PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018

(AUTONOMOUS)

B.Tech. INFORMATION TECHNOLOGY

CURRICULUM

REGULATIONS 2016

(CHOICE BASED CREDIT SYSTEM)

SEMESTER III

S.No	Category	Course Code	Course Title	L	T	P	C
Theory							
1	BS	MA16301	Transforms and Boundary Value Problems	3	2	0	4
2	PC	IT16301	Object Oriented Programming with C++	3	0	0	3
3	PC	IT16302	Design and Analysis of Algorithms	3	0	0	3
4.	ES	EC16307	Principles of Communication	3	0	0	3
5.	ES	EC16308	Digital Principles and System Design	3	0	0	3
6	BS	CH16301	Environmental Science and Engineering	3	0	0	3
Practical							
7.	PC	IT16305	Object Oriented Programming with C++ Laboratory	0	0	4	2
8.	ES	EC16309	Digital Laboratory	0	0	4	2
9.	HS	EN16301	Business English Course Laboratory	0	0	2	1
			TOTAL	**18**	**2**	**10**	**24**

SEMESTER IV

S.No	Category	Course Code	Course Title	L	T	P	C
Theory							
1.	BS	MA16401	Probability and Queuing Theory	3	2	0	4
2.	PC	IT16401	Java Programming	3	2	0	4
3.	PC	IT16402	Operating Systems	3	0	0	3
4.	PC	IT16403	Database Management Systems	3	0	0	3
5.	PC	IT16404	Computer Architecture	3	0	0	3
6.	ES	EC16408	Microprocessor and Microcontroller	3	0	0	3
Practical							
7.	PC	IT16405	Database Management Systems Laboratory	0	0	4	2
8.	PC	IT16406	Operating Systems Laboratory	0	0	4	2
9.	ES	EC16409	Microprocessor and Microcontroller Laboratory	0	0	4	2
			TOTAL	**18**	**4**	**12**	**26**

SEMESTER III

TRANSFORMS AND BOUNDARY VALUE PROBLEMS

MA16301 **3 2 0 4**

(COMMON TO ALL BRANCHES)

COURSE OBJECTIVES

- to introduce fourier series analysis which is central to many applications in engineering apart from solvingboundary value problems.
- to acquaint the student with Fourier transform techniques used in many engineering systems..
- to familiarize effective application of mathematical tools for the solutions of partial differential equationsthat model several physical processes.
- to apply one dimensional equation of heat conduction and study about wave equation.
- to learn and apply Z transform techniques for discrete time systems.

UNIT I FOURIER SERIES 15

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosineseries –Complex form of Fourier Series – Parseval's identity – Harmonic Analysis.

UNIT II FOURIER TRANSFORMS 15

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

UNIT III PARTIAL DIFFERENTIAL EQUATIONS 15

Formation of partial differential equations – Lagrange's linear equation – Solutions of standard four types of first order partial differential equations - Linear partial differential equations of second and higher order with constant, coefficients.

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 15

Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction.

UNIT V Z - TRANSFORMS AND DIFFERENCE EQUATIONS 15

Z-transforms – Elementary properties – Inverse Z-transform – Convolution theorem – Formation of difference equations – Solution of difference equations using Z-transform.

TOTAL PERIODS 75

COURSE OUTCOMES

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

- comprehend fourier series, their different possible forms and the frequently needed practical harmonicanalysis from discrete data.
- describe the concept of a function as a double integral under certain conditions and apply in the fourier transform pair and their properties.
- solve certain boundary value problems and apply the methods and results in engineering applications.
- employ partial differential equations to solve one dimensional wave and heat equations.
- demonstrate the knowledge of differential equations gained and solve them using Z transforms.

TEXT BOOKS

1. Veerarajan T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Pvt. Ltd.,New Delhi, Second reprint, 2012.
2. Narayanan S., Manickavasagam Pillai.T.K and Ramanaiah.G "Advanced Mathematics for EngineeringStudents" ,Vol. II & III, S.Viswanathan Publishers Pvt Ltd. 1998

REFERENCES

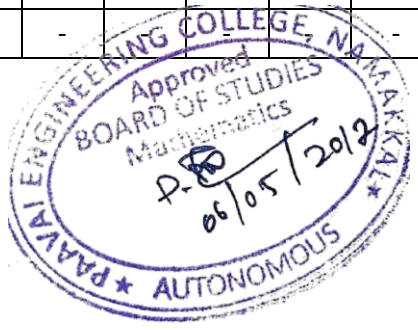
1. Larry C. Andrews, Bhimsen K. Shivamoggi, "Integral Transforms for Enginears", SPIE OpticalEngineering press, Washington USA (1999).
2. Ramana.B.V., "Higher Engineering Mathematics", Tata Mc-GrawHill Publishing Company limited, NewDelhi (2010).
3. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education (2007).
4. Erwin Kreyszig., "Advanced Engineering Mathematics" 10th Edition,Wiley Publications
5. Ray Wylie C and Barrett.L.C, "Advanced Engineering Mathematics", Tata McGraw Hill Education PvtLtd, Sixth Edition, New Delhi, 2012.

WEB LINKS

1. https://www.youtube.com/watch?v=coe-UA5ONI0
2. https://www.youtube.com/watch?v=gZNm7L96pfY
3. http://172.16.100.200/NPTEL/displayweb.html?type1=111103021%2F35.pdf
4. https://www.youtube.com/watch?v=4GHY8sRKPaU
5. http://172.16.100.200/NPTEL/displayweb.html?type1=111104031%2Flectures.pdf%23page%3D101.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	3	-	-	-	-	-	-	-	2	3	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3	3	3
CO3	3	3	3	2	-	-	-	-	-	-	-	2	3	3
CO4	3	2	3	3	-	-	-	-	-	-	-	3	3	3
CO5	3	3	2	3	-	-	-	-	-	-	-	3	3	3



IT16301 OBJECT ORIENTED PROGRAMMING WITH C++ 3 0 0 3

COURSE OBJECTIVES

- to get a clear understanding of object-oriented concepts.
- to understand object oriented programming through C++.
- to develop the problem solving skills by applying object-oriented concepts inheritance and virtualclasses.
- to create programs using streams and file handling
- to learn templates and exception handling in C++

UNIT I PRINCIPLES OF OOP 9

Programming Paradigms- Basic concepts and benefits of OOP- Structure of C++ program - Applications of C++- Tokens- Keywords- Identifiers-constants- variables - Data types - Basic, User defined ,Derived - Dynamic initialization -Reference variables- Scope resolution operator- Function Prototyping- Inline function- Default arguments – Function overloading.

