SCHEME AND DETAILED SYLLABUS

FOR

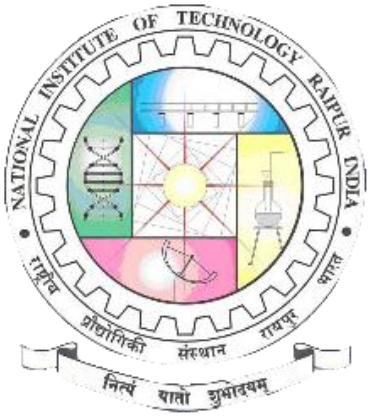
(5^{th} SEMESTER)

B.TECH FOUR YEAR DEGREE COURSE

IN

INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY



National Institute of Technology Raipur

Chhattisgarh – 492010

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DEPARTMENT OF INFORMATION TECHNOLOGY
Scheme (Third Year)

National Institute of Technology Raipur													
Course of Study and Scheme of Examination							B. Tech. 5th Semester					Branch: IT	
S. No.	Subject Code	Subject Name	Periods per Week			TA	Examination Scheme				Total Marks	Credits
			L	T	P		MSE/MTR		ESE/ESVE			
							Theory	Prac.	Theory	Prac.		
1	Program Core (IT105101IT)	Design Analysis of Algorithms	3	1	0	20	30		50		100	4
2	Program Core (IT105102IT)	Computer Networks	3	1	0	20	30		50		100	4
3	Program Core (IT105103IT)	Data Mining	3	1	0	20	30		50		100	4
4	Program Elective (IT1052XXIT)	Program Elective – I (Reference Table 1)	3	0	0	20	30		50		100	3
5	Open Elective (IT1053XXIT)	Open Elective - I (Reference Table 2)	3	0	0	20	30		50		100	3
6	Laboratory (IT105401IT)	Design Analysis of Algorithms Lab	0	0	2	40		20		40	100	1
7	Laboratory (IT105402IT)	Computer Networks Lab	0	0	2	40		20		40	100	1
8	Internship (IT105701IT)	Summer Internship I	0	0	2	40		20		40	100	1
												21

Reference Table:1 (Program Elective - I)		
S. No.	Subject Code	Subject Name
1	IT105201IT	Information Theory and Coding
2	IT105202IT	Digital Signal Processing
3	IT105203IT	Microprocessor

Reference Table:2 (Open Elective - I)		
S. No.	Subject Code	Subject Name
1	IT105301IT	Digital Image Processing
2	IT105302IT	Advance Computer Architecture
3	IT105303IT	E- Business

Design Analysis of Algorithms

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-1-0, (4)	Core	IT105101IT

[Pre-requisites: Mathematics, Data Structures]

Course Objectives

1. To teach paradigms and approaches used in design and analysis algorithms.
2. To make students understand how the best-case, worst-case and average-case time complexity of an algorithm is defined, how asymptotic notation is used to provide a rough classification of algorithms.
3. Ability to understand how the choice of data structures and the algorithm design
4. To clear up troubles the usage of set of rules design methods including the grasping approach, divide and overcome, dynamic programming, backtracking and department and certain.

Course Content

Unit-1: Analyzing algorithms

Algorithm types, Recurrence Equations, Growth function: Asymptotic notation, Standard notation & common functions, Recurrence relation, different methods of solution of recurrence equations with examples, Introduction to Divide and Conquer paradigm, maximum sub-array problem, Quick and merge sorting techniques, the basic divide and conquer algorithm for matrix multiplication Strassen Multiplication.

Unit-2: Heap Sort and, Sorting in Linear time

counting sort, radix, bucket sort, Binary Search tree, Red Black tree, B-Trees.

Unit-3: Dynamic programming

Rod cutting, Matrix multiplication, longest Common sequence, Optimal binary search trees, Overview of the greedy paradigm, activity-selection problem, Huffman codes, Knapsack problem, Single source shortest paths

Unit-4: Representational issues in graphs

Depth first search & Breath first search on graphs, strongly connected components using DFS, Topological sorting of nodes of an acyclic graph & applications, Shortest Path Algorithms, Bellman-Ford algorithm,Dijkstra'salgorithm,Floyd-Warshall's all pairs-shortest path algorithm, String Matching: Naïve, Rabin-Karp, Knuth Morris and Pratt algorithms, Linear timeanalysis of the KMP algorithm, Backtracking & Recursive backtracking, Applications of backtracking paradigm, Complexity measures, Polynomial VsNo polynomial time complexity; NP- hard and NP-complete classes, examples.

