NEW HORIZON COLLEGE OF ENGINEERING

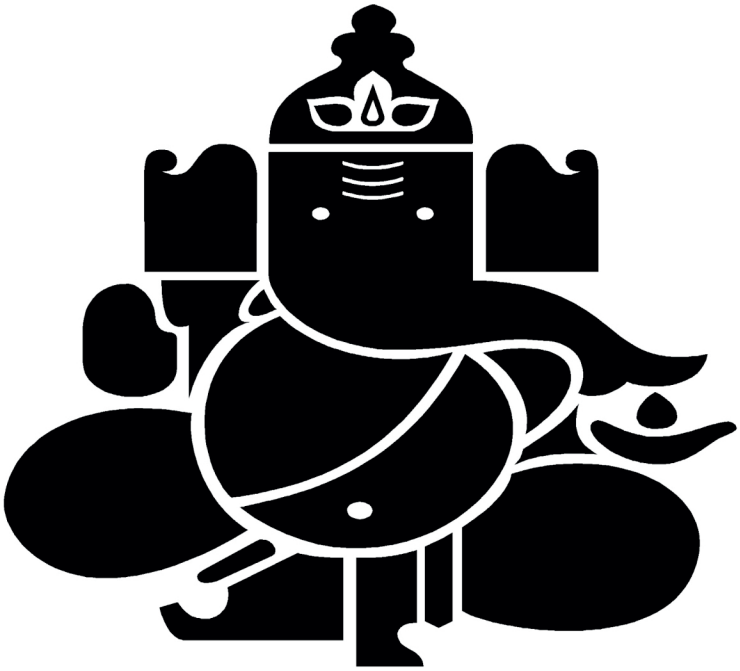
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

The Trust is a Recipient of Prestigious Rajyotsava State Award 2012 Conferred by the Government of Karnataka
Awarded Outstanding Technical Education Institute in Karnataka-2016
Ring Road, Bellandur Post, Near Marathalli, Bangalore -560 103, INDIA

Academic Year 2018-19

ISE - Information Science and Engineering

Third and Fourth Semesters
Scheme and Syllabus



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VISION

To emerge as a department of eminence in the field of Information Science & Engineering & Technology in serving the industry and the nation by empowering students with a high degree of technical, managerial and practical competence.

MISSION

To strengthen the theoretical, practical and ethical dimensions of the learning process by fostering a culture of research and innovation among faculty members and students.

To encourage long-term interaction between the academia and industry through their involvement in the design of the curriculum and its hands-on implementation.

To strengthen and mould students in professional, ethical, social and environmental dimensions by encouraging participation in co-curricular and extracurricular activities.

Program Educational Objectives

PEO1: To excel in their professional career with expertise in providing solutions to Information Technology problems.

PEO2: To pursue higher studies with profound knowledge enriched with academia and industrial skill sets.

PEO3: To exhibit adaptive and agile skills in the core area of Information Science & Engineering to meet the technical and managerial challenges.

PEO4: To demonstrate interpersonal skills, professional ethics to work in a team to make a positive impact on society.

Program Specific Outcomes

PSO1: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer based systems of varying complexity.

PSO2: The ability to apply standard practices and strategies in software project development using innovative ideas and open ended programming environment with skills in teams and professional ethics to deliver a quality product for business success.

PEO to Mission Statement Mapping

MISSION STATEMENTS	PEO1	PEO2	PEO3	PEO4
To impart quality education in Information Technology domain with leader ship qualities through best- in class faculty and infrastructure	3	1	2	1
To excel in Research and Development that discovers new knowledge and enables emerging Information Technologies through industry collaboration	2	3	1	2
To inculcate a culture of service towards the society and Professionalism	1	2	3	3

Correlation: High-3, Medium-2, Low-1

Sl. No	Graduate Attributes	Program Outcomes (POs)
1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals and computing to solve information science and engineering related problems.
2	Problem analysis	Graduates will demonstrate the ability to identify, formulate and solve engineering problems related to information Science and Engineering.
3	Design and Development of Solutions	Graduates will demonstrate the ability to design, analyze and interpret data and implement solutions for software based real life problems

4	Investigation of Problem	Graduates will demonstrate the ability to formulate the problem statement with investigation. Based on the investigation, graduates to design system, component or product as per needs and specifications
5	Modern Tool usage	Graduates will demonstrate the use of modern engineering tools with the latest techniques and skills, software and equipments to analyze and solve the problems
6	Engineer and society	Graduates will appraise the ethical, legal, professional and social norms of engineering practice.
7	Environment and sustainability	Graduates will have the broad education to understand the impact of engineering solution in a global, economic, environmental and societal context
8	Ethics	Graduates to follow the professional and social ethics and positive code of conduct for human welfare.
9	Individual & team work	Graduates will demonstrate the ability to work both as an individual and in team in information science and engineering or multi-disciplinary, exhibiting the leadership qualities

10	Lifelong learning	Graduates will demonstrate the ability and desire towards life-long learning for professional development. Graduates will participate and succeed in competitive examinations.
11	Communication	Graduates will communicate effectively both in verbal and written form.
12	Project management and finance	Apply engineering and management principles to manage projects

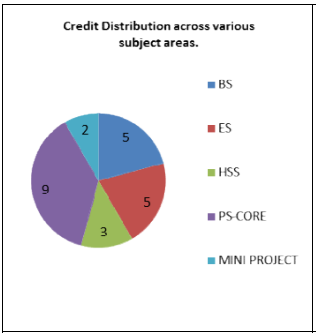
Mapping of POs To PEOs

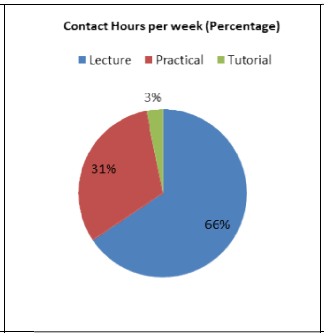
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO1	3	3	3	3	3	1	2	1	1	1	2	2
PEO2	2	2	2	2	2	1	3	1	1	3	1	2
PEO3	1	1	1	1	1	3	3	3	3	1	3	1
PEO4	1	1	1	1	1	3	2	3	1	3	1	3

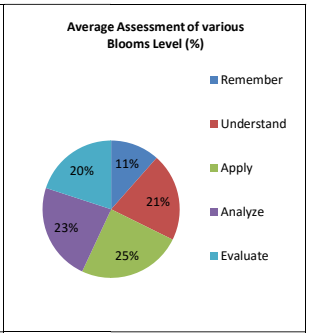
Correlation: 3- High, 2-Medium, 1-Low

New Horizon College of Engineering
Department of Information Science and Engineering
Third Semester B.E Program– Scheme AY: 2017-18

Sl. No	Course Code	Course	Credit Distribution				Overall Credits	Contact Hours weekly-Theory	Contact Hours weekly -(Lab)	Marks		
			L	P	T	S				CIE	SEE	TOTAL
1	MAT31	Engineering Mathematics-III	4	0	1	0	5	6	0	50	50	100
2	HSS321	Economics For Engineers	2	0	0	1	3	2	0	50	50	100
	HSS322	Life skills for Engineers										
3	ISE33	Analog and Digital Electronics	3	2	0	0	5	5	4	75	75	150
4	ISE34	Data Structures using C	3	2	0	0	5	5	4	75	75	150
5	ISE35	UNIX & SHELL Programming	3	1	0	0	4	4	2	75	75	150
6	ISE36	Mini Project	0	2	0	0	2	0	2	25	25	50
Total							**24**	**22**	**12**	**350**	**350**	**700**

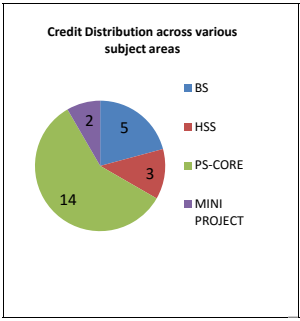


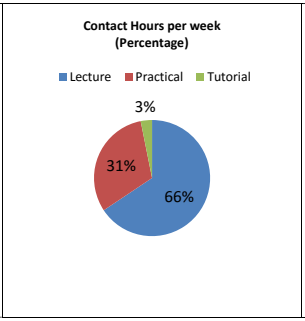


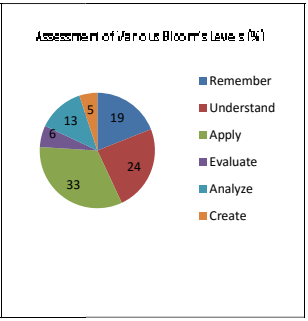


New Horizon College of Engineering
Department Of Information Science and Engineering
Fourth Semester B.E Program- Scheme AY: 2017-18

