



NEW HORIZON
COLLEGE OF ENGINEERING

New Horizon Knowledge Park, Ring Road, Marathalli
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade. Accredited by NBA

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

SCHEME AND SYLLABUS

BATCH: 2015-19

CREDITS: 200



NEW HORIZON COLLEGE OF ENGINEERING



Permanently affiliated to VTU, approved by AICTE & ISO 9001:2008 certified
The Trust is a Recipient of Prestigious Rajyotsava State Award 2012 Conferred by the Government of Karnataka
Awarded Outstanding Technical Education Institute in Karnataka-2014
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(An Autonomous Institution Affiliated to VTU)

Accredited by NAAC with 'A' Grade

Department of Information Science and Engineering

Academic Year 2016-17

Third and Fourth Semesters B.E

Scheme and Syllabus



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VISION

To evolve as an outstanding knowledge creation and dissemination centre at the cutting edge of Information Engineering and Technology to produce globally acceptable competent professionals in the field of research and innovations for the benefit of mankind.

MISSION

- Σ To impart quality education in Information Technology domain with leadership qualities through best-in-class faculty and infrastructure.
- Σ To excel in Research and Development that discovers new knowledge and enables emerging Information Technologies through industry collaboration.
- Σ To inculcate a culture of service towards the society and professionalism.

Program Education objectives (PEOs)

PEO1	To provide students with a sound foundation in the mathematical, scientific and information science engineering fundamentals necessary to formulate, solve and analyze real world problems.
PEO2	To promote students with the value of continuous learning to become the real professionals in ever changing and challenging world.
PEO3	To inculcate students to maintain high professionalism and ethical attitudes, effective communication skills, to work as a part of team on multi-disciplinary projects and diverse environments.
PEO4	To make students be engaged in a computing profession and utilizing professional skills to make a positive impact on society.

PEO to Mission Statement Mapping

Mission Statements	PEO1	PEO2	PEO3	PEO4
To impart quality education in Information Technology domain with leadership 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: 3- High, 2-Medium, 1-Low

Program Outcomes (PO) with Graduate Attributes

	Graduate Attributes	Program Outcomes (POs)
1	Engineering Knowledge	PO1: Apply the knowledge of mathematics, science, engineering fundamentals and computing to solve information science and engineering related problems.
2	Problem analysis	PO2: Graduates will demonstrate the ability to identify, formulate and solve engineering problems related to information Science and Engineering.
3	Design and Development of Solutions	PO3: Graduates will demonstrate the ability to design, analyze and interpret data and implement solutions for software based real life problems.
4	Investigation of Problem	PO4: 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	PO5: 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	PO6: Graduates will appraise the ethical, legal, professional and social norms of engineering practice.
7	Environment and sustainability	PO7: Graduates will have the broad education to understand the impact of engineering solution in a global, economic, environmental and societal context.
8	Ethics	PO8: Graduates to follow the professional and social ethics and positive code of conduct for human welfare.
9	Individual & team work	PO9: 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	Communication	PO10: Graduates will communicate effectively both in verbal and written form.
11	Lifelong learning	PO11: Graduates will demonstrate the ability and desire towards life-long learning for professional development. Graduates will participate and succeed in competitive examinations.
12	Project management and finance	PO12: Apply engineering and management principles to manage projects

