SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
THIRD YEAR, INFORMATION TECHNOLOGY
SEMESTER VI
EFFECTIVE FROM SESSION 2022-23

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/ WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	IT206TPC01	COMPILER DESIGN	3	0	0	30	70	100	3
2	IT206TPC02	COMPUTER NETWORKS	3	0	0	30	70	100	3
3	IT206TPE2X	ELECTIVE – II	3	0	0	30	70	100	3
4	IT206TPE3X	ELECTIVE – III	3	0	0	30	70	100	3
5		OPEN ELECTIVE - I	3	0	0	30	70	100	3
PRACTICAL									
1	IT206PPC01	COMPUTER NETWORKS LAB	0	0	4	30	20	50	2
2	IT206PPE2X	ELECTIVE – II LAB	0	0	4	30	20	50	2
3	IT206PPR11	PROJECT - I	0	0	6	30	20	50	3
TOTAL CREDITS									**22**
IA- INTERNAL ASSESSMENT, ESE-END SEMESTER EXAMINATION, L-LECTURE, T-TUTORIAL, P-PRACTICAL									

LIST OF ELECTIVE – II

1.	IT206TPE21	MICROPROCESSOR & MICROCONTROLLER
2.	IT206TPE22	WEB TECHNOLOGY & E-COMMERCE
3.	IT206TPE23	QUEUING THEORY & MODELING
4.	IT206TPE24	IMAGE PROCESSING

LIST OF ELECTIVE – II (LAB)

1.	IT206PPE21	MICROPROCESSOR & MICROCONTROLLER LAB
2.	IT206PPE22	WEB TECHNOLOGY & E-COMMERCE LAB
3.	IT206PPE23	QUEUING THEORY & MODELING LAB
4.	IT206PPE24	IMAGE PROCESSING LAB

LIST OF ELECTIVE-III

1.	IT206TPE31	GRID & CLOUD COMPUTING
2.	IT206TPE32	MULTIMEDIA SYSTEM DESIGN
3.	IT206TPE33	SPEECH & NATURAL LANGUAGE PROCESSING
4.	IT206TPE34	GRAPH THEORY

LIST OF OPEN ELECTIVE-I

S.No.	COURSE CODE	COURSE NAME	OFFERED BY	ELIGIBLE DEPARTMENT
1.	CH206TOE01	INDUSTRIAL UTILITIES AND SAFETY	CHEMICAL	CIVIL, CSE, ECE, IPE, IT & MECH
2.	CE206TOE01	METRO SYSTEMS AND ENGINEERING	CIVIL	CHEM, CSE, ECE, IPE, IT & MECH
3.	CS206TOE01	OBJECT ORIENTED PROGRAMMING WITH C++	CSE	CHEM, CIVIL, ECE, IPE, IT & MECH
4.	EC206TOE01	INTRODUCTION TO ELECTRONIC DEVICES AND CIRCUITS	ECE	CHEM, CIVIL, CSE, IPE, IT & MECH
5.	IP206TOE01	OPERATION RESEARCH	IPE	CHEM, CIVIL, CSE, ECE, IT & MECH
6.	IT206TOE01	COMPUTER GRAPHICS	IT	CHEM, CIVIL, CSE, ECE, IPE & MECH
7.	ME206TOE01	AUTOMOBILE ENGINEERING	MECHANICAL	CHEM, CIVIL, CSE, ECE, IPE & IT

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) (A CENTRAL UNIVERSITY)
B. TECH. INFORMATION TECHNOLOGY

Programme Outcomes: Graduates will be able to:

PO1: Fundamentals: Apply knowledge of mathematics, science and engineering.

PO2: Problem analysis: Identify, formulate and solve real time engineering problems using first principles.

PO3: Design: Design engineering systems complying with public health, safety, cultural, societal and environmental considerations

PO4: Investigation: Investigate complex problems by analysis and interpreting the data to synthesize valid solution.

PO5: Tools: Predict and model by using creative techniques, skills and IT tools necessary for modern engineering practice.

PO6: Society: Apply the knowledge to assess societal, health, safety, legal and cultural issues for practicing engineering profession.

PO7: Environment: Understand the importance of the environment for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics, and responsibilities and norms of the engineering practice.

PO9: Teamwork: Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary settings.

PO10: Communication: Communicate effectively by presentations and writing reports.

PO11: Management: Manage projects in multidisciplinary environments as member or a team leader.

PO12: Life-long learning: Engage in independent lifelong learning in the broadest context of technological change.

Programme Specific Outcomes:

PSO1: To apply knowledge of recent computing technologies, skills and current tools of Information Technology Engineering.

PSO2: To design software systems, components or processes to meet identified needs within economic, environmental and social constraints.

PSO3: To explore research gaps, analyze and carry out research in the specialized/emerging areas.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPC01	3	0	0	3 HOURS	30	70	3

Complier Design

Course Objectives:

1. To learn the process of translating a modern high-level language to executable code.
2. To provide a student with an understanding of the fundamental principles in compiler design and to provide the skills needed for building compilers for various situations that one may encounter in a career in Computer Science.
3. To develop an awareness of the function and complexity of modern compilers.
4. To apply the code generation algorithms to get the machine code for the optimized code.
5. To represent the target code in any one of the code formats.
6. To understand the machine dependent code.
7. To draw the flow graph for the intermediate codes.
8. To apply the optimization techniques to have a better code for code generation.

UNIT 1: Introduction: Phases of compilation and overview. Lexical Analysis (scanner): Regular languages, finite automata, regular expressions, from regular expressions to finite automata, scanner generator (lex, flex).