Sl. No	Course Code	Course	Credit Distribution				Overall Credits	Contact Hours weekly Theory	Contact Hours weekly (Lab)	Marks		
			L	P	T	S				CIE	SEE	TOTAL
1	MAT41	Engineering Mathematics-IV	4	0	1	0	5	6	0	50	50	100
2	HSS421	Introduction to Economics	2	0	0	1	3	2	0	50	50	100
	HSS422	SS for Engineers										
3	ISE43	Object Oriented Programming with C++	3	2	0	0	5	5	4	75	75	150
4	ISE44	Microprocessor	3	2	0	0	5	5	4	75	75	150
6	ISE45	Computer Organization	4	0	0	0	4	4	0	50	50	100
7	ISE46	Mini Project	0	2	0	0	2	0	2	25	25	50
Total							**24**	**22**	**10**	**325**	**325**	**650**







THIRD SEMESTER

(SYLLABUS)

ENGINEERING MATHEMATICS – III

Course Code : MAT31	**Credits: 05**
L:P:T:S : 4:0:1:0	**CIE Marks : 50**
Exam Hours : 3	**SEE Marks : 50**

Course Outcomes: At the end of the Course, the student will be able:

CO1	Solve the Fourier series expansion of functions analytically and numerically.
CO2	Solve the Continuous model problems using Fourier transform.
CO3	Solve the discrete model problems using Z-transforms and Fast Fourier transform.
CO4	Fit a suitable curve by the method of least squares and determine the lines of regression for a set of statistical data.
CO5	Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral numerically.
CO6	Use appropriate numerical methods to solve Boundary Value Problems in Partial differential equations.

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**POI0**	**POII**	**PO12**
CO1	3	3	3	2	2	-	-	-	1	1	-	2
CO2	3	3	3	2	2	-	-	-	1	1	-	2
CO3	3	3	3	2	2	-	-	-	1	1	-	2
CO4	3	3	3	2	2	-	-	-	1	1	-	2
CO5	3	3	3	2	2	-	-	-	1	1	-	2
CO6	3	3	3	2	2	-	-	-	1	1	-	2

Module No	Module Contents	Hours	COs
1	**Fourier series**: Periodic function, Dirichlet's conditions, Fourier series of periodic functions of period 2π and arbitrary period $2l$, half range series. Fourier series and half Range Fourier series of periodic square wave, half wave rectifier, full wave rectifier, Saw-tooth wave with graphical representation, practical harmonic analysis.	9	CO1
2	**Fourier Transforms:** Infinite Fourier transforms, Fourier Sine and Cosine transforms, Inverse Fourier transform. **Z - Transform:** Definition, Z-transforms of some standard functions, properties, damping rule, shifting rule (without proof), initial and final value theorems, inverse Z- transforms. **Applications:** Solving difference equations using Z-transform.	9	CO2, CO3
3	**Statistical Methods:** Fitting of the curves of the form $y = a + bx$, $y = a + bx + cx^2$, $y = ae^{bx}$, $y = ax^b$, and $y = ab^x$ by the method of least square**,** Correlation and Regression , Regression coefficients, line of regression – problems. **Discrete Fourier Transform and Fast Fourier Transform**: Definition of N-Point DFT, problems for 4-Points and inverse DFT for four points only.FFT algorithm to compute the Fourier transforms 4-Point only.	9	CO3, CO4
4	**Numerical Methods-1:** Numerical solution of algebraic and transcendental equations; Rugula- falsi method and Newton Raphson's method. Solution of a system of equations using Gauss-seidel and Relaxation method. Interpolation & extrapolation – Newton's forward and backward formulae for equal intervals, Newton divided difference and Lagrange's formulae for unequal intervals.	9	CO5
5	**Numerical Methods-2**: Numerical integration - Simpson's 1/3rd rule, Simpson's 3/8th rule, Weddle's rule (without proof)-Problems. Numerical solution of Boundary value problems-Solution of one dimensional wave equation and heat equation, Numerical solution of two dimensional Laplace's equation and Poisson's equation.	9	CO5 CO6

TEXT BOOKS:

1.Advanced Engineering Mathematics, Erwin Kreyszig, Wiley-India publishers,10th edition, 2014.
2. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers, 43rd edition, 2014.

REFERENCE BOOKS:

1. Advanced Modern Engineering Mathematics, Glyn James, Pearson Education, 4th edition, 2015.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, Jones and Barlett Publishers Inc., 4th edition, 2015,.
3. Engineering Mathematics, B.V.Ramana, Tata McGraw Hill Publications, 4th edition, 2005.
4. Engineering Mathematics, Anthony Craft, Pearson Education, 4th edition, 2013.

Assessment Pattern
CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Taxonomy	Tests	Assignments	Quizzes	Co-curricular Activities
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5	3	-	-
Understand	5	5	-	-
Apply	5	2	5	5
Analyze	5	-	-	-
Evaluate	5	-	-	5
Create	-	-	-	-

SEE – Semester End Examination (50 Marks)

Bloom's Taxonomy	Tests
Marks (Out of 50)	
Remember	10
Understand	10
Apply	20
Analyze	5
Evaluate	5
Create	-

ANALOG AND DIGITAL ELECTRONICS

Course Code : ISE33 **Credits : 05**
L:P:T:S : 3:2:0:0 **CIE Marks : 50+25**
Exam Hours : 3+3 **SEE Marks : 50+25**

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	To understand the operation and working of various electronic components and electronic circuits.
CO2	To simplify Boolean function using Karnaugh maps and Quine Mc-Clusky method and implement functions with combinatorial circuits.
CO3	To Analyze and design modular combinatorial logic circuits
CO4	To understand the Bi- stable elements like flip-flop and use its functionality to analysis and design the sequential circuits and its applications
CO5	Use the concepts of state and state transition for the analysis and design of sequential circuits.
CO6	To understand a HDL language and implement the logical circuits using HDL.

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	3	3	-	-	2	-	-	2	-	3
CO2	3	2	3	3	-	-	2	-	3	2	-	3
CO3	3	2	3	3	-	-	2	-	3	2	-	3
CO4	3	2	3	3	-	-	2	-	3	2	-	3
CO5	3	2	3	3	-	-	2	-	3	2	-	3
CO6	3	2	3	3	3	-	2	-	3	2	-	3

Sl. No.	Contents of Module	Hrs	Cos
1	**Electronic devices and applications** BJT vs FET, MOSFETs, CMOS Device,Ideal vs practical OP-AMP, Comparator, Active Filters, Relaxation Oscillator Optoelectronics devices: Photo-conductors, Photo-diodes, LED, LCD,CRT	9	CO1
	List of experiments 1. Design and implement Schmitt trigger for given UTP and LTP. Also, implement using a simulation package. 2. Design and construct Op- Amp relaxation oscillator for given frequency and demonstrate its working. Also, implement using a simulation package.	8	
2	**Wave Shaping Circuit** RC as Low pass and High pass, RC as Integrator and Differentiator, Diode as Clipper and Clamper, Bistable Multivibrators, IC Multivibrators: Astable and Monostable, Clock Waveforms	9	CO1
	List of experiments 1. Design and implement clipper and clamper (positive and negativ for both) use diodes. Also, demonstrate the working using simulation package. **2.** Design and implement an astable multivibrator circuit using 555 timer for a given frequency and duty cycle. Also, implement using simulation package.	8	
3	**Combinational Logic Circuits** Karnaugh maps, Quine-McClusky method, Half adder, Full adder, Subtractor, Multiplexers and De-multiplexers, Magnitude comparators(1 and 2 bit), Design of multiple output circuits using PLDs. Introduction to HDL, VerilogImplementation of Data Processing Circuits	9	CO2, CO3, CO6
	List of experiments 1. Given a 4-variable logic expression, simplify it using Entered Variable Map and realize the simplified logic expression using 8:1 multiplexer IC.Simulate and verify its working using Verilog code. 2. Perform n bit addition / subtraction using 4 bit full adder IC. Simulate and verify its working using Verilog code.	8	
4	**Sequential Circuit Elements** Latches, types of Flip-flops, Flip-flop excitation tables, Registers, type of Shift Registers, Universal shift Registers, Applications of Shift Registers –Ring Counter, Johnson Counter, Sequence generator, Verilog implementation of Flip-flops and Registers.	9	CO4, CO6
	List of experiments 1. Realize JK, D and T Flip-Flops and verify its truth table Simulate and verify the working of the same using VERILOG code. 2. Design and implement Ring counter and Johnson counter using 4-bit shift register and demonstrate its working. Simulate and verify the working using VERILOG code.	8	