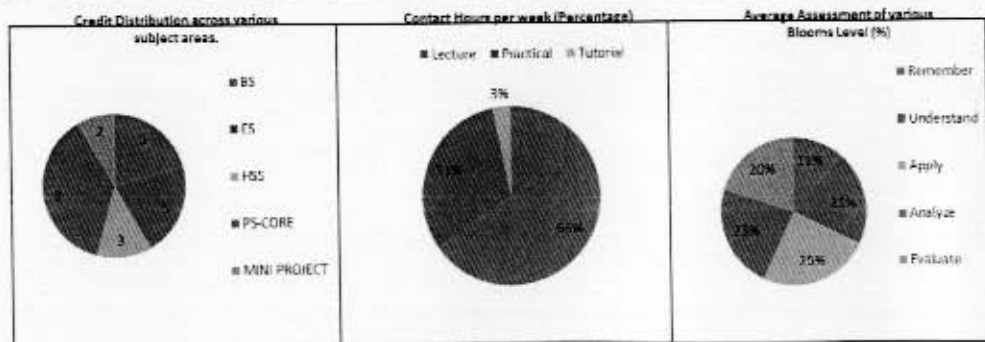
Mapping of POs TO PEOs

	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

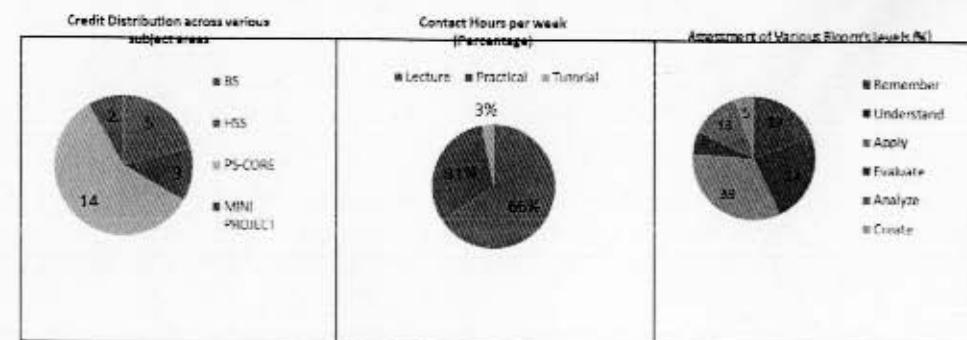
New Horizon College of Engineering
Department of Information Science and Engineering
Scheme of Third Semester B.E Program

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	16MAT31	Engineering Mathematics-III	4	0	1	0	5	6	0	50	50	100
2	16HSS321	Introduction to Economics	2	0	0	1	3	2	0	50	50	100
	16HSS322	Soft Skills for Engineers										
3	16CSE33 /16ISE33	Analog and Digital Electronics	3	2	0	0	5	5	4	75	75	150
4	16CSE34 /16ISE34	Data Structures using C	3	2	0	0	5	5	4	75	75	150
5	16CSE35 /16ISE35	UNIX & SHELL Programming	3	1	0	0	4	4	2	75	75	150
6	16CSE36 /16ISE36	Mini Project	0	2	0	0	2	0	2	25	25	50
Total							24	22	12	350	350	750



New Horizon College of Engineering
Department of Information Science and Engineering
Fourth Semester B.E Program-Scheme

Sl. No	Course Code	Course	Credit Distribution				Overall Credits	Contact Hours weekly Theory	Contact Hours weekly (Lab)	Marks		
			L	P	T	S				CIE	SEE	TO TAL
1	16MAT41	Engineering Mathematics-IV	4	0	1	0	5	6	0	50	50	100
2	16HSS421	Introduction to Economics	2	0	0	1	3	2	0	50	50	100
	16HSS422	SS for Engineers										
3	16CSE43 /16ISE43	Object Oriented Programming with C++	3	2	0	0	5	5	4	75	75	150
4	16CSE44 /16ISE44	Microprocessor	3	2	0	0	5	5	4	75	75	150
6	16CSE45 /16ISE45	Computer Organization	3	0	0	1	4	4	0	50	50	100
7	16CSE46 /16ISE46	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
(Common to All Branches)

Course Code : 16MAT31

Credits : 05

L:P:T:5 : 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	PO10	PO11	PO12
CO1	3	3	1	1	1	-	-	-	2	1	-	2
CO2	3	3	1	1	1	-	-	-	1	1	-	2
CO3	3	3	2	3	3	-	-	-	2	1	-	2
CO4	2	3	2	2	2	-	-	-	1	3	-	1
CO5	2	2	3	3	2	-	-	-	1	2	-	1
CO6	3	3	3	2	3	-	-	-	2	1	-	1

