

**MRSPTU B.TECH. INFORMATION TECHNOLOGY SYLLABUS  
2018 BATCH ONWARDS**

**B. Tech. IT (7<sup>th</sup> SEMESTER)**

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BITES1-701	**Project-II	0	0	4	60	40	100	2
BITES1-702	***Training-III	-	-	-	60	40	100	4
BITES1-703	Visual Basic .Net Lab	0	0	2	60	40	100	1
	<b>Departmental Elective-IV(choose one)</b>	3	0	0	40	60	100	3
BITED1-711	Building Enterprise Applications							
BITED1-712	Network Programming							
BITED1-713	Linux for Information Technology Applications							
BITED1-714	Ad-hoc and Sensor Networks							
	<b>Departmental Elective-V(choose one)</b>	3	0	0	40	60	100	3
BITED1-721	Resource Management Techniques							
BITED1-722	Wireless Sensor Networks							
BITED1-723	Antennas and Wave Propagation							
BITED1-724	Artificial Intelligence and Expert systems							
XXXX	<b>Open Elective*</b>	3	0	0	40	60	100	3
BMNCC0-002	Environmental Sciences	2	0	0	100	-	100	0
	<b>Total</b>	-	-	-	<b>400</b>	<b>300</b>	<b>700</b>	<b>16</b>

\*Open Elective Subjects may also be chosen from the list of Open Electives-I, II and III offered by other departments of university

\*\*Continued from VII Semester, Project work, seminar and internship in industry or at appropriate workplace.

\*\*\*During the summer vacation after 6th semester.

**B. Tech. IT (8<sup>th</sup> SEMESTER)**

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BITES1-801	Project-III**	0	0	10	60	40	100	5
	<b>Departmental Elective-VI</b>	3	0	0	40	60	100	3
BITED1-811	Enterprise Resource Planning							
BITED1-812	Object Oriented Software Engineering							
BITED1-813	Image Processing							
BITED1-814	Software Project Management							
XXXX	<b>Open Elective*</b>	3	0	0	40	60	100	3
XXXX	<b>Open Elective*</b>	3	0	0	40	60	100	3
	<b>Mandatory Courses- noncredit***</b>	2	0	0	100	00	100	0
BMNCC0-001	Constitution of India							
BMNCC0-006	Essence of Indian Knowledge Tradition							
	<b>Total</b>	-	-	-	<b>280</b>	<b>220</b>	<b>500</b>	<b>14</b>

\*Open Elective Subjects may also be chosen from the list of Open Electives-I, II and III offered by other departments of university

\*\*Project III to be made by student during the semester.

\*\*\*choose any one subject from mandatory Courses.

**VISUAL BASIC .NET LABORATORY**

**Subject Code- BITES1-703**

**L T P C**

**Duration-30 Hrs.**

**0 0 2 1**

**PRACTICALS**

1. Study of VB environment with following details:
  - a. Form and their types.
  - b. Intrinsic components – text box, label, combo, list, heck box, and option button.
  - c. Design time properties.
  - d. Different windows and their uses.
2. Design forms to perform mathematical operations like addition, subtraction, multiplication and division using:
  - e. Text box, labels.
  - f. Options to be selected using option, check box and combo box.
3. Design forms to use Date, Time, String, Mathematics functions with help of text box, label, radio button, check box, combo box and command button.
4. Using image control and scroll bar, design form to change height, width of image, movement to image. Using picture box and image list, flip the image on click of command button.
5. Design explorer using Directory, drive, file list box and common dialog controls.
6. Design text editor with menu having copy, cut, paste, select, search, replace the text and load and save the file.
7. Design stop watch with faculty of start, stop, reset using timer control, option, label, text box.
8. Practical including Data bound controls like DBgrid, DBcombo, Textbox, Combo, List, MS Flex grid and Database control like ADO, DAO, RDO to perform insertion, deletion, updation, display, Search.
9. Design MDI form including Menu bar, Toolbar, Status bar.
10. Design the interface to perform following operation on the file like create, open, read, write, delete, search.
11. Design the Active X control for login form and transport it to browser.
12. Design the Active X control to perform database operation with get and let property.
13. Design the experiment using RTF box to create file, load, save search and edit the file.
14. Integrate all above practical to form mini project including login form and splash form.

**BUILDING ENTERPRISE APPLICATIONS**

**Subject Code- BITED1-711**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

Main Objective of this course is to understand enterprise application, requirements, architectures and testing.

**COURSE OUTCOMES**

1. Understand Enterprise Applications, Methodologies, Life Cycle, Enterprise Analysis.

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2. Understand Requirement Elicitation and Analysis, Validation, Planning and Estimation, Architecture.
3. Learn Technical Architecture, Data Architecture, Infrastructure Architecture, Architecture Design and Documentation.
4. Understand Construction Readiness, Static Code Analysis, Build Process and Unit Testing, Dynamic Code Analysis.

**COURSE CONTENTS**

**UNIT I (11 Hrs.)**

Introduction and Incepting to Building Enterprise applications: Enterprise Applications, Software Engineering Methodologies, Life Cycle of Raising Enterprise Applications, Three Key Determinants of Successful Enterprise Applications, Measuring the Success of Enterprise Applications, Enterprise Analysis, Business Modeling.

**UNIT-II (11 Hrs.)**

Requirement Elicitation and Analysis, Requirements Validation, Planning and Estimation, Architecture, Views and Viewpoints, Enterprise Application- An Enterprise Architecture Perspective, Logical Architecture

**UNIT-III (12 Hrs.)**

Technical, Data and Infrastructure Architecture: Technical Architecture and Design, Data Architecture and Design, Infrastructure Architecture and Design, Architecture Design and Documentation.

**UNIT-IV (11 Hrs.)**

Constructing Enterprise Applications: Construction Readiness, Introduction to Software Construction Map, Constructing the Solution Layers, Code Review, Static Code Analysis, Build Process and Unit Testing, Dynamic Code Analysis.

**RECOMMENDED BOOKS**

1. Patterns of Enterprise Application Architecture, Martin Fowler, With Contributions from David Rice, Matthew Foemmel, Edward Hieatt, Robert Mee and Randy Stafford, AddisonWesley Publication, Reprint Version - 2016. ISBN 0-321-12742-0.
2. Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K.Nallasamy and Veerakumar Esakimuthu —Raising Enterprise Applications.
3. A systematic perspective to managing complexity with enterprise architecture by Pallab Saha, ISBN:9781466645189, 2013.

**NETWORK PROGRAMMING**

**Subject Code- BITED1-712**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

Main objective of this course is to develop programs using TCP Sockets, Use Socket Options and Ipv4 and Ipv6 interoperability.

**COURSE OUTCOMES**

1. Understanding of sockets.
2. Describe socket options.
3. Demonstrate Ipv4 and Ipv6 interoperability.

## **COURSE CONTENTS**

### **UNIT I (11 Hrs.)**

Introduction to Socket Programming – Overview of TCP/IP Protocols –Introduction to Sockets –Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write, close functions – Iterative Server –Concurrent Server.

### **UNIT-II (11 Hrs.)**

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

### **UNIT-III (12 Hrs.)**

Socket options – getsockopt and setsockopt functions – generic socket options – IP socket options –ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

### **UNIT-IV (11 Hrs.)**

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

## **RECOMMENDED BOOKS**

1. W. Richard Stevens, “UNIX NETWORK PROGRAMMING Vol-I” Second Edition, PHI / Pearson Education, 1998.
2. William Stallings, “SNMP, SNMPv2, SNMPv3 and RMON 1 and 2”, Third Edition, Addison Wesley, 1999.
3. D.E. Comer, “Intrenetworking with TCP/IP Vol- III”, (BSD Sockets Version), second Edition, PHI, 2003.

## **LINUX FOR INFORMATION TECHNOLOGY APPLICATIONS**

**Subject Code- BITED1-713**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

## **COURSE OBJECTIVE**

This course will help to learn Linux, Linux networking and Linux security.

## **COURSE OUTCOMES**

1. Learn about kernels.
2. Configure linux machine on the network
3. Learn about Linux Security.

## **COURSE CONTENTS**

### **UNIT I (11 Hrs.)**

**Introduction:** Basic concepts of the operating system. Commands, shells and processes; users and groups; file system and directories. System installation, configuration and upgrade

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Installation stages; network installation; disk partitioning; post-install system customization and upgrade; dpkg and APT package installation, remove, upgrade and query; semiautomatic system installation.

**Kernel:** Kernel tasks; managing kernel modules at runtime; kernel configuration and compilation boot loaders GRUB and LILO;

**UNIT-II (11 Hrs.)**

**Linux Networking:** Basic concepts of networking: Network packets, TCP/IP protocol suit, address resolution protocol (ARP); IP addresses and network mask; subnets and routing; IPV4 and Network classes; ports. Configuring Linux machine on the network; arp, ipconfig and netstat commands. Network services and tools; telnet, rsh, ftp, rcp, ssh, rsync, inetd.conf; opening and closing ports.

**UNIT-III (12 Hrs.)**

**Network File system (NFS):** File system sharing or the network; remote procedure call (R P C) services; NFS server and client sides; NFS installation & configuration; and statistic mount and auto mount configuration; when trouble shooting NFS; security and optimization

**Network information service (NIS):** Centralized authentication systems; sharing user and host information or the network; NIS server and client sides and configuration; compatibility mode; net group; security issues.