UNIT 2: Syntax Analysis (Parser): Context-free languages and grammars, push-down automata, LL(1) gram-mars and top-down parsing, operator grammars, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (yacc, bison)Semantic Analysis: Attribute grammars, syntax directed definition, evaluation and flow of attribute in a syntax tree.

UNIT 3: Symbol Table: Its structure, symbol attributes and management. Run-time environment: Procedure activation, parameter passing, value return, memory allocation, and scope.

UNIT 4: Intermediate Code Generation: Translation of different language features, different types of intermediate forms. Code Improvement (optimization): Analysis: control-flow, data-flow dependence etc.; Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc.

UNIT 5: Architecture dependent code improvement: instruction scheduling (for pipeline), loop optimization (for cache memory) etc. Register allocation and target code generation Advanced topics: Type systems, data abstraction, compilation of Object Oriented features and non-imperative programming languages.

List of Books:

1. A.V.Aho, Ravi Sethi, J.D.Ullman, Compilers tools and Techniques, Addison Wesley.
2. D.M.Dhamdhere, Compiler Construction-Principles and practice Macmillan, India.
3. Tremblay J.P. and Sorenson, P.G. the theory and practice of compiler writing, Mc Graw Hil.
4. Waite W.N. and Goos G., Compiler construction' springer verlag.

Course Outcomes :

By the end of the course, the successful student will be able to do:

1. To realize basics of compiler design and apply for real time applications.
2. To introduce different translation languages.
3. To understand the importance of code optimization.
4. To know about compiler generation tools and techniques.
5. To learn working of compiler and non compiler applications.
6. Design a compiler for a simple programming language.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3							3	3	3	1
CO2	3	3	3	2	1							3	3	3	1
CO3	3	3	2	1	1							3	3	3	1
CO4	3	3	3	1	1							3	3	3	1
CO5	3	3	3	1	1							3	3	3	1

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPC02	3	0	0	3 HOURS	30	70	3

Computer Networks

Course Objectives:

- To understand the working principle of various communication protocols.
- To analyze the various routing algorithms.
- To know the concept of data transfer between nodes.

UNIT I - Introduction: OSI and TCP/IP Reference models, Function of layers, Network Topologies, Categories of Network - LAN, WAN, MAN, Line Configuration, Transmission Modes, Networking Devices.

UNIT II - Data link layer: Design issues, framing, error detection and correction, CRC, Hamming Code Method, Elementary Protocol- stop and wait, Sliding Window, HDLC, Ethernet, CSMA/CD.

UNIT III - Network Layer: Design Issues, Forwarding and Routing, Virtual Circuit and Datagram Networks, shortest path routing – Dijkstra's algorithms, Link State Routing, Distance Vector Routing, Internet Protocol (IP), Hierarchical Routing – RIP – OSPF – BGP.

UNIT IV - Transport Layer: Transport Layer Services, Transmission Control Protocol, TCP header, 3 way Handshake, UDP, UDP header, Difference between TCP and UDP, Reliable Data Transfer – Go Back N and Selective Repeat.

UNIT V - Application Layer: Principles of Network Applications, Encryption, Compression, Cryptography: Substitution and Transposition Ciphers, Data functions: translation, Encryption standards (DES), RSA, Email, World Wide Web, file transfer protocol, VoIP, TFTP.

TEXT BOOKS

1. Data Communications and Networking – Behrouz A. Forouzan. TMH.
2. Computer Networks — Andrew S Tanenbaum, Pearson Education/PHI.
3. Data and Computer Communication by William Stalling (Pearson Education).

REFERENCE BOOKS

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.
3. Computer Networking by Ed Tittel (Schaum's series) (TMH).
4. Comer, "Computer Networks and Internets with Internet Applications", Pearson Education.

Course Outcomes :

1. Understand fundamental underlying principles of computer networking
2. Understand details and functionality of layered network architecture.
3. Apply mathematical foundations to solve computational problems in computer networking.
4. Analyze performance of various communication protocols.
5. Compare routing algorithms.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1									3	2	1
CO2	2	1	3	2									1	2	3
CO3	1	2	3	3									1	3	2
CO4	2	3	2	2									2	2	1
CO5	2	2	3	2									2	3	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE21	3	0	0	3 HOURS	30	70	3

Microprocessor &Microcontroller

Course Objectives:

Students will be able to.

1. To develop basic concepts and learn assembly language programming
2. Describe the architecture of 8086 Microprocessors.
3. Interfacing with memory and peripherals
4. Understand 8051 microcontroller concepts, architecture and programming.
5. Develop programs for microcontrollers and its applications

UNIT 1: Architecture of Microprocessors

Architecture of 8085Microprocessor.Architecture of 8086 Microprocessor. Signals and pins of 8086 microprocessor.

UNIT 2: Assembly Language of 8086

Description of Instructions, Assembly Directives Assembly, Software Programs with Algorithms

UNIT 3: Interfacing with 8086

Interfacing with RAMs, ROMs along with the explanation of timing diagrams.Interfacing with Peripheral ICs like 8255, 8254, 8279, 8259 etc.Architecture of 8087, Interfacing with 8086.

UNIT 4: Architecture of Micro controllers

Architecture of Microcontroller, Family members, Microcontroller Resources, Architecture of 8051 Microcontroller, Internal External memories, Counters &Timers, Synchronous Serial-Cum-Asynchronous Serial Communication USART Interface in Intel 8051, interrupts.

UNIT 5: Assembly language of 8051

Basic Assembly Language Programming in 8051, 8051 family Microcontrollers Instruction set.

REFERENCES

1. Advanced Microprocessor and peripherals by K M Bhurchandi and A K Ray, McGraw Hill Education
2. Architecture programming, interfacing and system design by Raj Kamal,pearson education.

Course Outcomes :

At the end of the course, students will develop ability to

1. Define the concept of microprocessors and learning of assembly language programming.
2. Describe the architectures of 8085 and 8086 microprocessors and learning how to compare two processors
3. Interfacing the memory andperipherals like 8254, 8259, 8087 etc.
4. Programming microcontroller and its architecture.
5. Apply the above concepts to real world automation and other electronics problems and applications.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	3	-	2	-	3	3	3	3	3	3
CO2	3	3	3	2	2	3	-	2	-	2	1	3	3	3	2
CO3	3	3	3	3	3	3	-	2	-	3	3	3	3	3	3
CO4	3	3	3	3	2	3	-	2	-	3	1	3	3	3	3
CO5	3	3	3	3	3	3	-	2	-	3	3	3	3	3	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE22	3	0	0	3 HOURS	30	70	3

Web Technology & E-Commerce

Course Objectives:

The course content enables students to:

1. Understand best technologies for solving web client/server problems.
2. Analyze and design real time web applications.
3. Use Java script for dynamic effects and to validate form input entry.
4. Analyze to Use appropriate client-side or Server-side applications

UNIT I

Fundamentals of Web, History of the Web, Growth of the Web in post decade, Web function. Security aspects on the web, Computational features encompassing the Web. Working Web Browsers, concepts of search Engines, Searching the Web, Web Servers.

UNIT II

HTML: - Introduction, , content positioning HTML content, Layer object, Handling events using localized scripts, Animating images, HTML List, HTML Table & DHTML. Cascading style sheets.

UNIT III

Active Server Page(ASP) Introduction , Internet Information System , Basic authentication , active server page, asp objects , server objects , file system objects , session ,accessing database with an ASP page, create an ODBC ADO connection object, common methods & Properties events , ADO record set object.

UNIT IV

XML: Introduction, difference between XML & HTML, building application with XML, XML schemas. DTD & XSLT.

UNIT V

Security of E-Commerce transactions, E-Commerce models- B2B, B2C, review of cryptographic tools, authentication, signatures, observers, anonymity, privacy, tractability, key certification, managementetc.EDI, Payment protocols and standards, smart card, e-card, e-wallet technologies, electronic money and electronic payment systems.

List of Books:

1. Minoli and Minoli, Web technology and Commerce, TMH.
2. Web Technology, Achyut Godbole, Atul Kahate, TMH.
3. Principles of Web Design, Sklar, Cengage.
4. Electronic Commerce, Schneider, cengage Learn.
5. The E-Business revolution, Daniel Amor, PHI.
6. E-Government, Satyanarayana, PHI.
7. E-Commerce, Greenstein, TMH.
8. Koisur David : Electronic Commerce, Microsoft.
9. Ravi Kalakota : Frontiers of Electronic commerce.

Course Outcomes :

At the end of the course students are able to:

1. Choose, understand, and analyze any suitable real time web application.
2. Integrate java and server side scripting languages to develop web applications.
3. Extend this knowledge to .Net platforms.

4. Understand the implementation of Electronic Data Interchange (EDI) in day to day life

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	3	2	3								2	2	3
CO2	2	2	2	2	3								1	1	2
CO3	3	3	1	1	2								3	2	2
CO4	2	2	3	2	2								2	2	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE23	3	0	0	3 HOURS	30	70	3

Queuing Theory & Modeling

Course Objectives:

1. To make students familiar with stochastic process theory and its applications.
2. To develop mathematical and modeling skills required for evaluating queueing systems performance.
3. To give a theoretical background needed to understand academic literature on the subject.

UNIT 1 RandomeVariables

Discrete and continuous random variables – Moments – Moment generating functions –Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

UNIT 2 Two-Dimentional Random Variables

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and & Linear regression – Transformation of random variables.

UNIT 3 Random Processes

Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT 4 Queueing Model

MarKovian queues – Birth and Death processes – Single and multiple server queueing models –Little's formula -Queues with finite waiting rooms – Queues with impatient customers : Balkingand reneging.

UNIT 5 Advanced Queueing Models

Finite source models – M/G/1 queue – Pollaczekkhinchin formula – M/D/1 and $M/E_k/1$ asspecial cases – Series queues – Open Jackson networks.

TEXT BOOKS:

1. Ibe. O.C., "Fundamentals of applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007
2. Gross. D. and Harris. C.M., "Fundamentals of Queueing Theory", Wiley Student edition,2004.

REFERENCES:

1. Robertazzi, "Computer Networks and Systems: Queueing Theory and performance evaluation", Springer, 3RdEdition, 2006.
2. Taha. H.A., "Operations Research", Pearson Education, Asia, 8th Edition, 2007.

3. Trivedi.K.S.,"Probability and Statistics with Reliability, Queueing and Computer Science applications", John Wiley and Sons, 2nd Edition, 2002.

Course Outcomes :

At the end of the course learners will be able to:

1. Understand the fundamental concepts of probability and acquire knowledge of standard distributions which can describe real life phenomena.
2. Identify various distribution functions and acquire skills in handling situations involving more than one variable.
3. Analyze the various classifications of Random Processes and characterize phenomena which evolve with respect to time in a probabilistic manner.
4. Understand the basic characteristic features of a queuing system and acquire skills in analyzing queuing models.
5. Analyze a network of queues with Poisson external arrivals, exponential service requirements and independent routing.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	2	2								3	2	2
CO2	1	2	3	1	2								3	2	2
CO3	2	3	2	2	2								2	2	2
CO4	2	2	1	2	3								3	2	3
CO5	3	2	1	2	2								3	2	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE24	3	0	0	3 HOURS	30	70	3

Image processing

Course Objectives:

1. To study the image fundamentals and mathematical transforms necessary for image processing.
2. To study the image enhancement techniques.
3. To study image restoration procedures.
4. To study the image compression procedures.

Unit 1 Digital Image Fundamentals-Elements of visual perception, image sensing and acquisition, image sampling and quantization, basic relationships between pixels – neighborhood, adjacency,connectivity, distance measures.

Unit 2 Image Enhancements and Filtering-Gray level transformations, histogramequalization andspecifications, pixel-domain smoothing filters – linear and order-statistics, pixel-domainsharpening filters – first and second derivative, two-dimensional DFT and its inverse, frequencydomain filters – low-pass and high-pass.

Unit 3 Color Image Processing-Color models–RGB, YUV, HSI; Color transformations–formulation,color complements, color slicing, tone and color corrections; Color image smoothing andsharpening; Color Segmentation.

Unit 4 Image Segmentation- Detection of discontinuities, edge linking and boundarydetection,thresholding – global and adaptive, region-based segmentation.

Unit 5 Image Compression-Redundancy–inter-pixel and psycho-visual; Losslesscompression –predictive, entropy; Lossy compression- predictive and transform coding; Discrete CosineTransform;Still image compression standards – JPEG and JPEG-2000.

Text/Reference Books:

1. R.C. Gonzalez and R.E. Woods, Digital Image Processing, Second Edition, PearsonEducation 3rd edition 2008.
2. Anil Kumar Jain, Fundamentals of Digital Image Processing, Prentice Hall of India.2nd edition 2004.
3. Murat Tekalp , Digital Video Processing" Prentice Hall, 2nd edition 2015.

Course Outcomes :

1. Review the fundamental concepts of a digital image processing system.
2. Analyze images in the frequency domain using various transforms.
3. Evaluate the techniques for image enhancement and image restoration.
4. Categorize various compression techniques.
5. Interpret Image compression standards.
6. Interpret image segmentation and representation techniques.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2							1	3	2	1
CO2	3	2	1	2	2							1	3	3	1
CO3	3	2	2	2	2							1	3	2	1
CO4	3	2	3	2	3							1	3	2	1
CO5	3	2	3	2	3							1	3	3	1

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE31	3	0	0	3 HOURS	30	70	3

Grid and Cloud Computing

Course Objectives:

1. Identify the technical foundations of cloud systems architectures.
2. Apply principles of best practice in cloud application design and management.
3. Analyze the development of various cloud services and applications.
4. Explore the importance of Bigdata and Distributed file systems.
5. Explore the concepts of distributed computing and architecture for development of cloud computing.

UNIT I

Cloud Computing, Cloud Architecture, Cloud Storage, Advantages and Disadvantages of Cloud Computing, Companies inthe Cloud Today, Cloud Services, Web-Based Application.Ubiquitous computing, On-Demand Computing,Cloud Computing for theCommunity, Collaborating on Group Projects and Events, Cloud Computing for the Corporation.

UNIT II

Infrastructure as a Service: Introduction, Virtualization, Client and Server, Storage, RAID, IBM SAN, Infrastructure creation, Elastic Computing: Amazon Ec2, Computation Services, Case Study.

UNIT III

Platformas a Service: Microsoft AZURE, Google App Engine, Amazon Web Services, IBM Clouds, Software as a Service, IBM Websphere Cast Iron, Case studies.

UNIT IV

MapReduce, GFS, Hadoop, HDFS,Bigdata, business perspectives, IBM InfosphereBiginsight, Analytics of BigData, Infosphere Streams,

UNIT V

Grid Computing: History, Definition, Types, Architecture and Goals, Applications and Challenges of Grid Computing, Providers of Grid Computing. IBM Globus Toolkit, Grid Security Infrastructure, Open Grid Service Architecture.

TEXT BOOKS / REFERENCE BOOKS

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work andCollaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing.

3. Viktors Berstis , Grid Computing : IBM Red Book.
4. Understanding Bigdata, by Paul C. Zikopoulos et al. McGraw Hill.
5. "Introduction to Grid Computing with Globus", Luis Ferreira et al. IBM Red Books.

Course Outcomes :

1. Understand the fundamental principles of cloud computing and applications.
2. Understand the importance of virtualization in distributed computing and how this has enabled the development of infrastructure as a service in Cloud Computing.
3. Learn the Concept of Platform as a service and Software as a service using case studies.
4. Understand the concept of Bigdata and Distributed File Systems.
5. Understand the architecture of distributed computing and Grid security.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3			3		1	2			3	3	3	3
CO2	1	3	3	3	3		3					3	3	3	3
CO3	1	3	3	3	3				3			3	3	3	3
CO4	2	3	3	3	3							3	3	3	3
CO5	2	3	3	3	3			3				3	3	3	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE32	3	0	0	3 HOURS	30	70	3

Multimedia System Design

Course Objectives:

The major goals of this course are:

1. Learn how learning theories influence the development of multimedia product.
2. Develop competencies in designing and creating interactive multimedia applications by explaining how elements of these applications reflect a theory of how learning will occur.
3. Work with all aspects of text, audio, images and video;
4. Learn the phases involved in multimedia planning, design and production.
5. Be able to use various multimedia authoring tools.
6. Be able to design and create interactive multimedia products.