Module No	Module Contents	Hours	COs
1	Fourier series: Periodic function, Dirichlet's conditions, Fourier series of periodic functions of period $2p$ 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; Regula- 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,	9	CO5

	Newton divided difference and Lagrange's formulae for unequal intervals.		
5	Numerical Methods-2: Numerical integration - Simpson's $1/3^{\text{rd}}$ rule, Simpson's $3/8^{\text{th}}$ 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
Marks (out of 50)	30	10	10
Remember	10	3	5
Understand	5	5	5
Apply	5	2	-
Analyze	5	-	-
Evaluate	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 : 16CSE33/16ISE33

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 operation of various electronic components like diodes, transistors and to understand the working of various electronic circuits.
CO2	Simplify Boolean function using Karnaugh maps and Quine Mc-Clusky method and implement functions with combinatorial circuits.
CO3	Analyze and design modular combinatorial logic circuits
CO4	Ability to understand the Bi- stable elements like flip-flop and use its functionality to understand the sequential circuits and its applications
CO5	Use the concepts of state and state transition for the analysis and design of sequential circuits.
CO6	Learn 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	1	-	-	-	2		2		1
CO2	3	3	2	1	-	-	-	1		2		2
CO3	3	3	3	3	-	-	-	1	1	2		2
CO4	3	2	3	3	-	-	-	1		2		1
CO5	3	3	3	3	-	-	-	2	2	3		2
CO6	2	2	2	3	3	-	2	2	2	2		2

Module No	Module Contents	Hours	COs
1	Electronic devices and applications -1 Diodes, Clippers and Clamper, Transistor, Transistor Biasing, Transistor as a switch, BJT Vs FET, JFET, MOSFETs, FET applications, CMOS Device, Ideal vs practical OP-AMP, Comparator, Active Filters, Relaxation Oscillator	9	
	List of experiments 1) Design clipper and clamper using diodes. Also, demonstrate the working using simulation package. 2) Design and demonstrate Op-Amp relaxation oscillator for given frequency. Also, implement using a simulation package. 3) Implement CMOS inverter using a simulation package and verify its truth table.	8	CO1
2	Electronic devices and applications -2 Optoelectronic Devices, Photo-conductors, Photo-diodes, LED, LCD Displays, CRT, Emerging Display Technologies, Optocouplers, Barkhausen Criterion for oscillation, Types of Oscillators, Multivibrators, IC Multivibrators, Clock Waveforms, TTL Clock.	9	
	List of experiments 1) Design and implement an astable multi-vibrator circuit using 555 timer for a given frequency and duty cycle. Also implement using simulation package. 2) Design and implement Colpitt oscillator for given frequency. Also, implement Crystal oscillator using simulation package.	8	CO1
3	Combinational Logic Circuits Boolean Expressions, Karnaugh maps, Quine-McClusky method, Half adder, Full adder, Carry Look Ahead Adder, Subtractor, Multiplexers and De-multiplexers, Decoders, Encoders, Priority encoders, Parity Generator and checker, Magnitude comparators, Design of multiple output circuits using PLDs. Introduction to HDL, Verilog Implementation of Data Processing Circuits	9	CO2, CO3, CO6
	List of experiments 1) Realize the given logical expression $f(a,b,c,d)$ using 8:1 multiplexer IC. Simulate and verify its working using Verilog code.	8	

	2) Perform n bit addition / subtraction using 4 bit full adder IC. Simulate and verify its working using Verilog code.		
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 -Design of sequence generators and detectors, Verilog implementation of Flip-flops and Registers.	9	CO4, CO6
	List of experiments 1) Realize J-K, 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, Design of digital clock. Counter Design as synthesis problem, Analysis and Design of Synchronous Sequential Circuits: Models selection, State Transition Diagram, State Synthesis Table, ASM, 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 IC 7476. Simulate and verify mod 8 synchronous up or down counter using VERILOG code. 2) Design and implement an asynchronous counter using IC 7490 to count up from 0 to n ($n \leq 9$).	8	

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Halkias and Chetan D Parikh, Tata McGraw Hill, 2nd Edition, 2011.

