TECHNOLOGY)

Course Code	Course Title	Teaching Scheme				Examination Scheme										
		Hours per week			No. of Credits	Theory						Practical				
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks			Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								Sessional								
			ESE	MSE	IE		TW		POE							
8BEIT01	Compiler Design	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
8BEIT02	Soft Computing Techniques	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
8BEIT03	TCP/IP	3	1	0	3	3	80	10	10	100	40	-	-	-	-	
8BEIT04	Core Elective-II 1) Optimization Techniques 2) Natural Language Processing 3) Web Data Management 4) Information Security System	3	1	0	4	3	80	10	10	100	40	-	-	-	-	
8BEIT05	Open Electives-I	3	1	0	2	3	80	10	10	100	40	-	-	-	-	
8BEIT06	Compiler Design	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
8BEIT07	Soft Computing Techniques	0	0	2	2	-	-	-	-	-	-	25	25	50	25	
8BEIT08	Project Phase -II	0	0	2	6	-	-	-	-	-	-	75	75	150	25	
		15	5	06	25	-				500				250		

UNIQUE CODE NOMENCLATURE TECHNIQUE

(Explained with respect to above nomenclature)

Example : 1BEAB007

- It consist of **FOUR** parts, as explained below.

1	BE	AB	007
Semester Number	Bachelor of Engineering	All Branches	Serial Code in that semester

CODES FOR VARIOUS BRANCHES OF ENGINEERING (UG)

01	Civil Engineering	CE
02	Electronics & Power Engineering	EP
03	Electrical Engineering	EE
04	Electronics Engineering	EX
05	Electronics & Communication Engineering	EC
06	Electronics & Telecommunication Engineering	ET
07	Mechanical Engineering	ML
08	Mining Engineering	MN
09	Computer Science & Engineering	CS
10	Computer Technology	CT
11	Instrumentation Engineering	IE
12	Information Technology	IT

(So, for example, with respect to fourth semester electronics and telecommunication engineering and sequence subject number 005, the complete subject code will be 4BEET005.)

PROGRAMME ELECTIVES

V – SEMESTER				VI - SEMESTER			
S.N.	COURSE TITLE	CODE	PARENT BOS	S.N.	COURSE TITLE	CODE	PARENT BOS
01			ELECTRICAL (EEE)	01			ELECTRICAL (EEE)
02			MECHANICAL	02			MECHANICAL
03			CIVIL	03			CIVIL
04			MINING	04			MINING
05			EN/ ECE/ EXTC	05			EN/ ECE/ EXTC
06			CT/CSE	06			CT/CSE
07	1.Cyber Security 2.Sensor Networks 3.Computational Intelligence	5BEIT05	INFORM. TECH.	07	1.Data Analytics 2.Natural Language Processing 3. Artificial Intelligence	6BEIT05	INFORM. TECH.
08			INSTRUMENTATION	08			INSTRUMENTATION