5	**Analysis of Sequential Circuit** Counters-Asynchronous and synchronous, Design of counters, Counter Design as synthesis problem, Design of Synchronous Sequential Circuits: Moore model, Mealy model, State Reduction Techniques, Verilog implementation of counters.	**9**	**CO4, CO5, CO6**
	List of experiments 1. Design and implement a mod-n (n<8) synchronous up or down counter using J-K Flip-Flop ICs and demonstrate its working.Simulate and verify mod 8 synchronous up or down counter using VERILOG code. 2. Design and implement an asynchronous counter using decade counter IC to count up from 0 to n (n<=9) and demonstrate its working.	**8**	

Text Books

1. Electronic Devices and Circuits, Anil K Maini, Varsha Agarwal, 1st Edition, 2009, Wiley.
2. Digital Principles and Applications, Donald P Leach and Albert Paul Malvino, 8th Edition, 2014, Tata McGraw Hill.

Reference books:

1. Digital Principles and design, Donald D. Givone, 2003, Tata McGraw Hill.
2. Digital Design: with an Introduction to Verilog HDL, M Morris Mano and Michael D. Ciletti, 5th Edition, 2013, Pearson Education.
3. Integrated Electronics – Analog and Digital Circuits and Systems, Jacob Millman, Christos Halkias and Chetan D Parikh, 2nd Edition, 2011, Tata McGraw Hill.

CIE- Continuous Internal Evaluation: Theory (50 Marks)

Bloom's Category	**Tests**	**Assignments**	**Quizzes**	**Co-Curricular Activities**
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5	-	-	-
Understand	5	-	-	-
Apply	10	-	5	5
Analyze	5	10	-	-
Evaluate	-	-	-	5
Create	-	-	-	-

CIE- Continuous Internal Evaluation: Lab (25 Marks)

Bloom's Category	LAB
Marks (out of 25)	
Remember	-
Understand	-
Apply	**15**
Analyze	**10**
Evaluate	-
Create	-

SEE- Semester End Examination: Theory (50Marks)

Bloom's Category	LAB
Marks (out of 50)	
Remember	**10**
Understand	**10**
Apply	**15**
Analyze	**15**
Evaluate	-
Create	-

SEE- Semester End Examination: Lab (25Marks)

Bloom's Category	LAB
Marks (out of 25)	
Remember	-
Understand	**5**
Apply	**10**
Analyze	**10**
Evaluate	-
Create	-

DATA STRUCTURES USING C

Course Code : ISE34 **Credits. : 05**
L:P:T:S : 3:2:0:0 **CIE Marks: 50+25**
Exam Hours : 3+3 **SEE Marks: 50+25**

Course Outcomes:At the end of the Course, the Student will be able to:

CO1	Understand the concept of array data structures, its applications and Dynamic memory management.
CO2	Compare, implement and know when to apply various sorting techniques
CO3	Understand and implement the operational aspects of stacks, queues and linked list in problem solving.
CO4	Learn and implement various operations on trees
CO5	Analyse the performance of Graphs
CO6	Handle operations like searching, insertion, deletion, traversing mechanism etc. On various data structures.

Mapping of Course Outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	3	3	-	-	-	-	-	-	-
CO4	3	3	2	3	3	-	-	-	-	-	-	-
CO5	3	3	2	3	-	-	-	-	-	-	-	-
CO6	3	3	2	3	3	-	2	-	-	-	-	3

Module No	Module Contents	Hours	COs
1	**Introduction to Data Structures:** Arrays and Pointers revisited, Sparse matrix, transpose of a sparse matrix, dynamic memory management. Introduction to Data Structures, Classification of Data Structures, Abstract Data Types, Insertion sort, Quick sort, Shell sort, Radix sort.	9	CO1, CO2, CO6
	List of programs: **1.** Write a program to check whether matrix is sparse or not. **2.** Write a program to determine the transpose of a sparse matrix.	4	
2	**Stacks & Queues:** Stacks: Definition, Stack representation, Primitive operations on stack, array representation of stacks, Applications of stacks: Recursion, Fibonacci series, Tower of Hanoi problem, Conversion of expressions, Evaluation of postfix expression, Iteration v/s recursion Queues: Definition, Queue representation, Primitive operations on queue, array representation of queues, Circular queue, Priority queue, Double ended queue, Applications of queues.	9	CO3, CO6

	List of programs: 1. Write a program to demonstrate Tower of Hanoi problem 2. Write a program for Ackermann's function 3. Develop a program for STACK that performs following primitive operations: push, pop and display 4. Develop a program to convert INFIX notation to POSTFIX 5. Develop a program for evaluation of POSTFIX notation. **6.** Develop a program for QUEUE that performs following primitive operations: insert, delete and display **7.** Develop a program for CIRCULAR QUEUE that performs following primitive operations: insert, delete and display	12	
3	**Linked Lists:** Dynamic memory allocation revisited – malloc, calloc, realloc, free, Introduction to linked list, Representation of linked list in memory, primitive operations on linked list, searching a linked list, circular linked list, doubly linked list, header linked list Applications of linked list: Josephus problem, addition of two long integers, addition of two polynomials, Linked representation of stack, Linked representation of queue.	9	CO1, CO3, CO6
	List of programs: 1. Write a menu driven program to perform primitive operations on single linked list **2.** Write a program to reverse a single linked list **3.** Develop a program for addition of two long integers using linked list.	8	
4	**Trees-I:** Introduction, Binary tree – strictly binary tree, complete binary tree, representing binary tree in memory, traversing a binary tree, binary search tree, insertion and deletion in binary search tree, threaded binary tree. Expression trees, construction of an expression tree from prefix and postfix, Heap tree, creation of heap tree, insertion in heap, Deletion from heap.	9	CO4, CO6
	List of programs: **1.** Develop a program to traverse a tree using in-order, pre-order and post-order. **2.** Develop a program to perform insertion, deletion and traversal of a binary search tree	8	
5	**Trees-II & Graphs:** AVL Trees, Rotations in AVL tree, Insertion and deletion in an AVL tree, Huffman's algorithm. Introduction to Graph, Graph theory terminologies, sequential representation of a graph, adjacency matrix and path matrix, Warshall's algorithm, Linked representation of a graph, Operations on a graph, Traversing a graph, Topological sorting	9	CO4, CO5, CO6
	List of programs: 1. Develop a program to implement BFS traversal of graph 2. Develop a program to implement DFS traversal of graph	8	

TEXT BOOKS:

1. Data Structures with C, Seymour Lipschutz, McGraw Hill Education, Special Indian Edition, Thirteenth reprint 2015.
2. Data Structures using C, Aaron M. Tanenbaum, YedidyahLangsam& Moshe J Augenstein, Pearson Education,Thirteenth Impression 2014.