**UNIT-IV (11 Hrs.)**

**Linux Security :** System vulnerabilities; port scanning; encryption, encrypted services and connections; PGP/GPG Intrusion protection: tcp-wrappers, IP-firewalls (iptables), NAT and DMZ; Intrusion detection systems: tripwire; Secure system management practices.

**RECOMMENDED BOOKS**

1. Red Hat Linux 9 – Bell & Duff- Pearson
2. Complete Reference, Red Hat Linux-Richard L. Peterson – TMH
3. Linux N/W Administration Guide by Tery Dawson, Gregor N. Purdy, Tony Bautts – OREILLY
4. Red Hat Linux 9 Bible-Christopher Negus by WILEY publishing
5. Linux Configuration & Installation by Patrick Volker Ding, Kevin Richard, Eric Foster-Johnson BPB publication
6. Linux Programming Bible by John Goerzen-Wiley Dream Tech India (P) Ltd

**Ad-hoc and SENSOR NETWORKS**

**Subject Code- BITED1-714**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

This course will help to learn the concepts of ad-hoc and sensor networks.

**COURSE OUTCOMES**

1. To be able to learn wireless technologies.
2. To be able to learn different protocols for ad-hoc networks.
3. To learn different routing algorithms used for ad-hoc networks.
4. To learn how to synchronize network nodes.

## **COURSE CONTENTS**

### **UNIT I (12 Hrs.)**

**Introduction:** Elements of Ad hoc Wireless Networks, Issues in Ad hoc wireless networks, Example commercial applications of Ad hoc networking. Cellular architecture, co-channel interference, frequency reuse, capacity increase by cell splitting, handoff, types of handoffs, Mobile IP, Cellular IP.

Introduction to Wireless sensor networks, Single-sink single-hop WSN, Single-sink multi-hop WSN, Multi-sink multi-hop WSN, Advantages of ad-hoc/sensor networks, Node and Network Architectures of WSN.

### **UNIT-II (12 Hrs.)**

**MAC protocols for Ad hoc Networks:** Design issues, Classifications, Contention based protocols, MACAW, FAMA, BTMA, DBTMA, MACABI, Real-Time MAC protocol, Multichannel protocols, Power aware MAC

**MAC protocols in WSN:** Scheduled protocols, LEACH IEEE 802.15.4 MAC protocol, Guo protocol, TRAMA protocol, Contention-based protocols, Zhong protocol, DMAC protocol, PAMAS protocol, SMAC protocol.

### **UNIT-III (9 Hrs.)**

**Routing protocols in Ad hoc Networks:** Design issues, Table-driven protocols - DSDV, WRP, CGSR, On-Demand protocols - DSR, AODV, TORA, LAR, ABR, Zone Routing Protocol, ZRP, ZHLS, Power Aware Routing protocols.

### **UNIT-IV (12 Hrs.)**

**Routing protocols in WSN:** Issues in designing routing protocols, Classification of routing protocols, Flat routing, Flooding and gossiping, SPIN protocol, PEGASIS protocol, TEEN protocol, MECN protocol, SPAN protocol, Location-based routing protocols, GAF protocol, GEAR protocol,

**Introduction to Technologies for WSNs:** ZigBee technology, Ultrawide bandwidth technology, Bluetooth technology, Comparison among technologies.

## **RECOMMENDED BOOKS**

1. Roberto Verdone, Davide Dardari, Gianluca Mazzini and Andrea Conti, "Wireless Sensor and Actuator Networks: Technologies, Analysis and Design", Academic Press, 2008.
2. Miguel A. Labrador and Pedro M. Wightman, "Topology Control in Wireless Sensor Networks-with a companion simulation tool for teaching and research", Springer Science, 2009.
3. Edgar H. Callaway, "Wireless Sensor Networks: Architectures and Protocols", CRC Press, 2004.
4. Xian-Yang Li, "Wireless Ad Hoc and Sensor Networks: Theory and Applications", Cambridge University Press 2008.
5. Feng Zhao and Leonidas J. Guibas, "Wireless Sensor Networks: An Information Processing Approach", Morgan Kaufmann Publishers, 2008.
6. C. Siva Ram Murthy and B. S. Manoj, 'Ad Hoc Wireless Networks: Architectures and Protocols', Pearson Education, 2007.
7. C.K. Toh, 'Ad Hoc Mobile Wireless Networks: Protocols and Systems', Pearson Education, 2007.

**RESOURCE MANAGEMENT TECHNIQUES**

**Subject Code- BITED1-721**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

This course will explain techniques to manage resources.

**COURSE OUTCOMES**

Upon Completion of the course, the students should be able to:

1. Solve optimization problems using simplex method.
2. Apply integer programming and linear programming to solve real-life applications.
3. Use PERT and CPM for problems in project management

**COURSE CONTENTS**

**UNIT I (12 Hrs.)**

Linear Programming Models: Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method.

**UNIT-II (11 Hrs.)**

Transformation and assignment models: Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm – Variants of the Assignment problem

**UNIT-III (11 Hrs.)**

Integer Programming Models: Formulation – Gomory’s IPP method – Gomory’s mixed integer method – Branch and bound technique.

**UNIT-IV (11 Hrs.)**

Scheduling by PERT and CPM: Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

**RECOMMENDED BOOKS**

1. Paneer Selvam, ‘Operations Research’, Prentice Hall of India, 2002
2. Anderson ‘Quantitative Methods for Business’, 8th Edition, Thomson Learning, 2002.
3. Winston ‘Operation Research’, Thomson Learning, 2003.
4. Vohra, ‘Quantitative Techniques in Management’, Tata Mc Graw Hill, 2002.
5. Anand Sarma, ‘Operation Research’, Himalaya Publishing House, 2003.

**WIRELESS SENSOR NETWORKS**

**Subject Code- BITED1-722**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

The objectives of this course are to introduce students to the state of the art in wireless sensor actuator networks and to provide hands on training in programming these networks.

**COURSE OUTCOMES**

At the end of the course the students will be able to

1. Design wireless sensor networks for a given application
2. Understand emerging research areas in the field of sensor networks

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3. Understand MAC protocols used for different communication standards used in WSN
4. Explore new protocols for WSN

**COURSE CONTENTS**

**UNIT I (12 Hrs.)**

Introduction to Sensor Networks, unique constraints and challenges, Advantage of Sensor Networks, Applications of Sensor Networks, Types of wireless sensor networks Mobile Ad-hoc Networks (MANETs) and Wireless Sensor Networks, Enabling technologies for Wireless Sensor Networks. Issues and challenges in wireless sensor networks.

**UNIT-II (11 Hrs.)**

Routing protocols, MAC protocols: Classification of MAC Protocols, S-MAC Protocol, B-MAC protocol, IEEE 802.15.4 standard and ZigBee.

Dissemination protocol for large sensor network. Data dissemination, data gathering, and data fusion; Quality of a sensor network; Real-time traffic support and security protocols.

**UNIT-III (11 Hrs.)**

Design Principles for WSNs, Gateway Concepts Need for gateway, WSN to Internet Communication, and Internet to WSN Communication.

**UNIT-IV (11 Hrs.)**

Single-node architecture, Hardware components & design constraints.

Operating systems and execution environments, introduction to TinyOS and nesC.

**RECOMMENDED BOOKS**

1. Waltenege Dargie , Christian Poellabauer, “Fundamentals Of Wireless Sensor Networks Theory And Practice”, By John Wiley & Sons Publications ,2011
2. Sabrie Soloman, “Sensors Handbook" by McGraw Hill publication. 2009
3. Feng Zhao, Leonidas Guibas, “Wireless Sensor Networks”, Elsevier Publications,2004
4. Kazem Sohrby, Daniel Minoli, “Wireless Sensor Networks”: Technology, Protocols and Applications, Wiley-Inter science
5. Philip Levis, And David Gay "TinyOS Programming" by Cambridge University Press 2009

**ANTENNAS AND WAVE PROPAGATION**

**Subject Code- BITED1-723**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

This course will help to learn the concepts of antennas and wave propagation.

**COURSE OUTCOMES**

At the end of the course, students will demonstrate the ability to:

1. Understand the properties and various types of antennas.
2. Analyze the properties of different types of antennas and their design.
3. Operate antenna design software tools and come up with the design of the antenna of required specifications.



## **COURSE CONTENTS**

### **UNIT I (12 Hrs.)**

Fundamental Concepts- Physical concept of radiation, Radiation pattern, near-and far-field regions, reciprocity, directivity and gain, effective aperture, polarization, input impedance, efficiency, Friis transmission equation, radiation integrals and auxiliary potential functions. Radiation from Wires and Loops- Infinitesimal dipole, finite-length dipole, linear elements near conductors, dipoles for mobile communication, small circular loop.

### **UNIT-II (11 Hrs.)**

Aperture and Reflector Antennas- Huygens' principle, radiation from rectangular and circular apertures, design considerations, Babinet's principle, Radiation from sectoral and pyramidal horns, design concepts, prime-focus parabolic reflector and cassegrain antennas.

### **UNIT-III (11 Hrs.)**

Broadband Antennas- Log-periodic and Yagi-Uda antennas, frequency independent antennas, broadcast antennas.

Micro strip Antennas- Basic characteristics of micro strip antennas, feeding methods, methods of analysis, design of rectangular and circular patch antennas.

### **UNIT-IV (11 Hrs.)**

Antenna Arrays- Analysis of uniformly spaced arrays with uniform and non-uniform excitation amplitudes, extension to planar arrays, synthesis of antenna arrays using Schelkunoff polynomial method, Woodward-Lawson method.