LIST OF AUDIT COURSES/ EVENTS

01	Business Communication Skills	07	
02	Advanced Excel	08	
03		09	
04		10	
05		11	
06		12	

UNIFORMITY TO BE MAINTAINED WHILE DESIGNING SCHEME OF TEACHING & EXAMINATION

- (I) The Examination scheme of any two or more examinations should not be exactly similar.
- (II) There will be total of 185 credits. (total of all eight semesters)
- (III) As 47 credits have already been allotted in I and II Semesters, remaining credits (185-47 = 138) shall be divided equally among all remaining six semesters, as far as possible.
- (IV) The subjects shall be categorized under following heads :
 - (a) Fundamental
 - (b) Core Compulsory
 - (c) Inter Disciplinary Cluster Course(IDCC)
 - (d) Core Elective
 - (e) Open Elective
- (V) A subject designated as IDCC – I shall be placed at the V Semester level, in all the branches. (3 credits)
- (VI) A subject designated as IDCC – II shall be placed at the VI Semester level, in all the branches.(3 credits)
- (VII) A Subject designated as Core Elective – I (CE – I) shall be placed at the VII Semester level, in all the branches. (4 credits)
- (VIII) A subject designated as Core Elective – II (CE – II) shall be placed at the VIII Semester level, in all the branches. (4 credits)
- (IX) A subject designated as Open Elective – I (OE – I) shall be placed at the VIII Semester level, in all the branches. (2 credits)
- (X) Industrial Training/ Industry Exposure Program for two weeks shall be required to be completed by every student by the beginning of VI Semester, so that its evaluation can be done in VI Semester examination. The evaluation will be only on Internal (50 marks) evaluation basis, with total of 2 credits. Minimum pass marks shall be 25 only.
- (XI) There will be seminar at V semester level, as far as possible, which will be evaluated only on internal (50 marks) evaluation basis, with total of 2 credits. Minimum pass marks shall be 25 only.
- (XII) There will be seminar at V semester level, as far as possible, which will be evaluated only on internal (50 marks) evaluation basis, with total of 2 credits. Minimum pass marks shall be 25 only.
- (XIII) There will be 'Minor Project/ Major Project Literature Review & Presentation' at VII semester level, as far as possible, which will be evaluated on internal & external (25 marks each) evaluation basis, with total of 4 credits. Minimum pass marks shall be 25 only.
- (XIV) There will be 'Major Project' at VIII semester level, as far as possible, which will be evaluated on internal & external (75 - marks each) evaluation basis, with total of 6 credits. Minimum pass marks shall be 25 only.

Course Code:

5BEIT01

Title of the Course:

Operating Systems

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Unit	Contents	Hours
I	INTRODUCTION Introduction, Evolution of Operating Systems, OS Structure, User OS Interface, Services & Functions of Operating System, Types of Operating Systems, Interrupts, Spooling. FILE SYSTEMS: File Concepts, File Access Methods, File system structure, File Control Block, File system Implementation, File Allocation Methods. DISK SCHEDULING: Disk structure, Performance parameters, Disk Scheduling policies.	9
II	PROCESS SCHEDULING Process Concept, Process States, Process Control Block, Management, Threads, Multithreading, Benefits of Multithreading, Types of threads, Multithreading Models, Scheduling Queue, Types of Schedulers: Long Term, Short Term & Medium Term, Context Switching, Dispatcher, Preemptive & Non Preemptive Scheduling, Scheduling Criteria, Scheduling Algorithms: First Come First Serve, Shortest Job First, Priority, Round Robin, Multilevel Queue Model, Multilevel Feedback Queue Scheduling.	9
III	INTER PROCESS COMMUNICATION & SYNCHRONIZATION Introduction, Race Condition, Critical Section Problem, Peterson's Solutions to Critical Section Problem, Synchronization, Semaphores, Binary & Countdown, Semaphore Implementation of Semaphores, Dining Philosopher Problem, Producer-Consumer problem, Reader-Writer problem, Monitors, Shared Memory & Message Passing Models, Direct & Indirect Communication.	9
IV	DEADLOCKS Introduction, Necessary conditions for deadlock, Resource Allocation Graph, Methods for handling deadlock: Deadlock Prevention & Deadlock Avoidance, Safe State, Resource Allocation Graph Algorithms, Bankers Algorithm, Deadlock Detection, Recovery from deadlock.	9
V	MEMORY MANAGEMENT Memory Management requirements, Partitioning, Paging, Hardware Support, Segmentation, Hardware Support, Virtual Memory, Demand Paging, O.S Policies for Virtual Memory, Page Replacement Algorithms, Thrashing, Locality.	9
Total		45

Text Book:

1. Operating Systems Concepts 7th Edition by Silberschatz, Galvin & Gagne, Wiley Publications.

Reference Books:

1. Modern Operating Systems 2nd Edition by Andrew S Tanenbaum
2. Operating Systems: Internals & Design Principles 6th Edition by William Stallings