REFERENCE BOOKS:

1. Data Structures – A Pseudocode Approach with C, Richard F Gilberg and Behrouz A Forouzan, Cengage Learning , Second edition, Fifth Indian Reprint 2015,

CIE - Continuous Internal Evaluation:Theory (50 Marks)

Bloom's Taxonomy	Tests	Assignments	Quizzes	Co-Curricular Activities
Marks (Out of 50)	**25**	**10**	**5**	**10**
Remember	5	-	-	-
Understand	10	5	-	-
Apply	10	5	5	5
Analyze	-	-	-	-
Evaluate	-	-	-	5
Create	-	-	-	-

CIE - Continuous Internal Evaluation:Lab (25 Marks)

Bloom's Taxonomy	Lab
Marks (Out of 25)	25
Remember	-
Understand	-
Apply	-
Analyze	-
Evaluate	25
Create	-

SEE – Semester End Examination: Theory (50 Marks)

Bloom's Taxonomy	Tests
Marks (Out of 50)	
Remember	5
Understand	20
Apply	25
Analyze	-
Evaluate	-
Create	-

SEE – Semester End Examination: Lab (25 Marks)

Bloom's Taxonomy	Lab
Marks (Out of 25)	
Remember	-
Understand	-
Apply	-
Analyze	-
Evaluate	25
Create	-

UNIX & SHELL PROGRAMMING

Course Code : ISE35 **Credits: 04**
L:P:T:S : 3:1:0:0 **CIE Marks: 50+25**
Exam Hours : 3 **SEE Marks: 50+25**

COURSE OUTCOMES:At the end of the Course, the Student will be able to:

CO1	Understand the fundamental concepts of UNIX Operating system
CO2	Analyze the working of various commands in the operating system
CO3	Formulate various filters to solve variety of applications
CO4	Develop and use of regular expression with pattern matching utilities like grep
CO5	Develop, Debug and execute shell scripts effectively.
CO6	Ability to program in AWK script.

Mapping of Course Outcomes to Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	-	3	2	-	-	-	-	-	-	3	3	-
CO3	-	3	2	-	-	-	-	-	-	3	3	-
CO4	-	3	2	-	-	-	-	-	-	3	3	-
CO5	-	3	2	-	-	-	-	-	-	3	3	-
CO6	-	3	2	3	2	-	-	-	-	3	3	-

Module No	Module Contents	Hours	COs
1	**Getting started & Understanding UNIX commands:** Operating System, UNIX Operating System, UNIX architecture, features of UNIX, Knowing your machine & keyboard, System Administrator, Logging in & out, working out with commands, understanding UNIX commands	9	CO1
2	**General Purpose Utilities:** passwd, who, tty, lock, sty, script, clear an tput, uname, date, cal, calendar, bc VI editor: preliminaries, quitting VI, inserting an replacing text, saving text, exit to UNIX shell, repeat factor, command mode, navigation, operators, deleting, moving and yanking text, changing text, repeating last command, undoing last editing instructions, string search, search with regular expressions, search and replace	9	CO2
3	**File system, Attributes & Process:** File system: The file, parent child relationship, UNIX file system, pwd, absolute pathname, changing directories, relative pathname, mkdir, rmdir, cp, rm, mv, cat, file, lp,	9	CO2

	cancel, df, du, compress, gzip, zip File Attributes: ls, ls –l, file permissions, chmod, directory permissions, umask, file ownership, chown and chgrp, file modification and access times, touch, ln, symbolic links, find Understanding the Process, how process is created, login shell, init process, internal and external commands, process status, running jobs in background, nice, signals, kill, at and batch, cron		
4	**Simple filters & Regular expressions:** more, wc, od, pr, cmp, diff, comm, head, tail, cut, paste, sort, tr, uniq, nl grep – searching for a pattern, grep options, regular expressions, egrep and fgrep sed – stream editor, line addressing, context addressing, editing text, substitution, regular expressions.	9	CO3, CO4
5	**Shell Programming & AWK:** Shell variables, shell scripts, read, positional parameters, exit status, logical operators, exit, if conditions, test and [], case, expr, sleep and wait, while and for AWK preliminaries, splitting line into fields, printf – formatting output, comparison operators, number processing, variables, reading program from a file, BEGIN and END section, positional parameters, getline, built in variables, arrays, functions, control flow, looping	9	CO5, CO6

TEXT BOOKS:

1. Your UNIX – The ultimate Guide, SUMITABHA DAS, McGraw Hill, TATA McGraw Hill Edition, 23rd reprint 2012.
2. UNIX – Concepts & Applications,SUMITABHA DAS, McGraw Hill, TATA McGraw Hill Edition, Fourth edition, 26th reprint 2015.

REFERENCE BOOKS:

1. UNIX and SHELL Programming, Richard F Gilberg and Behrouz A Forouzan,Cengage Learning, 15th impression, 2015.

CIE - Continuous Internal Evaluation: Theory (50 marks)

Bloom's Taxonomy	**Tests**	**Assignments**	**Quizzes**	**Co-Curricular Activities**
Marks (Out of 50)	**25**	**10**	**5**	**10**
Remember	-	-	-	-
Understand	5	5	5	-
Apply	5	-	-	5
Analyze	5	5	-	-
Evaluate	10	-	-	5
Create	-	-	--	-

CIE - Continuous Internal Evaluation: Lab (25 marks)

Bloom's Taxonomy	**Lab**
Marks (Out of 25)	
Remember	-
Understand	-
Apply	15
Analyze	-
Evaluate	10
Create	-

SEE – Semester End Examination: Theory (50 Marks)

Bloom's Taxonomy	**Tests**
Remember	-
Understand	10
Apply	10
Analyze	10
Evaluate	20
Create	-

SEE – Semester End Examination: Lab (25 Marks)

Bloom's Taxonomy	**Lab**
Marks (Out of 25)	
Remember	-
Understand	-
Apply	15
Analyze	-
Evaluate	10
Create	-

MINI PROJECT

Course Code : ISE36	**Credits: 02**
L:P:T:S : 0:2:0:0	**CIE Marks: 25**
Exam Hours : 03	**SEE Marks: 25**

The student shall be capable of identifying a problem related to the field of Computer Science and carry out a mini project on the problem defined. Each student is expected to do the mini project individually. The code developed towards the project will be reviewed by a panel of experts during the course of the semester. Plagiarized projects will automatically get an **"F" GRADE** and the student will be liable for further disciplinary action. At the completion of a project the student will submit a project report, which will be evaluated by duly appointed examiner(s).

Sample Mini project includes:

1) Tic-Tac-Toe Game
2) Quiz Game
3) Library Management
4) Telecom Billing Management system
5) Numerical Method Applications

CIE - Continuous Internal Evaluation (25 Marks)

Bloom's Taxonomy	**Mini Project**
Marks (Out of 25)	**-**
Remember	-
Understand	-
Apply	-
Analyze	-
Evaluate	25
Create	-

SEE – Semester End Examination (25 marks)

Bloom's Taxonomy	**Mini Project**
Remember	**-**
Understand	-
Apply	-
Analyze	-
Evaluate	25
Create	-

FOURTH SEMESTER

(SYLLABUS)

ENGINEERING MATHEMATICS – IV
(Common to All Branches)

Course Code: MAT41 **Credits. : 05**
L: P: T: S : 4:0:1:0 **CIE Marks : 50**
Exam Hours: 03 **SEE Marks : 50**

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Solve initial value problems using appropriate numerical methods.
CO2	Understand the concepts of Complex variables and transformation for solving Engineering Problems.
CO3	Understand the concepts of complex integration, Poles and Residuals in the stability analysis of engineering problems.
CO4	Gain ability to use probability distributions to analyze and solve real time problems.
CO5	Apply the stochastic process and Markov Chain in prediction of future events.
CO6	Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous probability and statistical methods.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	1	1	-	1
CO2	3	2	3	2	2	-	-	-	1	1	-	1
CO3	3	2	3	2	2	-	-	-	1	1	-	1
CO4	3	2	3	2	2	-	-	-	1	1	-	1
CO5	3	2	3	2	2	-	-	-	1	1	-	1
CO6	3	2	3	2	2	-	-	-	1	1	-	1

Module No.	Module Contents	Hours	COs
1	**Numerical Methods:** Numerical solution of ordinary differential equations of first order and of first degree: single step methods- Picard's Method, Taylor's series method, modified Euler's metho and Runge-Kutta method of fourth-order. Multi step methods- Milne's and Adams- Bashforth predictor and corrector methods. Numerical solution of simultaneous first order differential equations ; Picard's Method and Runge-Kutta Method of fourth-order(no derivation of formulae)	9	CO1
2	**Complex Variables**: Functions of complex Variables, Analytical functions, Cauchy's Riemann Equations in Cartesian and Polar forms, Harmonic functions and Construction of analytic functions Discussion of Transformations: $w = z^2$, $w = e^z$ and $w = z + (1 / z)$ and Bilinear Transformations.	9	CO2

3	**Complex Integrations:** Complex line integrals – Cauchy's theorem and Cauchy's Integral formula. Power Series, Laurent's series. Singularities, Poles and Residuals, Residual Theorem-problems (Without proof).	9	CO3
4	**Probability distributions:** Random variables (discrete and continuous), probability density function, cumulative density function. Discrete Probability distributions: Binomial and Poisson distributions. Continuous Probability distributions; Exponential and normal distributions. **Joint Probability distributions:**, Mathematical expectation, correlation, covariance (discrete random variables only).	9	CO4
5	**Sampling Theory:** Sampling, Sampling distributions, standard error, test of hypothesis for means and proportions, confidence limits for means, student's t-distribution, Chi-square distribution for test of goodness of fit. **Stochastic Processes:** Stochastic processes, Probability Vectors, Stochastic matrix, Regular stochastic matrix, Markov chains, Higher transition probabilities, Stationary distribution of regularMarkov chains and absorbing states	9	CO5, CO6

TEXT BOOKS:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley-India publishers, 10th edition,2014.
2. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers, 43nd edition, 2014.