UNIT 1: Introduction to Multimedia System: An overview of multimedia system and media streams architecture and components, synchronization & quality of service (QOS).

UNIT 2: Audio and Speech: Data acquisition, sampling and quantization, human speech, digital model of speech production, analysis and synthesis, psychoacoustics, low bit rate speech compression, MPEG audio compression.

UNIT 3: Images and Video: Image acquisition and representation, bi-level image compression standards: ITU (formerly CCITT) Group III and IV standards, JPEG image compression standards, MPEG, H.264/AVC video compression standards, Transcoding.

UNIT 4: Multimedia Communication: Fundamentals of data communication and networking, Bandwidth requirements of different media, Real time constraints: latency, video data rate, multimedia over LAN and WAN, Multimedia conferencing, video-on-demand broadcasting issues.

UNIT 5: Hypermedia Presentation: Authoring and publishing, Linear and non-linear presentation, Structuring Information, Different approaches of authoring hypermedia documents, Hyper-media data models and standards.

Text Book:

1. Jerry D. Gibson, Toby Berger, Tom Lookabaugh, Dave Lindergh and Richard L. Baker Digital Compression for Multimedia: Principles and Standards Elsevier, 2006.

2. Ralf Steinmetz and Klara Nahrstedt, Multimedia: Computing, Communications, and Application, Prentice Hall, 1995.
3. Khalid Sayood Introduction to Data Compression 3rd Edition, Elsevier, 2006.
4. Asit Dan and Dinkar Sitaram Multimedia Servers Elsevier, 2006.

Course Outcomes :

Upon successful completion of the course, students should be able to: Knowledge and understanding:

1. Understand the concepts and processes which underpin the design and development of multimedia products.
2. Understand the techniques and technologies used in the development of multimedia solutions. Intellectual / cognitive skills.
3. Plan the development of an idea into the realization of a product.
4. Design and implement multimedia solutions. Practical, research and independent learning skills.
5. Use appropriate tools for the design, development and creation of digital media arte facts.
6. Learn how to be proactive and reflective Transferable / key skills.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	2								2	2	3
CO2	2	3	2	2	3								3	2	2
CO3	2	2	3	2	2								3	3	3
CO4	2	2	3	3	3								2	2	2
CO5	2	3	2	2	2								2	2	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE33	3	0	0	3 HOURS	30	70	3

Speech and Natural Language Processing

Course Objectives:

1. To understand the basics of speech and language processing.
2. Apply conventional techniques in NLP.
3. Understand theories of Parsing, Parsing Algorithms.
4. Understand the Lexical Knowledge Networks.
5. Various types Sentiment analysis and their application.

UNIT 1 Sound : Biology of Speech Processing; Place and Manner of Articulation; Word Boundary Detection; Argmax based computations; HMM and Speech Recognition.

UNIT 2 Words and Word Forms : Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields.

UNIT 3 Structures : Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution.

UNIT 4 Meaning : Lexical Knowledge Networks, Wordnet Theory; Indian Language Wordnets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors; Coreferences.

UNIT 5 Applications : Sentiment Analysis; Text Entailment; Robust and Scalable Machine Translation; Question Answering in Multilingual Setting; Cross Lingual Information Retrieval (CLIR).

REFERENCES

1. Allen, James, Natural Language Understanding, Second Edition, Benjamin/Cumming, 1995.
2. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
3. Jurafsky, Dan and Martin, James, Speech and Language Processing, Second Edition, Prentice Hall, 2008.
4. Manning, Christopher and Heinrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

Course Outcomes :

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

1. Describe the fundamental concepts and techniques of natural language processing.
2. Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each.
3. Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions.
4. Analyze large volume text data generated from a range of real-world applications.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2	2	3								3	2	3
CO2	2	3	2	3	1								2	3	3
CO3	2	2	3	3	2								2	2	2
CO4	1	2	2	2	2								3	2	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206TPE34	3	0	0	3 HOURS	30	70	3

GRAPH THEORY

Course Objectives:

1. To understand and apply the fundamental concepts in graph theory.
2. To apply graph theory based tools in solving practical problems.
3. To improve the proof writing skills.
4. Model problems using graphs and to solve these problems algorithmically.
5. To apply theories and concepts to test and validate intuition and independent mathematical thinking in problem solving.

Unit-I

Preliminaries:Graphs,isomorphism,subgraphs, matrixrepresentations, degree, operationson graphs, degreesequences.Connectedgraphs andshortestpaths: Walks, trails, paths,connected graphs,distance, cut-vertices,cut-edges, blocks,weighted graphs,connectivity,Dijkstra's shortestpath algorithm,Floyd-Warshallshortest pathalgorithm

Unit-II

Trees: Characterizations,number of trees,minimum spanningtrees. Specialclasses ofgraphs:Bipartite graphs, linegraphs, chordalgraphs

Unit-III

Euleriangraphs: Characterization,Fleury's algorithm,chinese-postmanproblem. Hamiltongraphs: Necessary conditionsand sufficientconditions

Unit-IV

Independentsets, coveringsandmatching's: Basic equations,matching's in bipartitegraphs, perfectmatching's, greedyand approximationalgorithms. Vertexcolorings: Chromatic numberand cliques, greedycoloring algorithm,coloring of chordalgraphs, Brook'stheorem. Edgecolorings:Gupta-Vizingtheorem, Class-1graphs and class-2graphs, equitableedge-coloring.

