BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
FIFTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETCS 301		Algorithms Design and Analysis	3	1	4	M
ETCS 303		Software Engineering	3	1	4	M
ETCS-307		Java Programming	3	1	4	
ETMS 311		Industrial Management	3	0	3	
ETIT-309		Communication Systems	3	1	4	
ETHS 301		Communication Skills for Professionals	2	0	1	
PRACTICAL/VIVA VOCE						
ETCS 351		Algorithms Design and Analysis Lab	0	2	1	
ETCS 353		Software Engineering Lab ^	0	2	1	
ETCS 357		Java Programming Lab	0	2	1	
ETIT 359		Viva Industrial Training / In-house Workshop *	0	0	1	
ETIT 357		Communication Systems Lab	0	2	1	
ETHS 351		Communication Skills for Professionals Lab	0	2	1	
TOTAL			**17**	**14**	**26**	

M: Mandatory for award of degree
*Viva-Voce for evaluation of Industrial Training / In-house Workshop will be conducted in this semester.
^Using UML 2.0

BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
SIXTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETCS 302		Compiler Design	3	1	4	M
ETCS 304		Operating Systems	3	1	4	M
ETEC 310		Data Communication and Networks	3	1	4	M
ETCS 308		Web Engineering	3	0	3	
ETCS 310		Artificial Intelligence	3	1	4	
ETEE-310		Microprocessor and Microcontroller	3	1	4	
PRACTICAL/VIVA VOCE						
ETCS 352		Operating Systems (Linux Programming and Administration) Lab	0	2	1	
ETEC 358		Data Communication and Networks Lab	0	2	1	
ETCS 356		Web Engineering Lab	0	2	1	
ETEE 358		Microprocessor and Microcontroller	0	2	1	
TOTAL			**18**	**13**	**27**	

M: Mandatory for award of degree
Note: Minimum of 4-6 weeks of industrial training related to CSE will be held after 6th semester; however, viva-voce will be conducted in 7th Semester.
Imp:- Elective Paper will be floated in 7th Semester, if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 7th Semester is done before 15th April every year before end of 6th semester.

JAVA PROGRAMMING

		L	T/P	C
Paper Code: ETCS-307		**3**	**1**	**4**
Paper: Java Programming				

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To learn object oriented concepts and enhancing programming skills.

UNIT I
Overview and characteristics of Java, Java program Compilation and Execution Process. Organization of the Java Virtual Machine JVM as an interpreter and emulator, Instruction Set, Class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection. Security Promises of the JVM, Security Architecture and Security Policy. Class loaders and security aspects, sandbox model.

[T1,R2][No. of Hrs.: 11]

UNIT II
Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays, Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances. Class Member Modifiers Anonymous Inner Class Interfaces and Abstract Classes, Inheritance, throw and throws clauses, user defined Exceptions, The String Buffer Class, tokenizer, applets, life cycle of applets and Security concerns.

[T1,T2][No. of Hrs.: 12]

UNIT III
Threads: Creating, Priority, Blocked States, Extending Thread Class, Runnable Interface, Starting Threads, Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.
AWT Components, Component Class, Container Class, Layout Manager Interface Default Layouts, Insets and Dimensions, Border Layout, Flow Layout, Grid Layout, Card Layout Grid Bag Layout AWT Events, Event Models, Listeners, Class Listener, Action Event, Event Key Event,Mouse Events, Window Event

[T2][No. of Hrs.: 11]

UNIT IV
Input/Output Stream, Stream Filters, Buffered Streams, Data input and Output Stream, Print Stream Random Access File, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server. Remote Method invocation, Java Native interfaces, Development of web based application.
Collection API Interfaces, Vector, stack, Hashtable, classes, Enumerations, set, List, Map, Iterators.

[T1][R1][No. of Hrs.: 10]

Text Books:
[T1] Patrick Naughton and Herbertz Schildt, "Java - the complete Reference", TMH
[T2] Sierra & bates, "Head First Java", O'reilly

Reference Books:
[R1] E. Balaguruswamy, "Programming with Java", TMH
[R2] Horstmann, "Computing Concepts with Java 2 Essentials" John Wiley.
[R3] Decker & Hirshfield, "Programming.Java", Vikas Publication.