REFERENCE BOOKS:

1. Advanced Modern Engineering Mathematics, Glyn James,PearsonEducation, 4th edition, 2015.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, Jones and Barlett Publishers Inc, 4th edition, 2015,
3.Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publications, 4th edition, 2005.
4. Engineering Mathematics, Anthony Craft,Pearson Education, 4th edition, 2013.

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category Marks (Out of 50)	Tests (25 Marks)	Assignments (10 Marks)	Quizzes (5 Marks)	Co-curricular Activities
Remember	5	3	-	-
Understand	5	5	5	-
Apply	5	2	-	5
Analyze	5	-	-	-
Evaluate	5	-	-	5
Create	-	-	-	-

SEE- Semester End Examination (50 Marks)

Bloom's Category Marks (Out of 50)	Test (50 Marks)
Remember	10
Understand	10
Apply	20
Analyze	5
Evaluate	5
Create	-

OBJECT ORIENTED PROGRAMMING WITH C++

Course Code	**: ISE43**	**Credits**	**: 05**
L:P:T:S.	**: 3:2:0:0**	**CIE Marks**	**: 50+25**
Exam Hours	**: 3+3**	**SEE Marks**	**: 50+25**

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Apply an object oriented approachto programming and identify potential benefitsof object-oriented programming over otherapproaches.
CO2	Understand concepts of classes and objects and their significance in real world
CO3	Implement overloading concepts of function and operators
CO4	Implementing inheritance, polymorphism and object relationship in C++
CO5	Reuse the code and be able to design applications which are easier to debug, maintain and extend
CO6	Apply exception handling and gain efficient debugging skills

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	-	-	-	3	-	-	-	-	-	-	-	2
CO2	3	3	3	-	-	-	1	-	-	-	-	2
CO3	-	3	3	-	-	-	1	-	-	1	-	2
CO4	3	3	3	-	-	-	-	-	-	-	-	2
CO5	-	-	3	-	-	-	-	-	-	-	-	2
CO6	-	-	-	-	3	-	-	-	-	-	-	-

Module No.	**Module Contents**	**Hours**	**COs**
1	**Introduction to Object-Oriented Programming:** Evolution of programming methodologies, Procedural Approach V/s Object-OrientedApproach. Principles of OOP: Encapsulation and Abstraction, Message Passing, Inheritance –Reusability, Extensibility, Polymorphism – Overloading, , DynamicBinding **Comparison of C and C++:** Limitations of C, Introduction to C++, Structure of the C++ program, Added features ofC++ over C – Storage Classes, Reference variables, Inline functions. Data types – control structures – Arrays and Strings – User defined types – Functions and Pointers. **Review of Basic Language Constructs**: Data types – control structures – Arrays and Strings – User defined types – Functions and Pointers	9	CO1
	List ofExperiments 1. 1. Write a C++ program to find the largest of three numbers using inline function. 2. 2. Write a C++ program to sort an array of integer in ascending order using a function called exchange() which accepts two	8	

	integer arguments by reference. 3. 3. Write a C++ program to demonstrate the static and non-static variable usage defining them within a function		
2	**Introduction to Objects and Classes**Defining the class, Defining Data members and member functions, Creating Objects ofClass, Access Specifiers. Scope Resolution Operator, Friend Functions and Friend Classes, StaticMembers, this pointer, returning valuesusing this pointer. Comparison of class with structure. **Constructors and Destructors** Purpose of Constructors and Destructors, Default Constructors, Constructors with &without parameters, Constructor Overloading, Copy Constructor. Invoking Constructorsand Destructors. **Pointers in C++**Pointer declaration and Access, pointer and arrays, pointer to functions, memory management – new and delete.	9	CO2
	List of Experiments 1. Design, develop, and execute a program in C++ based on the following requirements: An EMPLOYEE class is to contain the following data members and member functions: Data members: Employee_Number (an integer), Employee_Name (astring of characters), Basic_Salary (an integer),All_Allowances(an integer), IT (an integer), Net_Salary (an integer). Member functions: to read the data of an employee, to calculate Net_Salary and to print the values of all the data members. (All_Allowances = 123% of Basic; Income Tax (IT) = 30% of the gross salary (= basic_Salary _ All_Allowance); Net_Salary =Basic_Salary + All_Allowances – IT) 2. Write a C++ program to perform matrix addition using static variable, default argument and friend function. 3. Write a C++ program for matrix manipulation with dynamic memory allocation using copy constructor and overloading of assignment operator 4. Create a class 'COMPLEX' to hold a complex number. Write a friend function to add two complex numbers. Write a main function to add two COMPLEX objects	12	
3	**Polymorphism** Overloading Concepts Function Overloading: Functions with different sets of parameters,default and constant parameters. Operator Overloading: Rules for overloading Operators. Overloading unary operators, overloading binaryoperators, Overloading Comma, [], (), ->, new, delete Operators. Type Conversions	9	CO3
	List of related Experiments 1. Write a C++ program to implement function overloading in order to compute power(m,n) where i) m is double and n is int ii) m and n are int. 2. Create a 'STRING' class which overloads ' = = ' operator to compare two STRING objects 3. write a C++ program to overload new and delete operators	8	

4	**Inheritance** Basic Concepts, Reusability & Extensibility. Defining derived classes, protected access specifier in Base class – public, private & protected inheritance – constructors and destructors in derived classes – Types of Inheritances. Virtual base class. **Virtual Functions** Normal member functions accessed with pointers, virtual member function access, latebinding, pure virtual function, abstract classes	9	CO4, CO5
	List of Experiments 1. Create a 'MATRIX' class of size m X n. Overload the '+' operator to add two MATRIX objects 2. Derive a class 'MAT' from MATRIX class created in the above program. Add a member function to overload '*' operator to multiply two objects. (Single Inheritance)	4	
5	**Templates** Generic Functions- A generic swap function, Functions with more than one Generic Type, Overloading a Function Template. Generic Classes – A stack generic class, Class template with more than one Generic Type, typename and template keywords, Template Restrictions, The power of Templates. **Exception Handling** Fundamentals of Exception Handling, Catching Class Types, Using Multiple catch statements, Catching All Exception, Restricting Exception, throw statement, Setting the Terminate and Unexpected Handlers, Uncaught exception, bad exception Classes, andBuilt-In Exceptions. Exception Vs Error Handling, Assertion in C++	9	CO6
	List of Experiments 1. Write a C++ program for bubble sort using template. 2. Define a function template for finding the minimum valuecontained in an array. Write main( ) function to find theminimum value of integer array and minimum value of floating point numbers in an array	8	

TEXT BOOKS:

1. C++ How to Program, Paul Deitel, Harvey Deitel,Pearson Education Limited , 9th Edition, 2016.
2. Object Oriented Programming with C++, E Balagurusamy, , TMH, 6th Edition, 2013

REFERENCE BOOKS:

1. C++ Primer Plus, Stephen Prata,Pearson Education Limited, 6th Edition, 2015.
2. C++ PROGRAMMING Today, Barbara Johnston, Pearson Education, 2nd Edition, 2015.