Basic Concepts of Smart Antennas- Concept and benefits of smart antennas, fixed weight beamforming basics, Adaptive beam forming.

Different modes of Radio Wave propagation used in current practice.

## **RECOMMENDED BOOKS**

1. R.E. Collin, Antennas and Radio Wave Propagation, McGraw Hill, 1985.
2. R.C. Johnson and H. Jasik, Antenna Engineering Handbook, McGraw Hill, 1984.
3. I.J. Bahl and P. Bhartia, Micro Strip Antennas, Artech House, 1980.
4. R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill, 2005
5. R.E. Crompton, Adaptive Antennas, John Wiley.
6. J.D. Kraus, Antennas, McGraw Hill, 1988.
7. C.A. Balanis, Antenna Theory - Analysis and Design, John Wiley, 1982.

## **ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS**

**Subject Code- BITED1-724**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

### **COURSE OBJECTIVE**

1. Introduce the basic principles in artificial intelligence research.
2. Explore Areas of application such as knowledge representation, natural language processing, expert systems, vision and robotics.

### **COURSE OUTCOMES**

1. Understand the concept of Artificial intelligence, problem solving and various types of search strategies.

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2. Understand the concept of Knowledge base, knowledge representation, AI languages & tools and various planning techniques.
3. Identify uncertainty and understand fuzzy logic concept to handle uncertainty.
4. Understand the COURSE of AI agents and various COURSE methods it also includes neural network and includes the communication of AI agents and natural language processing.

**COURSE CONTENTS**

**UNIT-I (12 Hrs.)**

**Introduction:** History of AI - Intelligent agents – AI and Applications - Problem spaces and search - Heuristic Search techniques – Best-first search – Informal search strategies-A\* algorithm, Iterative deepening A\*(IDA), small memory A\*(SMA). Game Playing: Minimax search procedure - Adding alpha-beta cutoffs

**UNIT-II (11 Hrs.)**

**Knowledge Representation:** Approaches and issues in knowledge representation Knowledge - Based Agent- Propositional Logic – Predicate logic –Reasoning, AI languages Prolog, Lisp.

**UNIT-III (10 Hrs.)**

**Reasoning under uncertainty:** Implementation- Basic probability notation - Bayes rule – Certainty factors and rule based systems - Bayesian networks, Fuzzy Logic.

**UNIT IV (12 Hrs.)**

**Planning and COURSE:** Basic representation of plans - conditional planning - Multi-Agent planning. Forms of COURSE - inductive COURSE - Reinforcement COURSE - COURSE decision trees - Neural Networks. Communication: Natural language processing, Formal Grammar, Parsing

**RECOMMENDED BOOKS**

1. Elaine Rich, Kevin Knight and Shivashankar B.Nair, ‘Artificial Intelligence’, 3rd Edn., Tata McGraw-Hill, 2009.
2. Stuart J. Russell and Peter Norvig, ‘Artificial Intelligence: A Modern Approach’, Pearson Education Asia, 2nd Edn., 2003.
3. N.P. Padhy, ‘Artificial Intelligence and Intelligent System’, Oxford University Press, 2nd Edn., 2005.
4. Rajendra Akerkar, ‘Introduction to Artificial Intelligence’, Prentice-Hall of India, 2005.
5. Patrick Henry Winston, ‘Artificial Intelligence’, Pearson Education Inc., 3rd Edn., 2001.
6. Eugene Charniak and Drew Mc Dermott, ‘Introduction to Artificial Intelligence’, Addison-Wesley, ISE Reprint, 1998.
7. Nils J. Nilsson, ‘Artificial Intelligence - A New Synthesis’, Harcourt Asia Pvt. Ltd., Morgan Kaufmann, 1988. Enterprise Resource Planning.

**ENVIRONMENTAL SCIENCES**

**Subject Code: BMNCC0-002**

**L T P C**

**Duration: 30 Hrs.**

2 0 0 0

**Course Objectives:**

1. To identify global environmental problems arising due to various engineering/industrial and technological activities and the science behind these problems
2. To realize the importance of ecosystem and biodiversity for maintaining ecological balance.
3. To identify the major pollutants and abatement devices for environmental management and sustainable development.
4. To estimate the current world population scenario and thus calculating the economic growth, energy requirement and demand.
5. To understand the conceptual process related with the various climatologically associated problems and their plausible solutions.

**. UNIT-I**

**1. The Multidisciplinary Nature of Environmental Studies:**

Definition, scope and importance, Need for public awareness.

**2. Natural Resources**

Renewable and Non-renewable Resources: Natural resources and associated problems.

(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

**UNIT-II**

**Environmental Pollution:** Definition

(a) Causes, effects and control measures of:

- i) Air pollution
- ii) Water pollution
- iii) Soil pollution
- iv) Marine pollution
- v) Noise pollution
- vi) Thermal pollution
- vii) Nuclear pollution
- (b) **Solid Waste Management:** Causes, effects and control measures of urban and industrial wastes.
- (c) Role of an individual in prevention of pollution.
- (d) Pollution Case Studies.
- (e) Disaster management: floods, earthquake, cyclone and landslides.

### **UNIT-III**

#### Social Issues and the Environment

- (a) From unsustainable to sustainable development
- (b) Urban problems and related to energy
- (c) Water conservation, rain water harvesting, Watershed Management
- (d) Resettlement and rehabilitation of people; its problems and concerns, Case studies.
- (e) Environmental ethics: Issues and possible solutions
- (f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies.
- (g) Issues involved in enforcement of environmental legislation

### **UNIT-IV**

#### Human Population and the Environment

- (a) Population growth, variation among nations
- (b) Population explosion – Family Welfare Programmes
- (c) Environment and human health
- (d) Human Rights
- (e) Value Education
- (f) Women and Child Welfare
- (g) Role of Information Technology in Environment and Human Health
- (h) Case Studies.

**Environmental Science related activities:**

We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around US. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects these ethos. There is a direct application of this wisdom even in modern times. Idea of an activity based course on environment protection is to sensitize the students on the above issues through following two types of activities.

**(a) Awareness Activities:**

- i) Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste.
- ii) Slogan making event
- iii) Poster making event
- iv) Cycle rally
- v) Lectures from experts.

**(b) Actual Activities:**

- i) Plantation
- ii) Gifting a tree to see its full growth
- iii) Cleanliness drive
- iv) Drive for segregation of waste
- v) To live some big environmentalist for a week or so to understand his work
- vi) To work in kitchen garden for mess
- vii) To know about the different varieties of plants
- viii) Shutting down the fans and ACs of the campus for an hour or so

**Recommended Books**

1. Agarwal, K. C. 2001 Environment Biology, Nidi Publ. Ltd. Bikaner.
2. Jadhav, H & Bhosale, V.M. 1995. Environment Protection and Laws. Himalaya Pub House, Delhi 284p.
3. Rao M. N. & Datta A.K. 1987. Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
4. Principle of Environment Science by Cunningham, W.P.
5. Essentials of Environment Science by Joseph.

**ENTERPRISE RESOURCE PLANNING**

**Subject Code- BITED1-811**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

To learn the concepts of Enterprise resource Planning. The course has all the required contents that are necessary for a graduate to understand the different strategies of an organization.

**COURSE OUTCOMES**

1. To understand the concepts of ERP and its related technologies.
2. To understand the implementation of ERP in an organization.
3. To have a deep understanding of different business modules of an organization.
4. To have a basic understanding of applications of ERP and various ERP software's.

**COURSE CONTENTS**

**UNIT-I (12 Hrs.)**

**ERP AND TECHNOLOGY:** Introduction, Related Technologies, Business Intelligence, E-Commerce and E-Business, Business Process Reengineering, Data Warehousing, Data Mining, OLAP, Product life Cycle management, SCM, CRM

**UNIT II (11 Hrs.)**

**ERP IMPLEMENTATION:** Implementation Challenges, Strategies, Life Cycle, Methodologies Package selection, Project Teams, Vendors and Consultants, Data Migration, Project management

**UNIT-III (11 Hrs.)**

**ERP IN ACTION & BUSINESS MODULES:** Operation and Maintenance, Business Modules, Finance, Manufacturing, Human Resources, Plant maintenance, Materials Management, Quality management, Marketing, Sales, Distribution and service.

**UNIT-IV (11 Hrs.)**

**ERP Application:** Enterprise Application Integration, ERP II, Total quality management.

**ERP CASE STUDY:** SAP AG, JD Edwards.

**RECOMMENDED BOOKS:**

1. Alexis Leon, 'ERP DEMYSTIFIED', 2nd Edn., Tata McGraw Hill, **2008**.
2. Mary Sumner, 'Enterprise Resource Planning', Pearson Education, **2007**.
3. Jim Mazzullo, 'SAP R/3 for Everyone', 2nd Edn., Pearson, **2007**.
4. Jose Antonio Fernandz, 'The SAP R /3 Handbook', Tata McGraw Hill, **2000**.
5. Biao Fu, 'SAP BW: A Step-by-Step Guide', 1st Edn., Pearson Education, **2003**.

**OBJECT ORIENTED SOFTWARE ENGINEERING**

**Subject Code- BITED1-812**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

This module aims to give students an understanding of the object-oriented programming paradigm in the context of developing software that is well specified, designed and tested. Students will be exposed to a variety of notations at different stages of the development process.