UNIT II CLASSES, OBJECTS AND CONSTRUCTORS 9

Class specification- Static data members and member functions - Array of objects- Objects as function arguments - Friend functions- Returning objects- Local classes - Constructors – Parameterized constructors- Multiple Constructors- Constructors with default arguments-Copy constructors- Destructors - Operator Overloading-Overloading unary and binary operator.

UNIT III INHERITANCE AND VIRTUAL CLASS 9

Introduction – types- Single Inheritance- Multiple Inheritance- Multi level inheritance- Hierarchical Inheritance-Hybrid Inheritance. Virtual base class – Abstract class – this pointer-Dynamic binding-virtualfunction – pure virtual function.

NIT IV STREAMS AND FILE HANDLING 9

Stream classes- Formatted and unformatted I/O operations- Manipulators- File handling - File open and close-File pointers and their manipulators- Sequential and random access-Error Handling.

UNIT V TEMPLATES AND EXCEPTION HANDLING 9

Class templates-Function templates- overloading of template functions- Exception Handling: Exception handling mechanism-throwing mechanism- catching mechanism- rethrowing an exception. Standard Template Library.

TOTALHOURS 45

COURSE OUTCOMES

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

- explain the object oriented concepts
- understand object oriented programming through C++.
- create programs using inheritance and virtual classes.
- develop programs using streams and file handling.
- know function and class template & way of handling exception.

TEXT BOOKS

1. E.Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill, Sixth Edition, 2013

REFERENCES

1. B.Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.
2. K.R.Venugopal, Rajkumar, T.Ravishankar, "Mastering C++ ",Tata McGraw Hill, 2007.
3. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publications, 2006
4. BjarneStroustrup, "The C++ Programming Language", Pearson Education, Fourth Edition, 2013.
5. K.S. Easwarakumar, " Object Oriented Data Structures Using C++", Vikas Publication House Pvt Ltd,First Edition, 2000.

WEB LINKS

1. http://www.desy.de/gna/html/cc/Tutorial/tutorial.html
2. http://thatchna.weebly.com/uploads/4/1/9/3/4193382/std_c_notes_03.pdf
3. https://www.youtube.com/watch?v=CzWZYwOvrcE

CO-PO MAPPING:

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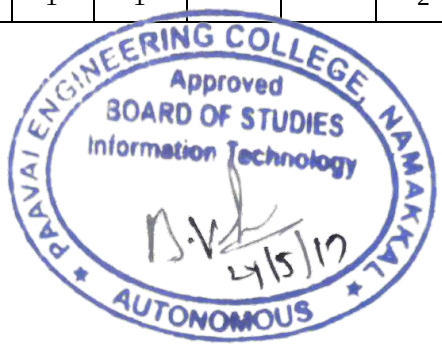
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	3
CO2	3	2	-	-	-	-	-	-	1	1	-	-	2	3
CO3	3	2	-	-	-	-	-	-	1	1	-	-	2	2
CO4	3	2	-	-	-	-	-	-	1	1	-	-	2	3
CO5	3	2	-	-	-	-	-	-	1	1	-	-	2	2



IT16302 DESIGN AND ANALYSIS OF ALGORITHMS 3 0 0 3

COURSE OBJECTIVES

- to study the principles of algorithm design.
- to know the importance of computational complexity of the algorithm .
- to become familiar with dynamic programming, divide and conquer, branch and bound andbacktracking techniques.
- to understand the limitations of algorithm power.
- to study about Notions of P, NP, NPC, and NP-hard.

UNIT I INTRODUCTION 9

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving –Important Problem Types– Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER 9

Brute Force –Closest-Pair and Convex-Hull Problems-Exhaustive Search - Traveling Salesman Problem - KnapsackProblem - Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication-Closest-Pair and Convex-HullProblems.

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE 9

Computing a Binomial Coefficient– Warshall's and Floyd's algorithm – Optimal Binary Search Trees– KnapsackProblem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm-Dijkstra's Algorithm- Huffman Trees.

UNIT IV ITERATIVE IMPROVEMENT 9

The Simplex Method-The Maximum-Flow Problem – Maxim Matching in Bipartite Graphs- The Stablemarriage Problem.

UNIT V LIMITATIONS OF ALGORITHM POWER 9

Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems- Coping- with the Limitations – Backtracking - n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound - Assignment problem – Knapsack Problem – Traveling Salesman Problem.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- discuss the significance of algorithms in problem solving process.
- analyze asymptotic runtime complexity of algorithms.
- describe and apply dynamic programming and divide and conquer algorithms.
- design efficient algorithms for new situations, using as building blocks the techniques learned.
- apply algorithm design techniques to solve certain NP-complete problems.

TEXT BOOK

1. AnanyLevitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, PearsonEducation, 2012.

REFERENCES

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009.
4. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.

WEB LINKS

1. nptel.ac.in/courses/106101060/
2. freevideolectures.com › Computer Science › IIT Bombay

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	-	2	1	-	2	1	1	1	2	3	1	-
CO2	3	3	1	2	2	-	2	-	-	-	2	3	2	-
CO3	3	3	1	2	2	-	2	-	-	-	2	3	2	2
CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1

EC16307 PRINCIPLES OF COMMUNICATION 3 0 0 3

COURSE OBJECTIVES

- to understand the different types of AM and FM Communication systems
- to gain knowledge in different digital modulation techniques for digital transmission.
- to study about base band transmission ISI and distortion free base band transmission.
- to know the different multiple access methods in wireless communication
- to acquire knowledge about Satellite and Optical Communication.

UNIT I ANALOG COMMUNICATION 9

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation

UNIT II DIGITAL COMMUNICATION 9

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude modulation.

UNIT III DIGITAL TRANSMISSION 9

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Inter symbolinterference, eye patterns.

UNIT IV MULTIPLE ACCESS TECHNIQUES 9

Multiple access techniques – wireless communication, TDMA, FDMA and CDMA in wireless communication systems, Source coding of speech for wireless communications.

UNIT V SATELLITE AND OPTICAL COMMUNICATION 9

Satellite Communication Systems-Keplers Law, LEO and GEO Orbits, Link model-Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- compare AM and FM communication systems .
- evaluate different digital modulation techniques for digital transmission.
- analyze the concepts of digital communication and applications.
- apply the concept of different multiple access methods
- analyze the concepts of satellite and optical communication.

TEXT BOOKS

1. Wayne Tomasi, “Advanced Electronic Communication Systems”, Pearson Education, 2007.
2. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley &Sons., 2001.

REFERENCES

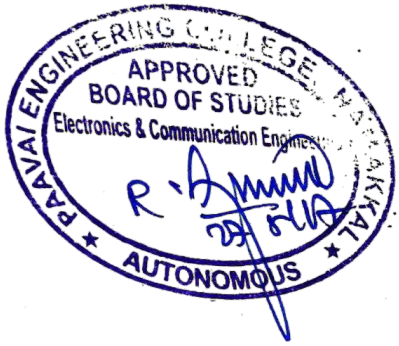
1. H.Taub, D L Schilling ,GSaha ,"Principles of Communication"3/e,2007.
2. B.P.Lathi,"Modern Analog and Digital Communication systems", 3/e, Oxford University Press, 2007
3. Dennis Roddy, "Satellite Communications", 4th Edition, McGraw Hill Professional, 2006.
4. Govind.P.Agarwal, "Fiber optic communication systems", 3rd edition, John Wiley & Sons Publications 2002.

WEB LINKS

1. https://www.youtube.com/watch?v=TPm0XSPxld8
2. www.nptel.ac.in/courses/106105080/pdf/M2L5.pdf
3. http://nptel.ac.in/courses/108101037/28
4. http://nptel.ac.in/courses/108101037/12

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	-	-	-	-	2	-	-	3	3	3
CO2	3	3	3	2	-	-	-	-	2	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO5	3	3	3	2	-	-	-	-	2	-	-	3	3	3



EC16308 DIGITAL PRINCIPLES AND SYSTEM DESIGN 3 0 0 3

(COMMON TO CSE & IT)

COURSE OBJECTIVES

- to learn the basic concepts of boolean algebra and logic gates.
- to know about the analysis and design procedure for combinational circuits
- to familiarize the students with memory devices.
- to know about the analysis and design procedure for synchronous sequential circuits.
- to acquire knowledge about the analysis and design procedure of asynchronous sequential circuits.

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Review of binary number systems - Binary arithmetic – Binary codes – Boolean laws and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Implementation of Boolean functions using logic gates.

UNIT II COMBINATIONAL LOGIC 9

Combinational circuits - Analysis and design procedures - Circuits for arithmetic operations and Code conversion- Encoder - decoder – Multiplexer- Introduction to Hardware Description Language (HDL). HDL for combinational circuits.

UNITIII MEMORY AND PROGRAMMABLE LOGIC 9

Classification of memory-ROM-ROM organization-RAM-Static and Dynamic RAM-Memory decoding andexpansion-Programmable logic devices-PLA,PAL.

UNIT V SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shiftregisters – Counters – HDL for Sequential Circuits.

UNIT VASYNCHRONOUS SEQUENTIAL LOGIC 9

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables - Race-free stateassignment – Hazards

TOTAL PERIODS 45

COURSE OUTCOMES

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

- understand the basic concept of boolean algebra and logic gates.
- design combinational logic circuits.
- evaluate the memory and programmable logic devices.
- analyze and design the synchronous sequential logic circuits.
- analyze and design the asynchronous sequential logic circuits.

TEXT BOOK

1. M.Morris Mano, "Digital Design", 3rd edition, Pearson Education, 2007.

REFERENCES

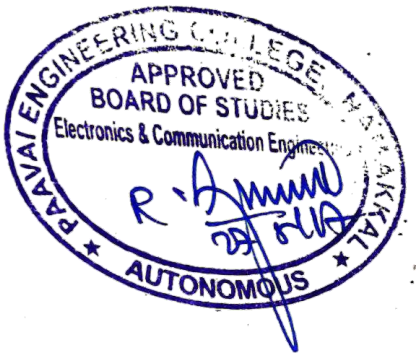
1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, CengageEarning, 5th ed, 2005.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2007.

WEB LINKS

1. http://nptel.ac.in/video.php?subjectid=117106086
2. http://www.electronics-tutorials.ws/combination/comb_1.html

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	-	-	-	-	2	-	-	3	3	3
CO2	3	3	3	2	-	-	-	-	2	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO5	3	3	3	2	-	-	-	-	2	-	-	3	3	3



CH 16301 ENVIRONMENTAL SCIENCE AND ENGINEERING 3 0 0 3

COURSE OBJECTIVES

At the end of this course the student is expected

- To know the constituents of the environment and the precious resources in the environment.
- To conserve all biological resources.
- To understand the role of human being in maintaining a clean environment and useful environment for the future generations
- To maintain the ecological balance and preserve bio-diversity.
- The role of government and non-government organizations in environment management.

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 9

Environment: Definition- scope - importance – need for public awareness. Forest resources: Use –over exploitation- deforestation - case studies- mining - effects on forests and tribal people. Water resources:Use – over utilization of surface and ground water- floods – drought - conflicts over water. Mineral resources Use – exploitation - environmental effects of extracting and using mineral resources – Food resources:World food problems - changes caused by agriculture and overgrazing – effects of modern agriculture fertilizer-pesticide problems - water logging - salinity. Energy resources: Growing energy needs renewable and non renewable energy sources. Role of an individual in conservation of natural resources.

UNIT II ECOSYSTEMS AND BIODIVERSITY 9

Concept of an ecosystem: Structure and function of an ecosystem – producers - consumers –decomposers – energy flow in the ecosystem – ecological succession – food chains - food webs and ecological pyramids. Types of ecosystem: Introduction - characteristic features - forest ecosystem – grassland ecosystem - desert ecosystem - aquatic ecosystems (lakes, rivers, oceans, estuaries).

Biodiversity: Introduction– definition (genetic - species –ecosystem) diversity. Value of biodiversity: Consumptive use - productive use – social values – ethical values - aesthetic values. Biodiversity level:Global - national - local levels- India as a mega diversity nation- hotspots of biodiversity. Threats to biodiversity : Habitat loss - poaching of wildlife – man wildlife conflicts – endangered and endemic species of India. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT III POLLUTION 9

Pollution: Definition –air pollution - water pollution - soil pollution - marine pollution - noise pollution - thermal pollution – nuclearhazards. Solid waste management: Causes - effects - control measures of urban and industrial wastes. Role of an individual in prevention of pollution - pollution. Disaster management :Floods – earthquake - cyclone - landslides. Electronic waste-Sources-Causes and its effects.

UNIT IV SOCIAL ISSUES AND ENVIRONMENT 9

Sustainable development : Unsustainable to sustainable development – urban problems related to energy.

Water conservation - rain water harvesting - watershed management. Resettlement and rehabilitation of people.

Environmental ethics: Issues - possible solutions – climate change - global warming and its effects on flora and fauna - acid rain - ozone layer depletion - nuclear accidents - nuclear holocaust -Environment protection act: Air (Prevention

and Control of Pollution) act – water (Prevention and control of Pollution) act – wildlife protection act – forest conservation act – issues involved in enforcement of environmental legislation.

UNIT V HUMAN POPULATION AND ENVIRONMENT 9

Human population: Population growth - variation among nations – population explosion – family welfare programme and family planning – environment and human health – Human rights – value education – HIV/AIDS Swine flu – women and child welfare. Role of information technology in environment and human health.

TOTAL PERIODS 45

COURSE OUTCOMES

Upon the completion of the course, students will be able to

- Know the relationship between the human population and environment.
- Understand the basic concepts of environment studies and natural resources.
- Gaining the knowledge about ecosystem and biodiversity.
- Have knowledge about causes, effects and control measures of various types of pollution.
- Understand the social issues and various environmental acts.

TEXT BOOKS

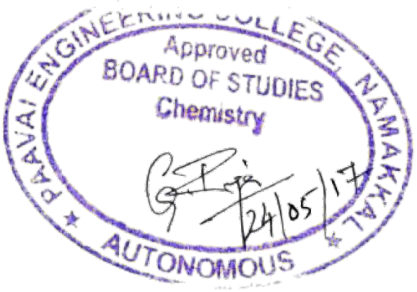
1. Raman Sivakumar, Introduction to Environmental Science and Engineering, 2nd Edn, Tata McGraw Hill Education Private Limited, New Delhi,(2010).
2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw Hill, (2010).

REFERENCES

1. S. Divan, Environmental Law and Policy in India, Oxford University Press, New Delhi, 2001.
2. A.K.De, EnvironmentalChemistry, VI edition,2015 NewAge International (P) ltd Publication,NewDelhi.
3. C.S.Rao, Environmental Pollution and Control engineering, Vedition,NewAge International (P) ltd Publication, NewDelhi 110002
4. Clair Nathan Sawyer, Perry L. McCarty, Gene F. Parkin, "Chemistry for Environmental Engineering and Sciences, V Edition,2013,Tata M'c Graw Hill pub,Newdelhi110008

Mapping of course outcome with Programme Outcomes
(S/M/W indicates strength of correlation) S-Strong-3, M-Medium=2 , W-Weak=1.

CO	Programmes Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	1	3	3	2	-	-	3	1	-
CO2	-	-	2	-	-	1	-	3	-	2	-	3	1	-
CO3	2	-	2	-	2	1	-	3	-	2	-	3	1	-
CO4	2	2	2	-	2	1	3	3	-	2	-	3	1	-
CO5	-	2	-	-	-	1	3	3	2	2	-	2	1	-



IT16305 OBJECT ORIENTED PROGRAMMING WITH C++ LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to know the fundamental knowledge of object oriented programming.
- to develop skills required to become a proficient C++ programmer.
- to transforming the physical problem domain into a hierarchy of objects.
- to apply OOP to solve simple engineering problems.
- to development of solution for complex problems in the real world.

LIST OF EXPERIMENTS

1. Write C++ Programs using Classes and Objects.
2. Write C++ classes with static members, methods with default arguments, friend functions.
3. Develop C++ Programs using Operator Overloading.
4. Develop C++ Programs using constructor, destructor, and copy constructor.
5. Develop C++ Programs Overload the new and delete operators.
6. Develop C++ Programs using Inheritance, Polymorphism and its types.
7. Develop C++ Programs using Arrays and Pointers.
8. Develop C++ Programs using Dynamic memory allocation.
9. Develop C++ Programs using Templates and Exceptions.
10. Develop C++ Programs using Sequential and Random access files.

TOTAL PERIODS 60

COURSE OUTCOMES

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

- design an object oriented program using classes and objects.
- apply inheritance to reuse the C++ code.
- apply polymorphism to extend the code and reduce the complexity of the program.
- implement files and streams in C++ programs.

RECOMMENDED SYSTEM/SOFTWARE

REQUIREMENTSSOFTWARE: Turbo C++.

HARDWARE: Flavor of any WINDOWS or LINUX and Standalone desktops 30 Nos.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	-	-	2	-	-	-	-	-	-	-	3	3
CO2	2	1	-	-	2	-	-	-	-	-	-	-	1	3
CO3	3	2	-	-	3	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	3

EC16309 **DIGITAL LABORATORY** **0 0 4 2**

(COMMON TO CSE & IT)

COURSE OBJECTIVES

- to understand the concept of Boolean theorems.
- to study the concept of combinational circuits using digital logic gates
- to learn the concept of combinational circuits using MSI devices.
- to design and implement the sequential logic circuits.
- to simulate combinational andsequential logic circuits using VHDL/Verilog.

LIST OF EXPERIMENTS

1. Verification of Boolean laws and theorems using logic gates
2. Design and verification of adders and subtractors using basic gates.
3. Design and implementation of code converter: Binary to Gray code and Gray code to Binarycode.
4. Design and implementation of 4-bit binary adder / subtractor using IC7483
5. Design and implementation of encoder and decoder using basic gates.
6. Design and implementation of multiplexers and Demultiplexers using basic gates.
7. Design and implementation of Shift registers.
8. Design and implementation of Synchronous and Asynchronous counters.
9. Simulation of Combinational circuits using Verilog HDL

TOTAL PERIODS 60

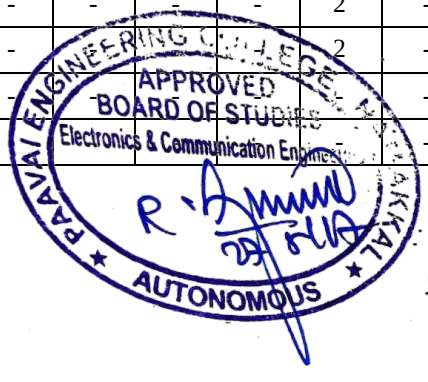
COURSE OUTCOMES

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

- evaluate the basic laws.
- analyse the Combinational logic circuits using logic gates.
- analyse the Combinational logic circuits using MSI devices.
- explain the working of Sequential logic circuits.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	-	-	-	-	2	-	-	3	3	3
CO2	3	3	3	2	-	-	-	-	2	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3	3	3



EN16301 BUSINESS ENGLISH COURSE LABORATORY 0 0 2 1

COURSE OBJECTIVES

- to develop the reading skills of the students and to familiarize them in skimmingand scanning.
- to instill the communication concepts and enhance the students' conversational skills through various practicesessions .
- to familiarize them with a variety of business correspondence.
- to develop the receptive skills such as listening and reading and to make the students well versed in theproductive skills (writing and speaking).
- to assist them in improving their vocabulary and comprehension of grammar.

UNIT I READING AND VOCABULARY 6

Understanding short, notices, messages - detailed comprehension of factual material- skimming & scanning skills - interpreting visual information- reading for gist and specific information - reading for grammatical accuracy and understanding of text structure - reading and information transfer.

UNIT II WRITING 9

Fixing appointments - asking for permission - giving instructions - apologizing and offering compensation - making oraltering reservations - dealing with requests - - giving information about a product

UNIT III LISTENING 6

Listening to short telephonic conversation - Listening to short conversation or monologue - Listening to specificinformation - Listening to recordered interview, discussion.

UNIT IV SPEAKING 9

Conversation between the interlocutor and the candidate - interaction in social contexts - A mini presentation by each candidate on a business theme - organising a larger unit of discourse – giving information and expressing opinions – interactive communication conversation between candidates followed by further prompting from the interlocutor-Expressing opinions- agreeing and disagreeing.

TOTAL PERIODS 30

COURSE OUTCOMES

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

- enrich the business vocabulary through reading.
- develop their pronunciation skills.
- speak effectively in English in various occasions.
- prepare flawless reports and proposals.

TEXT BOOKS

1. Cambridge BEC Preliminary, Self Study Edition, Cambridge University Press, New York, 2012
2. Whitby, Norman. Business Benchmark, Pre-intermediate to intermediate, Business Preliminary, Shree MaitreyPrintech Pvt. Ltd., Noida, 2014.

REFERENCES

1. Raman, Meenakshi&Sangeetha Sharma. Technical Communication: Principles and Practice Oxford UniversityPress, New Delhi. 2011.
2. Rizvi, Ashraf. M. Effective Technical Communication. Tata McGraw-Hill, New Delhi. 2005.
3. Rutherford, Andrea. J Basic Communication Skills for Technology. Pearson, New Delhi.

WEB SOURCE

1. http://www.cambridge.org/us/cambridgeenglish/catalog/cambridge-english-exams-ielts/business-benchmark

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	-	-	-	2	3	-	-	-	3	2	-	-	-	2
CO2	-	-	1	1	2	-	-	-	3	2	-	-	1	2
CO3	-	-	2	2	-	-	1	1	3	2	-	2	-	2
CO4	-	-	-	-	-	3	1	2	3	2	2	3	2	-

SEMESTER IV

PROBABILITY AND QUEUEING THEORY

MA16401 **3 2 0 4**

(COMMON TO CSE & IT)

COURSE OBJECTIVES

- to acquire knowledge of the random variables and manipulate.
- to understand the concepts of standard distributions methods.
- to analyse the relationship between the two random variables.
- to provide necessary basic concepts in probability and random processes related to communicationengineering domain.
- to use various queuing theory models for real time situations.

UNIT I RANDOM VARIABLES 15

Axioms of probability – Conditional probability – Total probability – Baye's theorem - Random variable- Probability mass function – Probability density function – Properties – Moments – Moment generating functionsand their properties.

UNIT II STANDARD DISTRIBUTION 15

Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions and theirproperties – Functionsof a random variable.

UNIT III TWO DIMENSIONAL RANDOM VARIABLES 15

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

UNIT IV RANDOM PROCESS AND MARKOV CHAIN 15

Classification – Stationary process – Poisson process – Markov Chain – Transition probabilities– LimitingDistributions.

UNIT V QUEUEING MODELS 15

Markovian models – (M/M/1), (M/M/C), finite and infinite capacity – (M/G/1) queue –Pollaczek – KhintchineFormula.

TOTAL PERIODS 75

COURSE OUTCOMES

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

- understand the basic probability concepts.
- know the standard distribution for real time applications.
- acquire skills in handling situations involving more than one random variable and functions of random variables.
- evolve with respect to time in a probabilistic manner.
- acquire the fundamental skills to analyze queuing models and systems.

TEXT BOOKS

1. Gross, Donald Harris and M Carl, " Fundamentals of Queuing Theory", 3rd ed., Wiley Publications, NewDelhi, 2008

2. Ibe. O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 2nd Indian Reprint,2010.
3. T Veerarajan, "Probability, Statistics and Random Processes", 2nd ed., Tata McGraw- Hill, New Delhi,2008.

REFERENCES

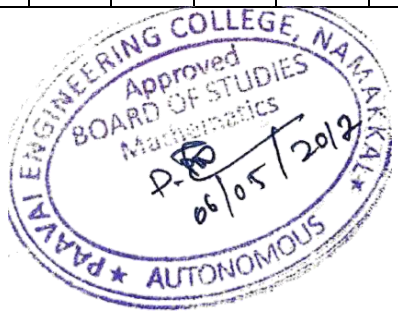
1. Trivedi, K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications",PHI, New Delhi, 2nd Edition, 2009.
2. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and RandomProcesses", Tata McGraw Hill, New Delhi, 9th Reprint, 2010.
3. Yates. R.D. and Goodman. D. J., "Probability and Stochastic Processes", Wiley India Pvt.Ltd.Bangalore,2nd Edition, 2012
4. Venkatachalam.G,"Probabilityand Queueing Theory", Hitech Publishing Company Pvt.Ltd.,Chennai,3rd Edition, 2012.

WEB LINKS

1. https://www.youtube.com/watch?v=IYdiKeQ9xEI
2. https://www.youtube.com/watch?v=xGkpXk-AnWU
3. https://www.youtube.com/watch?v=l-rRtmNpdkU
4. https://www.youtube.com/watch?v=J70dP_AECzQ
5. http://172.16.100.200/NPTEL/displayvideo.html?type1=111105041%2Fmod01lec16.mp4

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	3	-	-	-	-	-	-	-	-	3	3
CO2	3	3	3	2	-	-	-	-	-	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	2	3	-	-	-	-	-	-	-	-	3	3
CO5	3	3	2	-	-	-	-	-	-	-	-	-	3	3



IT16401 JAVA PROGRAMMING 3 2 0 4

COURSE OBJECTIVES

- to understand the concepts of object oriented programming.
- to understand the concepts of inheritance.
- to develop an application in event driven programming.
- to develop an application in generic programming.
- to develop an application in concurrent programming.

UNIT I OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS 15

Review of OOP - Objects and classes in Java – defining classes – methods –access specifies – static members– constructors – finalize method – Arrays – Strings -Packages – Java Doc comments.

UNIT II OBJECT-ORIENTED PROGRAMMING – INHERITANCE 15

Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword –abstract classes – the Objectclass – Reflection – interfaces – object cloning – inner classes – proxies.

UNIT III EVENT-DRIVEN PROGRAMMING 15

Graphics programming – Frame – Components– working with 2D shapes – Using color, fonts, and images - Basics of event handling – event handlers – adapter classes –actions – mouse events – AWT event hierarchy – introduction to Swing – Model – View-Controller design pattern – buttons – layout management – Swing Components.

UNIT IV GENERIC PROGRAMMING 15

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine– inheritance and generics – reflection and generics – exceptions –exception hierarchy – throwing andcatching exceptions – Stack Trace Elements -assertions – logging.

UNIT V CONCURRENT PROGRAMMING 15

Multi-threaded programming – interrupting threads – thread states – thread properties –thread synchronization– thread-safe Collections – Executors – synchronizers – threads and event-driven programming.

TOTAL PERIODS 75

COURSE OUTCOMES

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

- understand the needs of object oriented programming.
- differentiate the functionalities of object oriented approach and procedural languages.
- demonstrate the concepts of event-driven programming.
- exhibit the concepts of generic programming using Java .
- perform the concepts of concurrent programming.

TEXT BOOKS

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, SunMicrosystems Press, 2008.

2. Herbert Schildt, Java2-CompleteReference, Tata McGraw Hill, 2011.

REFERENCES

1. K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
2. Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, PearsonEducation, 2000.
3. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fourth Edition, TataMcGraw-Hill Publishing Company Ltd., 2006.
4. Gary Cornell and Cay S. Horstmann, Core Java Vol.1andVol.2,Sun Microsystems Press,2008
5. Herbert Schildt, Java, A Beginner's Guide, Tata McGraw Hill,2007.

WEB LINKS

1. www.javatpoint.com/java-oops-concepts
2. www.w3resource.com/java.../java-object-oriented-programming.php

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1	1	1	-	-	-	-	-	-	-	-	2	1
CO2	2	1	1	2	-	-	-	-	-	-	-	-	1	2
CO3	2	1	2	2	3	-	-	-	-	-	-	-	1	2
CO4	1	2	2	1	1	-	-	-	-	-	-	-	1	2
CO5	1	1	2	1	-	-	-	-	-	-	-	-	-	2

IT16402 OPERATING SYSTEMS 3 0 0 3

COURSE OBJECTIVES

- to study the basic concepts and functions of operating systems.
- to understand the structure and functions of OS.
- to learn about Processes, Threads and Scheduling algorithms.
- to understand the principles of concurrency and Deadlocks.
- to learn various memory management schemes.

UNIT I INTRODUCTION 9

Introduction: Computer system organization - Introduction to operating systems – operating system structures – Services - System calls – System programs. Processes: Process concept – Process scheduling – Operations on Processes –Cooperating processes – Inter process communication – Communication in client-server systems.Threads: Multi-threading models – Threading issues. Case Study: Pthreads library.

UNIT II PROCESS MANAGEMENT AND DEADLOCK 10

CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – Monitors. Deadlock: System model – Deadlock Characterization –Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance –Deadlock detection – Recovery from deadlock. Case Study: Process scheduling in Linux.

UNIT III MEMORY MANAGEMENT 9

Main Memory: Background – Swapping – Contiguous memory allocation –Paging – Segmentation – Segmentation with paging. Virtual Memory: Background –Demand paging – Page replacement – Allocation offrames –Thrashing. Case Study: Memory management in windows and Solaris.

UNIT IV FILE SYSTEMS 9

File-System Interface: File concept – Access methods – Directory structure – File system mounting – File sharing- Protection. File-System Implementation:Directory implementation–Allocation methods – Free-space management – efficiency and performance – recovery– Network file systems. Case studies: File systemin Windows XP.

UNIT V I/O SYSTEMS AND MASS STORAGE MANAGEMENT 8

I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem –streams – performance. Mass- Storage Structure: Disk attachment - Disk scheduling – Disk management – Swap-space management – RAID –stable storage. Case study: I/O in Linux.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- design various scheduling algorithms.
- apply the principles of concurrency.

- design deadlock, prevention and avoidance algorithms.
- compare and contrast various memory management schemes.
- schedule and manage the disk effectively .

TEXT BOOK

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", Ninth Edition, Wiley India Pvt Ltd,2013.

REFERENCES

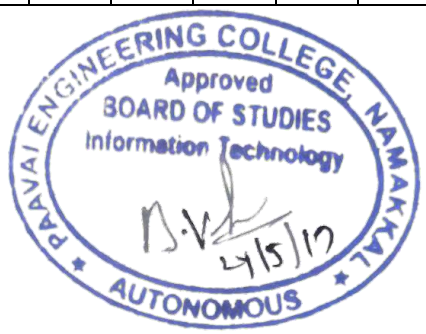
1. Andrew S. Tanenbaum, "Modern Operating Systems", Fourth Edition, Pearson Education, 2014.
2. William Stallings, "Operating Systems – internals and design principles", Prentice Hall, 7thEdition,2011.
3. Harvey M. Deital, "Operating Systems", Third Edition, Pearson Education, 2007.
4. Andrew S. Tannenbaum&Albert S. Woodhull, "Operating System Design and Implementation", Prentice Hall, 3rd Edition, 2006.
5. Gary J.Nutt, "Operating Systems", Pearson/Addison Wesley, 3rd Edition, 2004.

WEB LINKS

1. http://nptel.ac.in/courses/106108101
2. http://www.learnerstv.com

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	3	-	-	-	-	-	-	1	-	-	-	2	1
CO2	3	3	3	-	3	-	-	-	1	-	-	1	2	1
CO3	2	3	3	-	3	-	-	-	1	-	1	2	2	1
CO4	2	3	3	-	3	-	-	-	1	-	2	3	2	1
CO5	3	3	-	-	-	-	-	-	3	3	2	3	1	3



IT16403 DATABASE MANAGEMENT SYSTEMS 3 0 0 3

COURSE OBJECTIVES

- to learn the fundamentals of database management systems.
- to make the students understand the relational model.
- to familiarize the students with ER diagrams.
- to expose the students to SQL.
- to familiarize the students with the different types of databases.

UNIT I INTRODUCTION 9

Purpose of Database System - Views of data – Data Models – Database Languages – Database System Architecture – Database users and Administrator – Entity–Relationship model (E-R model) – E-R Diagrams - Introduction to relational databases.

UNIT II RELATIONAL MODEL 9

The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations –Additiona l/O operations- SQL fundamentals - Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views –Introduction to Distributed Databases and Client/Server Databases.

UNIT III DATABASE DESIGN 9

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/ Code Normal Form-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT IV TRANSACTIONS 9

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery –Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking –Intent Locking – Deadlock- Serializability – Recovery Isolation Levels – SQLFacilities for Concurrency.

UNIT V IMPLEMENTATION TECHNIQUES 9

Overview of Physical Storage Media–Magnetic Disks – RAID –Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing –Query Processing Overview – Catalog Information for Cost Estimation – Selection Operation – Sorting – Join Operation – Database Tuning.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- describe basic concepts of database system.
- design a data model and schemas in RDBMS.
- analyze functional dependencies for designing a robust database.
- apply SQL for business related problems.

- implement transactions, Concurrency control, and be able to do database recovery

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Sixth Edition,
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems",Eighth Edition, PearsonEducation, 2006.

REFERENCES

1. Elmasri R. and Shamakant B. Navathe, "Fundamentals of Database Systems", 6th Edition, AddisionWesley , 2011.
2. Atul Kahate, "Introduction to Database Management Systems", Pearson Education, New Delhi, 2006.
3. Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, Tata Mc Graw Hill, 2010.
4. G.K.Gupta, "Database Management Systems", Tata Mc Graw Hill, 2011.
5. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, "Database Systems: The Complete Book",Pearson Education, Second Edition, 2008

WEB LINKS

1. www.nptelvideos.in/2012/11/database-management-system.html
2. nptel.ac.in/courses/106106093

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	1	1	1	-	-	-	-	-	-	-	-	2	-
CO2	1	2	3	2	-	-	-	-	-	-	-	-	1	2
CO3	1	3	2	2	1	-	-	-	-	-	-	-	1	2
CO4	1	2	2	2	1	-	-	-	-	-	-	-	1	2
CO5	1	2	2	1	2	-	-	-	-	-	-	-	1	2

IT16404 COMPUTER ARCHITECTURE 3 0 0 3

COURSE OBJECTIVES

- to make students understand the basic structure and operation of digital computer.
- to familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- to expose the students to the concept of pipelining.
- to understand the concept of virtual and catch memory .
- to expose the students with different ways of communicating with I/O devices and standard I/Ointerfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface –Instruction set architecture – Addressing modes – RISC– CISC.

UNIT II BASIC PROCESSING UNIT & ALU OPERATIONS 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization– Hardwired control– Micro programmed control – ALU-Addition and subtraction–Multiplication–Division.

UNIT III PIPELINING & PARALLELISM 9

Basic concepts – Data hazards – Instruction hazards – Structural Hazards-Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling-Instruction-level- parallelism –Parallel processing challenges – Flynn's classification –Hardware multithreading- Hardware support for exposing parallelism

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache Performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

UNIT V I/O ORGANIZATION 9

Accessing I/O devices – Programmed Input/ Output -Interrupts – Direct Memory Access– Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- understand instruction and addressing modes.
- design arithmetic and logic unit.
- design and analyses pipelined control units.
- evaluate performance of memory systems.
- understand parallel processing architectures.

TEXT BOOKS

1. David A. Patterson and John L. Hennessey, "Computer organization and design', Morgan Kauffman/ Elsevier, Fifth edition, 2014.
2. Carl Hamacher, ZvonkoVranesic and SafwatZaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2012.

REFERENCES

1. William Stallings "Computer Organization and Architecture" , Seventh Edition , Pearson Education,2006.
2. Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, PearsonEducation, 2005.
3. John P. Hayes, "Computer Architecture and Organization", Third Edition, TataMcGraw Hill, 1998.

WEB LINKS

1. http://courses.cs.vt.edu/csonline/OS/Lessons/
2. http://www.linux-tutorial.info/modules.php?name=MContent&pageid=4

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
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CO1	3	3	2	2	-	-	-	-	-	-	-	2	2	2
CO2	3	2	2	3	2	-	-	-	-	-	-	2	2	2
CO3	3	2	1	2	2	-	-	-	-	2	-	2	-	2
CO4	3	3	2	3	2	-	-	-	-	2	-	3	-	2
CO5	2	3	2	3	2	-	-	-	-	2	-	3	2	2

EC16408 MICROPROCESSOR AND MICROCONTROLLER 3 0 0 3

COURSE OBJECTIVES

- to study the architecture of 8086 microprocessor.
- to learn the various addressing modes and instruction set of 8086.
- to acquire the knowledge of interfacing of I/O and memory with 8086 microprocessor
- to study the architecture of 8051 microcontroller.
- to learn about interfacing of keyboard and other devices with microcontroller.

UNIT I THE 8086 MICROPROCESSOR 9

Introduction to Microprocessor, Bus– Address bus, Data bus and control bus, Connecting Microprocessor toI/O devices, Introduction to 8086 – Microprocessor architecture, 8086 signals.

UNIT II 16 BIT MICROPROCESSOR INSTRUCTION SET AND ASSEMBLY 9

Addressing modes –Basic configuration and Interrupts – Instruction set and assembler directives – Assembly language programming.

UNIT III I/O INTERFACING 9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller

UNIT IV MICROCONTROLLER 9

Architecture of 8051 – Signals – Special Function Registers(SFRs) - I/O Ports – Memory –Interrupts – Instructionset – Addressing Modes – Assembly language programming.

UNIT V SYSTEM DESIGN USING MICROCONTROLLER 9

Case studies – Traffic light control, washing machine control, DC Motor – Stepper Motor – Keyboard Interfacing- ADC, DAC – External Memory Interface.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- explain the concepts of 8086 microprocessor.
- Implement programs on 8086 microprocessor.
- Interface various I/O circuits with 8086 microprocessor.
- Implement programs on 8051 microcontroller.
- design 8051 microcontroller based systems.

TEXT BOOKS

1. Krishna Kant, “Microprocessors and Microcontrollers Architecture, programming and systemdesign using 8085, 8086, 8051 and 8096”. PHI 2007.
2. Kenneth J.Ayala, “The 8051 Microcontroller Architecture, Programming and applications”,Second edition, Penram International.

REFERENCES

1. DoughlasV.Hall, "Microprocessors and Interfacing, Programming and Hardware",TMH2012
2. A.K.Ray& K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programmingand Interfacing", Tata McGraw Hill, 2006.

WEB LINKS

1. http://nptel.ac.in/courses/108107029
2. https://www.youtube.com/watch?v=liRPtvj7bFU
3. http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/Course_home2_5.htm
4. http://nptel.ac.in/courses/117104072/
5. https://www.smartzworld.com/notes/microprocessors-and-microcontrollers-mpmc/

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO3	3	2	2	2	2	2	2	-	-	-	-	-	3	3
CO4	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO5	3	2	2	2	2	2	2	-	-	-	-	-	3	3

IT16405 DATABASE MANAGEMENT SYSTEMS LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to learn to create and use a database.
- to be exposed to different types of database applications.
- to develop conceptual understanding of database management system.
- to understand how a real world problem can be mapped to schemas.
- to develop understanding of different applications and constructs of SQL PL/SQL.

LIST OF EXPERIMENTS

1. Data Definition, Table Creation, Constraints.
2. Insert, Select Commands, Update & Delete Commands.
3. Nested Queries & Join Queries.
4. Views.
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end tools.
7. Forms.
8. Triggers.
9. Menu Design.
10. Reports.
11. Database Design and implementation (Mini Project).
    a) Personal Information System.
    b) Web Based User Identification System.
    c) Timetable Management System.
    d) Hotel Management System

TOTAL PERIODS 60

COURSE OUTCOMES

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

- design and implement a database schema for a given problem-domain.
- populate and query a database.
- create and maintain tables using PL /SQL.
- prepare forms and reports.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Front end: VB/VC ++/JAVA or Equivalent

Back end: Oracle / SQL / MySQL/ PostGress / DB2 or Equivalent

HARDWARE: Standalone desktops (or) Server supporting terminals.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	3	1	1	-	-	-	-	-	-	-	1	2
CO2	1	1	2	1	-	-	-	-	-	-	-	-	1	2
CO3	2	1	2	1	2	-	-	-	-	-	-	-	1	2
CO4	1	2	2	1	-	-	-	-	-	-	-	-	1	2

IT16406 OPERATING SYSTEMS LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to implement scheduling algorithms.
- to learn to use the file allocation and organization strategies.
- to be familiar with implementation of deadlock avoidance & detection algorithms.
- to implement page replacement algorithms.
- to be exposed to process creation and inter process communication.

LIST OF EXPERIMENTS

1. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority.
2. Simulate all file allocation strategies: a) Sequential b) Indexed c) Linked.
3. Implement the producer – consumer problem using semaphores.
4. Simulate all File Organization Techniques:
   a) Single level directory b) Two level c) Hierarchical d) DAG.
5. Simulate Bankers Algorithm for Dead Lock Avoidance.
6. Simulate an Algorithm for Dead Lock Detection.
7. Simulate all page replacement algorithms a) FIFO b) LRU c) Optimal.
8. Simulate Shared memory and IPC.
9. Simulate Paging Technique of memory management.
10. Implement Threading & Synchronization Applications.
11. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority.
12. Simulate all file allocation strategies: a) Sequential b) Indexed c) Linked.
13. Implement the producer – consumer problem using semaphores.
14. Simulate all File Organization Techniques:

TOTAL PERIODS 60

COURSE OUTCOMES

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

- compare the performance of various CPU scheduling algorithm.
- implement file allocation and organization strategies.
- implement deadlock avoidance, and detection algorithms.
- critically analyze the performance of the various page replacement algorithms.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Standalone desktops (or) Server with C / C++ / Java / Equivalent complier

HARDWARE: Standalone desktops (or) Server supporting terminals.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	1	1	1	-	-	-	1	-	-	-	2	1
CO2	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO3	3	3	3	1	3	-	-	-	1	-	1	2	2	1
CO4	3	3	3	1	3	-	-	-	1	-	2	3	2	1

EC16409 MICROPROCESSOR AND MICROCONTROLLER LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to implement the assembly language programming of 8086 and 8051.
- to experiment the interface concepts of various peripheral devices with the processor.
- to impart the knowledge about the instruction set.
- to understand the basic idea about the data transfer schemes and its applications.
- to develop skill in simple program writing for 8051 & 8086 and applications.

Assembly Language programming using 8086 and MASM

1. Basic arithmetic and Logical operations.
2. Move a data block without overlap.
3. String manipulations
4. Sorting and searching

Interfacing with 8086 microprocessor

5. Stepper motor control.
6. Key board and Display.
7. Serial interface
8. Parallel interface

Programming using 8051 microcontroller

9. Basic arithmetic and Logical operations.
10. ADC and DAC interfacing.

TOTAL PERIODS 60

COURSE OUTCOMES

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

- write assembly language programmes for various applications.
- interface different peripherals with microprocessor.
- execute programs in 8086 and 8051.
- simulate programs in MASM

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO3	3	2	2	2	2	2	2	-	-	-	-	-	3	3
CO4	3	2	2	2	2	-	-	-	-	-	-	-	3	3