INDUSTRIAL MANAGEMENT

		L	T/P	C
Paper Code: ETMS-311		3	0	3
Paper: Industrial Management				

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The course provides a broad introduction to some aspects of business management and running of business organization.

UNIT I
Industrial relations- Definition and main aspects. Industrial disputes and strikes. Collective bargaining.
Labour Legislation- Labour management cooperation/worker's participation in management. Factory legislation. International Labour Organization.

[T1,T2][No. of Hrs. 10]

UNIT II
Trade Unionism- Definition, Origin, Objectives of Trade Unions. Methods of Trade union. Size and finance of Indian Trade unions- size, frequency distribution, factors responsible for the small size. Finance sources of income, ways of improving finance.

[T1,T2][No. of Hrs. 10]

UNIT III
Work Study-Method of work study. Foundations of work study. Main components of method study. Time study standards. Involvement of worker's unions. Work Sampling. Application of work study to office work.

[T1,T2][No. of Hrs. 10]

UNIT IV
Quality Management- What is quality? Control Chart. Quality is everybody's job. Taguchi Philosophy. Service Quality. What is Total Quality Management (TQM)? Roadmap for TQM. Criticism of TQM. Six Sigma.

[T1,T2][No. of Hrs. 10]

Text Books:
[T1]   Sinha, P.R.N., Sinha I.B. and Shekhar S.M (2012), Industrial Relations, Trade Unions and Labour Legislation. Pearson Education.
[T2]   Chary, S.N. (2012), Production and Operations Management. Tata McGraw Hill Education.

Reference Books:
[R1]   Srivastava, S.C. (2012), Industrial Relations and Labour Laws, Vikas Publishing
[R2]   Shankar R (2012) Industrial Engineering and Management, Galgotia Publications.
[R3]   Telsang, M (2006), Industrial Engineering and Production Management. S.Chand.
[R4]   Thukaram, Rao (2004), M.E. Industrial Management. Himalaya Publishing House.

COMMUNICATION SYSTEMS

Paper Code: ETIT-309   **L**   **T/P**   **C**
Paper: Communication Systems   **3**   **1**   **4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the students with the knowledge of electronic communication there by enabling the student to obtain the platform for studying in communication system.

UNIT I
Introduction: Overview of Communication system, Communication channels, Mathematical Models for Communication Channels
Introduction of random variables: Definition of random variables, PDF, CDF and its properties, joint PDF, CDF, Marginalized PDF, CDF, WSS wide stationery, strict sense stationery, non stationery signals, UDF, GDF, RDF, Binomial distribution, White process, Poisson process, Wiener process.
[T1, T2][No. of Hrs. 11]

UNIT II
Analog Modulation: Mathematical Need for Modulation, Amplitude Modulation theory: DSB-SC, SSB, VSB, Modulators and Demodulators. Angle Modulation, Relation between FM and PM Wave. Generation of FM wave- Direct and Indirect. Bandwidth of FM (NBFM, WBFM)
Pulse Analog Modulation: PAM-Natural and Flat top. reconstruction, TDM-Pulse Amplitude Modulation (TDM-PAM), Pulse Width Modulation (PWM), Pulse Position Modulation(PPM), Generation and Recovery.
Pulse Digital Modulation: Pulse Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), ADPCM.

[T1, T2][No. of Hrs. 11]

UNIT III
Digital Modulation and Transmission: Advantages of digital communication. Modulation schemes: ASK, PSK, FSK. Spectral Analysis. Comparison. Digital Signaling Formats-Line coding.
Information and Coding Theory: Entropy, Information, Channel Capacity, Source Coding Theorem: Shannon Fano Coding, Huffman Coding.

[T1, T2][No. of Hrs. 11]

UNIT IV
Fiber Optical System: Basic Optical Communication System, Optical fibers versus metallic cables, Light propagation through optical fibers. Acceptance angle and acceptance cone, Fiber configurations. Losses in optical fibers. Introduction to Lasers and light detectors. Applications: Military, Civil and Industrial applications.
Advanced Communication Systems: Introduction to cellular radio telephones. Introduction to satellite Communication.
[T1, T2][No. of Hrs. 11]

Text Books:
[T1]   George Kennedy, "Electronic Communication System", TMH 1993
[T2]   B.P. Lathi, "Analog& Digital Communication", Oxford University Press 1999.