### **COURSE OUTCOMES**

1. Discuss about software development process models.
2. Identify the contemporary issues and discuss about coding standards.
3. Recognize the knowledge about testing methods and comparison of various testing techniques.
4. Use the concept and standards of quality and getting knowledge about software quality assurance group.

### **COURSE CONTENTS**

#### **UNIT I (12 Hrs.)**

Introduction to Software Engineering - Software Development process models – Agile Development - Project & Process - Project management - Process & Project metrics - Object Oriented concepts, Principles & Methodologies.

Planning & Scheduling: Software Requirements Specification, Software prototyping - Software project planning - Scope - Resources - Software Estimation - Empirical Estimation Models – Planning - Risk Management - Software Project Scheduling - Object Oriented Estimation & Scheduling.

#### **UNIT-II (11 Hrs.)**

Analysis: Analysis Modeling - Data Modeling - Functional Modeling & Information Flow - Behavioral Modeling-Structured Analysis - Object Oriented Analysis - Domain Analysis-Object oriented Analysis process - Object Relationship Model - Object Behaviour Model, Design modelling with UML.

#### **UNIT-III (11 Hrs.)**

Design: Design Concepts & Principles - Design Process - Design Concepts - Modular Design - Design Effective Modularity - Introduction to Software Architecture - Data Design - Transform Mapping - Transaction Mapping - Object Oriented Design - System design process- Object design process - Design Patterns.

#### **UNIT-IV (11 Hrs.)**

Implementation, Testing & Maintenance L – 9 Top - Down, Bottom-Up, object oriented product Implementation & Integration. Software Testing methods-White Box, Basis Path-Control Structure - Black Box - Unit Testing - Integration testing - Validation & System testing - Testing Tools – Software Maintenance & Reengineering.

### **RECOMMENDED BOOKS**

1. Roger. S. Pressman and Bruce R. Maxim, “Software Engineering – A Practitioner’s Approach”, seventh Edition, McGraw Hill, 2015.
2. Ian Sommerville, “Software Engineering”, 8<sup>th</sup> edition, Pearson Education, New Delhi, 2011.
3. Bill Brykeczynski, Richard D. Stutz, ”Software Engineering Project Management”, Wiley India Edition, IEEE computer society, 2007.
4. Craig Larman, Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development (3rd Edition), Pearson Education, 2008.
5. Fairley R, “Software Engineering Concepts”, second edition, Tata McGraw Hill, New Delhi, 2003.

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6. Jalote P, "An Integrated Approach to Software Engineering", third edition, Narosa Publishers, New Delhi, 2013.
7. Grady Booch, James Rumbaugh, Ivar Jacobson - "the Unified Modeling Language User Guide" - Addison Wesley, 1999.
8. Ali Bahrami, "Object Oriented Systems Development" 1st Edition, The McGraw-Hill Company, 1999.

**IMAGE PROCESSING**

**Subject Code- BITED1-813**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

This course will help to understand the different techniques used for image processing.

**COURSE OUTCOMES**

1. To give introduction of image processing.
2. To understand image enhancement.
3. To have knowledge of image Compression Redundancy models.
4. To have knowledge of Image Segmentation.

**COURSE CONTENTS**

**Unit-I (12 Hrs)**

**Digital Image Fundamentals:** Simple image model, sampling and quantization, imaging geometry, digital geometry, different types of digital images, image formation, Elements of Storage, Relationships between pixels-neighbours of pixel, application of image Processing.

**Bilevel Image Processing:** Digital distance, distance transform, medial axis transform, component labeling, thinning, morphological processing, extension to grey scale morphology.

**Unit-II (11 Hrs)**

**Image Enhancement:** Point processing, spatial filtering, frequency domain methods, multi-spectral image enhancement, image restoration.

**Color Image Processing:** Color representation, laws of color matching, chromaticity diagram, color enhancement, color image segmentation, color edge detection.

**Unit-III (11 Hrs)**

Image Compression Redundancy models, error free compression, Lossy compression, Image compression standards.

**Unit-IV (11 Hrs)**

Image Segmentation Detection of Discontinuity, Edge detection, Boundary detection, Thresholding, Regional oriented segmentation, use of motion in segmentation.

**RECOMMENDED BOOKS**

1. Digital Image Processing - by Rafael Gonzalez and Richard E. Woods, Pearson Education Society.
2. Digital Image Processing - by Keenneth R Castleman, Pearson Education Society.
3. A. K. Jain, —Fundamental of Digital Image Processing, PHI



**SOFTWARE PROJECT MANAGEMENT**

**Subject Code- BITED1-814**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE**

It gives an in-depth knowledge of software project management and project planning. It also covers the Step Wise framework in project planning

**COURSE OUTCOMES**

1. Apply the basics of Software Project Management in order to manage and deliver qualified product and plan the activities within time schedules with CPM and PERT Analysis.
2. For managing the quality of product and managing the risk involved.
3. Managing team and measuring and tracking the planning.
4. To learn configuration management and project monitoring and control.