Course Materials

Required Text: Textbooks

1. Cormen, Leiserson, Rivest, Stein: "Introduction to Algorithms", 3/E, the MIT Press, 2009.
2. SartajSahni: "Data Structures, Algorithms and Applications in C++", 2/E, Universities Press/Orient Longman, 2005.
3. J. Kleinberg, E. Tardos: "Algorithm Design", 1/E, Pearson Education, Reprint 2006.

Computer Networks

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-1-0, (4)	Core	IT105102IT

[Pre-requisites: Communication Systems, Mathematics]

Course Objectives

1. To provide insight about networks, topologies, and the key concepts
2. To gain comprehensive knowledge about the layered communication architectures (OSI and TCP/IP) and its functionalities.
3. Evaluate the challenges in building networks and solutions to those.
4. Understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP

Course Content

Unit-1: Introduction to Computer Networking Concepts:

Layered Network Protocol Architectures; Physical Layer: Basics of communications; Physical media types and their important bandwidth and bit-error-rate characteristics; Wired and Wireless media including copper cables, optical fiber and wireless.

Data Link Layer and Logical Link Control (LLC) sub-layer: Framing; Error control including Bit-parity, CRC and Hamming Codes; Reliable transmission and Automatic Repeat Request (ARQ) protocols including Stop-and-Wait, Go-back-N, Selective Repeat. Performance analysis of ARQ protocols.Medium Access Control (MAC) sub-layer: Shared media systems; Bus, Star and Ring topologies; TDMA, FDMA, CSMA, CSMA/CD, Ethernet and IEEE 802.3; IEEE 802.11 including CSMA/CA protocols; Performance analysis; Shared and Switched Ethernet.

Unit-2:Network Layer:

Internet Protocol (IP) suite; Hierarchical network architectures; IPv4 and IPv6 addressing and headers; Routing protocols including distance-vector and link-state approaches; Interior and Exterior Gateway Protocol concepts; Routing Algorithms including Dijkstra's algorithm and distributed Bellman-Ford algorithm; Example protocols: OSPF, RIP, BGP.

Unit-3: Transport Layer:

Reliable end-to-end transmission protocols; UDP header; Details of TCP header and operation including options headers and congestion control; TCP variants such as Reno, Tahoe, Vegas, Compound and CUBIC.

Unit 4:Real-time applications:

Classification of applications, Introduction to cryptography and network security, Domain Name System (DNS), Applications: SMTP, MIME, Email clients, HTTP, persistent TCP connections, Multimedia, overlay networks like peer-to-peer file sharing and content distribution networks.

Course Materials

Required Text: Text books

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2003.
2. Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.

Optional Materials: Reference Books

1. Larry L.Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., SecondEdition.
2. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education,2000.
3. Knuth, Donald E. : "The Art of Computer Programming", Vol I & III, 3/E, Pearson Education, 1997
4. Sara Baase , Allen van Gelder : "Computer Algorithms: Introduction To Design & Analysis", 3/E, Pearson Education, 2000.

Data Mining

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-1-0, (4)	Core	IT105103IT

[Pre-requisites: Database Management Systems, Data Structures, Analysis and Design of Algorithms]

Course Objectives

1. To provide students with basic concepts in Data Mining and Data Warehousing
2. To make the students understand the basic and state-of-the algorithms used for analyzing data obtained from different sources
3. To build a warehouse and demonstrate competence with the fundamental tasks involved with it.
4. Formulate new techniques for analyzing complex data

Course Content

Unit 1: Data Warehousing – Introduction and Design:

Overview and Concepts: Data Warehousing Components, Building a Data Warehouse, Data Warehouse Architecture, Infrastructure and Metadata. Data Design and Data Representation: Principles of Dimensional Modeling, Data Extraction, Transformation and Loading, Data Quality, Online Analytical Processing (OLAP)–OLAP and Multidimensional Data Analysis.