CIE- Continuous Internal Evaluation: Theory (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes
Marks (out of 50)	30	10	10
Remember	5	-	-
Understand	10	-	5
Apply	10	-	5
Analyze	5	10	-
Evaluate	-	-	-
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	10
Apply	15
Analyze	15
Evaluate	-

Create

SEE- Semester End Examination: Lab (25Marks)

Bloom's Category	Lab
Marks (Out of 25)	
Remember	-
Understand	10
Apply	10
Analyze	05
Evaluate	-
Create	-

DATA STRUCTURES USING C

Course Code : 16CSE34/16ISE34

L:P:T:S : 3:2:0:0

Exam Hours : 3+3

Credits: 05

CIE Marks: 50+25

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	2	2	1	2	-	1	2	1	1
CO2	3	3	2	2	1	-	1	-	1	2	1	1
CO3	3	3	3	2	1	-	1	-	2	2	1	1
CO4	3	3	3	2	1	-	1	-	1	2	1	1
CO5	3	3	2	2	1	-	1	-	1	2	1	1
CO6	3	3	3	3	1	-	2	-	2	2	1	1

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	9	CO3, CO6
	Queues: Definition, Queue representation, Primitive operations on queue, array representation of queues, Circular queue, Priority queue, Double ended queue, Applications of queues. 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	9	CO1, CO3, CO6

	Applications of linked list: Josephus problem, addition of two long integers, addition of two polynomials, Linked representation of stack, Linked representation of queue.		
	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, Yedidyah Langsam & 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
Marks (Out of 50)	30	10	10
Remember	5	-	5
Understand	10	5	-
Apply	15	5	5
Analyze	-	-	-
Evaluate	-	-	-
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	
Create	

UNIX & SHELL PROGRAMMING

Course Code : 16CSE35/ISE35

Credits: 04

L:P:T:5 : 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

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	-	1	3	-	-	-	-	-	-	3	-	-
CO3	3	1	2	2	3	-	-	-	-	3	-	-
CO4	3	2	1	2	3	-	-	-	-	3	-	-
CO5	3	2	1	2	2	-	-	-	-	3	-	-
CO6	3	2	1	2	2	-	-	-	-	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	9	CO2

	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		
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, 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	9	CO2
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
Marks (Out of 50)	30	10	10
Remember	-	-	5
Understand	5	5	5
Apply	5	-	-
Analyze	10	5	-
Evaluate	10	-	-
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	-
Analyze	-
Evaluate	25
Create	-

MINI PROJECT

Course Code : 16CSE36/16ISE46
L:P:T:S : 0:2:0:0
Exam Hours : 03

Credits : 02
CIE Marks: 25
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: 16MAT41
L: P: T: 5 : 4:0:1:0
Exam Hours: 03

Credits: 05
CIE Marks: 50
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	-	-	-	2	1	-	2
CO2	3	3	3	2	2	-	-	-	1	1	-	1
CO3	3	3	2	3	2	-	-	-	2	1	-	2
CO4	3	2	2	2	3	-	-	-	1	3	-	1
CO5	2	2	3	3	2	-	-	-	1	3	-	1
CO6	3	3	3	2	3	-	-	-	2	2	-	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 method 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	9	CO1

	equations ; Picard's Method and Runge-Kutta Method of fourth order(no derivation of formulae)		
2	Complex Variables: Functions of complex Variables, Analytical functions, Cauchy's Riemann Equations in Cartesian and Polar forms, Harmonic functions and Construction of analytic function $w = z^2$, $w = e^z$ 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 regular Markov 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, 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 Category	Tests (30 Marks)	Assignments (10 Marks)	Quizzes (10 Marks)
Remember	10	3	5
Understand	5	5	5
Apply	5	2	-
Analyze	5	-	-
Evaluate	5	-	-
Create	-	-	-

