Kavayitri Bahinabai Chaudhari

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Second Year Engineering

(Computer Engineering / Information Technology)

Faculty of Science and Technology

'A' Grade
NAAC Re-Accredited
3rd Cycle

SYLLABUS STRUCTURE

Semester – III & IV

W.E.F. 2019 – 20

Syllabus Structure for Second Year Engineering (Semester – III) (Computer Engineering and Information Technology)(w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	-	4	40	60	-	-	100	4
Signals and Systems	C	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits	C	3	-	-	3	40	60	-	-	100	3
Discrete Mathematics	D	3	-	-	3	40	60	-	-	100	3
Organizational Behavior	A	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
Discrete Mathematics Lab	D	-	-	2	2			25	25 (PR)	50	1
Object Oriented Programming Lab	D	1	-	2	3	-	-	25	25 (PR)	50	2
		16	**1**	**6**	**23**	**200**	**300**	**75**	**75**	**650**	**20**

ISE: Internal Sessional Examination ESE: End Semester Examination ICA: Internal Continuous Assessment

Syllabus Structure for Second Year Engineering (Semester – IV) (Computer Engineering and Information Technology)(w.e.f. 2019 – 20)
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Digital Electronics	C	3	-	-	3	40	60	-	-	100	3
Data Structure & Algorithms	D	3	-	-	3	40	60	-	-	100	3
Computer Organization & Architecture	D	3	-	-	3	40	60	-	-	100	3
Finance & Accounting	A	3	-	-	3	40	60	-	-	100	3
Digital Electronics Lab	C	-	-	2	2	-	-	-	-	-	1
Data Structure & Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Organization & Architecture Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
IT Workshop	D	1	-	2	3	-	-	25	25 (PR)	50	2
Environmental Studies	H	-	-	-	-	-	60	40	-	-	-
Internship – I*	H	-	-	-	-	-	-	-	-	-	-
		16	**1**	**8**	**25**	**200**	**300**	**75**	**75**	**650**	**21**

ISE: Internal Sessional Examination ESE: End Semester Examination ICA: Internal Continuous Assessment

* Internship – I is a mandatory and non-credit course. It shall be during summer vacation after Semester – IV. The satisfactory completion of Internship – I should be submitted to University at the end of Semester – VIII.

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COURSE OUTLINE

Semester - III

W.E.F. 2019 – 20

MATHEMATICS-III

COURSE OUTLINE

Course Title:	MATHEMATICS-III	Short Title:	M-III	Course Code:	

Course description:

This course is aimed at introducing the fundamentals of basic Mathematics to undergraduate students. The background expected includes a prior knowledge of Mathematics from first year engineering or diploma and familiarity with various laws, principles and theories of probability and statistics. The goals of the course are to understand the basic principle of Transforms, probability, statistics and its application in Engineering Field.

	Hours/week	No. of weeks	Total hours	Semester credits
Lecture	3	14	42	4
Tutorial	1	14	14	

Prerequisite course(s):

Mathematics –I , Mathematics –II

Course objectives:

1. To familiarize the prospective engineers with techniques in Basic Transforms.
2. To introduce the solution methodologies for Fourier transform, Z-Transform and Laplace transform with applications in engineering.
3. To introduce the solution methodologies for basic and applied statistics, probability, test of significance with applications in engineering.
4. To equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course outcomes:

After successful completion of this course the students should be able to

1. Solve field problems in engineering involving Ordinary differential equations using Laplace Transform.
2. Apply concept of Fourier and Z-transform to solve field problems in engineering
3. Formulate and solve problems involving random variables.
4. Apply statistical methods for analyzing experimental data.
5. Understand basic concept statistics, probability distribution and test of significance

COURSE CONTENT

Mathematics -III		Semester:	III
Teaching Scheme:		Examination scheme	
Lectures:	3 hours/week	End semester exam (ESE):	60 marks
Tutorial:	1 hour/week	Duration of ESE:	03 hours
		Internal Sessional Exams (ISE):	40 marks

Unit–I:	No. of Lectures: 09 Hours	Marks: 12

Laplace Transform: Properties of Laplace Transform, Laplace transform of some important functions. Initial value theorem, final value theorem. Finding inverse Laplace transform by

different methods, convolution theorem, Evaluation of integrals, solving Ordinary differential equations. by Laplace transform.

Unit–II:	No. of Lectures: 08 Hours	Marks: 12

Fourier Transform:

Fourier sine and cosine integrals, Fourier sine Transform, Fourier cosine Transform, Inverse Fourier transform. Discrete Fourier Transform (DFT). Properties of DFT.

Unit–III:	No. of Lectures: 08 Hours	Marks: 12

Z – Transform:

Introduction, Definition, Region of convergence, Properties of Z-Transform, Inverse Z-Transform, Difference equation using Z-Transform.