Unit-2 Data Mining – Pre-processing:

Steps in Data mining process, Data Mining Functionalities, Architecture of a Typical Data Mining Systems, Classification of Data Mining Systems, Knowledge Discovery in Databases (KDD), KDD Process, Data Preprocessing, Data Cleaning, Data Transformation, Data Compression and Dimension Reduction, Principal Component Analysis, Binning Methods.

Unit-3 Data Mining Techniques

Association Rule Mining, Classification and Prediction: Efficient and Scalable Frequent Item set Mining Methods, Mining, Various Kinds of Association Rules, Association Rules, Market Basket Analysis, Apriori Algorithm, Tree Based Algorithms. Classification by Decision Tree Introduction, Bayesian Classification, Rule Based Classification, Classification by Back propagation, Support Vector Machines, Lazy Learners, Prediction Techniques, Regression Models.

Unit-4 Clustering & Introduction to Web Mining

Data Mining Algorithms: Clustering. Partitioned Algorithms, Hierarchical Algorithms, Density Based, Algorithms, Grid Based Algorithms, Web Content Mining, Web Structure Mining, Web Usage Mining, Spatial Mining, Multimedia Data Mining, Text Mining.

Course Materials

Required Text: Text books

1. J. Han and M. Kamber, “Data Mining Tools and Techniques”, Morgan Kaufmann Publishers.
2. .M.H. Dunham, “Data Mining Introductory and Advanced Topics”, Pearson Education.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, PearsonEducation.

Optional Materials: Reference Books

1. Prabhu, “Data warehousing- concepts, Techniques, Products and Applications”, Prentice Hall of India.
2. Alex Berson and Stephen J. Smith, “Data Warehousing, Data Mining & OLAP”, Tata McGraw Hill Edition, Tenth Reprint.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Pearson Education.

Information Theory and Coding

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-0-0, (3)	Program Elective	IT105201IT

[Pre-requisites: Computational Mathematics, Communication Systems]

Course Objectives

1. To understand the principles and applications of information theory.
2. To learn the encoding schemes and error correcting techniques.
3. To analyse compression techniques required to compress text and image.
4. To analyse compression techniques required to compress audio and video.

Course Content

Unit 1: Information Entropy Fundamentals

Uncertainty, Information and Entropy, Source coding Theorem, Huffman coding, Shannon Fano coding, Discrete Memory less channels, channel capacity, channel coding Theorem, Channel capacity Theorem.

Unit 2:Error Control Coding

Linear Block codes, Syndrome Decoding, Minimum distance consideration, cyclic codes,Generator Polynomial, Parity check polynomial, Encoder for cyclic codes, calculation of syndrome, Convolutional codes.

Unit 3: Compression Techniques

Principles, Text compression, Static Huffman Coding, Dynamic Huffman coding, Arithmetic coding, Image Compression, Graphics Interchange format, Tagged Image File Format, Digitized documents, Introduction to JPEG standards.

Unit 4:Data, Voice, Audio and Video Coding:

Differential Pulse Code Modulation, Adaptive Differential Pulse Code Modulation, Adaptivesubband coding, Delta Modulation, Adaptive Delta Modulation, Coding of speech signal at low bit rates (Vocoders, LPC).Linear Predictive coding, code excited LPC, Perceptual coding, MPEG audio coders, Dolby audio coders, Video compression, Principles, Introduction to H.261 & MPEG Video standards.

Course Materials

Required Text: Text books

1. Simon Haykin, “Communication Systems”, John Wiley and Sons, 4th Edition, 2001.
2. Fred Halsall, “Multimedia Communications, Applications Networks Protocols and Standards”, Pearson Education, Asia 2002.
3. R. Bose Information Theory, Coding and Cryptography.

Optional Materials: Reference Books

1. Mark Nelson, Data Compression Book, BPB Publication 1992.
2. Watkinson J, Compression in Video and Audio, Focal Press, London, 1995.

Digital Signal Processing

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-0-0, (3)	Program Elective	IT105202IT

[Pre-requisites: Mathematics-I]

Course Objectives

1. To study digital signal processing methods for real time DSP systems.
2. To study FIR & IIR Filters for signal processing
3. To compare various design methods of filter and selection of best filter
4. To study the Z transform and its applications in signal processing

Course Content

Unit 1: Need of digital signal processing:

Analog IO interface for real time DSP system, Block diagram, Review of FFT algorithm, Review of Z transform, Properties of z transform, Rational z transforms, Inversion of z transform, One sided z transform, Analysis of LTI system in z domain, Stability. Correlation and convolution methods

Unit 2: Implementationof Discrete Time Systems:

Structures for realization of discrete time systems, Structures for FIR systems, Structures for IIR systems, State space system analysis and structures, Representation of numbers, Quantization of filter coefficients, Round off effects in digital filters, Introduction to digital signal processors, MAC unit, Circular buffer.