SEE- Semester End Examination (50 Marks)

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

OBJECT ORIENTED PROGRAMMING WITH C++

Course Code : 16CSE43/16ISE43
L:P:T:S : 3:2:0:0
Exam Hours : 3+3

Credits : 05
CIEMarks : 50+25
SEE Marks : 50+25

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

- CO1 Apply an object oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.
- 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	3	-	-	2	-	2	-	-	3	-	3
CO2	3	1	3	3	1	-	3	-	-	-	-	3
CO3	3	2	3	2	3	-	2	-	-	2	-	2
CO4	3	2	3	2	3	-	2	-	-	2	-	2
CO5	1	2	3	-	3	-	2	-	-	2	-	2
CO6	3	1	-	2	3	-	2	-	-	2	-	3

Module No.	Module Contents	Hours	COs
1	<p>Introduction to Object-Oriented Programming: Evolution of programming methodologies, Procedural Approach V/s Object-Oriented Approach. Principles of OOP: Encapsulation and Abstraction, Message Passing, Inheritance – Reusability, Extensibility, Polymorphism – Overloading, , Dynamic Binding</p> <p>Comparison of C and C++: Limitations of C, Introduction to C++, Structure of the C++ program, Added features of C++ over C – Storage Classes, Reference variables, Inline functions.</p> <p>Data types – control structures – Arrays and Strings – User defined types – Functions and Pointers.</p> <p>Review of Basic Language Constructs: Data types – control structures – Arrays and Strings – User defined types – Functions and Pointers</p>	9	CO1

List of Experiments

1. Write a C++ program to find the largest of three numbers using inline function.
2. Write a C++ program to sort an array of integer in ascending order using a function called exchange() which accepts two integer arguments by reference.
3. Write a C++ program to demonstrate the static and non-static variable usage defining them within a function

8

Introduction to Objects and Classes Defining the class, Defining Data members and member functions, Creating Objects of Class, Access Specifiers, Scope Resolution Operator, Friend Functions and Friend Classes, Static Members, this pointer, returning values using 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 Constructors and Destructors.

9

Pointers in C++ Pointer declaration and Access, pointer and arrays, pointer to functions, memory management – new and delete.

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

CO2

12

	<p>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 binary operators, Overloading Comma, [], (), -, >, new, delete Operators. Type Conversions</p>	9	
3	<p>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</p>	8	CO3
	<p>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</p>	9	CO4, CO5
4	<p>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)</p>	4	
	<p>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, type name 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, and Built-In Exceptions. Exception Vs Error Handling, Assertion in C++</p>	9	CO6
5	<p>List of Experiments 1. Write a C++ program for bubble sort using template. 2. Define a function template for finding the minimum value</p>	8	

contained in an array. Write main() function to find the minimum value of integer array and minimum value of floating point numbers in an array

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
Marks (out of 50)	30	10	10
Remember	5	-	5
Understand	5	5	-
Apply	10	-	5
Analyze	5	5	-
Evaluate	-	-	-
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
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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 : 16CSE44/16ISE44
 L:P:T:S : 3:2:0:0
 Exam Hours : 3+3

Credits : 05
 CIE Marks : 50+25
 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	2	-	2	2	-	-	-	-	-	-	-	1
CO2	3	2	2	2	1	-	-	-	-	-	-	2
CO3	-	3	2	3	2	-	-	-	1	1	-	1
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	3	2	3	2	2	-	-	-	-	-	-	1
CO6	3	-	3	-	-	-	1	-	-	1	-	3

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 in 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. 4) Program to compute factorial and ${}^n C_r$ using recursion.	8	
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	8	

	<ol style="list-style-type: none"> 1) Program to implement addition and multiplication on logic controller interface. 2) Program to rotate stepper motor clockwise N times and rotate anti clockwise 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. 		
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
Marks (out of 50)	30	10	10
Remember	10	-	-
Understand	10	5	5
Apply	10	5	5
Analyze	-	-	-
Evaluate	-	-	-