Course Code: 5BEIT02
Title of the Course: Java Programming

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	Contents	Hours
I	OOPS Concepts in Java Introduction : Java Virtual Machine, Java features, Program Structures. Java Programming Constructs: Variables, Primitive data types, Identifier, Literals, Operators, Expressions, Precedence Rules and Associativity, Primitive Type Conversion and Casting, Flow of Control. Classes and Objects: Classes, Objects, Creating Objects, Methods, Constructors, Class Variable and Methods, overloading methods, this keyword, Arrays, Command Line Arguments, Vectors - Wrapper Classes.	9
II	Packages and Interfaces in Java: Interfaces: Multiple Inheritance : Defining Interfaces - Extending Interfaces - Implementing Interfaces - Accessing Interface Variables .Packages: Java API Packages - Using system Packages - Naming Conventions - Creating Packages - Accessing a Package - Using a Package - Adding a Class to a Package. Multithreaded Programming: Creating Threads - Extending the Thread Class - Stopping and Blocking a Thread - Life Cycle of a Thread - Using Thread Methods - Thread Exceptions - Thread Priority – Synchronization	9
III	Exceptions and Applets: Managing Errors and Exceptions: Types of Errors - Exceptions - Syntax of Exception Handling Code - Multiple Catch Statements - Using Finally Statement - Throwing our own Exceptions - Applet Programming: How Applets differ from Applications - Preparing to write Applets - Building Applet Code - Applet Life Cycle - Creating an executable Applet - Designing a WebPage - Applet Tag - Adding Applet to HTML file - Running the Apple.	9
IV	Files and String, String buffer classes: Java File I/O: File, File Dialog object, Low and High level File I/O, the Stream classes, Byte Stream: Input stream, Output stream, File Input stream, File Output stream, Data Input stream, Data Output stream, Print Writer, String class , functions,String buffer class, functions	9
V	Network programming : Introduction -Net package, TCP/IP programming, UDP programming, client/server model implementation, getting information from internet.	9
Total		45

TEXT BOOKS:

- 1) Herbert Schildt : Java Complete References(McGraw Hill)
- 2) C.Thomas Wu: An Introduction to OOP with Java(McGraw Hill)

REFERENCE BOOKS:

1. —Introduction to Java programming:, Daneal/Yong PHI
2. —Introduction to Java Programming, a primar||, Balaguruswamy.
- 3) Sachin Malhotra : Programming in JAVA, Oxford Press

Course Code: 5BEIT03
Title of the Course: Design Analysis Of Algorithm

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	Contents	Hours
I	Algorithm Analysis – Time Space Complexity – Asymptotic Notations – Recurrence equations – Solving recurrence equations –Characteristic equations	9
II	Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Knapsack Problem-Job scheduling with or without deadline	9
III	Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem Longest common subsequence	9
IV	Backtracking: General Method – N Queens problem – sum of subsets – graph coloring – Hamiltonian problem	9
V	Introduction to NP-Hard and NP-Completeness-SAT-Independent Set-3VC-Exact cover-MultiSet-Subset sum and partition.	9
Total		45

Text Books:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007. (For Units II to V)
2. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

Reference Books:

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.
3. Algorithm Designs and Analysis, by Udit Agrawal, Dhanpat Rai and Company.

Course Code: 5BEIT04
Title of the Course: Microprocessor and Microcontroller

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	Contents	Hours
I	Introduction to 16-bit Microprocessor 8086: Architecture of 16 bit Microprocessor 8086 , concept of pipelining and memory segmentation , logical address, offset address and physical address, Bus Interface Unit (BIU), Execution Unit (EU), segment registers, Pin functions, Minimum and Maximum mode of operation, addressing modes, Instruction set, assembler directives, Assembly Language programming.	9
II	Interrupt Structure and Memory Interfacing: Stack structure of 8086, Interrupts and interrupt service routines, processing of interrupt, Internal and External interrupts, Interrupt Priorities, Memory Interfacing Concepts, Interfacing of 8086 Microprocessor with memory ICs.	9
III	Programmable Peripheral Devices-I : Modes of operation of 8255, Interfacing of 8255 with 8086, Interfacing of ADC & DAC, Programmable Interval Timer 8254: Architecture and Signal Descriptions, Operating Modes, Programming and Interfacing	9
IV	Programmable Peripheral Devices-II: Programmable Interrupt Controller 8259: Architecture and Signal Descriptions , Command Words and Modes of Operations, Programming and Interfacing ; Keyboard /Display Controller 8279: Architecture and Signal Descriptions , Modes of operations , Programming and Interfacing	9
V	Microcontroller 8051: Introduction to 8051 family architecture, pin diagram, architecture of 8051, memory organization, counters and timers, addressing modes, SFR, flags, 8051 Instruction set, interrupts structure	9
Total		45

Text Book/s:

1. Advanced Microprocessor and Peripherals- A.K.Ray and K.M. Bhurchandi, Tata McGraw Hill.
2. Microcomputer systems 8086/8088 family, Architecture, Programming and Design - Yu-Cheng Liu & Glenn A Gibson, 2nd Edition- July 2003, Prentice Hall of India
3. Microprocessors and Microcontrollers – A.P. Godse, D. A. Godse, Technical Publications, First edition.