Unit 3: FIR Filter Design:

Features of FIR filers, Linear phase response and its implications, FIR filter specifications, FIR filter design, Coefficient calculation methods, Window method, Optimal method, Frequency sampling method, Design of FIR differentiators, Design of Hilbert transformer, Comparison of various design methods. Introduction to adaptive FIR filters.

Unit 4:IIR Filter Design:

Features of IIR filters, Design stages, specifications, Pole-zero placement method, Impulse invariant method, Matched Z transform method, Bilinear Z transform method, calculating coefficients by mapping s-plane poles and zeros, Choice of coefficient calculation methods, Finite word-length effects, Digital frequency oscillators, DTMF detection using Goertzel algorithm.

Course Materials

Required Text: Text books

1. Digital signal processing, 4/e, J G Proakis, D G Manolakis, Pearson Education 2007.
2. Digital signal processing – A practical approach, 2/e, E C Ifeachor, B W Jervis, Pearson Education 2002

Optional Materials: Reference Books

1. Digital signal processing – Fundamentals and applications, Li Tan, Elsevier Inc, USA 2008.
2. C algorithms for real time DSP, P M Embree, Prentice Hall Inc, USA 1995.
3. Digital signal processing laboratory, B P Kumar, CRC Press, USA 2005

Microprocessor

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-0-0, (3)	Program Elective	IT105203 IT

[Pre-requisites: Digital Electronics & Logic Design]

Course Objectives

1. To introduce students with the architecture and operation of microprocessor.
2. To make students familiar with the programming and interfacing of microprocessor.
3. To design applications using microprocessor.

Course Content

Unit 1: Introduction to 8085 Microprocessor

Review of logic design using MSI/LSI chips such as De-multiplexers/Decoders, Multiplexers, Priority encoders, Registers, Counters, Buffers, Latches. Introduction to functions performed by microprocessor, R/W and ROM memory models, Memory map and addresses, I/O devices, I/Addressing. The 8085programming model, Instruction classification, Instruction and data formats, addressing modes, Data transfer operations, Arithmetic operations, Logic operations, Branch operations, Writing Assembly Language programs, Hand assembly of a program 8085Microprocessor architecture, Logic pin-out, machine cycles and bus timings.

Unit 2: Interfacing & Assembly Language Program

Memory interfacing, Absolute, Partial decoding, Multiple Address range, interfacing memory with wait states, Interfacing I/O devices, Peripheral I/O, Memory mapped I/O, 8085 single-board microcomputer system. Interfacing of 8085 with 8155/8156 (RAM), 8355/8755 (ROM). Programming techniques with additional instructions, Looping, counting and indexing, Data transfer from/to memory to/from microprocessor, 16-bit arithmetic instructions, Logic operations like rotate, compare, Time delays, Counters, Stack, Subroutine, Call and return instructions. Interrupts, The 8085interruptprocess, multiple interrupt and priorities, vectored interrupts, Restart as software instruction.

Unit 3: Peripheral Devices

Programmable Interfacing devices, Basic concept, 8279 programmable Keyboard/Display interface,8255A programmable Parallel interface, interfacing keyboard and display using 8255A, 8254programmable Interval Timer, 8259A programmable Interrupt Controller, Direct Memory Access(DMA), 8237 DMA Controller. Serial I/O and Data communication, Basic concept in serial I/O, Data communication over telephone lines, Standards in serial I/Os, the 8085-serial I/O lines, 8251Aprogrammable communication interface Microprocessor Applications, Interfacing scanned multiplexed displays and Liquid Crystal Displays, Interfacing a matrix keyboard.

Unit 4: Introduction to 8086 Microprocessor

Architecture and pin configuration of 8086, Instruction Format; Addressing modes Basic 8086 system bus architecture, Minimum mode Configuration, Maximum mode configuration; memory interfacingwith 8086 in minimum and maximum mode; System Bus Timings, Bus Assembler Directives and Operators; Assembly Process; Translation of assembler Instructions. Programming of microprocessor 8086.