Unit–IV:	No. of Lectures: 09 Hours	Marks: 12

Basic Probability:

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables ,Addition Law of probability, Multiplication Law of probability, Expectation of Discrete Random Variables, Correlation coefficient. Binomial, Poisson and Normal distributions.

Unit–V:	No. of Lectures: 08 Hours	Marks: 12

Test of significance:

Testing of Hypothesis, Null Hypothesis and Alternative Hypothesis. Level of Significance. Test of Significance of large sample, Small sample test for mean, testing for difference between means of two samples.

Text Books :

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2016.
2. H.K.DASS "Advance Engineering Mathematics" S. Chand publications, 5th revised Edition
3. S. C. Gupta "Fundamentals of Statistics", Himalaya Publishing House, 6th revised Edition
4. DebashisDatta "Textbook of Engineering Mathematics'' New Age International Publication, revised 2nd Edition

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. ChandrikaPrasasd, Advanced Engineering Mathematics, (ISBN: 9789386173522) Khanna Book Publishing Co. (P) Ltd., Delhi
8. Sashtry, Advanced Engineering Mathematics (ISBN:9788120336094), PHI
9. S. Chakraborty& B.K. Sarkar, Discrete Mathematics and Its Applications, Oxford

Signals & Systems					
COURSE OUTLINE					
Course Title:	**Signals & Systems**	**Short Title:**	**S&S**	**Course Code:**	

Course description:

Signals play a major role in our life and it can be represented in a number of ways. Signal processing is a method of extracting information from the signal which in turn depends on type of signal and the nature of information it carries.

This course describes the various signals with the help of mathematical tools such as Fourier Transform, Laplace Transform and Z-Transform. It also introduces the state space approach of system.

Lecture	Hours/week	No. of weeks	Total hours	Semester credits
	3	14	42	3

Prerequisite course(s):

Mathematics - II

Course objectives:

1. To introduce the students to the various signals.
2. Study and understanding of representation of signals and systems.
3. To learn and understand different Transforms for Digital Signal Processing
4. Analysis of Discrete Time signals and systems

Course outcomes:

After successful completion of this course the student will be able to:

1. Demonstrate the ability to represent signals mathematically in continuous time and discrete time, and in frequency domain.
2. Understand the use of numerical method to analyze digital signal processing.
3. Understand Discrete Fourier Transform (DFT) and properties.
4. Analyze discrete time systems using Laplace and Z – transform.
5. Basic Understanding of state space analysis of system.

COURSE CONTENT

Signals & Systems		Semester:	III
Teaching Scheme:		**Examination scheme**	
Lectures:	**3 hours/week**	**End semester exam (ESE):**	**60 marks**
		Duration of ESE:	**03 hours**
		Internal Sessional Exams (ISE):	**40 marks**

Unit–I:	No. of Lectures: 08 Hours	Marks: 12

Classifications of Signals and Systems (only Introduction)

Classifications of Signals-Deterministic and non-deterministic signals, periodic and aperiodic signals, even and odd signals, energy and power signals.

Singularity functions-unit impulse function, unit step function, unit ramp function, unit pulse function, representation of signals**.**

Classifications of Systems-Static and dynamic systems, linear and non-linear systems, time

variant and time invariant systems, stable and unstable systems.
Simple manipulations of discrete time signals-shifting, folding, time scaling. Representations of systems, Linear differential equations, Impulse response of a system. Analog to digital conversion of signals-sampling of continuous time signals, signal reconstruction.

Unit–II:	No. of Lectures: 10 Hours	Marks: 12

Fourier Transform

Introduction - Trigonometric Fourier series, complex or exponential form of Fourier series, Parseval's identity for Fourier series.
Fourier Transform- energy spectrum for non-periodic function, properties of Fourier Transform.
Discrete Fourier Transforms (DT)- discrete convolution, properties of convolution, circular convolution (numerical), Discrete -Time Fourier Transform (DTFT),properties of DFT (numerical)

Unit–III:	No. of Lectures: 08 Hours	Marks: 12

Laplace Transforms

Definition, Region of Convergence (ROC), LT of some important function and numerical. Initial value theorem , Final value theorem. Convolution integral numerical. Application of LT only in series R-L circuit and series R-C circuit.

Unit–IV:	No. of Lectures: 08 Hours	Marks: 12

z- Transforms

Introduction, definition, Region of Convergence (ROC), properties of the ROC for the z-transform and numerical. Properties of z-transform such as Linearity, Time Reversal, Time Shifting, Scaling, Differentiation, Convolution and numerical based on these properties.

Unit–V:	No. of Lectures: 08 Hours	Marks: 12

State space analysis

Concept of state (State variable and state model). State model of linear system. Eigen Values of Matrix A. Solution of state equation. Properties of State Transition Matrix and numerical.