CIE- Continuous Internal Evaluation: Theory (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes	Co-curricular Activities
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5	-		-
Understand	5	5	-	-
Apply	5	-	5	5
Analyze	5	5	-	-
Evaluate	-	-	-	5
Create	5	-	-	-

CIE- Continuous Internal Evaluation: Lab (25 Marks)

Bloom's Category	Lab
Marks (out of 25)	
Remember	-
Understand	-
Apply	-
Analyze	-
Evaluate	25
Create	-

SEE- Semester End Examination: Theory (50 Marks)

Blooms Category	Tests
Marks (out of 50)	
Remember	10
Understand	10
Apply	20
Analyze	5
Evaluate	-
Create	5

SEE- Semester End Examination: Lab (25 Marks)

Blooms Category	Tests
Marks (out of 25)	
Remember	-
Understand	-
Apply	15
Analyze	-
Evaluate	10
Create	-

MICROPROCESSOR

Course Code : ISE44 **Credits : 05**
L:P:T:S : 3:2:0:0 **CIEMarks : 50+25**
Exam Hours : 3+3 **SEE Marks : 50+25**

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Understand the architecture and organization of 8086
CO2	Learn and use various instructions of 8086
CO3	Analyze and write assembly level programs
CO4	Understand the operation modes, memory and I/O address decoding concepts of 8086
CO5	Interface hardware devices to 8086
CO6	Understand and differentiate the coprocessor and advance microprocessors working with respect to 8086

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	2	-	-	1	-	-	-	-	1
CO2	3	2	3	2	2	-	-	-	-	-	-	1
CO3	-	2	3	2	2	-	-	-	1	1	-	1
CO4	3	-	3	-	-	-	-	-	-	-	-	-
CO5	3	2	3	2	-	-	-	-	-	-	-	1
CO6	3	-	3	-	-	-	1	-	-	1	-	1

Module No.	**Module Contents**	**Hours**	**COs**
1	**8086 architecture**: Evolution of Microprocessor, Internal architecture of 8086; Programming Model, Real mode memory addressing, Addressing modes, Data transfer instructions, Arithmetic instructions	9	CO1
	List of experiments 1) Program to perform 32 bit addition, multiplication and division operations. 2) Program to sort a given array of N elements is ascending / descending order using bubble and insertion sort 3) Program to check a given string is palindrome or not 4) Program to implement digital clock.	8	
2	**8086 Instruction set**: Assembler directives, Logical instructions, Program control instructions, String Manipulation instructions, Miscellaneous instructions, and programs, Introduction to interrupts	9	CO2, CO3
	List of experiments 1) Program to validate an entered string. 2) Program to perform concatenation of two given strings. **3)** Program to generate Fibonacci series of N numbers.	8	

	4) Program to compute factorial and ${}^{n}C_{r}$ using recursion.		
3	**Hardware Specification**: Pin Configuration, Clock Generator, Timing diagrams, 8288 Bus, Interrupts, Physical memory, Types of memory, Memory decoding	9	CO4
	List of experiments 1) Program to read and set system time. 2) Program to read current date and set the date. 3) Program to perform file operations such as open, close, create, delete and rename a file. 4) Program to link modules present in different files.	8	
4	**Interfacing** : Basic I/O interfacing, I/O address decoding, 8255 programmable peripheral interface, bus protocols like PCI, serial com, USB	9	CO4, CO5
	List of experiments 1) Program to implement addition and multiplication on logic controller interface. 2) Program to rotate stepper motor clockwise N times and rotate anti clock wide N times. 3) Program to generate sine, full rectifier and square waveforms using DAC. 4) Program to display a given message (max of 8 characters) on seven segment display from left to right and right to left N number of times.	8	
5	**Coprocessor and advance microprocessors**: 8087 architecture, instruction set, programming with 8087, comparison of 8086 with advance microprocessors like 80386,80486, Pentium processors, Core-2 etc.	9	CO3, CO6
	List of experiments 1) Program to perform floating point addition and Subtraction. 2) Program to find square and cube of a floating point number. 3) Program to interface 4*4 HEX keypad. 4) Program to implement elevator.	8	

TEXT BOOKS:

1. The Intel Microprocessor: Architecture, Programming & Interfacing, Barry B. Brey, Pearson Education India, 8th edition, 2014,
2. Microcomputer Systems: 8086/8088 - Family Architecture, Programming and Design,Chen Liu and Glenn A Gibson, Prentice Hall India, 2nd Edition, 2014.

REFERENCE BOOKS:

1. Microprocessors and Interfacing, Douglas V. Hall, , TMH, Revised 2nd Edition, 2006.
2. The Intel Microprocessor Family: Hardware and Software Principles and Applications,James L. Antonakos,Cengage Learning, 2007.
3. Advanced Microprocessors, Daniel Tabak,, TMH, 2nd Edition, 2011

CIE- Continuous Internal Evaluation:Theory (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes	Co-curricular Activities
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5	-	-	-
Understand	10	5	-	5
Apply	10	5	5	-
Analyze	-	-	-	-
Evaluate	-	-	-	5
Create	-	-	-	-

CIE- Continuous Internal Evaluation: Lab (25 Marks)

Bloom's Category	Lab
Marks (out of 25)	
Remember	-
Understand	-
Apply	15
Analyze	10
Evaluate	-
Create	-

SEE- Semester End Examination: Theory (50 Marks)

Bloom's Category	Theory
Marks (out of 50)	
Remember	10
Understand	20
Apply	10
Analyze	10
Evaluate	-
Create	-

SEE- Semester End Examination: Lab (25 Marks)

Bloom's Category	Lab
Marks (out of 25)	
Remember	-
Understand	05
Apply	15
Analyze	05
Evaluate	-
Create	-

COMPUTER ORGANIZATION

Course Code	**: ISE45**	**Credits**	**: 04**
L: P: T: S	**: 4:0:0:0**	**CIE Marks**	**: 50**
Exam Hours	**: 3**	**SEE Marks**	**: 50**

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Gain the Technical knowledge of how computers are constructed out of a set of functional units and how the functional units operate, interact, and communicate.
CO2	Understand the merits and pitfalls in computer performance measurements.
CO3	Understand the memory hierarchy and its impact on computer cost/ performance
CO4	Gain the Technical knowledge on representation of data at the machine level and how computations are performed at the machine level.
CO5	Be familiar with internal structure of a processor and how the control signals are generated in sequence.
CO6	Be familiar with various ways in which input, output operations are performed.

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	-	1	1	-	-	-	-	-	-	3
CO2	3	3	2	1	-	-	-	-	-	-	-	3
CO3	3	3	2	1	1	1	-	-	-	-	2	3
CO4	3	3	2	1	1	-	-	-	-	-	-	3
CO5	3	3	2	1	1	-	1	-	-	-	-	3
CO6	3	3	2	1	1	-	-	1	-	-	2	3

Module No.	**Module Contents**	**Hours**	**COs**
1	Introduction: Functional units , Basic operational concepts, Number representation and arithmetic operations and characters, Memory locations and addresses, Memory operations, Instructions and Instruction sequence, Addressing modes, Stacks, Subroutines	9	CO1, CO2
2	Input/Output Organization: Bus structure, Bus operation, Arbitration, Accessing I/O devices, Interrupts	9	CO6
3	Computer Arithmetic: Addition subtraction of signed numbers, Design of fast adders, Multiplication of unsigned and signed numbers, Fast multiplication, Integer Division, Floating point numbers and operations	9	CO4

4	Computer Memory System: Characteristics of Memory System, The Memory hierarchy, Elements of cache design: Cache addresses, Cache size, Mapping function, Performance considerations – Hit-ratio and Miss penalty – Caches on the processor chip, Semiconductor main memory: Organization, DRAM and SRAM, types of ROM	9	CO2, CO3
5	Basic Processing Unit: Fundamental concepts, Instruction execution, Hardware components, Instruction fetch and execution steps, control signals, hardwired control, CISC style processors	9	CO5

TEXT BOOKS:

1. Computer Organization and Embedded Systems , Carl Hamacher, Zvonks Vranesic, Safea Zaky, McGraw Hill, Sixth Edition, 2012.
2. Computer Organization and Architecture, William Stallings, Pearson/PHI, Eighth edition, 2013.