Course Materials

Required Text: Text books

1. Microprocessor Architecture, Programming and Application by R. S. Gaonkar, Wiley Eastern.
2. Advance Microprocessor and Peripherals (Architecture, Programming & Interfacing) by A. K.Roy& K. M. Bhurchandi – TMH

Optional Materials: Reference Books

1. The Intel Microprocessor – (Architecture, Programming & Interfacing) by Barry B. Bery.
2. Microprocessors and Programmed Logic (2nd Edition), Pearson Education by Kenneth L. Short
3. Microcomputer Systems: The 8086/8088 Family, Yu-Cheng Lieu & Glenn A. Gibson, PrenticeHall India.
4. Microprocessors & Interfacing: Programming & Hardware, Douglas V. Hall, Tata McGrawHill.

Digital Image Processing

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-0-0, (3)	Open Elective	IT105301IT

[Pre-requisites: Computational Mathematics, Digital and Logic Design]

Course Objectives

1. Cover the basic theory and algorithms that are widely used in digital image processing.
2. Expose students to current technologies and issues that are specific to image processing systems.
3. Evaluate the techniques for image enhancement and image restoration.
4. Categorize various compression techniques

Course Content

Unit 1: Digital Image Fundamentals

Image formation model, Spatial & Gray level resolution, Image enhancement in special domain:Piecewise transformation functions, Histogram equalization, Histogram specification. Relationships between pixels, Color image fundamentals, RGB, HSI models.

Unit 2: Image Enhancement in Spatial andFrequency DomainImage

Averaging, spatial filters, smoothing and sharpening, Laplacian filter, 2D discrete Fourier transform & its inverse, filtering in frequency domain, Ideal & Gaussian low pass filters, High pass filtering, FFT.

Unit 3: Image Segmentation and Restoration

Line detection, Edge detection, Edge linking & boundary detection, Thresholding and its types, Region based segmentation, Canny edge detector. Image Restoration filters, Mean Filters, Order Statistics filters, Inverse Filtering, Wiener filtering

Unit 4: Morphological Image Processing&Image Compression

Logic operations involving binary image, Dilation& Erosion, Opening & Closing, Applications to Boundary extraction, region filling, connected component extraction. hit-and-miss transform, thinning and shape decomposition.

Coding redundancy- Huffman coding, LZW coding, run length coding, Lossy compression- DCT, JPEG, MPEG, video compression.

Course Materials

Required Text: Text books

1. Ganzalez and Woods, Digital Image Processing, Pearson education.
2. Sonka and Brooks, Image Processing, TSP ltd.

Optional Materials: Reference Books

1. Jain and Rangachar, Machine Vision, MGH.
2. Schalkoff, Digital Image Processing, John Wiley and sons.

Advance Computer Architecture

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-0-0, (3)	Open Elective	IT105302IT

[Pre-requisites: Computer Organization, Microprocessor]

Course Objectives

1. To understand the principles of parallel computer architecture
2. To understand the design of parallel computer systems including modern parallel architectures
3. To assess the communication and computing possibilities of parallel system architecture and to predict the performance of parallel applications
4. Technical knowhow of parallel hardware constructs to include instruction-level parallelism for multi core processor design

Course Content

Unit 1: Introduction

Parallel Computing, Parallel Computer Model, Program and Network Properties, Parallel Architectural Classification Schemes, Flynn's &Feng's Classification, Performance Metrics and Measures, Speedup Performance Laws: Multiprocessor System and Interconnection Networks; IEEEPOSIX Threads: Creating and Exiting Threads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, Canceling the Threads.

Unit 2: Pipelining and Memory Hierarchy

Basic and Intermediate Concepts, Instruction Set Principle; ILP: Basics, Exploiting ILP, Limits on ILP; Linear and Nonlinear Pipeline Processors; Super Scalar and Super Pipeline Design; Memory Hierarchy Design: Advanced Optimization of Cache Performance, Memory Technology and Optimization, Cache Coherence and Synchronization Mechanisms.

Unit 3: Thread and Process Level Parallel Architecture

Introduction to MIMD Architecture, Multithreaded Architectures, Distributed Memory MIMDArchitectures, Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMD Architecture, Associative and Neural Architecture, Data Parallel Pipelined and Systolic Architectures, Vector Architectures.

Unit 4: Parallel Algorithmsand Developing Parallel Computing Applications

PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, merging two Sorted lists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quick-sort, Hyper Quick sort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies.OpenMP Implementation in 'C': Execution Model, Memory Model; Directives: Conditional Compilation, Internal Control Variables, Parallel Construct, Work Sharing Constructs, Master and Synchronization Constructs; Run-Time LibraryRoutines: Execution Environment Routines, Lock Routines, Timing Routines; Simple Examples in 'C'Basics of MPI.

Course Materials

Required Text: Text books

1. Kai Hwang, Advance Computer Architecture, TMH.
2. Matthew, Beginning Linux Programming, SPD/WROX.
3. Hennessy and Patterson, Computer Architecture: A Quantitative Approach, Elsevier.

Optional Materials: Reference Books

1. Dezso and Sima, Advanced Computer Architecture, Pearson.
2. Quinn, Parallel Computing: Theory & Practice, TMH.
3. Quinn, Parallel Programming in C with MPI and Open MP, TMH Open MP Specificationand Usage

E-Business

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	3-0-0, (3)	Open Elective	IT105303IT

[Pre-requisites: Nil]

Course Objectives

1. This course introduces information systems for business and management.
2. It is designed to familiarize students with organizational and managerial foundations of systems, the technical foundation for understanding information systems.

Course Content

Unit 1:

Concept of e-business; Nature, scope, and impact of e-business; Difference between e-business and ecommerce; History and development of e-business; Advantages of e-business; Business models for e-products and e-services; Contribution of e-business to economic growth, market, competitiveness, and productivity. Web commerce concepts, the e-commerce phenomenon, electronic marketplace technologies, web-based tools for e-commerce, e-commerce software, hosting services and packages.

Unit 2:

Introduction; e-business technologies - hardware, e-business software applications, internet and World Wide Web; Database management system; e-business security; Online payment technology; IT/IS evaluation and e-business; Social consequences of e-business technologies. Security issues, approaches to safe e-commerce, PKI- biometrics for security in e-commerce, smart cards and applications

Unit 3:

Wireless infrastructure, payment agents, mobile agent based systems, digital cash, security requirements for digital cash, Digital cheques, netcheque systemsERP, e-SCM, CRM, E-Payment. E-Procurement definition, processes, methods and benefits.Describe payment methods in B2B EC.

Unit 4:

Secure electronic transaction- secure online payment – micropayments – industrial epayment systems– challenges and opportunities of e-payment.Electronic Data Interchange, EDI Applications in Business, EDI and E-Commerce, Standardization and EDI, EDI Software Implementation, Value Added Networks (VANs), Internal Information Systems.

Course Materials

Required Text: Text books

1. Weidong Kou, Payment Technologies for E-Commerce, Springer, 2003.
2. Kalakota R. &Whinston A.B., "Frontiers of Electronic Commerce", Addison-Wesley, New Delhi

Optional Materials: Reference Books

1. Janice Raynolds, The Complete E-Commerce Book, 2/e, CMP Books, 2004.
2. Schneider G. P. & Perry J. T., Electronic Commerce, Course Technology, Cambridge
3. Westland J. C. & Clark T.H. K., "Global Electronic Commerce", University Press, 2001.
4. Minoli D. &Minoli E., "Web Commerce Technology Handbook", Tata McGraw Hill, New Delhi
5. E-business roadmap for success by Dr. Ravi Kalakota & Marcia Robinson.

Introduction to Linguistics

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Humanities	3-0-0, (3)	Open Elective	

Computational Biology

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Bio Technology	3-0-0, (3)	Open Elective	

Entrepreneurship-I

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Humanities	3-0-0, (3)	Open Elective	Humanities

Design Analysis of Algorithms Lab

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	0-0-2, (1)	Lab	IT105401IT

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.

Computer NetworksLab

[5thSemester, Third Year]

Course Description

Offered by Department	Credits	Status	Code
Information Technology	0-0-2, (1)	Lab	IT105402IT

List of 10 -15 Assignment/Practical will be allotted by the Instructor in the respective Lab.