Text Books:

1. S. Salivahanan, C. Gnanpriya, Digital Signal processing, McGraw Hill, 4th Edition
2. I..J. Nagrath and M. Gopal , Control system Engineering- New Age 5thEdition

Reference Books:

1. John G. Proakis, Dimitris G. Manolakis, Digital Signal Processing Principles, algorithms and applications, Pearson Prentice Hall, Fourth edition
2. I.J. Nagrath, S.N. Sharan, R.Ranjan,S.Kumar, Signals and Systems, TMH, 2nd Edition
3. Katsuhiko Ogata, Modern Control Engineering, Pearson, 4th edition.
4. A. Anand Kumar, Signals and Systems, PHI
5. RishabhAnand, Signals and Systems, Khanna Book Publishing Co., Delhi
6. TarunRawat, Signals and Systems, Oxford University Press
7. B.P. Lathi, Signal Processing and Linear Systems, Oxford University Press

Analog Electronic Circuits					
COURSE OUTLINE					
Course Title:	**Analog Electronic Circuits**	**Short Title:**	**AEC**	**Course Code:**	
Course description:					
This course provides the students with comprehensive study of basic components and circuits of Analog Electronics. It deals with BJT, FET, OpAmp, DAC and ADC.					
Lecture	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	3	**14**	**42**	**3**	
Prerequisite course(s):					
Basic knowledge of Electronics					
Course objectives:					
1. To impart detailed knowledge of transistor's DC and AC configuration. 2. To familiarize the students to perform frequency analysis of active devices. 3. To provide students the knowledge of power amplifier. 4. To provide students the knowledge of positive and negative feedback. 5. To empower students to understand open loop and close loop application of OP-Amp.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. To categorize and calculate the DC and AC parameters of BJT / FET. 2. To describe and solve the frequency analysis of BJT. 3. To decide and formulate the various classes of operation of power amplifier. 4. To predict and classify the different configurations of feedback amplifiers. 5. To identify and analyze the different open loop and close loop applications of OP-Amp.					
COURSE CONTENT					
Analog Electronic Circuits			**Semester:**	**III**	
Teaching Scheme:			**Examination scheme**		
Lectures:	**3 hours/week**		**End semester exam (ESE):**	**60 marks**	
			Duration of ESE:	**03 hours**	
			Internal Sessional Exams (ISE):	**40 marks**	
Unit–I:	**No. of Lectures: 09 Hours**		**Marks: 12**		
Transistor					
BJT &FET voltage divider biasing, Q point & Stability factor analysis, BJT - h parameter analysis for CE,CB, CC, Miller theorem and its dual Cascade configuration- CE-CE, CE-CB, CE-CC, Darlington configuration					
Unit–II:	**No. of Lectures: 08 Hours**		**Marks: 12**		
Frequency Response and power amplifiers					
Frequency response of single & cascade stages, High frequency model of CE & short circuit current gain, Class A series fed & transformer coupled amplifier, Class B complementary symmetry configuration, Power relation & efficiency, Harmonic distortion analysis					
Unit–III:	**No. of Lectures: 09 Hours**		**Marks: 12**		

Feedback amplifiers		
Negative feedback- Classification, characteristics of negative feedback, analysis of all the four topologies-voltage series, current series, voltage shunt, current shunt Positive feedback- Barkhausen Criterion, R-C phase shift &Wein bridge oscillator, Hartley, Colpitt & Clapp oscillator		
Unit–IV:	**No. of Lectures: 08 Hours**	**Marks: 12**
Operational Amplifier		
Differential Amplifier- Ad, Ac & CMRR, OPAMP Applications-Inverting and Non inverting amplifier, Adder Subtractor, Integrator , Differentiator, Instrumentation amplifier ,log amplifier, antilog amplifier, Schmitt trigger		
Unit–V:	**No. of Lectures: 08 Hours**	**Marks: 12**
Filters and Convertors		
OPAMP active filters – Low pass ,high pass ,band pass ,band stop ,Design guidelines, DAC-Weighted registor,R2R ladder, ADC-Single slope , Dual slope and Successive approximation Switched capacitors circuit, basic concept and practical configuration		
Text Books:		
1. Millman and Halkais, Integrated Electronics TMH Publication, 2nd Edition 2. J.V. Wait, L P. Huelsman& G.A. Korn Introduction to Operational Amplifier- Theory and Applications, Mcgraw Hills, 2nd Edition 3. R. A. Gaikwad , OpAmp& Linear Integrated Circuits, Pearson Edition, 4th Edition		
Reference Books:		
1. Louis Nashelsky& Robert Boylestad, Electronics Devices and Cercuits Theory, Pearson Publication, 10th Edition 2. Dr. R. S. Sedha, Electronics Circuits by, S Chand Publication,4th Edition 3. L.K. Maheshwari, Analog Electronics, Laxmi Publications 4. A.K. Maini, Analog Electronics, Khanna Publishing House 5. I.G. Nagrath, Analog Electronics, PHI		