REFERENCE BOOKS:

1. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Elsevier, Fifth Edition, 2012.
2. Structured Computer Organization, Andrew S. Tanenbaum, PHI/Pearson, Sixth Edition 2013.
3. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication, 2013.
4.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes	Co-Curricular
Marks (out of 50)	**25**	**10**	**5**	**10**
Remember	5	-	-	-
Understand	10	-	-	-
Apply	10	10	-	5
Analyze	-	-	5	-
Evaluate	-	-	-	5
Create	-	-	-	-

SEE- Semester End Examination (50 Marks)

Bloom's Category	Tests
Remember	10
Understand	20
Apply	10
Analyze	10
Evaluate	-
Create	-

MINI PROJECT

Course Code : ISE46 **Credits : 02**
L:P:T:S : 0:2:0:0 **CIE Marks: 25**
Exam Hours : 03 **SEE Marks: 25**

The student shall be capable of identifying a problem related to the field of Computer Science and carry out a mini project on the problem defined. Each student is expected to do the mini project individually. The code developed towards the project will be reviewed by a panel of experts during the course of the semester. Plagiarized projects will automatically get an **"F" GRADE** and the student will be liable for further disciplinary action. At the completion of a project the student will submit a project report, which will be evaluated by duly appointed examiner(s).

CIE- Continuous Internal Evaluation (25 Marks)

Bloom's Category	**Mini Project**
Marks (out of 25)	
Remember	-
Understand	-
Apply	-
Analyze	-
Evaluate	25
Create	-

SEE- Semester End Examination (25 Marks)

Blooms Category	**Tests**
Marks (out of 25)	
Remember	-
Understand	-
Apply	15
Analyze	-
Evaluate	10
Create	-

ECONOMICS FOR ENGINEERS

Course Code	**: HSS321/421**	**Credits**	**: 03**
L:P:T:S	**: 2:0:0:1**	**CIE Marks**	**: 50**
Exam Hour	**: 03**	**SEE Marks**	**: 50**

Course Outcomes: On completion of the course, the student will be able to:

CO1	Gain knowledge about importance of economics in decision making processes in day to day life.
CO2	Analyze business environment at micro and macroeconomic level and its impact on industries in country's economy.
CO3	Acquire knowledge about costing and estimation of projects for profit making.
CO4	Apply principles of budgeting and finance for entrepreneurial success.

COS	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	2	1	-	1	-	1	2	2	-	2	2
CO2	2	2	1	-	1	-	1	2	2	-	2	2
CO3	2	2	1	-	1	-	1	2	2	-	2	2
CO4	2	2	1	-	1	-	1	2	2	-	2	2

Module	**Contents of Module**	**Hours**	**COs**
I	**Introduction to Economics**: Role of Engineer as an Economist, Types and problem of economies, Basics of economics (GDP, National income, inflation, business cycle, fiscal and monetary policies, balance of payment).	**4**	**CO1, CO3**
II	**Basic concepts of Microeconomics**: concept of Demand & Elasticity of Demand. Concept of Supply & Elasticity of Supply, Meaning of Production and factors of production, Production Possibility Curve, Law of variable proportions and returns to scale. Relevance of Depreciation towards industry, Depreciation computing methods.	**5**	**CO2, CO3**
III	**Concepts of cost of production**: different types of cost; accounting cost, sunk cost, marginal cost and opportunity cost. Break even analysis, Make or Buy decision. Cost estimation, Elements of cost as Direct Material Costs, Direct Labor Costs, Fixed Over-Heads, Factory cost, Administrative Over-Heads.	**4**	**CO3, CO4**
IV	**Capital budgeting**: Traditional and modern methods, Payback period method, IRR, ARR, NPV, PI. . Interest and Interest factors: Interest rate, Simple interest, Compound	**4**	**CO1, CO3, CO4**

	interest, Cash - flow diagrams, Personal loansand EMI Payment. Present worth, Future worth.		
V	**Book Keeping and Accounts**: Journal, Ledger, Trial balance, asset Types, profit & loss account, balance sheet.	**5**	**CO1, CO2, CO3, CO4**

TEXT BOOKS:

1. Riggs J.L, Engineering Economy, TMH, 2012 edition
2. Jain T.R., Economics for Engineers, VK Publications
3. IM PANDEY,Finacial Management, Vikas Pub. House
4. D N Dwivedi, Mangerial Economics , Vikas Pub. House

REFERENCE BOOKS:

1.Thuesen H.G, Engineering Economy. PHI
2. Prasanna Chandra, Financial Mangement,TMH
3. Singh Seema, Economics for Engineers, IK International
4. Chopra P. N, Principle of Economics, Kalyani Publishers
5. Dewett K K, Modern Economic Theory, S. Chand
6. H. L. Ahuja, Modern Economic Theory, S. Chand
7. Mishra S. K, Modern Micro Economics, Pragathi Publications
8. Gupta Shasi K, Management Accounting, Kalyani Publications

Assessment pattern

CIE –Continuous Internal Evaluation(50 Marks, Theory)

Bloom's category	**Test**	**Assignments**	**SSR**
Marks (out of 50)	**20**	**15**	**15**
Remember	5	-	-
Understand	5	-	-
Apply	5	-	-
Analyze	5	5	5
Evaluate	-	5	5
Create		5	5

SEE –Semester Ending Examination (50 Marks)

Bloom's category	**Test**
Remember	20
Understand	10
Apply	10
Analyze	10
Evaluate	-
Create	-

LIFE SKILLS FOR ENGINEERS

Course Code : HSS322/HSS422	**Credits : 3**
L:P:T:S : 2:0:0:1	**CIE Marks : 50**
Exam Hours : 03	**SEE Marks : 50**

Course Outcomes: At the end of the course, the students will be able to:

CO1	Take responsibility for their actions and be accountable to themselves
CO2	Acquire Corporate etiquettes and develop their personality for their professional career
CO3	Understand and learn to manage themselves better and to work with groups
CO4	Set their personal and professional goals by themselves
CO5	Articulate effectively their ideas, thoughts and concepts

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PO12
CO1	-	-	-	-	-	3	3	3	3	3	-	-
CO2	-	-	-	-	-	3	3	3	3	3	-	-
CO3	-	-	-	-	-	3	3	3	3	3	-	-
CO4	-	-	-	-	-	3	3	3	3	3	-	-
CO5	-	-	-	-	-	3	3	3	3	3	-	-

Module	Contents of the Module	Hours	COs
1.	Taking Ownership, Being Responsible and Accountable for their own actions The meaning of ownership, responsibility and accountability, Practicing these philosophies in everyday life, how do these philosophies build credibility, Developing a 'Credible Character Impression about yourself', Self motivation, Developing healthy Self esteem, Leadership	**4**	**CO1**
2.	**Personality Development and Grooming** Expectations from the industry, building personal presence, corporate grooming, corporate etiquettes, developing personal work code,	**10**	**CO2**

	corporate code of conduct		
3.	**Self Awareness and Self Management** Knowing your own self- understanding personality, perception, values and attitude. Interpersonal skills - Knowing others, working well with others, developing the right attitude for work, being proactive and positive.	**10**	**CO3**
4.	**GOAL Setting** Importance of Goals, Creating SMART goals , Tips for effective execution of goals	**4**	**CO4**
5.	**Articulation and Group Discussion** Ideas generation, expressing thoughts in a logical flow, presenting views in a group	**8**	**CO 5**

Reference Books:

1. The 7 – Habits of Highly Effective People, Stephen R Covey, Neha Publishers.

2. Seven Habits of Highly Effective Teens, Convey Sean, New York, Fireside Publishers, 1998.

3. Emotional Intelligence, Daniel Coleman, Bantam Book, 2006.

4. How to win friends and influence people, Dale Carnegie

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Test**	**Self Study**	**Quiz**	**Assignment**
Remember	-	-	5	-
Understand	-	-	-	5
Apply	5	-	5	5
Analyze	5	-	-	-
Evaluate	-	-	-	-
Create	-	15	-	5

SEE- Semester End Examination (50 Marks)

Blooms' Category	**GROUP DISCUSSION**
Remember	5
Understand	10
Apply	10
Analyse	10
Evaluate	5
Create	10