Reference Books:
[R1]   Simon Haykin, "Introduction to Analog & Digital Communication", Wiley, 2000
[R2]   Tannenbaum, "Computer networks", PHI, 2003
[R3]   K. Sam Shanmugam, "Digital & Analog Communication system", John Wiley & Sons 1996.

COMMUNICATION SKILLS FOR PROFESSIONALS

	L	T/P	C
Paper Code: ETHS-301			
Paper: Communication Skills for Professionals	2	0	1

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

UNIT I

Organizational Communication: Meaning, importance and function of communication, Process of communication, Communication Cycle - message, sender, encoding, channel, receiver, decoding, feedback, Characteristics, Media and Types of communication, Formal and informal channels of communication, 7 C's of communication, Barriers to communication, Ethics of communication (plagiarism, language sensitivity)

Soft Skills: Personality development, Self Analysis through SWOT, Johari Window, Interpersonal skills -Time management, Team and leadership skills, Emotional Intelligence. Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self esteem.

[T1,T2][No. of Hrs. 08]

UNIT II

Introduction to Phonetics: IPA system (as in Oxford Advanced Learner's Dictionary), Speech Mechanism, The Description of Speech Sounds, Phoneme, Diphthong, Syllable, Stress, Intonation, Prosodic Features; Pronunciation; Phonetic Transcription of words (from words to phonetic symbols and from phonetic symbols to words. British & American English (basic difference in vocabulary, spelling, pronunciation, structure)

Non-Verbal Language: Importance, characteristics, types – Para language (voice, tone, volume, speed, pitch, effective pause), Body Language (posture, gesture, eye contact, facial expressions), Proxemics, Chronemics, Appearance, Symbols.

[T1,T2][No. of Hrs. 08]

UNIT III

Letters at the Workplace – letter writing, hard copy and soft copy, request, sales, enquiry, order, complaint. Job Application -- resume and cover letter

Meeting Documentation-- notice, memo, circular, agenda and minutes of meeting.

Report Writing – Significance, purpose, characteristics, types of reports, planning, organizing and writing a report, structure of formal report, Writing an abstract/summary, Basics of formatting and style sheet (*IEEE Editorial Style Manual)*, development of thesis argument, data collection, inside citations, bibliography; Preparing a written report for presentation and submission, Writing a paper for conference presentation/journal submission.

[T1,T2][No. of Hrs. 08]

UNIT IV

Listening and Speaking Skills: Importance, purpose and types of listening, process of listening, difference between hearing and listening, Barriers to effective listening, Traits of a good listener, Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

Presentations: Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

Group Discussion: Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

Interview Skills: Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

[T1,T2][No. of Hrs. 07]

Text Books:
[T1]   Anna Dept. Of English. Mindscapes: English for Technologists & Engineers PB. New Delhi: Orient Blackswan.
[T2]   Farhathullah, T. M. Communication Skills for Technical Students. Orient Blackswan, 2002.

References Books:
[R1]   Masters, Ann and Harold R. Wallace. Personal Development for Life and Work, 10th Edition.Cengage Learning India, 2012.
[R2]   Institute of Electrical and Electronics Engineers. IEEE Editorial Style Manual. IEEE, n.d. Web. 9 Sept 2009.
[R3]   Sethi and Dhamija. A Course in Phonetics and Spoken English. PHI Learning, 1999.
[R4]   Khera, Shiv. You Can Win. New York: Macmillan, 2002.

ALGORITHMS DESIGN AND ANALYSIS LAB

Paper Code: ETCS 351   **L   T/P   C**
   Paper: Algorithms Design and Analysis Lab   **0   2   1**
List of Experiments:

1. To implement following algorithm using array as a data structure and analyse its time complexity.
   a. Merge sort
   b. Quick sort
   c. Bubble sort
   d. Bucket sort
   e. Radix sort
   f. Shell sort
   g. Selection sort
   h. Heap sort
2. To implement Linear search and Binary search and analyse its time complexity.
3. To implement Matrix Multiplication and analyse its time complexity.
4. To implement Longest Common Subsequence problem and analyse its time complexity.
5. To implement Optimal Binary Search Tree problem and analyse its time complexity.
6. To implement Huffman Coding and analyse its time complexity.
7. To implement Dijkstra's algorithm and analyse its time complexity.
8. To implement Bellman Ford algorithm and analyse its time complexity.
9. To implement naïve String Matching algorithm, Rabin Karp algorithm and Knuth Morris Pratt algorithm and analyse its time complexity.

NOTE:- At least 8 experiments of the list must be done in the semester.

SOFTWARE ENGINEERING LAB

		L	T/P	C
Paper Code: ETCS-353				
Paper: Software Engineering Lab		0	2	1

Tool Required: Rational Rose Enterprise Edition

List of Experiments:

1. Write down the problem statement for a suggested system of relevance.
2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4. To perform the user's view analysis for the suggested system: Use case diagram.
5. To draw the structural view diagram for the system: Class diagram, object diagram.
6. To draw the behavioral view diagram : State-chart diagram, Activity diagram.
7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram.
8. To perform the implementation view diagram: Component diagram for the system.
9. To perform the environmental view diagram: Deployment diagram for the system.
10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system.
11. 10 Perform Estimation of effort using FP Estimation for chosen system.
12. 11 To Prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Text Books:

1. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2005
2. Pankaj Jalote, "An Integrated Approach to Software Engineering", Second Edition, Springer.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

JAVA PROGRAMMING LAB

Paper Code: ETCS-357   **L   T/P   C**
Paper: Java Programming Lab   **0   2   1**

<u>**List of Experiments:**</u>

1. Create a java program to implement stack and queue concept.
2. Write a java package to show dynamic polymorphism and interfaces.
3. Write a java program to show multithreaded producer and consumer application.
4. Create a customized exception and also make use of all the 5 exception keywords.
5. Convert the content of a given file into the upper case content of the same file.
6. Develop an analog clock using applet.
7. Develop a scientific calculator using swings.
8. Create an editor like MS-word using swings.
9. Create a servlet that uses Cookies to store the number of times a user has visited your servlet.
10. Create a simple java bean having bound and constrained properties.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

COMMUNICATION SYSTEMS LAB

		L	T/P	C
Paper Code: ETIT-357		0	2	1
Paper: Communication Systems Lab		0	2	1

List of Experiments:

1. Generation of DSB-SC AM signal using balanced modulator.

2. Practical study of amplitude demodulation by linear diode detector

3. Generation of SSB AM signal.

4. Practical study of envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.

5. To generate FM Signal using voltage controlled oscillator.

6. To generate a FM Signal using Varactor & reactance modulation.

7. Detection of FM Signal using PLL & foster seelay method.

8. Practical study of Super heterodyne AM receiver and measurement of receiver parameters viz sensitivity, selectivity & fidelity.

9. Practical study of Pre-emphasis and De-emphasis in FM.

10. Generation of PAM modulated and demodulated signal.

Simulations study of some of the above experiments using P-spice or Multisim softwares

NOTE: - At least 8 experiments out of the list must be done in the semester.

COMMUNICATION SKILLS FOR PROFESSIONALS LAB

Paper Code: ETHS-351 **L T/P C**
Paper: Communication Skills for Professionals Lab **0 2 1**

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision .These activities will enhance students' communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

Lab Activities to be conducted

1. **Listening and Comprehension Activities** – Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.
2. **Reading Activities** -- Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.
3. **Conversation Activities**-- Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.
4. **Making an Oral Presentation**–Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.
5. **Making a Power Point Presentation** -- Structure and format; Covering elements of an effective presentation; Body language dynamics.
6. **Making a Speech** -- Basics of public speaking, Preparing for a speech; Features of a good speech; Speaking with ... Famous speeches may be played as model speeches for learning the art of public speaking ... speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawa... Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.
7. **Participating in a Group Discussion** -- Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others' views / ideas; Arguing against others' views or ideas, etc.
8. **Participating in Mock I...** ...interview preparation and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.

Suggested Lab Activities:

1. Interview through telephone/video conferencing.
2. Extempore, Story Telling, Poetry Recitation
3. Mock Situations and Role Play; Enacting a short skit.
4. Debate (Developing an Argument), News Reading and Anchoring.
5.

Reference Books:

1. Patnaik, Priyadarshi. *Group Discussion and Interview Skills*: *With VCD*. Cambridge University Press India (Foundation Books), 2012 edition.
2. Kaul,Asha. *Business Communication*. PHI Learning, 2009.
3. Hartman and Lemay. *Presentation Success: A Step-by-Step Approach*. Thomson Learning, 2000.

Note: The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.

COMPILER DESIGN

Paper Code: ETCS-302   L   T/P   C
Paper: Compiler Design   3   1   4

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This course aims to teach students the principles involved in compiler design. It will cover all the basic components of a compiler, its optimizations and machine code generation. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.

UNIT- I
Brief overview of the compilation process, structure of compiler & its different phases, lexical analyzer, cross compiler, Bootstrapping, quick & dirty compiler, Shift-reduce parsing, operator precedence parsing, top-down parsing, predictive parsing ,LL(1) and LL(k) grammar, bottom up parsing, SLR, LR(0), LALR parsing techniques.

[T1][T2][R1][No. of Hrs. 12]

UNIT- II
Design and implementation of lexical analyzer and parsing using automated compiler construction tools(eg, Lex, YACC, PLY), translation schemes, implementation of syntax directed translations, Intermediate code, three address code, quadruples, and triples, translation of assignment statements, Boolean, control statements, Semantic Analysis, Type Systems, Type Expressions, Type Checker, Type Co...

[T2][R1][R3][R4][R5][No. of Hrs. 12]

UNIT- III
Symbol table, data structures and implementation of symbol table, and scope information.
Run Time Storage Administration, implementation of a simple stack allocation scheme, storage allocation in block structured languages and non block structured languages, Error, lexical-phase errors, syntactic-phase errors, semantic errors.

[T1][T2]][R2][No. of Hrs. 10]

UNIT-IV
The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis, object program, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

[T1][T2] [No. of Hrs. 10]

Text Books:
[T1]   Alfred V. Aho & J.D. Ullman "Compiler Principles Techniques& Tools", Pearson
[T2]   Kenneth C. Louden, "Compiler Design",Cengage Publication

Reference Books:
[R1]   Kakde O.G., "Complier Design", Laxmi Publication
[R2]   Trembley and Sorenson, "Theory and Practice of Compiler Writing", McGraw Hill
[R3]   Vinu V. DAS, "Compiler Design Using FLEX and YACC , PHI
[R4]   Jhon R. Levine, Tony Mason and Doug Brown, "Lex &Yacc", O'Reilly.pdf
[R5]   Andrew W. Appel, Maia Ginsburg, "Modern Compiler Implementation in C", Cambridge University Press

OPERATING SYSTEMS

		L	T/P	C
Paper Code: ETCS-304		3	1	4
Paper: Operating Systems				

INSTRUCTIONS TO PAPER SETTERS:　　　　　　　**MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The goal of this course is to provide an introduction to the internal operation of modern operating systems. The course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

UNIT I
Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal computer systems, Parallel systems, Distributed Systems, Real-time Systems, OS – A Resource Manager.
Memory Organization & Management: Memory Organization, Memory Hierarchy, Memory Management Strategies, Contiguous versus non- Contiguous memory allocation, Partition Management Techniques, Logical versus Physical Address space, swapping, Paging, Segmentation, Segmentation with Paging.
Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Thrashing, Demand Segmentation, and Overlay Concepts.

[T1] [T2][R2][R3] [No. of hrs. 10]

UNIT II
Processes: Introduction, process states, process management, Interrupts, Interprocess Communication
Threads: Introduction, Thread states, Thread Operation, Threading Models.
Processor Scheduling: Scheduling levels, pre emptive vs no pre emptive scheduling, priorities, scheduling objective, scheduling criteria, scheduling algorithms, demand scheduling, real time scheduling.
Process Synchronization: Mutual exclusion, software solution to Mutual exclusion problem, hardware solution to Mutual exclusion problem, semaphores, Critical section problems, Case study of Dining philosopher problem, Barber shop problem etc.

[T1][T2][[R3] [No. of hrs. 10]

UNIT III
Deadlocks: examples of deadlock, resource concept, necessary conditions for deadlock, deadlock solution, deadlock prevention, deadlock avoidance with Bankers algorithms, deadlock detection, deadlock recovery.
Device Management: Disk Scheduling Strategies, Rotational Optimization, System Consideration, Caching and Buffering

[T1][T2][R1] [No. of hrs. 10]

UNIT IV
File System: Introduction, File Organization, Logical File System, Physical File System, File Allocation strategy, Free Space Management, File Access Control, Data Access Techniques, Data Integrity Protection, Case study on file system viz FAT32, NTFS, Ext2/Ext3 etc.

[T1][T2][R4][R5] [No. of hrs. 10]

Text Books:
[T1]　　Deitel & Dietel, "Operating System", Pearson, 3rd Ed., 2011
[T2]　　Silbersachatz and Galvin, "Operating System Concepts", Pearson, 5th Ed., 2001
[T3]　　Madnick & Donovan, "Operating System", TMH,1st Ed., 2001

Reference Books:
[R1]　　Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
[R2]　　Godbole, "Operating Systems", Tata McGraw Hill, 3rd edition, 2014
[R3]　　Chauhan, "Principles of Operating Systems", Oxford Uni. Press, 2014
[R4]　　Dhamdhere, "Operating Systems", Tata McGraw Hill, 3rd edition, 2012
[R5]　　Loomis, "Data Management & File Structure", PHI, 2nd Ed.

DATA COMMUNICATION & NETWORKS

		L	T/P	C
Paper Code: ETEC-310				
Paper: Data Communication & Networks		**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of the paper is to provide an introduction to the fundamental concepts on data communication and the design, deployment, and management of computer networks.

UNIT- I

Data Communications : Components, protocols and standards, Network and Protocol Architecture, Reference Model ISO-OSI, TCP/IP-Overview ,topology, transmission mode, digital signals, digital to digital encoding, digital data transmission, DTE-DCE interface, interface standards, modems, cable modem, transmission media-guided and unguided, transmission impairment, Performance, wavelength and Shannon capacity, Review of Error Detection and Correction codes.

Switching: Circuit switching (space-division, time division and space-time division), packet switching (virtual circuit and Datagram approach), message switching.

                                                                            [T1, T2, R1, R4][No. of Hours: 11]

UNIT- II

Data Link Layer: Data Link Control and Protocols: Flow and Error Control, Stop-and-wait ARQ. Sliding window, Go Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to –Point Access: PPP Point –to- Point Protocol, PPP Stack,

Medium Access Sub layer: Channel allocation problem, Controlled Access, Channelization, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Token ring, Token Bus, FDDI based LAN, Network Devices-repeaters, hubs, switches bridges.

                                                                            [T1, T2,R1][No. of Hours: 11]

UNIT- III

Network Layer: Design Issues, Routing algorithms, Congestion control algorithms,
Host to Host Delivery: Internetworking, addressing and routing, IP addressing (class full & Classless), Subnet, Network Layer Protocols: ARP, IPV4, ICMP, IPV6 and ICMPV6.

                                                                            [T1, T2,R1][No. of Hours: 11]

UNIT- IV

Transport Layer: Process to Process Delivery, UDP, TCP, Congestion control and Quality of service.

Application Layer: Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP), file transfer (FTP), HTTP and WWW.

                                                                            [T2, T1, R1, R4][No. of Hours: 11]

Text Books:

[T1]   A. S. Tannenbum, D. Wetheral, "Computer Networks", Prentice Hall, Pearson, 5th Ed
[T2]   Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, 4th Ed

Reference Books:

[R1]   Fred Halsall, "Computer Networks", Addison – Wesley Pub. Co. 1996.

[R2]   Larry L, Peterson and Bruce S. Davie, "Computer Networks: A system Approach", Elsevier, 4th Ed
[R3]   Tomasi, "Introduction To Data Communications & Networking", Pearson 7th impression 2011
[R4]   William Stallings, "Data and Computer Communications", Prentice Hall, Imprint of Pearson, 9th Ed.
[R5]   Zheng , "Network for Computer Scientists & Engineers", Oxford University Press
[R6]   Data Communications and Networking: White, Cengage Learning

WEB ENGINEERING

	L	**T/P**	**C**
Paper Code: ETCS-308			
Paper: Web Engineering	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This paper gives understanding of web designing to the students.

UNIT - I
History of the Internet, Basic internet protocols, World Wide Web (W3C), HTTP: Hypertext Transfer Protocol.
Markup languages XHTML: Introduction to HTML, basics of XTHML, HTML elements, HTML tags, lists, tables, frames, forms, defining XHTML's abstract syntax, defining HTML documents.
CSS style sheets: Introduction, CSS core syntax, text properties, CSS box model, normal flow box layout, other properties like list, tables, DHTML, XML, XML documents & vocabulary, XML versions & declarations, introduction to XML.

[T1,T2][No. of hrs. 10]

UNIT – II
Client Side Programming: JAVA Scripts, basic syntax, variables & data-types, literals, functions, objects, arrays, built-in objects, JAVAscript form programming, Intrinsic event handling, modifying element style, document trees,
Server side programming Servlets: Servlet architecture, life cycle, parameter data, sessions, cookies, servlets capabilities, concurrency. Introduction to JSP, JSP Tags, JSP life cycle, custom tags.

[T1,T2][No. of hrs. 12]

UNIT - III
Security Threats, Security risks of internet, Web attacks and their prevention, Web security model, Session management, authentication, HTTPS, Security. Application vulnerabilities and defenses.
Client-side security, Cookies security policy, HTTP security extensions, Plugins, extensions, and web apps, Web user tracking.
Server-side security tools, Web Application Firewalls (WAFs) and Fuzzers.

[T1,T2][No. of hrs. 10]

UNIT – IV
Introduction to Web 2.0 and Web 3.0, Concepts and Issues, Latest Trends in Web Technologies. Web Security concerns. Applications of Web Engineering Technologies in distributed systems etc. Case studies using different tools.

[T1,T2][No. of hrs. 12]

Text Books:
[T1] Web Technologies: A Computer Science Perspective, Jackson, Pearson Education India, 2007.
[T2] Web Engineering: A Practitioner's Approach by Roger S Pressman, David Lowe, TMH, 2008.

Reference Books:
[R1] Achyut Godbole,Atul Kahate, "Web Technologies", McGraw-Hill Education, Third Edition.
[R2] Uttam K Roy, "Web Technologies", Oxford University Press, 2012.
[R3] Chris Bates, "Web Programming", Wiley
[R4] Web Engineering by Gertel Keppel, Birgit Proll, Siegfried Reich, Werner R., John Wiley.
[R5] Thinking on the Web: Berner's LEE, Godel and Turing, John Wiley & Sons Inc.

ARTIFICIAL INTELLIGENCE

Paper Code: ETCS-310 **L** **T/P** **C**
Paper: Artificial Intelligence **3** **1** **4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

UNIT-I
Introduction: Introduction to intelligent agents
Problem solving: Problem formulation, uninformed search strategies, heuristics, informed search strategies, constraint satisfaction Solving problems by searching, state space formulation, depth first and breadth first search, iterative deepening

[T1,T2][No. of hrs. 12]

UNIT-II
Logical Reasoning : Logical agents , propositional logic, inferences ,first-order logic, inferences in first order logic, forward chaining, backward chaining, unification , resolution

[T1,T2][No. of hrs. 10]

UNIT-III
Game Playing: Minimax algorithm, theorem proving, natural language processing, vision and speech processing, robotics. Advanced AI techniques- search knowledge, abstraction

[T1,T2][No. of hrs. 12]

UNIT-IV
Learning from observations: Inductive learning, learning decision trees, computational learning theory, Explanation based learning
Applications: Environmental Science, Aerospace, Medical Sciences etc.

[T1,T2][No. of hrs. 10]

Text Book:
[T1] Rich and Knight, "Artificial Intelligence", Tata McGraw Hill, 1992
[T2] S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Edu.

Reference Books:
[R1] KM Fu, "Neural Networks in Computer Intelligence" McGraw Hill
[R2] Russel and Norvig, "Artificial Intelligence: A modern approach", Pearson Education

MICROPROCESSORS AND MICROCONTROLLERS

Paper Code: ETEE-310
Paper: Microprocessors and Microcontrollers

	L	T/P	C
	3	1	4

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the knowledge of microprocessor systems and microcontroller.

UNIT- I
Introduction to Microprocessor Systems: Architecture and PIN diagram of 8085, Timing Diagram, memory organization, Addressing modes, Interrupts. Assembly Language Programming.

[T1][No. of hrs. 10]

UNIT- II
8086 Microprocessor: 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus Cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts.

[T2][No. of hrs. :12]

UNIT- III
Interfacing of 8085/8086 with 8255, 8253, 8251, 8259: Introduction, Generation of I/O Ports, Programmable Peripheral Interface (Intel 8255), Sample and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

[T1][No. of hrs. :12]

UNIT-IV
Overview of Microcontroller 8051: 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming.

[T3][No. of hrs. 11]

Text Books:

[T1]   Muhammad Ali Mazidi, "Microprocessor and Microcontrollers", Pearson, 2006

[T2]   Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" Tata McGraw Hill, 2006.

[T3]   Ramesh Gaonkar "Micro Processor Architecture, Programming and Applications with the 8085", PHI

References Books:

[R1]   Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay, "The 8051 Microcontroller and Embedded Systems",2nd Edition, Pearson Education 2008.

[R2]   Kenneth J. Ayala, "The 8086 Microprocessor: Programming & Interfacing The PC", Delmar Publishers, 2007.

[R3]   A K Ray, K M Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill, 2007.

[R4]   Vaneet Singh, Gurmeet Singh, "Microprocessor and Interfacing", Satya Prakashan, 2007.

OPERATING SYSTEMS (LINUX PROGRAMMING AND ADMINISTRATION) LAB

		L	T/P	C
Paper Code: ETCS-352				
Paper: Operating Systems (Linux Programming and Administration) Lab		**0**	**2**	**1**

List of Experiments:

1. Write a program to implement CPU scheduling for first come first serve.
2. Write a program to implement CPU scheduling for shortest job first.
3. Write a program to perform priority scheduling.
4. Write a program to implement CPU scheduling for Round Robin.
5. Write a program for page replacement policy using a) LRU b) FIFO c) Optimal.
6. Write a program to implement first fit, best fit and worst fit algorithm for memory management.
7. Write a program to implement reader/writer problem using semaphore.
8. Write a program to implement banker's algorithm for deadlock avoidance.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

DATA COMMUNICATION & NETWORKS LAB

		L	T/P	C
Paper Code: ETEC-358				
Paper: Data Communication & Networks Lab		0	2	1

List of Experiments:

1. PC to PC Communication
2. Parallel Communication using 8 bit parallel cable & Serial communication using RS 232C
3. Ethernet LAN protocol
4. To create scenario and study the performance of CSMA/CD protocol through Simulation
5. To create scenario and study the performance of token bus and token ring protocols through simulation
6. To create scenario and study the performance of network with CSMA / CA protocol and compare with
7. CSMA/CD protocols.
8. Implementation and study of stop and wait protocol
9. Implementation and study of Go back-N and selective repeat protocols
10. Implementation of distance vector routing algorithm
11. Implementation of Link state routing algorithm.

*All Practical can be conducted using C-Language and LAN Emulator.

NOTE:- At least 8 experiments of the list must be done in the semester.

WEB ENGINEERING LAB

Paper Code: ETCS-356	**L**	**T/P**	**C**
Paper: Web Engineering Lab	**0**	**2**	**1**

Web Engineering Lab experiment based on syllabus of (ETCS-308).

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

MICROPROCESSORS AND MICROCONTROLLERS LAB

	L	T/P	C
Paper Code: ETEE-358			
Paper: Microprocessors and Microcontrollers Lab	0	2	1

List of Experiments:

1. Write a program to add and subtract two 16-bit numbers with/ without carry using 8086.
2. Write a program to multiply two 8 bit numbers by repetitive addition method using 8086.
3. Write a Program to generate Fibonacci series.
4. Write a Program to generate Factorial of a number.
5. Write a Program to read 16 bit Data from a port and display the same in another port.
6. Write a Program to generate a square wave using 8254.
7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1(using 8051).
8. Write a Program to transfer data from external ROM to internal (using 8051).
9. Design a Minor project using 8086 Micro processor (Ex: Traffic light controller/temperature controller etc)
10. Design a Minor project using 8051 Micro controller

NOTE: - At least 8 Experiments out of the list must be done in the semester.