Create	-	-	-
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CIE- Continuous Internal Evaluation: Lab (25 Marks)

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

Evaluate	-
Create	-

COMPUTER ORGANIZATION

Course Code : 16CSE45/16ISE45

Credits : 04

L: P: T: S : 3:0:0:1

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	2	-	1	2	-	-	-	-	-	-	1
CO2	3	1	3	1	2	-	-	-	-	-	-	2
CO3	2	3	2	2	1	1	-	-	-	-	-	3
CO4	3	3	3	1	1	-	-	-	-	-	-	3
CO5	3	1	2	1	2	-	1	-	-	-	-	3
CO6	3	3	2	3	1	-	-	1	-	-	-	3

Module No.	Module Contents	Hours	COs
1	Introduction: Organization and Architecture, Structure and Function of computers, Computer Components, Interconnection structures, Bus interconnection, Performance of computers, Numbers, Arithmetic operations and characters, Memory locations and addresses, CISC and RISC instruction sets, Addressing	9	CO1,CO2

	modes, Stacks, Subroutines		
2	Input/output organization: Accessing I/O devices, Interrupts, Bus structure, bus operation, Arbitration	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, replacement algorithms, Performance considerations, 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, Saeed 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.

SELF STUDY

The student shall identify an Emerging topic related to the field of Computer organization and carry out a Self-study on the problem defined. Topic should be socially relevant and research oriented ones. On the completion student will submit a report, which will be evaluated.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes	Self-Study
Marks (out of 50)	30	5	5	10
Remember	20	-	-	-
Understand	10	-	-	-
Apply	-	5	-	5
Analyze	-	-	5	5
Evaluate	-	-	-	-
Create	-	-	-	-

SEE- Semester End Examination (50 Marks)

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

MINI PROJECT

Course Code : 16CSE46/16ISE46
L:P:T:S : 0:2:0:0
Exam Hours : 03

Credits : 02
CIE Marks: 25
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).

INTRODUCTION TO ECONOMICS

Course Code : 16HSS321/16HSS421

L:P:T:S : 2:0:0:1

Exam Hours : 03

Credits : 03

CIE Marks : 50

SEE Marks : 50

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

CO1	Understand the basics of economics and different types of economics.
CO2	Understand the macro-economic environment of the business and its impact on enterprise.
CO3	Evaluate the national income by using various methods.
CO4	Examine the money and banking system of India.
CO5	Have a in depth knowledge about budget and the economy.
CO6	Analyze the balance of payments and foreign exchange markets.

Mapping of Course Outcomes to Program Outcomes:

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

Module No	Module Contents	Hours	COs
1	Introduction: Open, closed and mixed economy, central problems of an economy, Organization of economic activities: the centrally planned economy and The market economy, positive economics and Normative economics. Microeconomics: Consumer Behaviour: rationality, revealed preferences and utility, indifference curves, utility maximization, demand functions, substitution and income effects, demand elasticity- substitutes and complements.	5	CO1,
2	Introduction to Macroeconomics: Definition, Introduction to National income, circular flow of income, methods of calculating national income: value added, expenditure and income method, macroeconomic identities, goods and prices, Role of LPG and FDI, Inflation.	5	CO2, CO3
3	Money and Banking: Role of money, Transaction motive & Speculation motive, the supply of money, instruments of monetary policy and the Reserve bank of India.	4	CO4
4	Budget and the Economy: Components of the government budget: The revenue account, the capital account. measures of government deficit, Fiscal policy: changes in government expenditure, changes in	4	CO5

	taxes and debt.		
5	Open economy Macroeconomics: The balance of payments, the foreign exchange market, determination of the exchange rate, flexible exchange rates, fixed exchange rates and managed floating, trade deficits, savings and investment.	4	CO6

Text Books:

1. Modern economic theory, K KDewett, S.Chand publishing
2. Economics, Begg, D., S. Fischer and R. Dornbusch, McGraw Hill, 2014
3. Economics, Lipsey, R.G. and K.A. Chrystal, Oxford University Press, 2015
4. Principle of Economics, Chopra P. N., Kalyani Publishers.
5. Indian Economy, Agrawal AN, Wiley Eastern Ltd, New Delhi, 2012

Reference Books:

1. Introductory to Macroeconomics, Textbook for class 12th, NCERT.

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes/Presentation
Marks (out of 50)	20	15	15
Remember	10	-	-
Understand	5	-	-
Apply	5	5	-
Analyze	-	5	5
Evaluate	-	5	5
Create	-	-	5

SEE- Semester End Examination (50 Marks)

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

SOFT SKILLS FOR ENGINEERS

Course Code : 16HSS322/16HSS422
L:P:T:S : 2:0:0:1
Exam Hours : 03

Credits : 03
CIE Marks : 50
SEE Marks : 50

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

CO1	To transform as stronger individuals to handle life challenges of professional life.
CO2	To apply the concept of Personality development & Grooming in real life.
CO3	Understand the concept of self and Creativity so that they can align with their life better.
CO4	To understand the role of motivation and leadership on behavior
CO5	To enhance holistic development of personality to equip the student with employability skills.
CO6	Determine the significance of goal setting & decision making in their professional life

Mapping of Course Outcomes to Program Outcomes:

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

Module No	Module Contents	Hours	COs
1	Personality development & Grooming: Expectations from the industry & Career Planning / Reality Check; Building personal presence; Corporate grooming; Corporate etiquettes; Developing personal work code.	6	CO1
2	Self Analysis & Creativity: SWOC analysis, Who am I attributes, Importance of Self Confidence, Self Awareness, Self Management, Social Awareness, Emotional Intelligence, out of box thinking, lateral Thinking & Johari windows.	4	CO2, CO3
3	Motivation & Leadership: Basic concepts & theories, factor, types of Motivation, Good Leadership skill, Traits of a leader & Assessment of Leadership Skill.	4	CO4, CO5
4	Interpersonal Skill: Assessment of interpersonal skills, situation detail of interpersonal skill, Team Working, leading a team, and Strategies for influencing people. Understanding the relationship among motivation, leadership and team work	4	CO5
5	Goal Setting and Decision Making: Identifying goals like (short term, long term, lifetime goals), Time management, importance of work scheduling, importance and necessity of decision making.	4	CO6

Text Books:

1. Soft Skill, 2015, Career development Centre, Green Pearl Publication.

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.

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Tests	Assignments	Quizzes/Presentation
Marks (out of 50)	20	15	15
Remember	10	-	-
Understand	5	-	-
Apply	5	5	-
Analyze	-	5	5
Evaluate	-	5	5
Create	-	-	5

SEE- Semester End Examination (50 Marks)

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

APPENDIX A

Outcome Based Education

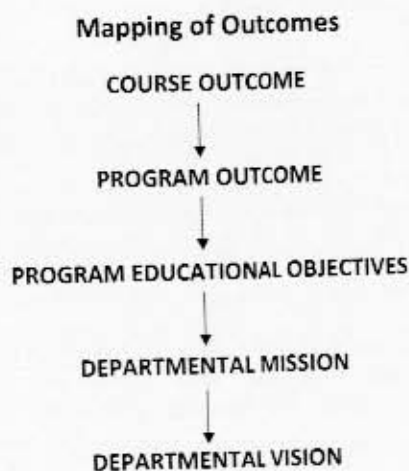
Outcome-based education (OBE) is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience each student should have achieved the goal. There is no specified style of teaching or assessment in OBE; instead classes, opportunities,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

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

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



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 modeling 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 and other evaluations of student learning, curriculum (units, lessons, projects, and other learning activities), and instructional methods such as questioning strategies. [eduglosarry.org]