**COURSE CONTENTS**

**UNIT-I (13 Hrs.)**

**Project Planning:** Characteristics of a software project, Software scope and feasibility, resources, the SPM plan.

**Software Project Estimation:** Size/scope estimation, Decomposition techniques, WBS. Effort estimation: Sizing, Function point, LOC, FP vs LOC. Schedule estimation: GANTT Charts, Activity networks, PERT/CPM networks. Cost estimation: Models: COCOMO-I, COCOMO-II.

**UNIT-II (11 Hrs.)**

**Quality Planning:** Quality control, Quality assurance, Formal Technical Reviews, The SQA Plan, ISO and CMM standards.

**Risk Management:** Reactive vs proactive Risk strategies, Risk projection, Risk Refinement, Risk Monitoring, Monitoring and management, RMMM plan.

**UNIT-III (11 Hrs.)**

**Measurement and Tracking Planning:** Earned Value Analysis.

**Team Management:** Team structures: hierarchical, Egoless, chief programmer, mixed; Team software Process; Resource levelling, Building a team: Skill sets.

**UNIT-IV (10 Hrs.)**

**Configuration Management:** Baselines, Configurable items, SCM repository, SCM process, version control change control, configuration audit.

**Project Monitoring and Control:** Audits and Reviews.

**RECOMMENDED BOOKS**

1. Bob Hughes and Mike Cotterell, 'Software Project Management', 5th Edn., Tata McGraw Hill, **2009**.
2. Roger Pressman, 'A Practitioner's Guide to Software Engineering', 8th Edn., Tata McGraw Hill, **2014**.
3. 'Head First PMP: A Brain Friendly Guide to Passing the Project Management Professional Exam', **2013**.

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**CONSTITUTION OF INDIA**

**Subject Code- BMNCC0-001**

**L T P C**

**Duration – 30 hrs.**

**2 0 0 0**

**COURSE OBJECTIVE**

The student will be able to learn different perspectives of constitution of India.

**COURSE OUTCOMES**

1. To learn the meaning and historical perspective of law.
2. To have deep knowledge of fundamental rights.
3. To learn different policies implemented by Constitution of India.
4. To learn Article 19 and 21.

**COURSE CONTENTS**

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21.

**ESSENCE OF INDIAN KNOWLEDGE TRADITION**

**Subject Code- BMNCC0-006**

**L T P C**

**Duration – 30 hrs.**

**2 0 0 0**

**COURSE OBJECTIVE:**

The course is introduced

1. To get a knowledge in Indian Philosophical Foundations.
2. To Know Indian Languages and Literature and the fine arts in India & Their Philosophy.
3. To explore the Science and Scientists of Medieval and Modern India

**COURSE OUTCOMES:**

After successful completion of the course the students will be able to

1. Understand philosophy of Indian culture.
2. Distinguish the Indian languages and literature among difference traditions.
3. Learn the philosophy of ancient, medieval and modern India.
4. Acquire the information about the fine arts in India.
5. Know the contribution of scientists of different eras.
6. The essence of Yogic Science for Inclusiveness of society.

**COURSE CONTENTS:**

**UNIT – I**

**Introduction to Indian Philosophy:** Basics of Indian Philosophy, culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian culture, Ancient Indian, Medieval India, Modern India.

**Indian Philosophy & Literature:** Vedas Upanishads, schools of Vedanta, and other religion Philosophical Literature. Philosophical Ideas the role of Sanskrit, significance of scriptures to current society, Indian Philosophies, literature of south India.

**UNIT – II**

**Religion and Philosophy:** Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

**UNIT – III**

**Indian Fine Arts & Its Philosophy(Art, Technology & Engineering):** Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in Indian, development of science in ancient, medieval and modern Indian.

**UNIT – IV**

**Education System in India:** Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Scientists of Medieval India, Scientists of Modern India. The role Gurukulas in Education System, Value based Education.

**RECOMMENDED BOOKS:**

1. Kapil Kapoor, “Text and Interpretation: The India Tradition”, ISBN: 81246033375, 2005
2. “Science in Samskrit”, Samskrita Bharti Publisher, ISBN-13:978-8187276333,2007
3. NCERT, “Position paper on Arts, Music, Dance and Theatre”, ISBN 81-7450-494-X, 2006.
4. S. Narain, “Examination in Ancient India”, Arya Book Depot, 1993
5. Satya Prakash, “Founders of Sciences in Ancient India”, Vijay Kumar Publisher, 1989
6. M.Hiriyanna, “Essentials of Indian Philosophy”, Motilal Banarsidass Publishers, ISBN-13: 978- 8120810990,2014
7. Chatterjee. S & Dutta “An Introduction to Indian Philosophy”.