Reference Book/s:

1. Microprocessor and Interfacing, Programming & Hardware- Douglas V Hall, 2nd Edition, Tata McGraw Hill
2. Microprocessors: The 8086/8088, 80186/80286, 80386/80486 and the Pentium Family Bahadure, N. B., - Prentice Hall of India Private Limited
The 8051 Microcontroller, architecture, programming and application, --

Course Code: : 5BEIT05/1
Title of the Course: PE-I : Cyber Security

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Cyber Security: Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.	09
II	Unit 2: Cyber Security Vulnerabilities and Cyber Security Safeguards Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.	09
III	Unit 3: Securing Web Application, Services and Servers Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.	09
IV	Unit 4: Intrusion Detection and Prevention Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.	09
V	Unit 5: Cryptography and Network Security Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.	09
Total		45

Reference Books:

1. Cybersecurity For Dummies, Palo Alto, Network edition
2. Introduction to Cyber Security by Jeetendra Pande, Uttarakhand Open University
3. Fundamentals of Network Security, John E. Canavan, Artech House, London
4. Digital Forensics, DSCI- Nasscom 2012
5. Cyber Crime Investigation, DSCI-Nasscom 2013

Course Code : SBEIT05/2

Title of the Course: PE-I: Sensor Networks

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction: Overview, Broad application areas of WSN, Speciality and constrains	09
II	Hardware and software: Overview of hardware architecture of the sensor motes, Types of operating systems for WSN, TinyOS and Contiki, Basic programming in TinyOS, Concepts of protothreads, Basic programming in Contiki, Network stack overview;	09
III	MAC layer issues: Types of MAC protocols for WSN, Contention-based and reservation based protocols. Detailed study of specific protocols such as SMAC, RMAC, TMAC, DW-MAC, DMAC, Aloha, CSMA-CA, BMAC, LPL, LPP, AMAC, TICER, RICER, RC -MAC, ZMAC, Y-MAC etc.;	09
IV	Network layer issues: Routing, classification of the protocols, specific protocols such as SPIN, LEACH etc. Transport layer issues: TCP/IP for WSN and other related issues, Study of specific transport layer protocols.	09
V	Application layer protocols: Data collection, Data dissemination, Data aggregation, Time synchronization. Standard based protocols: IEEE 802.15.4	09
Total		45

Text Books:

1. Holger Karl, Andreas Willig, Protocols and Architectures for Wireless Sensor Network, John Wiley & Sons, 2005

Reference Books:

6. Ibrahiem M. M. El Emary, S. Ramakrishnan, Wireless Sensor Networks: From Theory to Applications, CRC Press, 2013
 7. Ian F. Akyildiz, Mehmet Can Vuran, Wireless Sensor Networks, John Wiley & Sons, 2010
 8. J Zheng, and A Jamalipour. Wireless sensor networks: a networking perspective, John Wiley & Sons, 2009
- Anna Hac, Wireless Sensor Network Designs

Course Code: 5BEIT05/3

Title of the Course: PE-I: Computational Intelligence

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	Soft Computing: Artificial Neural Network: Artificial neuron, single layer and multilayer architecture, nonlinear function like sigmoid function, back propagation learning algorithm.	09
II	Functional link artificial neural network, trigonometric, Chebyshev and Legendre polynomial. Radial basis function neural network, its learning algorithm, recurrent neural network and its learning algorithm;	09
III	Fuzzy Logic: Types of fuzzy logic, membership functions, fuzzification and defuzzification, rule-based fuzzy inference engine, Type-1 and Type-2 fuzzy logic, typical applications	09
IV	Evolutionary Computing: Derivative based and derivative free optimization, multivariable and multiconstraint optimization. Genetic algorithm and its variants, Differential evolution and its variants.	09
V	Swarm Intelligence: Particle swarm optimization and its variants, Cat swarm optimization, bacterial foraging optimization, Artificial immune system, multi-objective optimization like NSGA-II	09
Total		45

Reference Book/s:

1. S. Haykin, '*Neural Networks and Learning Machines*', Prentice Hall, 2009.
2. Y.H. Pao, '*Adaptive pattern recognition and neural networks*', Addison -Wesley, 1989.
3. Jang, J.S.R., Sun, C.T. and Mizutani, E., '*Neuro-fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence*', Prentice Hall, 2009.
4. Hagan, M., '*Neural Network Design*', Nelson Candad, 2008.
5. K.A.D. Jong, '*Evolutionary Computation – A Unified Approach*', PHI Learning, 2009.

Course Code: 5BEIT06
Title of the Course: Java Programming

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
0	0	2	2	2	25	25	50

Practicals Based on above mentioned Syllabus

Course Code: 5BEIT07
Title of the Course: Microprocessor and Microcontroller

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
0	0	2	2	2	25	25	50

Practicals Based on above mentioned Syllabus

Course Code : 5BEIT08
Title of the course: Seminar

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
0	0	2	2	2	50		50

Course Code: 6BEIT01
Title of the Course: Database Management Systems

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	Contents	Hours
I	Introduction Purpose of Database System -- Views of data – Data Models – Database Languages Database System Architecture – Database users and Administrator – Entity– Relationship model (E-R model) – E-R Diagrams -- Introduction to relational databases	9
II	Relational Model The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals - Integrity – Triggers	9
III	Database Design Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form- Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form	9
IV	Transactions Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery Two Phase Commit - Save Points – SQL Facilities for recovery – Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock- Serializability – Recovery	9
V	Implementation Techniques Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Hashing -Query Processing Overview	9
Total		45

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, —Database System Concepts||, Fifth Edition, Tata McGraw Hill, 2006 (Unit I and Unit-V) .
2. C.J.Date, A.Kannan, S.Swamynathan, —An Introduction to Database Systems||, Eighth Edition, Pearson Education, 2006.(Unit II, III and IV)

Reference Books:

1. Ramez Elmasri, Shamkant B. Navathe, —Fundamentals of Database Systems||, FourthEdition , Pearson / Addison wesley, 2007.
2. Raghu Ramakrishnan, —Database Management Systems||, Third Edition, McGraw Hill, 2003.
3. S.K.Singh, —Database Systems Concepts, Design and Applications||, First Edition, Pearson Education, 2006.

Course Code: 6BEIT02
Title of the Course: Software Engineering

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Unit	Contents	Hours
I	Introduction to Software and Engineering Approaches: Introduction of Software, The evolving Role of Software, Software characteristic, Software Application, Software Crisis, Software Myths. Software Engineering Approach, A Generic View of Software Engineering, Software Process, Software Process Models - Waterfall Model, Prototype Model, Incremental Model, Spiral Model, COCOMO Model.	9
II	Software Process, Project Metrics and Project Planning: Measures, Metrics and Indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within the Software Engineering Process. Project Planning Objectives, Software Scope, Resources, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, the Make-Buy Decision.	9
III	Software Requirement Definition and Design: Software requirement Specification, Formal Specification Techniques, Languages and Processors for Requirement Specification. Fundamental Design Concepts, Modules and Modularization Criteria, Design Notation, Design Techniques, Detailed Design Consideration.	9
IV	Implementation Issues, Verification and Validation: Structured Coding Techniques, Coding Styles, Standards and Guidelines, Documentation Guidelines. Quality Assurance, Walkthroughs and Inspections, Symbolic Execution, unit testing and Debugging, System Testing, Formal Verification.	9
V	Risk Management and Maintenance: Software Risks, Risk Identification, Risk Projection, Risk Mitigation, Monitoring, and Management. Introduction, Enhancing Maintainability during Development, Configuration Management, Managerial Aspects of Software Maintenance, Source-Code Metrics, Other Maintenance Tools and Techniques	9
Total		45

Text Book/s:

1. Software Engineering: a practitioner's approach: Roger S. Pressman
2. Software Engineering Concepts: Richard Farley

Reference Book/s:

1. Sommerville, Ian. —Software Engineering||. Addison-Wesley, 2004.
2. Rajib Mall, Fundamentals of Software Engineering, Prentice Hall India.
3. Pankaj Jalote, An integrated approach to Software Engineering, Springer/Narosa.
4. Software Engineering, Manish Kumar Jha, Dhanpat Rai and Company.