Discrete Mathematics					
COURSE OUTLINE					
Course Title:	**Discrete Mathematics**	**Short Title:**	**DM**	**Course Code:**	
Course description:					
Basic set theory and symbolic logic. Methods of proofs, including mathematical induction. Relations, functions, and partitions; modular arithmetic. Graph and Trees					
Lecture	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	3	**14**	**42**	**3**	
Prerequisite course(s):					
Basic Mathematics Concepts					
Course objectives:					
The student will be					
1. Learn the use of set, proof techniques and determine logical possibilities in a given situation. 2. Understand relations, functions among various entities in real world. 3. Think about relations and functions in real life. 4. Learn the problem mathematically using graph theory and trees.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. Formulate the given logic sentence it in terms of predicates, quantifiers, and logical connectives 2. Formulate real life problems in terms of set theory concepts. 3. Analyze the solution using deductive logic and prove the solution based on logical inference for given problem 4. Describe given mathematical problem according to its algebraic structure 5. Analyze the given problem as graph networks and solve with techniques of graph theory.					
COURSE CONTENT					
Discrete Mathematics			**Semester:**	**III**	
Teaching Scheme:			**Examination scheme:**		
Lectures:	**3 hours/week**		**End semester exam (ESE):**		**60 marks**
			Duration of ESE:		**03 hours**
			Internal Sessional Exams (ISE):		**40 marks**
Unit–I:		**No. of Lectures: 08 Hours**		**Marks: 12**	
Set, Relation and Function:					
Operations and Laws of Sets, Cartesian Products, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem. Binary Relation, Partial Ordering Relation, Equivalence Relation, Functions, Bijective functions, Inverse and Composite Function					
Unit–II:		**No. of Lectures: 09 Hours**		**Marks: 12**	
Mathematical Induction, Counting					

The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.
Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination. Number system and Inter conversion of number system.

Unit–III:	**No. of Lectures: 08 Hours**	**Marks: 12**

Propositional Logic

Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers.

Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Unit–IV:	**No. of Lectures: 08 Hours**	**Marks: 12**

Algebraic Structures and Morphism

Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Unit–V:	**No. of Lectures: 09 Hours**	**Marks: 12**

Graphs and Trees

Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Coloring, Coloring maps and Planar Graphs, Dijkstra's shortest path Algorithm, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Kruskal's and Prim's algorithm for minimum spanning tree

Text Books:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill, 7th Edition
2. Susanna S. Epp, Discrete Mathematics with Applications, Wadsworth Publishing Co. Inc., 4th edition
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, Tata McGraw – Hill, 3rd Edition,

Reference Books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science, Tata Mcgraw-Hill, 1st Edition
2. Norman L. Biggs, Discrete Mathematics, Oxford University Press, 2nd Edition
3. Seymour Lipschutz, Marc Lipson Discrete Mathematics Schaum's Outlines Series,Tata McGraw – Hill ,2nd Edition.
4. Chakraborty&Sarkar, Discrete Mathematics and Its Applications, Oxford
5. S.B. Singh, Discrete Structures, Khanna Book Publishing, Delhi
6. T. Veerarajan, Discrete Mathematics, Tata McGraw-Hill

Organizational Behavior					
COURSE OUTLINE					
Course Title:	**Organizational Behavior**	**Short Title:**	**OB**	**Course Code:**	
Course description:					
This course includes the behavior of people in the work environment. Students develop a basic understanding of individual behavior and explore issues of personality, attitude, motivation, communication, leadership, job satisfaction, group dynamics and work stress.					
Lecture	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	3	**14**	**42**	**3**	
Prerequisite course(s):					
Basic knowledge of the organization and human behavior.					
Course objectives:					
1. To understand organization behavior. 2. To know individual perspective and individual behaviour. 3. To understand group dynamics. 4. To gain knowledge of leadership. 5. To understand work stress and stress management.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. Explain organization behaviour. 2. Define individual behaviour. 3. Determine group issues. 4. Apply leadership styles. 5. Analyze factors causing work stress.					
COURSE CONTENT					
Organizational Behavior			**Semester:**	**III**	
Teaching Scheme:			**Examination scheme**		
Lectures:	**3 hours/week**		**End semester exam (ESE):**	**60 marks**	
			Duration of ESE:	**03 hours**	
			Internal Sessional Exams (ISE):	**40 marks**	
Unit–I:	**No. of Lectures: 08 Hours**		**Marks: 12**		
Introduction to Organization Behavior					
• Meaning and Definition of Organization Behavior (O.B) • