COURSE ID: 15

Course Name : APPLIED MATHEMATICS
Course Code : ITE301
Course Abbreviation : EAPA

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : CCE105 & CCE106

Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	03	04
Tutorial	01	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	--	--	
Marks	**20**	**--**	**80**	**--**	**--**	**100**

RATIONALE:

Mathematics is an important pre-requisite for the development and understanding of engineering and technological concepts. For an engineer and technologist, knowledge of Mathematics is an effective tool to pursue and to master the applications in the engineering and technological fields. Applied mathematics is designed for its applications in engineering and technology. It includes integration, differential equation, Complex Numbers. The connection between applied mathematics and its applications in real life can be understood and appreciated. Integral calculus helps in finding the area, mean value R. M. S value etc .In analog to digital converter and modulation system integration is important. Differential equation is used in finding curve, rectilinear motion. Complex Numbers are useful in Electrical and Electronics Engineering The fundamentals of this topic are directly useful in understanding engineering applications in various fields.

OBJECTIVES:

The student will be able:

1. Apply rules and methods of Integration to Engineering and technical field.
2. Apply rules and methods of differential equation to solve Engineering and technical Problems
3. Apply various concepts of Complex number in to Engineering and technical field.

CONTENT:

A. THEORY :

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
1	**Indefinite Integrals** 1.1 Definition, Standard formulae 1.2 Integration of sum of two or more functions 1.3 Integration by substitution, Integration by parts 1.4 Integration by partial fractions 1.5 Integration by trigonometric transformations	**12**	**20**
2	**Definite Integrals** 2.1 Definition, Properties of Definite Integration (without proof) 2.2 Examples based on properties	**06**	**10**
3	**Application of Integration** 3.1 Area under the curve and 3.2 Area between two curves 3.2 Mean value & R.M.S. value of a function	**06**	**10**
	Total	**24**	**40**

1.Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.
2.In each topic corresponding applications will be explained

Section II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
4	**Differential equations** 4.1 Definition of a differential equations 4.2 Order & degree of Differential equations 4.3 General & particular solution of the Differential equations 4.4 Solutions of Differential equations of first order & first degree of following types 3.4.1 Variables separable 3.4.2 Equation Reducible to Variable Separable 3.4.3 Homogenous Equation 3.4.4 Exact equations 3.4.5 Linear Equations 3.4.6 Bernoulli's Equation 4.5 Applications of Differential equations 4.5.1 Geometrical Application 4.5.2 Application to rates	**02** 08 02	**04** 12 04
5	**Complex numbers** 5.1 Definition , Algebra of complex numbers , simple examples , 5.2 Argand diagram , Polar form ;Exponential form; 5.3 De-Moivre's Theorem, Roots of a complex number , 5.4 Euler's Theorem, 5.5 Hyperbolic functions ,Relation between trigonometric function and hyperbolic function 5.6 separation into real and imaginary parts.	12	20
	Total	**24**	**40**

1.Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.
2. In each topic corresponding applications will be explained

Specification table for setting question paper for semester end theory examination:

Topic No.	Name of topic	Distribution of marks (level wise)			Total Marks
		Knowledge	Comprehension	Application	
1	Indefinite Integrals	4	10	6	20
2	Definite Integrals	2	2	6	10
3	Application of Integration	--	--	10	10
4	Differential equations	6	6	08	20
5	Complex numbers	6	6	08	20

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

B. TUTORIALS

Note: Tutorials are to be used to get enough practice [One batch for 20 Students]

Sr No.	Topic	Tutorial Content (10 problems in each tutorial)
1	Indefinite Integrals	To evaluate Integration using standard formulae, To evaluate Integration using Substitution Method
2	Indefinite Integrals	To evaluate Integration of Various forms.
3	Indefinite Integrals	To evaluate Integration using by Part rule and Partial fraction method
4	Definite Integrals	To evaluate Define Integration for various forms and using properties.
5	Application of Integration	Apply Integration concepts to find Area ,Mean value, RMS value
6	Differential equations	To determine Order and Degree of D.E. Formation and Solution of D.E. Examples on V.S. Form ,Reducible to V.S. Form of D.E.
7	Differential equations	Examples on Homogeneous ,Linear of D.E
8	Differential equations	Examples on Bernoulli's form of D.E. and Examples on Applications of D.E.

9	Complex Numbers	Examples on Algebra of Complex Numbers, Examples on De-Moivres Theorem
10	Complex Numbers	Examples on Roots of Complex , Numbers,Eulers Theorem, Circular and Hyperbolic functions

INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Demonstrations
2. Tutorials

Teaching and Learning resources:

1. Chalk board
2. Item Bank
3 Formulae Charts
4 Power point presentation

REFERENCE MATERIAL:

a) Books:

Sr. No.	Author	Title	Publisher
1.	G.V. Kumbhojkar	Engineering Mathematics III	Phadake Prakashan, Kolhapur
2.	Patel, Rawal,	Applied Mathematics	Nirali Prakashan,Pune
3.	P.M.Patil and others	Applied Mathematics	Vision Publication, Pune
4.	Sameer Shah	Applied Mathematics	Tech-Max Publication, Pune
5.	P.N.Wartikar	Applied mathematics	Pune vidyarthi Griha Prakashan , pune
6	H.K.Dass	Higher engineering mathematics	S .Chand publication
7	B.S.Grewal	Higher engineering Mathematics	Khanna publication, New Delhi

b) Websites

i) www.khanacademy.org
ii) www.easycalculation.com
iii) www.math-magic.com

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COURSE ID: 16

Course Name : DIGITAL ELECTRONICS
Course Code : ITE302
Course Abbreviation : EDTE

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	--	As per Proforma - II	
Marks	**20**	**--**	**80**	**--**	**50**	**150**

Rationale:

In the present era, applications of digital circuits are prevalent in consumer products right from calculators, digital diaries, digital watches, computers, mobile phones, to industrial products. So the digital technique has been introduced as a core technology subject. It will enable the students to assemble, design, test logical circuits such as ALU, Mux, Demux, A/D and D/A converters. It deals with topics ranging from logic gates to combinational and sequential logic circuits and memories. It lays a foundation for the knowledge of microprocessors and computers.

Objectives:

Students should understand

1. Different number systems in digital.
2. Combination and sequential logic design.
3. Encoder / decoder and multiplexing / demultiplexing.
4. Data converters.
5. Learn data convertors.

6. Learn TIMER 555

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
1	**NUMBER SYSTEMS & CODES** 1.1 Introduction to Number systems- Binary number System, Decimal number System. 1.2 Octal no system, Hexadecimal no. System. 1.3 Decimal to binary, hexadecimal, octal conversion 1.4 Binary to decimal, Hexadecimal, octal conversion. 1.5 Hexadecimal to decimal, binary, octal conversion. 1.6 Octal to Decimal, binary, hexadecimal conversion. 1.7 Binary arithmetic 1.7.1Addition. 1.7.2 Subtraction 1.9 Binary subtraction using 1's & 2's complement 1.10 BCD subtraction using 9's and 10's complement 1.11 Study of different codes. 1.11.1 Gray code. 1.11.2 Alphanumeric code. 1.11.3 Extended BCD interchange code. 1.11.4 ASCII codes	8	14
2	**LOGICAL GATES & BOOLEAN ALGEBRA** 2.1 Study of Logic Gates i.e. AND, OR, NOT, NAND, NOR, EX-OR 2.2 Commutative, Associative and distributive Laws. 2.3 Demorgan's theorem 2.4 K-Map representation of logical functions. 2.5 K-Map reduction techniques 2.6 Sum of Product & Product of Sum reduction techniques	6	10
3	**COMBINATION LOGIC CIRCUITS.** 3.1 Full & Half adder. 3.2 Full adder using Half adder. 3.3 Parallel binary adder. 3.4 Study of 4 bit binary adder. IC 7483 3.5 Half & Full Subtractor. 3.6 Study of ALU IC 74181. 3.7 Multiplexer, Demultiplexer 3.8 Encoder, Decoder	10	16

Section II

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
4	**SEQUENTIAL LOGIC DESIGN** 4.1 Introduction - definition, concept of Latch etc. 4.2 Circuit diagram, truth table and working of RS flip flop, D - flip, flop, T flip-flop. 4.3 Race around condition in J-K flip flop. 4.4 Level triggered flip flop. 4.5 Introduction to registers. 4.6 Shift registers, universal Registers. 4.7 SISO, SIPO, PISO, PIPO modes of operation of shift registers. 4.8 Bidirectional shift registers 4.9 Applications of shift Registers. 4.10 Introduction to counters 4.11 Classification of counters 4.12 Ripple up counter 4.13 Ripple down counter 4.14 Ripple up down counter 4.15 Mod N ripple counter	8	16
5	**MEMORIES** 5.1 Introduction 5.2Classification 5.3 Memory organization & operation. 5.4 Introduction to different types of memories such as RAM, ROM, EPROM, EEPROM, PROM Etc. (static & dynamic)	6	10
6	**DATA CONVERTERS** 6.1 Circuit diagram, working and the expression for output voltage of binary weighted register DAC 6.2 Principle of working of R - 2R ladder DAC 6.3 Principle of working of Dual Slope ADC 6.4 Study of ICs 0808, 0809.	6	14
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Number System & codes	08	06	00	14
I / 2	Logical gates & Boolean algebra	06	04	00	10
I / 3	Combination Logic circuits.	04	06	06	16
II / 4	Sequential Logic Design	00	06	06	12

II / 5	Memories	06	08	02	16
II/ 6	Data converters	06	06	02	14

Laboratory experiences and related skills developed.

Sr. no	Laboratory experience	Skills developed
1	Number System	1) To understand Number System. 2) To understand conversion among number systems
2	Study of Logic Gates & demorgan's theorem	1) To understand all Logic Gates. 3) To understand demorgan's 1 st theorem 4) To understand demorgan's 2 nd theorem
3	Full & Half adder	1) To understand Full & Half adder circuit operation. 2) To understand input and output of Full & Half adder.
4	Adder / Subtractor	To understand Adder circuit operation. 2) To understand input and output of adder. 3) To understand Substractor circuit operation. 4) To understand input and output of Substractor.
5	Multiplexers, DeMultiplexers	1) To understand Multiplexers circuit operation. 2) To understand input and output of Multiplexers adder. 3) To understand Multiplexers circuit operation. 4) To understand input and output of Multiplexers adder.
6	Flip-Flop	1) To understand RS, Master Slave RS, D, T Flip-Flop. 2) To understand input and output of Multiplexers RS, Master Slave RS, D, T Flip-Flop.
7	Ripple Up Down Counter	1) To understand Ripple Up Down Counter circuit operation. 2) To understand input and output of Ripple Up Down Counter.
8	DAC/ADC	1) To understand DAC/ADC circuit operation. 2) To understand input and output of DAC/ADC.

Criteria for Continuous Assessment of Practical work and Progressive Skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	5
2	Preparedness for practical	10
3	Correct figures / diagrams	10
4	Observation tables	10
5	Result table / calculations / graphs	10
6	Safety / use of proper tools	5
		50

Instructional strategies:

1) Lectures and discussions.
2) Laboratory experiences and laboratory interactive sessions.

3) Time bound assignments.

Teaching and Learning resources, including references:

1) Chalk-board.
2) Demonstrative kits.
3) Demonstrative charts.
4) Books:

1. Digital Principals : Malvino
2. Digital Computers Fundamentals : P.C. Bartee
3. Digital Electronics :: R.P. Jain
4. TTL CMOS Data Handbook

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1	Correct figures / diagrams	15
2	Observation tables	10
3	Result table / calculations / graphs	15
4	Safety / use of proper tools	10
	Total	50

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COURSE ID: 17

Course Name : DATA COMMUNICATION
Course Code : ITE303
Course Abbreviation : EDTC

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	4	5
Tutorial	1	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	--	As per Proforma - II	
Marks	**20**	**--**	**80**	**--**	**50**	**150**

RATIONALE:

Communication plays a vital role in various fields like business, academics, defense, budget research, engineering, medicine. In the present Industrial & commercial environment, the technician is expected to use digital communication skillfully.

The primary purpose of this course is to give an elementary but sound fundamental understanding of how data communication work, its basic components, how they work and basic knowledge of applications of Internet.

OBJECTIVES:

The student should be able to

1. Understand functions of hardware & software components of a communication system.
2. Understand the basics of analog and digital signals, communication.
3. Use of error detection and correction algorithm.
4. Understand and use various applications of the Internet.

CONTENT:

C. THEORY :

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
1	**INTRODUCTION TO DATA COMMUNICATION** 1.1 A Communication Model 1.2 Communication System Components 1.3 Data Representation 1.4 Data Flow 1.5 Data Communication Networks	**06**	**10**
2	**DATA & SIGNALS** 2.1 Analog & Digital 2.1.1 Analog and Digital Data 2.1.2 Analog and Digital Signals 2.1.3 Periodic and Non Periodic Signals 2.1.4 Characteristics of Signals(Introduction) 2.2 Digital signals 2.2.1 Bit rate 2.2.2 Bit Lengths 2.2.3 Transmission of digital Signals 2.3 Transmission Impairments 2.3.1 Attenuation 2.3.2 Distortion 2.3.3 Noise 2.4 Data Rate Limits 2.4.1 Noiseless Channel- Nyquist bit rate 2.4.2 Noisy channel-Shannon capacity	**12**	14
3	**DIGITAL TRANSMISSION** 3.1 Digital to Digital Conversion-Line coding 3.2 Line coding scheme 3.2.1 Unipolar-NRZ 3.2.2 Polar-NRZ-L NRZ-I 3.2.3 Bipolar-AMI 3.2.4 Multilevel 3.2.5 Multitransition 3.3 Analog to Digital Conversion -Pulse Code Modulation(Introduction) -Delta Modulation(Introduction) 3.4Transmission Modes -Parallel Transmission -Serial transmission	**14**	**16**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	SECTION- II		
4	**ANALOG TRANSMISSION** 4.1 Digital to analog Conversion 4.1.1 Aspects of digital to analog conversion -Amplitude Shift Keying -Frequency Shift Keying -Phase Shift Keying 4.2 Analog to Analog Conversion 4.2.1 Amplitude Modulation 4.2.2 Frequency Modulation 4.2.3 Phase Modulation	**08**	**10**
5	**ERROR DETECTION AND CORRECTION** 5.1 INTRODUCTION 5.1.1 Types of error 5.1.2 Redundancy 5.1.3 detection Versus Correction 5.2 Block coding 5.2.1 Error detection 5.2.2 Error Correction 5.2.3 Hamming distance 5.2.4 Minimum Hamming Distance 5.3 Linear Block Code 5.3.1 Minimum Distance for Linear Block Code 5.3.2 Simple parity check codes 5.3.3 Hamming codes 5.4 Cyclic Codes 5.4.1Cyclic Redundancy check 5.4.2 Advantages of cyclic codes 5.5 Checksum- Idea, One's complement	**14**	**16**
6	**MULTIPLEXING AND DATA LINK CONTROL** 6.1 Frequency Division Multiplexing 6.2 Wavelength Division Multiplexing 6.3 Synchronous Time Division Multiplexing Data Link control 6.4 Flow Control 6.5 Error Control 6.6 Protocols For Noiseless channel 6.7 Protocols for Noisy channel	**10**	**14**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

D. TERM WORK

Term work shall consist of the following:

i) Laboratory experiments and related skills to be developed :

Sr. No.	Title of Experiment	Skills to be developed
1.	Data and Communication Model.	• Understanding Data • Data Representation • Data Flow
2.	Analog Data & Signals	• Understanding Characteristics of Signal • Period, Frequency, Phase, Wavelength • Calculation of Bandwidth..Examples
3.	Digital Data & Signals	• Understanding Characteristics of Signal • Bit Rate, Bit Length, Baseband and broadband Transmission • Calculation Examples
4.	Transmission Impairments	• Understanding Factors which affects Communication • Attenuation, Unit of attenuation, Distortion, Noise. • Methods to detect these Factors
5.	Digital Transmission	• Understanding Coding Scheme and Transmission Mode for digital transmission • Line Coding • Block Coding • Transmission Modes
6.	Analog Transmission	• Understanding aspects of Digital to Analog Conversion • Examples
7.	Modems	• Understanding Role of Modem • Functions of Modem • Operation of Modems • Types of Modem and Examples
8.	Error Detection and Correction	• Error Detection V/S Correction • Hamming Distance • Linear Codes, Cyclic Code • Examples
9.	Framing	• Fixed size and Variable Size Framing • Flow and Error Control

10.	Flow Control and Error Control	• Understanding Flow and Error Control • Protocols for Flow and Error Control
11	Case Study	• Case Study of Example Network(Like Telephone Networks , switching Network, Wireless Network) • Technical Report

ii) Progressive Skills Test :

Criteria for Continuous Assessment of Practical work and Progressive skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Neat & complete Diagram.	05
5	Logical thinking and approach	05
6	Oral Based on Lab work and completion of task	05
	TOTAL	25

Assessment at semester end practical exam as per Pro-forma II.

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1.	Technical ability	20
2.	Communication skill	10
3.	Logical approach	20
	TOTAL	50

INSTRUCTIONAL STRATEGIES :

InstructionalMethods:

1. Lectures cum Discussions
2. Regular Home Assignments.

3.Laboratory experiences and laboratory interactive sessions

Teaching and Learning resources:

1. Chalk board 2. Slides 3. Self-learning Tutors

REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	Behrouz Forouzan	Data Communication and networking	The McGraw-Hill
2.	stallings	Data Communication and networking	Pearson Education India

b) Websites

i) http://my.safaribooksonline.com

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COURSE ID: 18

Course Name : Object Oriented Programming Using C++
Course Code : ITE304
Course Abbreviation : ECPP

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	3	7
Practical	4	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Practical Examination (External)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	--	As per Proforma - I	
Marks	**20**	**--**	**80**	**--**	**50**	**150**

RATIONALE:

Object oriented programming has become the preferred approach for most software projects. Object oriented programming concepts are useful for constructing complex physical systems.

Instead of viewing the program as a series of steps to be carried out, it views as a group of objects that have certain properties and can take appropriate actions. Among the Object oriented programming languages available, C++ is most widely used language. Different programs based on Inheritance, polymorphism, encapsulation, overriding requires knowledge of C++. This subject acts as a base for languages JAVA, VC++ & UML.

OBJECTIVES:

The students will be able to:

1. Learn basics of OOP like data types, token, keywords, memory management operators etc.

2. How to use function in programs.
3. Write programs using objects & classes.
4. Develop programs to create and destroy the objects.
5. Use existing operators for different meanings (Operator overloading).
6. Using reusability concept by implementing inheritance.
7. Implement pointers for arrays, strings & object.
8. Implement polymorphism, its types, virtual function.
9. Apply formatted & unformatted console I/O operation & perform file related activities like opening and closing files.
10. How to use different opening modes for file opening.
11. Use of graphic functions in C++.

CONTENT:

E. THEORY :

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
1	**PRINCIPLE OF OBJECT ORIENTED PROGRAMMING** 1.1 What is OOP? 1.2 Applications of OOP 1.3 Beginning with C++ 1.3.1 A simple C++ program 1.3.2 Structure of C++ program 1.3.3 Creating source file 1.3.4 Compiling & linking 1.4 Tokens, Expressions and control structures 1.4.1 Tokens, keywords, identifiers, Basic data types, Derived data types, Symbolic Constants, Type Compatibility, Declaration of variables, Operators in C++, Scope Resolution operator, Memory management operators manipulators and type cast operator, operator precedence 1.4.2 Control structures.	05	08
2	**FUNCTIONS IN C++** 2.1 Introduction 2.2 The main function 2.3 Function prototype	06	08

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	2.4 Default arguments, constant arguments 2.5 Call by value 2.6Call by Reference 2.7 Return by Reference 2.8 Inline function 2.9 Function overloading		
3	**CLASSES & OBJECTS** 3.1 Introduction 3.2 Specifying a class, defining member function, a C++ program with a class, Making a outside function inline, Nesting of member function, Private member functions, Arrays within class 3.3 Memory allocation for Objects ,Static data member, static member function, Arrays of Objects, Objects as a function argument, Friendly functions, Returning object	08	14
4	**CONSTRUCTORS & DESTRUCTORS** 4.1 Introduction 4.2 Constructors , Parameterized constructors, Multiple constructors in a class, Constructors with Default arguments 4.3 Dynamic initialization of objects. 4.4 Copy Constructor 4.5 Destructors	04	10
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Section II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
5.	**OPERATOR OVERLOADING** 5.1 Introduction 5.2 Defining operator overloading, Overloading unary operator, Overloading binary operator using friends, Manipulation of strings using operators, Rules for overloading,	06	12

6	**INHERITANCE : EXTENDING CLASSES** 6.1 Introduction 6.2 Concept of Inheritance, Defining derived classes, Types of inheritance(single, multilevel, multiple, Hierarchical, hybrid), making a private member inheritance, 6.3 Virtual base classes, abstract classes,	06	10
7	**POINTERS, VIRTUAL FUNCTION & POLYMORPHISM** 7.1 Introduction 7.2 Concept of Pointers, (Pointer declaration, pointer operator, Address operator, pointer expressions, and pointer arithmetic), Pointers to objects, THIS pointer, pointer to derived classes, 7.3 Virtual function, pure virtual function,	07	10
8	**MANAGING CONSOLE I/O OPERATIONS** 8.1 Introduction 8.2 C++ streams, C++ stream classes, 8.3 unformatted I/O operations, 8.4 formatted I/O operations – width() , precision(), fill() 8.5 Managing output with manipulators 8.6 Working with Files 8.6.1 Introduction 8.6.2 classes for file stream operations, opening and closing a file, 8.6.3 detecting End-of-file, more about open () : file modes, 8.6.4 sequential input and output operations - put() and get() Function - write() and read () Function	06	08
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end theory examination:

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Principal of Object Oriented Programming	04	02	02	08
I / 2	Classes & Objects	03	02	03	08
I / 3	Functions in c++	04	05	05	14
I / 4	Constructors & Destructors	03	03	04	10

II / 5	Operator overloading	04	04	04	12
II/6	Inheritance : Extending classes	02	04	04	10
II/7	Pointers, virtual function & polymorphism	03	04	03	10
II/8	Managing Console I/O Operations	02	03	03	08

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

F. TERM WORK

Term work shall consist of the following:

iii) Laboratory experiments and related skills to be developed :

The following practical exercises shall be conducted as Practicals detailed in the *Lab Manual* developed by the Institute in practical sessions of batches of about 20 students :

Sr. No.	Title of Experiment	Skills to be developed
01	Comparative study of POP & OOP	1. Definition of POP 2. Definition of OOP 3. Characteristics of POP & OOP 4. Basic concepts of OOP
02	Program to Input And Output data	1. Understanding Input & Output Stream 2. Syntax for cin and cout 3. Simple C++ Program
03	Program to create an object of a class	1. Definition of class and Object 2. Study of access specifiers 3. Syntax for class declaration 4. Use of Dot operator 5. Syntax of object creation 6. Program using class & Objects
04	Program to create and manipulate array of object	1. Understanding Array of objects 2. Syntax for declaration of array of objects 3. Implementation of this concept.
05	Program to access Static member variables	1. Understanding static member variable 2. Syntax to declare static member variable 3. Program using static member variable
06	Program using object as function argument	1. Understanding Object as Argument to function 2. Syntax for function Declaration having object as argument. 3. Understanding Call by Value & Pass by Reference 4. Implementation of object as function argument.

07	Program to define a class with constructor and destructor.	1. Definition of Constructor 2. Characteristics of constructor 3. Definition of Destructor 4. Characteristics of Destructor 5. Syntax for Declaration of Constructor & destructor function 6. Program based on constructor and destructor.
08	Program using constructor with default argument	1. Understanding constructor with default arguments 2. Syntax for default arguments 3. Program using constructor with default argument
09	Program to overload unary and binary operator	1. Understanding operator overloading 2. Rules for overloading unary operators 3. Rules for overloading binary operators 4. Operators cannot be overloaded 5. Syntax for declaration of operator overloading function 6. Programs for overloading various operators.
10	Program to implement single and hierarchical Inheritance.	1. Definition of inheritance 2. Understanding Base and Derived classes. 3. Definition of single inheritance 4. Definition of hierarchical inheritance 5. Three visibility modes in inheritance 6. Syntax to derive a class from base class. 7. Programs based on single and hierarchical inheritance
11	Program to implement Multiple Inheritance with virtual base class.	1. Definition of Multiple Inheritance and Virtual base class. 2. Syntax to declare a base class as virtual. 3. Programs based on Multiple Inheritance with virtual base class.
12	Program to overload a function	1. Definition of function overloading 2. Compile time and Runtime polymorphism 3. Syntax for Function overloading 4. Implementation of function overloading
13	Program to implement run time polymorphism	1. Understanding Late Binding & Dynamic binding 2. Definition of virtual Function. 3. Rules for declaring virtual Function 4. Syntax to declare virtual Function 5. Implementation of virtual Function
14	Program using Pointer	1. Understanding pointers in C 2. Declaration and definition of pointers in C 3. Implementation of pointers in C
15	Program using Pointer to string	1. Declaration and definition of pointers in C++ 2. Understanding pointers to string concept 3. Syntax to Declare pointers to string with example

		4. Implementation of pointers to string
16	Program using Pointer to object	1. Understanding Pointer to object 2. Syntax to declare a pointer to object 3. Implementation of pointers to object
17	Program using ' this 'Pointer	1. Use and Definition of this pointer 2. Program using 'this' pointers
18	Program to format output using manipulators	1. What is manipulators. 2. Use of manipulators 3. List of manipulators 4. Implementation
19	Program for file Processing	1. Study of I/O Streams 2. use and Syntax of open() & close() method 3. study of various modes for opening a file. 4. Program for reading writing from/to file.
20	Graphics in C++	1. Study of Line() function 2. Study of Circle() function 3. Study of Rectangle() function
21	A mini project based on oop using c++ (with group of four students.)	4. what is project 5. A small applications using c++:- - Implementing DOS commands using command line arguments e.g. copy ,type, copy con., - Student data management – Using Structure & arrays, - Develop games using classes

iv) Progressive Skills Test :

Criteria for Continuous Assessment of Practical work and Progressive skill Test :

Sr. No.	Criteria	Marks allotted
1	Attendance	5
2	Preparedness for practical	5
3	C++ program	5
4	Logical Approach	5
5	Presentation	5
	Total	25

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1	Technical Ability	15
2	Logical Approach	10
3	Presentation	15
4	Applications	10
	Total	50

Assessment at semester end practical exam as per Pro-forma I.

INSTRUCTIONAL STRATEGIES :

InstructionalMethods :

1) Lectures and discussions.
2) Laboratory experiences and laboratory interactive sessions.
3) Time bound assignments.

Teaching and Learning resources:

1. Books
2. Transparencies
3. Power Point Presentation
4. Self-learning

REFERENCE MATERIAL:

a) Books / Codes

Sr. No.	Author	Title	Publisher
1.	E BALAGURUSAMY	Object Oriented Programming with C++	Tata McGraw-Hill Education
2.	Robert Lafore	Object Oriented Programming in Turbo C++	Galgotia Publications
3	Yashwant Kanetkar.	Let us C ++	BPB PUBLICATIONS
4	John R Hubbard	Programming with C++	Tata McGraw-Hill Education

b) Websites for mini project

- www.sourcecodesworld.com
- www.softeam.com
- www.cplus.about.com/od/beginnerctutoriall

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COURSE ID: 19

Course Name : DATABASE MANAGEMENT SYSTEM
Course Code : ITE305
Course Abbreviation : EDBM

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme:

Scheme component	Hours / week	Credits
Theory	4	8
Practical	4	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Practical Examination (External)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	--	As per Proforma - I	
Marks	**20**	**--**	**80**	**--**	**50**	**150**

RATIONALE:

The essential requirement of any organization maintaining database system is the knowledge and hands-on experience of powerful database management system. Also the need of today's software development is competence in a GUI based front end tool, which can connect to relational database engine. The database management system is a collection of programs that enables to store, modify and extract information from a database. This course gives the students the ability to understand the design of DBMS and use any RDBMS package as a backend for developing database applications.

OBJECTIVES:

The students will be able to:

1. Understand the concept of Relational Database system
2. Understand and develop the concepts of Data Modeling, Security and Integrity.
3. Understand and execute different SQL queries and PL / SQL programs.

4. Normalize the database using normal forms.
5. Understand the concept of query processing and Transaction processing.
6. Understand the concept of concurrency control and recovery.

CONTENT:

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
1	**INTRODUCTION TO DBMS** 1.1 Purpose of Database System 1.2 DBMS Vs File system 1.3 Instances and Schemas 1.4 Data Models: 1.4.1 Entity Relationship Model 1.4.2 Object Oriented Model 1.4.3 Relational Model 1.5 Data Definition Language, Data Manipulation Language 1.6 Database Administrator and Database Users 1.7 Entity sets, Relationship set, Attributes, types of attributes, domain, Mapping Cardinalities, concept of database keys	**08**	**10**
2	**RELATIONAL MODEL** 2.1 Structure of Relational Database 2.2 Database Schema 2.3 Query languages 2.4 Relational Algebra 2.4.1 Fundamental Operations	**04**	**06**
3	**SQL** 3.1 Introduction to SQL queries 3.2 Creating, Inserting, Updating, Deleting tables 3.3 Integrity constraints – primary key, foreign key, NULL constraints 3.4 Arithmetic, Logical, Relational operators 3.5 Aggregate functions, Mathematical functions, Date functions, String functions 3.6 Subqueries, concept of outer join, 3.7 View – need, creating, updating and deleting database view 3.8 concept of index	**10**	**12**
4	**PL / SQL** 4.1 PL/ SQL block structure 4.2 Variables	**10**	**12**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
	4.3 PL/SQL control structures 4.4 Cursors – Types, Attributes 4.5 Triggers – Use of database trigger 4.6 Stored procedures and functions – Advantages, Syntax for creating 4.7 Exception handling in PL/SQL		
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Section II

Sr. No.	Topics / Subtopics	Lectures (Hours)	Theory Evaluation (Marks)
5.	**NORMALIZATION** 5.1 Purpose of normalization 5.2 Functional dependencies and decomposition 5.3 Normalization using 1NF, 2NF, 3NF, BCNF	**06**	**08**
6	**QUERY PROCESSING AND TRANSACTION PROCESSING** 6.1 Overview of query processing 6.1.1 Parsing and Translation 6.1.2 Optimization 6.1.3 Evaluation 6.2 Measures of query cost 6.3 Concept of transaction 6.4 Transaction states 6.5 Concurrent executions 6.6 Serializability 6.7 Recoverability	**10**	**12**
7	**CONCURRENCY CONTROL** 7.1 Lock based Protocols 7.1.1 Locks- shared mode and exclusive mode lock 7.1.2 Granting of locks 7.2 Two phase locking protocol 7.3 Time stamp based protocol 7.4 Validation based Protocol	**08**	**10**
8	**RECOVERY** 8.1 Failure classification 8.2 Data access 8.3 Log based Recovery 8.3.1 Deferred database modification 8.3.2 Immediate database modification	**08**	**10**

	8.3.3 Checkpoints		
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end theory examination:

Section / Topic no.	Name of topic	Distribution of marks			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction To DBMS	5	2	3	10
I / 2	Relational Model	2	2	2	06
I / 3	SQL	4	4	4	12
I / 4	PL / SQL	4	2	6	12
II / 5	Normalization	4	2	2	08
II/6	Query Processing And Transaction Processing	4	4	4	12
II/7	Concurrency Control	4	4	2	10
II/8	Recovery	4	4	2	10

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

G. TERM WORK

Term work shall consist of the following:

v) Laboratory experiments and related skills to be developed :

The following practical exercises shall be conducted as Practicals detailed in the *Lab Manual* developed by the Institute in practical sessions of batches of about 20 students :

(Note: Practical exercises should be done on the recent version of any RDBMS package like Oracle, Microsoft SQL server, IBM DB2 or Mysql etc.**)**

Sr. No.	Title of Experiment	Skills to be developed
01	Study of database design	5) Study of database schema 6) Designing ER diagram for any database

02	Study of Relational Algebra operations	1) Study of fundamental operations of relational algebra 2) Queries based on relational algebra
03	Creating database	1)Creating database 2)Creating table 3) Inserting, updating and deleting records 4) Displaying records 5) Applying integrity constraints
04	Modifying table structure	3) Using Alter table command 4) Using Rename command
05	Operators	1) Executing SQL queries using Arithmetic, Logical, Mathematical operators 2) Grouping data from tables
06	Functions	1) Executing SQL queries using String functions 2) Executing SQL queries using Date functions
07	Functions	1) Executing SQL queries using Group functions 2) Executing SQL queries using Mathematical functions
08	Subqueries, Joins	1) Executing subqueries 2) Joining tables
09	Index	1) Understanding use of Index 2) Creating an index and Dropping an Index
10	Views	1) Creating view 2) Inserting, Updating, Deleting records using view 3) Deleting view
11	PL/SQL Control Structures	1) Understanding PL/SQL block structure 2) Using conditional controls in PL/SQL
12	PL/SQL Control Structures	1) Understanding PL/SQL block structure 2) Using iterative controls in PL/SQL
13	Cursors	1) Understanding types of cursor and cursor attributes 2) Using explicit cursor
14	Stored Procedures and functions	1) Understanding creating and deleting stored procedures and functions 2) Example programs
15	Database Triggers	1) Understanding the concept of trigger and its types 2) Creating a trigger 3) Applying trigger 4) Deleting trigger
16	Transaction	1) Understanding concept of transaction 2) Commit and Rollback statement
17	Normalization	1) Understanding the concept of normalization 2) Understanding 1NF, 2NF, 3NF and BCNF
18	Designing Example Database	Students should design any example database like Hospital Management, Library Management, Student section etc.

vi) Progressive Skills Test :

Criteria for Continuous Assessment of Practical work and Progressive skill Test :

Sr. No.	Criteria	Marks allotted
1	Attendance at regular practical	10
2	Technical preparation	10
3	Logical Thinking and Approach	20
4	Application	10
	TOTAL	50

Criteria for assessment at semester end practical exam:

Sr. no	**Criteria**	**Marks allotted**
1	Technical ability	20
2	Communication skill	10
3	Logical approach	20
	TOTAL.	50

Assessment at semester end practical exam as per Pro-forma I.

INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1) Lectures and discussions.
2) Laboratory experiences and laboratory interactive sessions.
3) Time bound assignments.
4) Group tasks

Teaching and Learning resources:

5. Books
6. Transparencies
7. Power Point Presentation
8. Self-learning

REFERENCE MATERIAL:

c) Books / Codes

Sr. No.	Author	Title	Publisher
1.	Silberschatz, Korth, Sudarshan	Database System Concepts (4th edition)	Tata McGraw-Hill
2.	Ivan Bayross	SQL, PL/SQL	BPB Publication
3	Bipin Desai	An Introduction To Database System	BPB Publication
4	G.K.Gupta	Database Management Systems	Tata McGraw-Hill

d) Websites for mini project

- www.sourcecodesworld.com
- www.softeam.com

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COURSE ID: 20

Course Name : COMPUTER NETWORK
Course Code : ITE306
Course Abbreviation : ECON

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	--	As per Proforma - II	
Marks	**20**	**--**	**80**	**--**	**50**	**150**

RATIONALE:

In today's age of Information Technology many applications send information from one place to another place. Computer network organizes this information in such a way that it can be sent anywhere over wide geographical area and output remote information at a push of button. This indicates the type of networks used. Here we study basic concept of networking, its applications, topologies, network devices, protocol used, OSI reference model, TCP/IP model, IP addressing and various types of the communication protocols
Note: It is expected that only the basic concepts and functionalities of the computer Networking be taught to the students.

OBJECTIVES:

1) To study types of network.
2) To study Models of network and their functions.
3) To study Different network devices and their use.
4) Understand Different cabling standards used in network.
5) To study Way to assign IP address.

6) Understand the working of File Server, DNS Server, DHCP Server, Web Server, Proxy Server and Mail Server
7) Concept of Network Security

CONTENT:

H. THEORY :

Section I

Sr. No.	Topics / Sub-topics	Theory (Hours)	Theory Evaluation (Marks)
1	**NETWORKING BASICS** 1.1 Introduction to Computer Networking 1.2 Network Services 1.3 Application of Computer Networks 1.4 Advantages and disadvantages of Computer Network 1.5 Active and Passive Network 1.5 Network Architecture- 1.5.1 Client Server Network 1.5.2 Peer-to Peer Network 1.5.3 Centralized and distributed Computing	04	10
2	**Line configuration** 2.1 Point to point, Multi point; 2.2 Topology – Mesh, Star, Tree, Bus, Ring, Hybrid; 2.3 Network criteria-Categories of network, Classification of network, LAN, MAN, WAN.	04	08
3	**Network Reference Model and Network Devices** 3.1 OSI reference model 3.2 TCP/IP reference model 3.3 Comparison of OSI ,TCP/IP model 3.4 ATM model, Cloud and Grid Computing 3.5 Network devices(Introduction & Functionalities) 3.5.1 Repeaters 3.5.2 Hubs- Types 3.5.3 Bridges-Types 3.5.4 Switches (Multiport bridges) 3.5.5 Routers (Gateways) 3.5.6 Network interface card	06	12
4	**Transmission media** 4.1 Guided – UTP, STP, coax Standards- Introduction 4.2 Unguided-Radio Wave, Microwave, Infrared	10	10

Sr. No.	Topics / Sub-topics	Theory (Hours)	Theory Evaluation (Marks)
	4.3 Fiber optics –Principle, Advantages and Disadvantages,		
	SECTION-II		
5	**IEEE Standards** 5.1 IEEE Standards 5.2 Project 802 5.3 IEEE 802.1 LLC – MAC PDU 5.4 Ethernet IEEE-802.3 5.5 Base band – broad band – 10base5, 10base2, 10base-T; 1Base5, 100Base-T 5.6 CSMA/CD - Switched Ethernet – fast Ethernet 5.7 Gigabit Ethernet, Token Bus – Token ring –FDDI	08	10
6	**TCP/IP FUNDAMENTALS** 6.1 TCP/IP Protocol suite 6.1.1 Network IP protocol , Class full Addressing , sub netting,CIDR 6.1.2 Protocols – ARP,RARP, ICMP, IGMP 6.1.3 Transport Layer – UDP – TCP 6.1.4 Application Layer –BOOTP, DHCP, DNS, TELNET, FTP, SMTP, SNMP, HTTP, WWW. (Introduction and Functionalities only)	08	14
7	**Network Security** 7.1 Introduction to network security model 7.2 Security services 7.3 Security Mechanisms 7.4 Types of attacks 7.5 Cryptographic Techniques 7.5.1 Substitution and transposition technique 7.5.2 Symmetric Key and Public Key Cryptography	08	14
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	NETWORKING BASIC	02	04	04	10
I / 2	LINE CONFIGURATION	04	04	02	08
I / 3	NETWORK REFERENCE MODEL AND NETWORK DEVICE	04	06	02	12
I / 4	TRANSMISSION MEDIA	04	04	02	10
II / 5	IEEE STANDARD	06	04	02	12
II / 6	TCP/IP FUNDAMENTALS	04	06	04	14
II / 7	NETWORK SECURITY	04	06	04	14

I. TERM WORK

Term work shall consist of the following :

vii) Laboratory experiments and related skills to be developed :

Sr. no	Laboratory experience	Skills developed
1	Compare different network topologies	1. Definition of topology. 2. To understand different types of topologies i.e LAN, MAN, WAN.
2	Layout of lab network	1. To study and draw type of topology used for computer lab networking.
3	Compare Network devices	1. Use and comparison of different network devices used i.e. Hub, switches, router etc.
4	Files sharing	1. To understand step by step procedure used for files sharing.
5	Device sharing	1. To understand step by step procedure used for device sharing
6	Create a network cable using RJ45 connectors	1. To understand how to connect connectors to network cable using crimping tool.
7	IP addressing	1. Assign IP addresses to identify the systems on the network
8	Internet connection	1. Ways to connect internet 2. Media used i.e modem and Broadband

9	Creating TCP/IP connection	1. Understanding TCP/IP protocol
10	Configuring TCP/IP connection	1. TCP/IP network configuring
11	Network Security	1 Introduction to network security
11	Visit Report	1. Report based on visit to business system and industrial factory

viii) Progressive Skills Test :

Criteria for Continuous Assessment of Practical work and Progressive skill Test :

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	05
2	Preparedness for practical	05
3	Observations & computer handling skill	05
4	Use of toolbar, menu bar and short cut keys.	05
5	Oral Based on Lab work and completion of task	05
	TOTAL	25

Assessment at semester end practical exam as per Pro-forma II.

Instructional strategies:

1. Lectures and discussions.
2. Laboratory experiences and laboratory interactive sessions.
3. Time bound assignments.

Teaching and Learning resources, including references:

1. Books
2. Transparencies
3. Power Point Presentation

Text Books:

1. Data Communication and Networking- Behrouz , Forouzan TMH 1999
2. Computer Networks –Tanenbaum
   Fourth edition
3. Cryptography and Network Security -- Atul Kahate(For Chapter -7)
4. Cryptography and Network Security -- William Stallings(For Chapter -7)

Criteria for assessment at semester end oral exam:

Sr. no	Criteria	Marks allotted
1	Technical Ability	15
2	Logical Approach	10
3	Presentation	15
4	Applications	10
	Total	50

Assessment at semester end oral exam as per Pro-forma II.

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COURSE ID: 21

Course Name : OPERATING SYSTEM
Course Code : ITE307
Course Abbreviation : EOPS

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	--	As per Proforma - II	
Marks	**20**	**--**	**80**	**--**	**50**	**150**

RATIONALE:

Operating system is the interface between the user and the computer system .Its function is to co-ordinate processes and to manage I/O devices and memory. This is core technology subject and the knowledge of which is absolutely essential for Computer Engineers. It familiarizes the students with the functions and services provided by operating system.

This subject gives overview of UNIX and Windows operating system as a case study.

OBJECTIVES:

The students will be able to:

1. Learn the various modern trends in operating system.
2. Understand the components and services of OS provided by various system calls.
3. Understand a process, process management and deadlock handling.
4. Learn memory and file management.

5. Learn various algorithms of scheduling.
6. Installation and booting of Windows.
7. Implement various disk management techniques
8. Understand the Unix vi editor and Unix utilities.

CONTENT:

SECTION-I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory evaluation Marks
1	**INTRODUCTION TO OPERATING SYSTEM** 1.1 What is an O.S.?,Evolution,Generation 1.2 Mainframe Systems – Batch, Multi programmed, Multitasking, Time sharing, Desktop. 1.3 Parallel systems 1.4 Real time system. 1.5 Distributed system 1.6 Clustered System	10	12
2	**OPERATING SYSTEM STRUCTURE** 2.1 System Components 2.1.1Process Management 2.1.2 Main Memory Management 2.1.3 File Management 2.1.4 I/O Management 2.1.5 Secondary storage management 2.1.6 Networking 2.1.7 Protection system 2.1.8 Command Interpreter System 2.2 Operating System Services 2.3 System Calls – Process control, File management, Device Management, Information Maintenance, Communication 2.4 System Programs 2.5 System structure 2.5.1 Simple structure 2.5.2 Layered approach 2.5.3 Monolithic 2.5.4 Microkernel 2.6 Booting	12	16
3	**PROCESS MANAGEMENT** 3.1 Process Concept – Process, Process State, Process Control Block, Thread 3.2 Process Scheduling – Scheduling queues, schedulers, context	10	12

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory evaluation Marks
	switch 3.3 Operations on Process: creation, termination. 3.4 Inter process communication. 3.5 Thread – overview, benefits, user and kernel threads 3.6 Multithreading Models - Many to one, one to one, many to many.		
	SECTION-II		
4	**Scheduling** 4.1 Scheduling – Objectives, concept, criteria, CPU and I/O burst cycle. 4.2 Types of Scheduling-Pre-emptive, Non pre- emptive. 4.3 Scheduling Algorithms. first come first served (FCFS), Shortest job first (SJF), Round Robin (RR), Priority. 4.4 Other Scheduling. Multilevel, Multiprocessor, real-time. 4.5 Dead Locks 4.5.1 System Model 4.5.2 Necessary conditions for deadlock 4.5.3 Resource Allocation Graph 4.6 Method for Handling Deadlocks 4.7 Deadlock Prevention & Detection. 4.8 Recovery from Dead Locks	10	12
5	**MEMORY MANAGEMENT** 5.1 Address Binding 5.2 Logical V/S Physical Address Space 5.3 Dynamic Loading 5.4 Swapping 5.5 Contiguous Memory Allocation. 5.6 Paging 5.6.1 Basic Method 5.7 Segmentation. 5.7.1Basic Method 5.7.2 Hardware	08	10
6	**FILE MANAGEMENT** 6.1 File system & file concept 6.1.1 File Attributes 6.1.2 File Operations 6.1.3 File Types 6.2 Access methods-sequential access and direct access 6.3 Directory structure 6.3.1 Single Level Directory 6.3.2 Two Level Directory	08	08

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory evaluation Marks
	6.3.3 Tree Structured Directory 6.4 Protection 6.5 File system structure--organization 6.6 Contiguous allocation method of disk space		
7	**I/O MANAGEMENT** 7.1 I/O Hardware 7.1.1 Polling 7.1.2 Interrupt 7.1.3 DMA 7.2 Application I/O interface 7.2.1 Block and character devices 7.2.2 Network devices 7.2.3 Clocks and timers 7.2.4 Blocking and non-blocking I/O 7.3 Kernel I/O subsystem 7.3.1 I/O scheduling 7.3.2 buffering 7.3.3 caching 7.4 I/O Request Handling	06	10

Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction To Operating System	6	2	4	12
I / 2	Operating System Structure	08	4	04	16
I / 3	Process Management	4	4	04	12
II / 4	Scheduling	4	4	4	12
II / 5	Memory Management	4	2	2	10
II / 6	File Management	4	2	2	08
II / 7	I/O Management	4	2	2	10

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

Laboratory experiments and related skills to be developed :

Sr. no	Laboratory experience	Skills developed
1	Booting Process	5) Studying booting process

		6) BIOS configuration
2	Installation	3) Installation of Windows 4) Installation of drivers 5) Configuration of system
3	System Information	6) Studying system information 7) Checking whether particular device is working properly or not 8) Installing drivers of various devices
4	Disk Partitioning	1) Partitioning the hard disk 2) Understanding the FAT 3)
5	Disk Maintenance	7) Study and use of utilities like ScanDisk, Disk Cleanup, Disk Defragmenter, disk scheduling
6	Troubleshooting	3) Installing corrupted system files 4) Reinstallation of Windows
7	Basic commands in UNIX	3) Understanding UNIX file system structure 4) Use of commands- man, pwd, cd, ls, cat, mkdir, rmdir,chmod, cp, rm, mv
8	General purpose utilities	3) Use of commands – more, wc, lp, cal, date, who, banner, echo 4) Combining commands with pipes 5) Redirecting output to a file 6) Setting system date 7) Two way communication – write command
9	Vi editor	3) Using vi editor 4) Using various options
10	System process	3) Understanding process status – ps command 4) Understanding system process
11	Case Study	1) Study of Windows & Unix Operating System

Criteria for Continuous Assessment of Practical work and Progressive Skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	10
2	Preparedness for practical	10
3	Correct figures / diagrams	10
4	Logical Thinking and Approach	10
5	Application	10
	Total	50

Instructional strategies:

4) Lectures and discussions.
5) Laboratory experiences and laboratory interactive sessions.
6) Time bound assignments.

Teaching and Learning resources, including references:

5) Chalk-board.
6) Transparencies
7) Presentation Slides
8) Demonstrative video files
9) Books:
    i. Applied Operating system concepts : Avi Silberschatz (Willy)
    ii. UNIX System V.4 Concepts and Applications : Sumitabha Das
    iii. Opearating Systems: Achyut S. Godbole

Criteria for assessment at semester end Oral exam:

Sr. no	Criteria	Marks allotted
1	Knowledge	15
2	Preparedness	10
3	Logical thinking	15
4	Presentation	10
	Total	50

Assessment at semester end practical exam as per Pro-forma II.

b) Websites:

http://codex.cs.yale.edu

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COURSE ID: 22

Course Name : COMPUTER ARCHITECTURE AND MAINTENANCE
Course Code : ITE308
Course Abbreviation : ECAM

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	As per proforma - III	--	
Marks	**20**	**--**	**80**	**25**	**--**	**125**

RATIONALE:

The aim of the subject is to teach the basic working of the computer motherboard, peripherals and add-on cards. The subject helps the students to do the maintenance of the Computer, peripherals and its add-on cards. The students will be able to select the proper peripheral as per their specification and requirement. The subject is practical oriented and will develop the debugging skills in the students.

Objectives:

The students will be able to:

1. Debug and repair the faults in computer system.
2. Assemble the system.
3. Load the operating system and device drivers in the system.

CONTENT:

SECTION-I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory evaluation Marks
1	**UNDERSTANDING PC HARDWARE & SOFTWARE** 1.1 Hardware 1.1.1 Hardware Used For Input And Output 1.1.2 Hardware Inside The Computer Case 1.1.3 The System Board 1.1.4 Primary Storage Device 1.1.5 Secondary Storage Devices 1.1.6 Interface Cards 1.1.7 The Electrical System 1.2 Software 1.2.1 Three Types Of Software And Their Jobs 1.2.2 Operating System - Starting up OS, Interfacing with OS	**8**	**12**
2	**SOFTWARE AND HARDWARE TOGETHER** 2.1 The Boot Process 2.2 The Boot Process step by step 2.3 How Software Manages Hardware 2.4 ISA Bus 2.5 Memory Addresses 2.6 I/O Addresses 2.7 DMA Channels 2.8 Protecting Data, Software and Hardware	**6**	**10**
3	**SYSTEM BOARD** Types of System Board System Clock CPU and chipset (Attribute only) Pentium and Its competitors ROM BIOS Flash ROM RAM On-Board Ports CMOS Chip Setup	**6**	**10**
4	**MEMORY MANAGEMENT** 4.1 Physical Memory-ROM,RAM,SIMM,DIMM 4.2 Virtual Memory 4.3 Using HIMEM.SYS,EMM386.EXE	**4**	**8**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory evaluation Marks
	4.4 Real Mode Vs. Virtual Mode 4.5 Upgrading Memory 4.6 Installing Memory		
	SECTION-II		
5	**HARD DRIVES** 5.1 Hard drive Technology 5.2 IDE Technology 5.3 Formatting Hard Drive 5.4 IDE Drives (Enhanced IDE) 5.5 SCSI Technology 5.6 Comparing SCSI and EIDE 5.7 Hard Drive Partitions 5.8 Logical Drives 5.9 FAT and Root Directory 5.10 DOS Commands to Manage a Hard Drive MKDIR,CHDIR, RMDIR, TREE, ATTRIB, MIRROR, UNFORMAT, PATH 5.11 Fragmentation 5.12 Disk Compression 5.13 Disk Caching	**8**	**12**
6	**TROUBLESHOOTING** 6.1 Troubleshooting Tools 6.2 Isolate Computer Problem and Device 6.3 Troubleshooting Power Supply 6.4 Troubleshooting System Board 6.5 Troubleshooting OS and Hard Drive 6.6 Problem after Computer Boots 6.7 Problems with Keyboard and Monitor 6.8 Troubleshooting Printer Problem	**6**	**10**
7	**SUPPORTING I/O DEVICES** 7.1 Using Ports 7.1.1 USB 7.1.2 UART Chip	**6**	**10**

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory evaluation Marks
	7.1.3 Parallel Ports 7.2 Keyboard-connector 7.3 Monitors 7.4 Video Cards		
8	**ELECTRICITY AND POWER SUPPLLIES** 8.1 Basic Electricity 8.2 Voltage, Current, Resistance, Power 8.3 AC and DC Current 8.4 Hot ,Neutral and Ground 8.5 ESD and EMI 8.7 Power Supply 8.8 Voltage Supply to an system Board 8.9 UPS - Types of UPS	**4**	**8**

Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Understanding PC Hardware & Software	6	4	2	12
I / 2	Software And Hardware Together	4	4	2	10
I / 3	System Board	4	4	2	10
I / 4	Memory Management	2	2	4	8
II / 5	Hard Drives	4	2	6	12
II / 6	Troubleshooting	2	2	6	10
II / 7	Supporting I/O Devices	4	4	2	10
II / 8	Electricity And Power Supplies	2	2	4	8

Laboratory experiences and related skills developed.

Sr. no	Laboratory experience	Skills developed
1	Motherboard layout	7) Understand various motherboard components 8) Understand various motherboard chips 9) Understand Bus structure
2	CMOS setup of Pentium	6) Understand peripheral devices configuration of system
3	Hard Disk Partitioning	9) Understand FDISK utility
4	Study of HDD	1) Identify various components of HDD and write their functions.
5	Display Cards	8) Study and installation of any one display cards : VGA or SVGA display cards
6	Installation of	5) Installation of Scanner, Printers and Modems.

	peripheral devices	
7	Study of SMPS	1) Understand components and connectors of SMPS
8	Study of Diagnostic Software. (Any one)	8) Understanding diagnostic techniques using any software like Norton utilities, Microsoft device manager
9	Fault findings :	1) Problems related to monitor. 2) Problems related to CPU.
10	Assembling of PC and Installation of Operating System.	1) Assembling various components of PC 2) Installation of OS

Criteria for Continuous Assessment of Practical work and Progressive Skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	10
2	Preparedness for practical	10
3	Correct figures / diagrams	10
4	Logical Thinking and Approach	10
5	Application	10
		50

Instructional strategies:

1. Lectures and discussions.
2. Laboratory experiences and laboratory interactive sessions.
3. Time bound assignments.

Teaching and Learning resources, including references:

1. Chalk-board.
2. Transparencies
3. Presentation Slides
4. Demonstrative video files
5. Books:
   - i. Enhanced guide to managing and maintaining your PC – Andrews(Thomson)
   - ii. PC upgrade and maintenance guide – Mark Minasi (BPB)
   - iii. Upgrading and repairing PCs – Scott Mueller (Pearson Education)

Criteria for assessment at semester end:

Sr. no	Criteria	Marks allotted
1	Correct figures / diagrams	15
2	Observation tables	15
3	Result table / calculations / graphs	10

4	Safety / use of proper tools / workmanship	10
	Total	50

c) Websites

i. **http://computernetworkingnotes.com/**

ii. **http://www.freecomputermaintenance.com/category/computer-maintenance-tutorials/**

iii. **http://www.karbosguide.com/**

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COURSE ID: 23

Course Name : PROGRAMMING USING .NET
Course Code : ITE309
Course Abbreviation : EPRV

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	2	6
Practical	4	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Practical Examination (External)	
Details of Evaluation	--	i. 25 marks for each practical ii. One PST of 25 marks	--	As per proforma - VI	As per proforma - IV	
Marks	--	--	--	**25**	**50**	**75**

RATIONALE:

.NET Framework (pronounced dot net) is a software framework developed by Microsoft that runs primarily on Microsoft Windows. It includes a large library and provides language interoperability (each language can use code written in other languages) across several programming languages. Programs written for .NET Framework execute in a software environment (as contrasted to hardware environment), known as the Common Language Runtime (CLR), an application virtual machine that provides services such as security, memory management, and exception handling. The class library and the CLR together constitute .NET Framework.

.NET Framework's Base Class Library provides user interface, data access, database connectivity, cryptography, web application development, numeric algorithms, and network communications. Programmers produce software by combining their own source code with .NET Framework and other libraries. .NET Framework is intended to be used by most new applications created

for the Windows platform. Microsoft also produces an integrated development environment largely for .NET software called Visual Studio.

OBJECTIVES:

The students will be able to:

1. Understand .net Programming environment.
2. Understand the .NET Integrated Development Environment
3. Understand all the syntax types & variable declarations of .NET
4. Understand how to use object oriented programming concept in .NET
5. Understand how to perform ADO.NET connectivity through .NET
6. Handle different classes of .NET required for ADO.NET connectivity
7. Implement the database related projects

CONTENT:

Sr. No.	Topics / Sub-topics	Lectures (Hours)
1	**INTRODUCING TO .NET** 1.1 What Is the .NET Framework? 1.2 What's in the .NET Framework? 1.3 Comparison of VB.NET & C#.NET 1.3 Writing Applications Using the .NET Framework 1.4 CIL and JIT 1.5 Assemblies 1.6 Managed Code 1.7 Garbage Collection 1.8 Fitting It Together 1.9 Linking 1.10 What Is C#? 1.11 Applications You Can Write with C#	02
2	**BASICS OF .NET** 2.1 The Visual Studio Development Environment 2.2 Toolbox controls & properties 2.3 Basic C# Syntax 2.4 Basic C# Console Application Structure 2.5 Variables 2.6 Expressions 2.7 Boolean Logic 2.8 The goto Statement 2.9 Branching 2.10 Looping 2.11 Type Conversion	06

Sr. No.	Topics / Sub-topics	Lectures (Hours)
	2.12 Complex Variable Types	
3	**FUNCTIONS, DEBUGGING AND ERROR HANDLING** 1.1 Defining and Using Functions 1.2 Variable Scope 1.3 The Main( ) Function 1.4 Struct Functions 1.5 Overloading Functions 1.6 Using Delegates 1.7 Debugging in Nonbreak (Normal) Mode 1.8 Debugging in Break Mode 1.9 Error Handling	04
4	**IMPLEMENTATION OF OBJECT ORIENTED PROGRAMMING** 4.1 OOP in Desktop Applications 4.2 Class Defi nitions in C# 4.3 System.Object 4.4 Constructors and Destructors 4.5 OOP Tools in Visual Studio 4.6 Class Library Projects 4.7 Interfaces Versus Abstract Classes 4.8 Struct Types 4.9 Shallow Copying Versus Deep Copying 4.10 Member Definitions 4.11 Interface implementation 4.12 Partial class definition 4.13 Partial method definition	06
5	**Introducing ADO.NET** 5.1 Why ADO.NET? 5.2 Understanding ADO.NET Architecture 5.3 Data Providers As APIs 5.4 Introducing the Data Provider Connection Classes 5.5Connecting to SSE with SqlConnection 5.6 Improving Use of Connection Objects 5.7 Connecting to SSE with OleDbConnection	04
6	**Data Readers** 6.1 Understanding Data Readers in General 6.2 Using Ordinal Indexers 6.3 Using Column Name Indexers 6.4 Using Typed Accessor Methods 6.5 Getting Data About Data	06

Sr. No.	Topics / Sub-topics	Lectures (Hours)
	6.6 Getting Data About Tables 6.7 Using Multiple Result Sets with a Data Reader	
7	**DATASETS AND DATA ADAPTERS** 7.1 Understanding the Object Model 7.2 Working with Datasets and Data Adapters 7.3 Populating a Dataset with a Data Adapter 7.4 Filtering and Sorting in a Dataset 7.5 Using Data Views 7.6 Refining Data with a Data View 7.7 Modifying Data in a Dataset 7.8 Propagating Changes to a Data Source 7.9 Concurrency	04
8	**DATA BINDING** 8.1 What's Data Binding? 8.2 Performing Simple Data Binding 8.3 Performing Complex Data Binding 8.4 Understanding Data Binding 8.5 Synchronizing Controls with a Data Source 8.6 Using a Binding Manager 8.7 Updating from a Data Grid	04

Laboratory experiments and related skills to be developed :

Sr. No.	Title of Experiment	Skills to be developed
1	Introduction to .NET Environment	9) Study of .net environment 10) Writing and running a VB.net program 11) Getting help
2	Data Types and Operators	1) Study of various data types and operators in VB.net 2) Variable Declaration
3	Control Structures	10) If….end if statement, 11) For….Next loop 12) Do While loop 13) While loop 14) Exit statement
4	Numeric Functions	10) Using numeric functions in .net – Log, Sin, Cos etc.
5	String Functions	11) Using String functions in .net – Mid, InStr, Replace etc.
6	Textbox, command button and Label controls Using .net	6) Textbox – use of properties, methods and events 7) Label - use of properties, methods 8) Command button - use of properties, methods and events

7	Option button, Checkbox using .Net	1) Difference in use of Option button, Checkbox 2) Option button - use of properties, methods and events 3) Checkbox - use of properties, methods and events
8	Listbox and Combobox using .Net	1)Listbox - use of properties, methods and events 2) Combobox - use of properties, methods and events
9	Implementation of Controls in .net	1) Design registration form of college using text box, text area, radio list, check list, button etc. 2) Simple application for following function: (1) Login (2) Surfing (3) Logout
10	Implementation of OOP	1) Design form, make it a class, create its object and access it from another form. 2) Design student class, marks class, inherits it in result class and access it using form
11	Study Of Components	Using components create: 1) Advertisement (using Ad rotator) 2) Book example (using Next function) 3) find capabilities of browser (Browser object capabilities)
12	Database using ADO	1) ADO control – Properties, Methods 2) DAO control – Properties, Methods 3) Connection object, Command Object, Recordset object 4) Working with one and multiple tables
13	Database Manipulation	1) Inserting, updating, deleting records
14	Form Creation Using ADO	1) Design employee details with help of database (back-end) using data adapter, data reader and datasets. Use data grid to display result. 2) Generation of database (data table) of employee or student with help of data tables of .Net.
15	Online Application	Online application (student, employee, product, shopping mall) (a) Using dataset, data reader. (b) Same application using data table and data row. (use data grid to display data) (c) Bind the data to data grid using properties / templates. (d) Display details (student, employee, product, etc.) using data list. (4 cols per line) (e) Use control validation in application.
16	Database Implementation	1) Design Application which sends email.
17	Miniproject	1)Mini project of minimum 2 students. Design the mini project by integrating all the experiment performed as mentioned in the curriculum. 2)Set up and deployment of mini project.

Criteria for Continuous Assessment of Practical work and Progressive Skill Test:

Sr. no	Criteria	Marks allotted
1	Attendance at regular practical	10
2	Preparedness for practical	10
3	Correct figures / diagrams	10
4	Logical Thinking and Approach	10
5	Application	10
	Total	50

Instructional strategies:

7) Lectures and discussions.
8) Laboratory experiences and laboratory interactive sessions.
9) Time bound assignments.

Teaching and Learning resources, including references:

10) Chalk-board.
11) Transparencies
12) Presentation Slides
13) Demonstrative video files
14) Books:
    i. Beginning Visual C# 2012 Programming – Karly Watson, Jacob wibe hammer
    ii. Beginning.C.Sharp.2005.Databases.From.Novice.to.Professional –James Hamalston
    iii. .Net Framework --- Anthony Jones

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1	Technical ability	10
2	Communication skill	5
3	Logical approach	10
4	Mini Project	25
	TOTAL.	50

b) Websites

ii) http://www.tutorialspoint.com/csharp/
iii) http://www.completecsharptutorial.com/
iv) http://csharp.net-tutorials.com/
v) http://zetcode.com/lang/csharp/
vi) http://www.homeandlearn.co.uk/csharp/csharp.html

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COURSE ID: 24

Course Name : SYSTEM PROGRAMMING
Course Code : ITE310
Course Abbreviation : ESPG

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL

Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	3	3
Tutorial	0	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	--	Term End Theory Exam (03 hours)	--	--	
Marks	**20**	**--**	**80**	**--**	**--**	**100**

Rationale:

Computers cannot understand any language without using system programs like Assemblers, Loaders, and Compliers. The main purpose of system programming is to teach procedures for the design of such system software. System programs e.g. compliers, loaders, macro processors were developed to make computers better adapted to the needs of their users.

Objectives:

The students will be able to:

a) Understand the basics of language processing
b) Understand the function of assembler, compiler, interpreters etc.
c) Understand various design aspects of system software.
d) Develop software tools like editors and debuggers.

Section - I

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
1	**INTRODUCTION** 1.1 Components of a programming system 1.1.1 Assemblers 1.1.2 Loaders 1.1.3 Macros 1.1.4 Compilers 1.1.5 Formal systems 1.2 Evolution of Operating system 1.3 Operating system : functions and facilities	**04**	**08**
2	**LANGUAGE PROCESSORS** 2.1 Introduction 2.1.1 Language processors 2.1.2 Interpreter 2.1.3 Problem oriented and Procedure oriented languages 2.2 Language processing activities 2.2.1 Program generation 2.2.2 Program execution 2.3 Fundamentals of language processing 2.3.1 Lexical, Syntax and Semantic rules 2.3.2 Phases and passes of a language processor 2.3.3 Intermediate representation of programs 2.4 A Toy Compiler 2.4.1 Front end – Lexical, Syntax and Semantic analysis 2.4.2 Back end – Memory allocation, Code generation 2.5 Fundamentals of language specification 2.5.1 Programming language grammars 2.5.2 Binding and binding times	**10**	**14**
3	**ASSEMBLERS** 3.1 Elements of assembly language programming 3.1.1 Assembly language statements 3.1.2 Advantages of assembly language 3.2 A simple assembly scheme – Design specification of an assembler, synthesis phase, analysis phase 3.3 Pass structure of assemblers	**06**	**12**
4	**MACRO AND MACRO PROCESSORS** 4.1 Introduction 4.2 Macro definition and call 4.3 Macro Expansion	**04**	**06**

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
	4.4 Nested macro calls		
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Section II

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
5	**COMPILERS AND INTERPRETERS** 5.1 Aspects of compilation - data types, data structures, scope rules, control structure 5.2 Memory allocation 5.2.1 Static and dynamic memory allocation 5.3 Compilation of expressions 5.3.1 A Toy Code Generator for expressions 5.3.2 Intermediate codes for expressions 5.4 Compilation of control structures 5.4.1 Control transfer, conditional execution and iterative constructs 5.4.2 Function and procedure calls – calling conventions, parameter passing mechanisms 5.5 Code optimization 5.5.1 Optimizing transformations 5.5.2 Local optimization 5.5.3 Global optimization 5.6 Interpreters 5.6.1 Use of interpreter 5.6.2 Overview of interpretation 5.6.3 A Toy interpreter 5.6.4 Pure and impure interpreters	**12**	**16**
6	**LINKER** 6.1 Translated, linked and load time addresses 6.2 Relocation and linking concepts 6.2.1 Program relocation 6.2.2 Linking 6.2.3 Object module 6.3 Self – relocating programs	**04**	**10**
7	**SOFTWARE TOOLS** 7.1 Software tools for program development	**08**	**14**

	7.1.1 Program design and coding 7.1.2 Program entry and editing 7.1.3 Program testing and debugging 7.1.4 Enhancement of program performance 7.1.5 Design of software tools 7.2 Editors – screen editors, word processors, structure editors, design of an editor 7.3 Debug monitors 7.4 Programming Environments 7.5 User interfaces 7.5.1 Command dialogs 7.5.2 Presentation of data 7.5.3 Online help 7.5.4 Structure of a user interface 7.5.5 User interface management systems		
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Introduction	6	2	2	08
I / 2	Language Processors	6	4	4	14
I / 3	Assemblers	4	6	2	12
I / 4	Macro And Macro Processors	2	2	2	06
II / 5	Compilers And Interpreters	8	4	4	16
II / 6	Linker	4	4	2	10
II / 7	Software Tools	4	4	6	14

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

Instructional strategies:

10) Lectures and discussions.
11) Laboratory experiences and laboratory interactive sessions.
12) Time bound assignments.

Teaching and Learning resources, including references:

15) Chalk-board.
16) Transparencies
17) Presentation Slides
18) Books:

Sr. No.	Author	Title	Publisher
1.	D.M. Dhamdhere	Systems programming and Operating systems	McGraw Hill
2.	John J. Donovan	Systems programming	McGraw Hill

COURSE ID: 25 (A)

Course Name : MICROPROCESSOR
Course Code : ITE311
Course Abbreviation : EMIP

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	As per proforma - III	--	
Marks	**20**	**--**	**80**	**25**	**--**	**125**

Rationale:

Microprocessors are essential constituent of controllers in all the modern production processes. They are also principle part of the computer hardware. As such the study of principles, operations and applications of microprocessors form an essential part of making a hardware engineer. The contents of this subject are devised to fulfill this requirement.

Objectives:

The students will be able to:

1) Learn architecture of 8085 processor
2) Understand the Silent features of 8086 Microprocessor
3) Understand the execution process
4) Use instructions of 8086 microprocessor
5) Prepare & run assembly language programs
6) Use of micros in programs.
7) Identify different IC's used in microprocessor-based systems.
8) Learn interrupt process
9) Learn I/O Interfacing, Addressing

Section I

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
1	**Basics of Microprocessor** 1.1 Evolution of Microprocessor and types 1.2 Silent features of 8085 Microprocessor, architecture of 8085 (Block diagram), register organization, limitations of 8-bit Microprocessor.	**08**	**08**
2	**16-bit Microprocessor 8086** 2.1 Silent features of 8086 Microprocessor, architecture of 8086 (Block diagram, signal description), register organization, concepts of pipelining, memory segmentation and memory address generation. 2.2 Minimum and Maximum Mode operation and diagram	**08**	**16**
3	**8086 Instruction set** 3.1 Machine Language Instruction format, addressing modes 3.2 Instruction set (Arithmetic, logical, data transfer, bit manipulation, string, program control transfer, process control)	**08**	**16**
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Section II

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
4	**The art of assembly Language Programming** 4.1 Program development steps defining problem, algorithms flowchart, initialization checklist, choosing instructions, converting algorithms to assembly language programs. 4.2 Assembly Language Programming Tools Editors, Assembler, Linker, Debugger. 4.3 Assembler directives, model of 8086 assembly language programming, programming using assembler.	**08**	**20**
5	**Procedure and Macro** 5.1 Defining Procedure (Directives used, FAR and NEAR, CALL and RET instructions) 5.2 Defining Macros. 5.3 Assembly Language Programs using Procedure and Macros.	**08**	**12**
6	**System Interfacing** 6.1 Interfacing Techniques (I/O mapped I/O, Memory mapped I/O, memory and I/O addressing, 8086 addressing, and address decoding, memory interfacing as Even and Odd bank)	**08**	**08**
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Basics of Microprocessor	4	2	2	08
I / 2	16-bit Microprocessor 8086	6	6	4	16
I / 3	8086 Instruction set	6	6	4	16
I / 4	The art of assembly Language Programming	8	8	4	20
II / 5	Procedure and Macro	4	4	4	12
II / 6	System Interfacing	4	2	2	08

Laboratory experiences and related skills developed.

1) Basics of Assembler, linker, debugger, editor

2) Write an Assembly Language Program to

I. Add / Sub two 16 bit numbers.

II. Find sum of series of numbers.

III. Multiply two 16 bit unsigned/ signed numbers.

IV. Divide two unsigned/ signed numbers (32/16 , 16/8, 16/16, 8/8)

V. Add / Sub / Multiply / Divide two BCD numbers.

VI. Find smallest/ largest number from array of n numbers.

VII. Arrange numbers in array in ascending/ descending order.

VIII. Perform block transfer data using string instructions / without using string

IX. instructions.

X. Compare two strings using string instructions / without using string instructions.

XI. Display string in reverse order, string length, Concatenation of two strings.

Criteria for Continuous Assessment of Practical work and Progressive Skill Test:

Sr. no	**Criteria**	**Marks allotted**
1	Attendance at regular practical	10
2	Preparedness for practical	10

3	Correct figures / diagrams	10
4	Logical Thinking and Approach	10
5	Application	10
	Total	50

Instructional strategies:

13) Lectures and discussions.

14) Laboratory experiences and laboratory interactive sessions.

15) Time bound assignments.

Teaching and Learning resources, including references:

19) Chalk-board.

20) Transparencies

21) Presentation Slides

22) Demonstrative video files

23) Books:

1. Microprocessor interfacing & applications : Douglas Hall
2. Advanced Microprocessor & peripherals: A.K. Ray & K.M.Bhurchandi
3. Microprocessor architecture & applications : R. Gaonkar.
4. An introduction to the Intel family of Microprocessors:James L. Antonakos

Criteria for assessment at semester end oral exam:

Sr. no	Criteria	Marks allotted
1	Technical Ability	15
2	Logical Approach	10
3	Presentation	15
4	Applications	10
	Total	50

Assessment at semester end oral exam as per Pro-forma II.

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COURSE ID: 25 (B)

Course Name : HIGHER MATHEMATICS
Course Code : ITE312
Course Abbreviation : EHIM

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : Engineering Mathematics & Applied Mathematics

Teaching Scheme :

Scheme component	Hours / week	Credits
Theory	03	05
Tutorial	02	

Evaluation Scheme :

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	As per proforma - III	--	
Marks	**20**	**--**	**80**	**25**	**--**	**125**

RATIONALE:

Mathematics is an important pre-requisite for the development and understanding of engineering and technological concepts. For an engineer and technologist, knowledge of Mathematics is an effective tool to pursue and to master the applications in the engineering and technological fields. The connection between Higher Mathematics and its applications in real life can be understood and appreciated. Finite Differences helps in finding population ,Temperature of a city etc .

OBJECTIVES:

The student will be able:

4. Apply methods of finite differences to Engineering and technical field..
5. Apply rules and methods of partial differentiation equation to solve Engineering and technical Problems
6. Apply various concepts of Probability in Engineering and technical field.

CONTENT:

J.THEORY :

Section I

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
1	**FINITE DIFFERENCE** 1.1 Finite differences, forward difference Δ , Backward differences ∇ ,Operator E and Difference tables. 1.2 Inverse of E , Δ,∇, 1.3 Factorial notations of polynomials 1.4 To find missing terms by using difference table 1.5 Newton's forward & backward differences interpolation formulae (Examples) 1.6 Lagrange's interpolation formula for unequal intervals.(Examples)	**12**	**20**
2	**PARTIAL DIFFERENTIATION** 2.1 Partial Derivatives of first order (Definition, Examples) 2.2 Partial Derivatives of higher Order (Definition, Examples) 2.3 Homogeneous functions , Euler's theorem on homogeneous functions (Examples) 2.4 Jacobians (Definition, Examples)	**12**	**20**
	Total	**24**	**40**

1.Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.
2.In each topic corresponding applications will be explained

Section II

Sr. No.	Topics / Sub-topics	Lectures (Hours)	Theory Evaluation (Marks)
3	**LINEAR DIFFERENTIAL EQUATION WITH CONSTANT COEFFICIENTS** 3.1 Definition. operator D, Inverse of D 3.2 To find C.F. Of L.D.E. When I) Roots are real and equal, II) Roots are real and different III) Roots are Imaginary and a pair of equal imaginary roots 3.3 To find P.I. when $X=e^{ax}$, $x=\sin ax$ or $\cos ax$, $X=x^{n.}$	**10**	**16**
4	**PROBABILITY DISTRIBUTIONS** 4.1Binomial Distribution 4.2 Poissions Distribution 4.3 Normal Distribution	**08**	**12**
5	**LINEAR PROGRAMMING PROBLEMS** 5.1 Formulation of problem 5.2 Solution of problem (Feasible solution by graphical method)	**08**	**12**
	Total	**24**	**40**
1.Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only. **2**. In each topic corresponding applications will be explained			

Specification table for setting question paper for semester end theory examination:

Topic No.	Name of topic	Distribution of marks (level wise)			Total Marks
		Knowledge	Comprehension	Application	
1	Finite Differences	4	6	10	20
2	Partial Differentiation	4	6	10	20
3	L.D.E.	4	4	8	16
4	Probability Distribution	4	-	8	12
5	L.P.P.		-	12	12

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

K. PRACTICALS.

Note: Practicals are to be used to get enough practice [One batch for 20 Students]

Sr No.	Topic	Tutorial Content (10 problems in each tutorial)
1	Finite Differences	To evaluate examples on operators as E , Δ,∇ and Factorial notation
2	Finite Differences	To evaluate Newton's forward & backward differences interpolation formulae
3	Finite Differences	To evaluate Lagrange's interpolation formulae
4	Partials Differentials.	To evaluate Partial Derivatives of higher Order Homogeneous functions ,
5	Partials Differentials.	To evaluate examples on Euler's theo. On homogeneous functions, Jacobian's
6	L.D.E.	To find C.F. Of L.D.E. When I) Roots are real and equal, II) Roots are real and different III) Roots are Imaginary and a pair of equal imaginary roots
7	L.D.E.	To find P.I. when $X=e^{ax}$, x=sinax or cosax,$X=x^{n.}$
8	Probability Distribution	Binomial Distribution (Examples)
9	Probability Distribution	Poissions Distribution Normal Distribution (Examples)
10	L.P.P.	Feasiable solution by graphical method

INSTRUCTIONAL STRATEGIES:

Instructional Methods:

1. Lectures cum Demonstrations
2. Tutorials

Teaching and Learning resources:

1. Chalk board
2. Item Bank
3 Formulae Charts
4 Power point presentation

REFERENCE MATERIAL:

a) Books:

Sr. No.	Author	Title	Publisher
1.	G.V. Kumbhojkar	Engineering Mathematics III	Phadake Prakashan, Kolhapur
2.	P.N. Wartikar	Applied mathematics	Pune vidyarthi Griha Prakashan , pune
3	H.K. Dass	Higher engineering mathematics	S .Chand publication
4	B.S.Grewal	Higher engineering Mathematics	Khanna publication, New Delhi

b) Websites

i) www.khanacademy.org
ii) www.easycalculation.com
iii) www.math-magic.com

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COURSE ID: 25 (C)

Course Name : COMPUTER GRAPHICS
Course Code : ITE313
Course Abbreviation : ECOG

TEACHING AND EVALUATION SCHEME:

Pre-requisite Course(s) : NIL
Teaching Scheme: MPECS 2013

Scheme component	Hours / week	Credits
Theory	3	5
Practical	2	

Evaluation Scheme:

Mode of Evaluation	**Progressive Assessment**		**Term End Examination**			**Total**
	Theory	Practical	Theory Examination	Term Work	Oral Examination (Internal)	
Details of Evaluation	Average of two tests of 20 marks each	i. 25 marks for each practical ii. One PST of 25 marks	Term End Theory Exam (03 hours)	As per proforma - III	--	
Marks	**20**	**--**	**80**	**25**	**--**	**125**

RATIONALE :

Computer system is set up to allow the user to interact with the system through a graphical user interface, where information on the display screen is conveyed in both textual and graphical forms. Everyone should be aware of this rapidly expanding technology.

Computer graphics is a complex and diversified technology. The output product of Computer graphics is a pictorial image. Hence the computer has become a new tool for the artist and animator. Computer graphics is an extremely effective medium for communication between man and machine through pictures, charts and diagrams. Thus one can understand the information contents of a displayed diagram or perspective view much faster than the table of numbers.

Computer graphics techniques can be used in many fields such as Engineering drawing, business graphs, architectural design and also for video games, which provides a new form of entertainment.

Objectives:

The students will be able:

1. to understand basic Graphics primitives.
2. to implement these primitives on the screen using C/C ++ Compiler
3. to solve the design problems

CONTENT:

L. THEORY :

Section I

Sr. No.	Topics / Sub-topics	Theory (Hours)	Theory Evaluation (Marks)
1	**Basics of CG** 1.1 Display devices, Primitive operations 1.2 The Display-file Interpreter 1.3 Display file structure , Graphics file formats , Text mode graphics function, Graphic mode 1.4 Graphics functions Shapes, colors, Co-ordinate systems, Applications of computer graphics	06	10
2	**Line, circle, and polygon.** 2.1 Basic concepts in line drawing, Line drawing algorithms: DDA algorithms, Bresenham's algorithm 2.2 Circle generating algorithms: DDA circle drawing algorithm, Bresenham's circle drawing algorithm, midpoint circle algorithm 2.3 Polygons – Types of polygons, Polygon representation, Entering polygons, polygon filling: Flood fill, scan-line algorithm	08	14
3	**Transformations** 3.1 Principles of Transfromations 3.2 2D transformation: scaling, Reflection, shearing, Rotation, Translation, Rotation about an arbitrary point.. 3.3 3D Transformation: scaling, rotation, translation, rotation about arbitrary axis	10	16
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Section II

Sr. no.	Topics Subtopics	Teaching (Hours)	Theory evaluation Marks
4	**Windowing & clipping** 4.1 Viewing transformation, Normalization transformation 4.2 Line clipping: Cohen-Sutherland, Line clipping algorithm, midpoint subdivision algorithm 4.3 Polygon clipping: Sutehrland – Hodgeman Polygon clipping algorithm.	11	18
5	**Curves** 5.1 Curve generation: arc generation using DDA algorithm. 5.2 Characteristics of B-Spline, Bezier curves.	06	10
6	**Raster graphics and interactive graphics** 6.1 Raster scan display, Random scan display 6.2 Need for graphics standards 6.3 Advantages of Graphics standards	07	12
Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.			

Specification table for setting question paper for semester end theory examination

Section / Topic no.	Name of topic	Distribution of marks (level wise)			Total marks
		Knowledge	Comprehension	Application	
I / 1	Basics of CG	04	04	02	10
I / 2	Line, circle, and polygon.	04	06	04	14
I / 3	Transformations	06	04	06	16
II / 4	Windowing & clipping	06	06	06	18
II / 5	Curves	04	04	02	10
II / 6	Raster graphics and interactive graphics	06	06	---	12

Semester end exam question paper should be such that total marks of questions on each topic is one and half times the marks allotted above but the candidates are able to attempt questions of the above allotted marks only.

Laboratory experiments and related skills developed.

Sr. no	Laboratory experiments	Skills developed
1	Study of graphics Functions	1. Plotting of Pixels 2. Drawing Lines, Shapes, applying Colors
2	Study of DDA algorithm for line drawing	1. Understanding DDA Line Drawing Algorithm 2. Implementation of DDA algorithm for line drawing
3	Program to Draw a Line using Bresennham's algorithm	1. Understanding Bresenham's Line Drawing Algorithm 2. Implementation of Bresenham's algorithm for line drawing
4	Study of DDA algorithm for circle drawing	1. Understanding DDA Circle Drawing Algorithm 2. Implementation of DDA algorithm for drawing Circle
5	Study of Bresennham's algorithm of circle drawing	1. Understanding Bresenham's Circle Drawing Algorithm Implementation of Bresenham's algorithm for drawing Circle
6	Study of Scan conversion algorithm for Polygon filling	1. Understanding Scan conversion algorithm 2. Implementation of Scan conversion algorithm
7	Write Program for 2-D transformations -> Translation	1. Principles of transformation 2. Understanding translation 3. Implementation of Translation
8	Write Program for 2-D transformations -> scaling, Rotation,	1. Understanding Scaling and rotation 2. Implementation of Rotation and Scaling
9	Write Program for 2 D transformations shearing and Translation program	1. Study of Shearing 2. Implementation of shearing & Translation
10	Write program for rotation about an arbitrary point.	1. Understanding Rotation about an arbitrary point 2. Implement program for rotation about an arbitrary point
11	Study of Cohen- Sutherland algorithm for line clipping.	1. Understanding Cohen- Sutherland algorithm for line clipping. 2. Implementation of Cohen- Sutherland algorithm for line

		clipping.
12	Study of mid point subdivision algorithm for line clipping.	1. Understanding mid point subdivision algorithm 2. Implementation of mid point subdivision algorithm
13	Study of Sutherland-Hodgeman algorithm for polygon clipping.	1. Understanding Polygon Clipping 2. Implementation of Sutherland-Hodgeman algorithm for polygon clipping.

Criteria for Continuous Assessment of Practical work and Progressive Skill Test:

Sr. no	Criteria	Marks allotted
1	Preparedness for practical	5
2	Technical Ability	5
3	Algorithm	5
4	Implementation	5
5	Logical Approach	5
		25

Instructional strategies:
16) Lectures and discussions.
17) Laboratory experiences and laboratory interactive sessions.
18) Time bound assignments.

Teaching and Learning resources, including references:
4. Books
5. Transparencies
6. Power Point Presentation
4. Self-learning

24) Books:
1. Mathamatical elements for Computer Graphics – David F.Rogers.
2. Procedural Elements for Computer Graphics – David F.Rogers.
3. Principles of Interactive Computer Graphics- Newman and Sproull , Tata McGraw Hill

2) References :

1) www.insidecg.com
2) www.graphics.standard.edu
3) www.cmp.uea.ac.uk/research
4) www.computerarts.co.uk

Criteria for assessment at semester end practical exam:

Sr. no	Criteria	Marks allotted
1	Technical Ability	15
2	Logical Approach	10
3	Presentation	15
4	Applications	10
	Total	50

Assessment at semester end practical exam as per Pro-forma II.

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