Course Code:

6BEIT03

Title of the Course:

Web Technologies

Course Scheme					Evaluation
Lecture	Tutorial	Practical	Periods/week	Credits	Duration
	1	0	4	3	3

Unit	Contents
I	Introduction to Web Technologies: OSI reference Model, understanding 3 -tier web architecture, Web browsers, Overview of HTTP, Cookies. Basic tools of Internet access: WWW, Email, FTP, HTTP, HTTPS, URL, URI, POP3, MIME, Client Server Architecture, Introduction to HTML, DHTML and JavaScript.
II	HTML: HTML document structure, Creating headings and paragraphs on a web page, working with links, Image Mapping, tables, frames, Introduction of Forms and HTML controls, Introduction to CSS and its types
III	Introduction to CGI, Architecture of CGI, Working with environment variables, Sending information to the web server. Introduction to Sockets, Creating and closing sockets, Socket Programming, C programming on Linux platform.
IV	Introduction to XML, goals of XML, XML basics: XML structures and syntax, valid V/s well-formed XML, Document Classes, DTD (document type definition) classes
V	Scripting XML: The XML processor, parent child relationship, XML as a data: data type in XML, XML namespaces, linking with XML: simple link the HTML way. XSL: XML with style: style sheet basics, XSL style sheets.
Total	

TEXT BOOK:

1. XML in Action Web Technology - William J. Pardhi .
2. XML and Related Technologies -Atul Kahate, Pearson, First Edition.

REFERENCES:

1. Web Technologies – Black Book
2. Complete reference HTML, TMH, 4th Ed
3. JavaScript Bible, Wiley Pub
4. HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross, BPB Pub, 3rd Ed
5. Web Technology by Udit Agrawal, Dhanpat Rai and Compan

Course Code: 6BEIT04
Title of the Course: Professional Management Information System

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100
Unit	Contents								Hours
I	CONCEPTUAL FOUNDATIONS: Management Information Systems (MIS), Structure & Classification of MIS, Information & System Concepts, Information Systems for Competitive Advantage								9
II	INFORMATION TECHNOLOGIES: Computer Hardware, Software & Emerging Technology, Database Management, Telecommunication & Computer Networks								9
III	BUSINESS APPLICATION OF IS: E-Commerce, ERP Systems, Decision Support systems, Business Intelligence & Knowledge Management System								
IV	MANAGEMENT OF IS: Information System Planning, System Acquisition, System Implementation, Evaluation & Maintenance of IS, Security & Control								9
V	BUILDING OF IS System Development Approaches, System Analysis & Design								9
Total								45	

Textbook:

1. Management Information Systems by D.P.Goyal 3rd Edition, Macmillan Publishers India

Reference Book/s:

1. Management Information Systems Concepts & Design by Robert G Murdic (PHI Pub)
2. Management Information Systems by Sadagopan (PHI Pub)
3. . Management Information Systems by James A.Obrien(Galotia Pub)
4. Management Information Systems by A.K.Gupta S.ChandPub)

Course Code: 6BEIT05/1

Title of the Course: PE-II: Data Analytics

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction: Sources, modes of availability, inaccuracies, and uses of data. Data Objects and Attributes: Descriptive Statistics; Visualization; and Data Similarity and Dissimilarity.	09
II	Pre-processing of Data: Cleaning for Missing and Noisy Data; Data Reduction – Discrete Wavelet Transform, Principal Component Analysis, Partial Least Square Method, Attribute Subset Selection; and Data Transformation and Discretization.	09
III	Inferential Statistics: Probability Density Functions; Inferential Statistics through Hypothesis Tests Business Analytics: Predictive Analysis (Regression and Correlation, Logistic Regression, In-Sample and Out-of-Sample Predictions), Prescriptive Analytics (Optimization and Simulation with Multiple Objectives);	09
IV	Mining Frequent Patterns: Concepts of Support and Confidence; Frequent Item-set Mining Methods; Pattern Evaluation. Classification: Decision Trees – Attribute Selection Measures and Tree Pruning; Bayesian and Rule-based Classification; Model Evaluation and Selection; Cross-Validation;	09
V	Clustering: Partitioning Methods – k-means Hierarchical Methods and Hierarchical Clustering Using Feature Trees; Probabilistic Hierarchical Clustering; Introduction to Density-, Grid-, and Fuzzy and Probabilistic Model-based Clustering Methods; and Evaluation of Clustering Methods.	09
Total		45