Unit-V

Planargraphs: Basic concepts,Euler's formula, polyhedrons andplanar graphs,characterizations, planarity testing, 5-color-theorem. Directed graphs: Directed graph,underlying graph, out degree,in-degree,connectivity,orientation, Euleriandirected graphs,Hamilton directedgraphs,tournaments

Text Books:

1. J.A. Bondy and U.S.R.Murty: Graph Theory and Applications (Freely downloadable from Bondy's website; Google-Bondy)
2. D.B.West: Introduction to Graph Theory, Prentice-Hall ofIndia/Pearson, 2009 (latest impression).

Reference Books:

1. J.A.Bondy and U.S.R.Murty: Graph Theory, Springer, 2008.
2. R.Diestel: Graph Theory, Springer (Low price edition) 2000.

Course Outcomes: After completing the course, the students will be able to:

1) Understand and explore the basics of graph theory.
2) Analyze the significance of graph theory in different engineering disciplines.
3) Demonstrate algorithms used in interdisciplinary engineering domains.
4) Evaluate or synthesize any real world applications using graph theory.
5) Analyze new networks using the main concepts of graph theory.

Course Outcomes and their mapping with Programme Outcomes:

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	3	3				2	2	2	2	2	2	2
CO2	3	3	1	3	3				1	2	2	1	2	2	2
CO3	3	3	1	3	3				1	2	2	2	1	2	1
CO4	3	3	1	3	2				2	1	1	2	1	1	1
CO5	3	2	1	3	3				1	2	2	1	1	2	1

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT06TOE01	3	0	0	3 HOURS	30	70	3

Computer Graphics

Course Objectives:

1. The main objective of the course is to introduce students with fundamental concepts and theory of computer graphics.
2. Understand the need of developing graphics application.
3. Learn algorithmic development of graphics primitives like: line, circle, polygon etc.
4. Learn the representation and transformation of graphical images and pictures.
5. It presents the important drawing algorithm, polygon fitting, clipping and 2D transformation curves and an introduction to 3D transformation.

UNIT-I OVERVIEW OF GRAPHICS SYSTEM:
I/O devices, Raster scan & Random scan system, DDA & Bresenhams Line drawing Algorithm,Mid-Point &Bresenhamscircle drawing Algorithm,Midpoint ellipse generating algorithm, Clipping: Sutherland Cohen LineClipping, Polygon clipping: Hodgeman-Sutherland&Weiler-Atherton polygon clipping.2-D & 3-D Transformation.

UNIT-II CURVES &SURFACES:
Conics-Parametric forms for circle, ellipse, parabola, Bezier Curves-Need for cubic parametric curves c0, c1, c2 continuity, Generation though Bernstein polynomials, Condition for smooth joining of 2 segments, Convex Hull property, B-Spline Curves: Knot vectors-uniform and open uniform curves, Uniform, Periodic B-splines, Open B-splines, Uniform B-splines, Non-uniformB-splines, Rational B-splines, Beta splines.

UNIT-III PROJECTIONS & HIDDEN SURFACE REMOVAL :
Parallel projection on xy plane (including oblique view), Perspective projection-1, 2 and 3 Vanishing points, Reconstruction of 3-D images. Hidden Surface Removal: Back face removal, Floating Horizon method for curved objects, Z-Buffer or Depth Buffer Algorithm, Painters algorithm (Depth sorting method), Binary space partitioning trees, Scan-line algorithm, Warnock's algorithm.

UNIT-IV SHADING & COLOR ISSUES :
Filled Area Primitives,Illumination model for diffused & specular reflection, Computing reflection vector,Gouraud and Phog Shading, Texture mapping, Bump mapping, Handling shadows, Radiosity: Lambert's Law, Basic element, Modeling transparency, Visualization of data sets, volume rendering, Color issues: Additive, Subtractive primaries,Filled Area Primitives.

UNIT-V FRACTALS &ANIMATION:
Fractals: self-similar fractals-fractal dimension, Generation of Terrain-random midpoint displacement, Self-squaring fractals. SolidModeling: Generation through sweep techniques, Constructive sold geometry, B representations, Octrees, Ray Tracing & their Theory, Animation: In-between using rotation and translation, Procedural animation, Morphing, Motion Control (Key framing).

Text Books:

1. Computer graphics, Hearn and Baker, PHI.
2. Computer Graphics, Foley, PE-LPE.

Reference Books:

1. Procedural Elements of Computer graphics, Rogers, McGraw Hill.
2. Computer graphics, Harringtons S., McGraw Hill.
3. Computer Graphics, Schoum Series.

Course Outcomes :

1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
3. Use of geometric transformations on graphics objects and their application in composite form.
4. Extract scene with different clipping methods and its transformation to graphics display device.
5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	3	2							2	2	3
CO2	3	2	2	3	2	3							3	3	2
CO3	3	3	3	2	3	2							2	2	2
CO4	3	2	2	2	2	3							2	2	3
CO5	3	2	2	3	3	2							2	3	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206PPC01	0	0	4	4 HOURS	30	20	2

Computer Networks Lab

Course Objectives:

This course is designed to enable the students to:

1. Understand basic network models and Different transmission media used for data communication.
2. Understand the data link design issues and various data link protocols used for data transmission.
3. Comprehend different routing algorithms used for data transmission from source to destination in a network layer.
4. Know how internet addresses are configured and how internet protocols are used in connecting internet.

S.No.	Experiments
1	To configure the IP address for a computer connected to LAN and to configure network parameters of a web browser for the same computer.
2	a. Installing of internal modem and connecting to Internet. b. To configure WiFi for your PC.
3	Study of Stop and Wait Protocol.
4	Study of Go Back N Protocol.
5	Study of Selective Repeat Protocol.
6	Study of Networking Devices.
7	Study of LAN, MAN and WAN.
8	To practice the color code for different cables.
9	To construct Peer to Peer Topology.
10	To Construct Star Topology.