BASIC ENGINEERING MATHEMATICS-I

Course Code : DMAT31
L:P:T:S : 0:0:0:0
Exam Hours : 02

Credits : 00
CIE Marks : 25
SEE Marks : 25

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Learn the principles of engineering mathematics through calculus
CO2	Determine the power series expansion of a function
CO3	Find the definite integrals with standard limits
CO4	Develop the ability to construct mathematical models involving differential equations
CO5	Apply ideas from linear algebra in solving systems of linear equations
CO6	Determine Eigen values and Eigen vectors of a matrix

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	1	1	-	1
CO2	3	2	3	2	2	-	-	-	1	1	-	1
CO3	3	2	3	2	2	-	-	-	1	1	-	1
CO4	3	2	3	2	2	-	-	-	1	1	-	1
CO5	3	2	3	2	2	-	-	-	1	1	-	1
CO6	3	2	3	2	2	-	-	-	1	1	-	1

Course Syllabus

Module No.	Contents of the Module	Hours	CO'S
1	**Differential Calculus:** Polar curves-Problems on angle between the radius vector and tangent, Angle between two curves-Problems, Pedal equation for polar curves-Problems. Taylor's and Macluren's theorems for function of one variable (statement only)-Problems.	**5**	**CO1, CO2**
2	**Partial differentiation:** Definition and Simple problems, Euler's theorem for Homogeneous function (NO Derivation & NO extended theorem)-Problems, Partial differentiation of composite functions (chain rule)-Problems, Jacobians - definition and problems.	**5**	**CO1, CO2**
3	**Integral Calculus:** Problems on reduction formulae for functions $\sin x$, $\cos^n x$, $\sin^n x \cos^n x$, Problems on evaluation of these integrals with standard limits (0 to $\pi/2$). **Differential Equations:** Solution of first order and first degree differential equations-Variable separable, Linear Bernoulli's and Exact differential equations.	**5**	**CO3, CO4**

4	**Linear Algebra-1:** Problems on rank of a matrix by elementary transformations, consistency of a system of linear equations and solution (homogeneous and non-homogeneous)-Problems. Solution of system of linear equations by Gauss elimination method-Problems.	**5**	**CO5**
5	**Linear Algebra-2:** Linear transformation, Eigen values and Eigen vectors, diagonalisation of a square matrix, Quadratic forms, Reduction to canonical form by orthogonal transformation-Problem	**5**	**CO6**

Text Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 10^{tH} edition, 2014, Wiley-India Publishers.
2. Higher Engineering Mathematics, B.S.Grewal, 43nd edition, 2014, Khanna Publishers .

Reference Books:

1. Modern Engineering Mathematics, Glyn James, 4th edition, 2015, Pearson Education.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, 4th edition, 2015, Jones and Barlett Publishers Inc.
3. Engineering Mathematics, B. V. Ramana, 4th edition, 2005, Tata McGraw Hill Publications.

Assessment Pattern:

CIE- Continuous Internal Evaluation (25 Marks).

Bloom's Category	Tests (20 Marks)	Assignments (5 Marks)
Remember	5	--
Understand	5	5
Apply	5	--
Analyze	2.5	--
Evaluate	2.5	--
Create	--	--

SEE- Semester End Examination (50 Marks)

Bloom's Category	Questions (50 Marks)
Remember	10
Understand	20
Apply	10
Analyze	5
Evaluate	5
Create	--

BASIC ENGINEERING MATHEMATICS-II

Course Code: DMAT41
L:P:T:S : 0:0:0:0
Exam Hours : 02

Credits : 00
CIE Marks : 25
SEE Marks : 25

Course Outcomes: At the end of the Course, the Student will be able to do the following:

CO1	Gain knowledge of basic operations of vectors
CO2	Use curl and divergence of a vector function in three dimensions
CO3	Understand ordinary differential equations and their application.
CO4	Understand basic concepts of Laplace transform to solve engineering problems
CO5	Solve the Laplace transform of Periodic and step functions
CO6	Solve initial and boundary value problems using Laplace transform method.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	1	3	-	1
CO2	3	2	3	2	2	-	-	-	1	3	-	1
CO3	3	2	3	2	2	-	-	-	1	3	-	1
CO4	3	2	3	2	2	-	-	-	1	3	-	1
CO5	3	2	3	2	2	-	-	-	1	3	-	1
CO6	3	2	3	2	2	-	-	-	1	3	-	1

Syllabus			
Module No.	**Contents of the Module**	**Hours**	**CO's**
1	**Vectors:** Definition of scalar and vector, Vector addition , Subtraction and multiplication-dot product, cross product, scalar triple product and vector triple product .Orthogonal ,co-planar and angle between vectors.	**5**	**CO1**
2	**Vector Differentiation:** Velocity and accelerations,Vector differential operator-Gradient of a scalar function, Divergence of a vector function, Cu of a vector function, problems and Vector Identities.	**5**	**CO2**
3	**Linear differential equations with constant coefficients:** Solutions of second and higher order differential equations - inverse differential operator method.	**5**	**CO3**
4	**Laplace Transform:** Definition and Laplace transforms of elementary	**5**	**CO4,**

	functions. Properties of Laplace transforms (without proof) ,Periodic functions, Heaviside function – problems		**CO5**
5	**Inverse Laplace Transform:** Properties of inverse Laplace Transform, problems, solution of linear differential equations using Laplace Transforms.	**5**	**CO4, CO6**

Text Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 10^{tH} edition,2014, Wiley-India Publishers.
2. Higher Engineering Mathematics, B.S.Grewal, 43nd edition, 2014, Khanna Publishers .

Reference Books:

1. Modern Engineering Mathematics, Glyn James, 4th edition, 2015, Pearson Education.
2. Advanced Engineering Mathematics, Dennis G. Zill, Michael R. Cullen, 4th edition, 2015, Jones andBarlett Publishers Inc.
3. Engineering Mathematics, B. V. Ramana, 4th edition, 2005, Tata McGraw Hill Publications.

Assessment Pattern:

CIE- Continuous Internal Evaluation (25 Marks).

Bloom's Category	Tests (20 Marks)	Assignments (5 Marks)
Remember	5	--
Understand	5	5
Apply	5	--
Analyze	2.5	--
Evaluate	2.5	--
Create	--	--

SEE- Semester End Examination (50 Marks)

Bloom's Category	Questions (50 Marks)
Remember	10
Understand	20
Apply	10
Analyze	5
Evaluate	5
Create	--

APPENDIX A

Outcome Based Education

Outcome-based education (OBE) is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience each student should have achieved the goal. There is no specified style of teaching or assessment in OBE; instead classes, opportunities, and assessments should all help students achieve the specified outcomes.

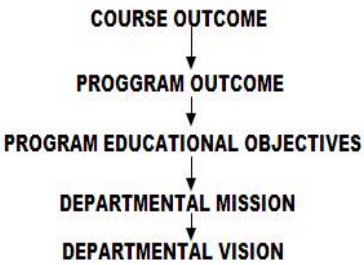
There are three educational Outcomes as defined by the National Board of Accredition:

Program Educational Objectives: The Educational objectives of an engineering degree program are the statements that describe the expected achievements of graduate in their career and also in particular what the graduates are expected to perform and achieve during the first few years after graduation. [nbaindia.org]

Program Outcomes: What the student would demonstrate upon graduation. Graduate attributes are separately listed in Appendix C

Course Outcome: The specific outcome/s of each course/subject that is a part of the program curriculum. Each subject/course is expected to have a set of Course Outcomes

Mapping of Outcomes



APPENDIX B

The Graduate Attributes of NBA

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.

Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: The problems that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions that require consideration of appropriate constraints/requirements not explicitly given in the problem statement (like: cost, power requirement, durability, product life, etc.) which need to be defined (modeled) within appropriate mathematical framework that often require use of modern computational concepts and tools.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

APPENDIX C

BLOOM'S TAXONOMY

Bloom's taxonomy is a classification system used to define and distinguish different levels of human cognition—i.e., thinking, learning, and understanding. Educators have typically used Bloom's taxonomy to inform or guide the development of assessments (tests and other evaluations of student learning), curriculum (units, lessons, projects, and other learning activities), and instructional methods such as questioning strategies.