Reference Books:

1. Han, J., M. Kamber, and J. Pei, Data Mining: Concepts and Techniques, Elsevier, Amsterdam. Textbook. Year of Publication 2012.
2. James, G., D. Witten, T. Hastie, and R. Tibshirani, An Introduction to Statistical learning with Application to R, Springer, New York. Year of Publication 2013
3. Jank, W., Business Analytics for Managers, Springer, New York. Year of Publication 2011
4. Williams, G., Data mining with Rattle and R: The Art of Excavating Data for Knowledge Discovery, Springer, New York. Year of Publication 2011
5. Witten, I. H., E. Frank, and M. A. Hall, Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann. Year of Publication 2011
6. Wolfgang, J., Business Analytics for Managers, Springer. Year of Publication 2011
7. Montgomery, D. C., and G. C. Runger, Applied Statistics and Probability for Engineers. John Wiley & Sons. Year of Publication 2010
8. Samuelli G., N. R. Patel, and P. C. Bruce, Data Mining for Business. Intelligence, John Wiley & Sons, New York. Year of Publication 2010
9. Hastie, T., R. T. Jerome, and H. Friedman, The Elements of Statistical Learning: Data Mining, Inference and Prediction, Springer. Year of Publication 2009

Course Code: 6BEIT05/2

Title of the Course: PE-II: Natural Language Processing

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Natural Language Processing, Finite-state automata and transducers	09
II	Computational morphology, N-gram language models; smoothing; interpolation; backoff Part-of-speech tagging	09
III	Syntactic parsing: rule-based parsing; CYK algorithm; Earley's algorithm, Computational semantics and lexical semantics,	09
IV	Computational lexicons: WordNet Word Sense Disambiguation and Induction,	09
V	Roles and frames: FrameNet, Semantic Role Labeling, Discourse and dialogue, Statistical Machine Translation.	09
Total		45

Text Book/s:

1. Jurafsky and Martin, "Speech and Language Processing", Prentice Hall, 2009.
2. Manning and Schütze. Foundations of Statistical Natural Language Processing, MIT Press, 1999.
3. Larry Wall, Tom Christiansen, Jon Orwant. Programming Perl. O'Reilly. 1996. ISBN 1-56592-149-6.

Course Code: 6BEIT05/3

Title of the Course: PE-II: Artificial Intelligence

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	INTRODUCTION TO AI AND PRODUCTION SYSTEMS: Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics - Specialized production system- Problem solving methods – Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction – Related algorithms, Measure of performance and analysis of search algorithms.	09
II	REPRESENTATION OF KNOWLEDGE: Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.	09
III	KNOWLEDGE INFERENCE: Knowledge representation -Production based system, Frame based system. Inference – Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning – Certainty factors, Bayesian Theory-Bayesian Network-Dempster – Shafer theory.	09
IV	PLANNING AND MACHINE LEARNING: Basic plan generation systems – Strips -Advanced plan generation systems – K strips-Strategic explanations -Why, Why not and how explanations. Learning- Machine learning, adaptive Learning.	09
V	EXPERT SYSTEMS: Expert systems – Architecture of expert systems, Roles of expert systems – Knowledge Acquisition – Meta knowledge, Heuristics. Typical expert systems – MYCIN, DART, XOON, Expert systems shells.	09
Total		45

Text Book/s:

1. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Mc Graw Hill - 2008. (Units-I,II,VI & V)
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007. (Unit-III)

Reference Book/s:

1. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
2. Stuart Russel and Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2007.
3. Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013.

Course Code: 6BEIT06
Title of the Course: Audit Course

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
0	0	0	0	1	-	-	-

Course Code: 6BEIT07
Title of the Course: Database Management System

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
0	0	2	2	2	25	25	50

Practicals Based on above mentioned Syllabus

Course Code : 6BEIT08
Title of the course: Web Technology

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
0	0	2	2	2	25	25	50

Practicals Based on above mentioned Syllabus

Course Code : 6BEIT09
Title of the course: Industrial Training

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
0	0	0	0	1	50		50