TEXT BOOKS

1. Data Communications and Networking – Behrouz A. Forouzan. TMH.
2. Computer Networks — Andrew S Tanenbaum, Pearson Education/PHI.
3. Data and Computer Communication by William Stalling (Pearson Education).

REFERENCE BOOKS

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.
3. Computer Networking by Ed Tittel (Schaum's series) (TMH).
4. Comer, "Computer Networks and Internets with Internet Applications", Pearson Education.

Course Outcomes:

At the end of this course the student can answer how to:

1. By learning models students suggest appropriate network model for data communication.
2. Know how reliable data communication is achieved through data link layer.
3. Suggest appropriate routing algorithm for the network.
4. Provide internet connection to the system and its installation.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	1							2	1	2	1
CO2	3	2	2	2	1							2	3	2	2
CO3	3	3	2	3	2							2	1	2	1
CO4	3	3	3	3	3							2	3	3	2
CO5	3	3	3	3	3							2	3	3	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206PPE21	0	0	4	4 HOURS	30	20	2

Microprocessor & Microcontroller Lab

Course Objectives:

Students will be able to.

1. To expose students to the operation of typical microprocessor (8086) trainer kit.
2. To prepare the students to be able to solve different problems by developing different programs in assembly language.
3. To develop the quality of assessing and analyzing the obtained data.
4. To understand and hands on training of Interfacing of devices.

S.No.	Experiments with 8086 Microprocessor
1	To perform addition & subtraction of two 8 – bit hexadecimal numbers.
2	To perform addition & subtraction 16 – bit hexadecimal numbers.
3	To perform addition & subtraction 32 – bit hexadecimal numbers.
4	To perform addition & subtraction of two 8 – bit decimal numbers and store the result in DX register.
5	To perform addition & subtraction of two decimal digits n and m using ASCII code store the result in ASCII format. Where n and m are decimal number with single decimal digits.
6	To perform addition & subtraction of two decimal digits n and m using ASCII code store the result in ASCII format in CX-BX register. Where n and m are decimal number with two decimal digits.
7	To perform multiplication of n and m. Where n and m are hexadecimal numbers.
8	To perform division of 16 – bit number with 8-bit number.
9	To perform multiplication of two 8-bit numbers using ASCII code store the result in ASCII form in DX. Register.
10	To perform division of two 8-bit numbers using ASCII code store the result in ASCII form in DX register.
11	To solve Arithmetic equation 3AX+5DX+BP and store the result in CX register.
12	To solve Arithmetic equation (P*Q)+(R*S).
13	To add only positive number from 100 data bytes.
14	To write a program to add series of 20 bytes.
15	To find positive & negative byte from 100 data bytes.
16	To find largest & smallest byte from block of data.

S.No.	Experiments with 8051 Microcontroller
1	Data transfer/exchange between specified memory locations.
2	Largest/smallest from a series.
3	Sorting (Ascending/Descending) of data
4	Addition / subtraction / multiplication / division of 8/16 bit data.
5	Sum of a series of 8 bit data.
6	Multiplication by shift and add method.
7	Square / cube / square root of 8 bit data.
8	Matrix addition.

9	LCM and HCF of two 8 bit numbers.
10	Code conversion – Hex to Decimal/ASCII to Decimal and vice versa.
Interfacing experiments using 8051 Trainer kit and interfacing modules (At least two Experiments are mandatory)	
11	Time delay generation and relay interface.
12	Display (LED/Seven segments/LCD) and keyboard interface
13	ADC interface..
14	DAC interface with wave form generation.
15	Stepper motor and DC motor interface.
16	Realization of Boolean expression through port.

Reference Books:

1. IBM PC Assembly Language and Programming, P. Abel, 5th Edition, PHI/Pearson Education.
2. Introduction To Assembly Language Programming, SivaramaP.Dandamudi, Springer Int. Edition,2003.
3. The 8088 and 8086 Microprocessors: Programming ,Interfacing,Software,Hardware and Application,4th edition,W.A.Triebel,A.Singh,N.K.Srinath,Pearson Education.

Course Outcomes:

On completion of this lab course the students will be able to:

1. Understand and apply the fundamentals of assembly level programming of microprocessors and microcontroller.
2. Work with standard microprocessor real time interfaces including GPIO, serial ports, digital-to-analog converters and analog-to-digital converters.
3. Troubleshoot interactions between software and hardware.
4. Analyze abstract problems and apply a combination of hardware and software to address the problem.
5. Design &Develop the solutions of problems using 8051 microcontroller.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	-	3	-	1	3	3	3	3	2
CO2	3	3	3	3	3	2	-	3	-	1	2	3	3	3	2
CO3	3	3	3	3	3	3	-	3	-	1	3	3	3	3	3
CO4	3	3	3	3	3	3	-	3	-	1	2	3	3	3	3
CO5	3	3	3	3	3	3	-	3	-	1	3	3	3	3	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206PPE22	0	0	4	4 HOURS	30	20	2

Web Technology & E-Commerce Lab

Course Objectives:

This course is designed to enable the students to:

1. Understand the web technologies to create adaptive web pages for web application.
2. Use CSS to implement a variety of presentation effects to the web application.
3. Know the concept and implementation of cookies as well as related privacy concerns.
4. Develop a sophisticated web application that employs the MVC architecture.

S.No.	Experiments
1	Design the following static web pages required for a Training and placement cell web site. 1) Home Page 2) Login Page 3) Registration page
2	Design the following static web pages required for a Training and placement cell web site. 4) Company Details Page 5) Alumni Details Page 6) Placement Staff Details Page
3	Design the following static web pages required for a Training and placement cell web site. 7) Student personal Info Page 8) Student Academic Info page 9) Semester Wise Percentage & their Aggregate page
4	Validate login page and registration page using regular expressions.
5	Apply different font styles, font families, font colors and other formatting styles to the above static web pages.
6	Install wamp server and tomcat server, access above developed static web pages using these servers.
7	Write a servlet/PHP to connect to the database, Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration.
8	Write a JSP/PHP to connect to the database, Insert the details of the student academic information with student academic info page.
9	Write a JSP which does the following job: Authenticate the user when he submits the login form using the user name and password from the database.
10	Write a JSP to insert the student's semester wise percentages and calculate aggregate and insert into database.
11	Write a JSP to search the students according to their aggregate and produce sorted list or according to their Enroll number.

List of Books:

1. Minoli and Minoli, Web technology and Commerce, TMH.
2. Web Technology, Achyut Godbole, Atul Kahate, TMH.
3. Principles of Web Design, Sklar, Cengage.
4. Electronic Commerce, Schneider, cengage Learn.
5. The E-Business revolution, Daniel Amor, PHI.
6. E-Government, Satyanarayana, PHI.
7. E-Commerce, Greenstein, TMH.
8. Koisur David : Electronic Commerce, Microsoft.
9. Ravi Kalakota : Frontiers of Electronic commerce.

Course Outcomes:

At the end of this course the student can answer how to:

1. Integrate frontend and backend web technologies in distributed systems.
2. Facilitate interface between frontend and backend of a web application.
3. Debug, test and deploy web applications in different web servers.
4. Migrate the web applications to the other platforms like .Net.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	2								2	2	2
CO2	3	2	3	1	3								3	1	3
CO3	2	3	2	2	2								2	2	2
CO4	1	2	3	3	3								3	3	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206PPE23	0	0	4	4 HOURS	30	20	2

Queuing Theory & Modeling Lab

Course Objectives:

This course is designed to enable the students to:

1. To provide necessary basic concepts in probability and random processes for applications such as random signals, linear systems in communication engineering.
2. To understand the basic concepts of probability, one and two dimensional random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon.
3. To understand the basic concepts of random processes which are widely used in IT fields.
4. To understand the concept of queueing models and apply in engineering.
5. To understand the significance of advanced queueing models.
6. To provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.

S.No.	Experiments
1	Infinite Capacity Markovian Models.
2	Finite Capacity Markovian Models.
3	Retrial Markovian Models for Bulk Arrival/Service.
4	Infinite Capacity Non Markovian Models.
5	Finite Capacity Non Markovian Models.
6	Non Markovian Models for Bulk Arrival/Service.
7	Discrete time Experiments.
8	Open Tandem Queue.
9	Tandem Queue with feedback.
10	Open Queueing Network Experiment.

TEXT BOOKS:

1. Ibe. O.C., "Fundamentals of applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007
2. Gross. D. and Harris. C.M., "Fundamentals of Queueing Theory", Wiley Student edition,2004.

REFERENCES:

3. Robertazzi, "Computer Networks and Systems: Queueing Theory and performance evaluation", Springer, 3RdEdition, 2006.
4. Taha. H.A., "Operations Research", Pearson Education, Asia, 8th Edition, 2007.
5. Trivedi.K.S.,"Probability and Statistics with Reliability, Queueing and Computer Science applications", John Wiley and Sons, 2nd Edition, 2002.

Course Outcomes:

At the end of this course the student can answer how to:

1. Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
2. Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
3. Apply the concept of random processes in engineering disciplines.
4. Acquire skills in analyzing queueing models.
5. Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2									1	3	3
CO2	3	1	3	3									2	2	2
CO3	2	2	2	2									3	3	1
CO4	3	3	3	1									2	2	2
CO5	2	2	2	2									2	3	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT206PPE24	0	0	4	4 HOURS	30	20	2

Image Processing Lab

Course Objectives:

This course is designed to enable the students to:

1. To study the image fundamentals and mathematical transforms necessary for image processing.
2. To study the image enhancement techniques.
3. To study image restoration procedures.
4. To study the image compression procedures.

S.No.	Experiments
1	Display of Gray scale Images
2	Histogram Equalization.
3	Design of Non-linear Filtering.
4	Determination of Edge detection using Operators.
5	Filtering in frequency domain.
6	Display of color images.
7	2-D DFT and DCT.
8	Conversion between color spaces.
9	DWT of images.
10	Segmentation using watershed transform.

Text/Reference Books:

1. R.C. Gonzalez and R.E. Woods, Digital Image Processing, Second Edition, PearsonEducation 3rd edition 2008.
2. Anil Kumar Jain, Fundamentals of Digital Image Processing, Prentice Hall of India.2nd edition 2004.
3. Murat Tekalp , Digital Video Processing" Prentice Hall, 2nd edition 2015.

Course Outcomes:

At the end of this course the student can answer how to:

1. Study the image fundamentals, mathematical transforms necessary for image processing.
2. About the various techniques of image enhancement, reconstruction, compression and segmentation.
3. Know sampling and reconstruction procedures.
4. Design image processing systems.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	3				1		1	1	2	2	1
CO2	3	2	1	1	2				1		1	1	2	2	1
CO3	3	2	1	1	2				1		1	1	3	2	1
CO4	3	2	1	1	2				1		1	1	2	3	1

Weightage: 1-Sightly, 2-Moderately, 3-Strongly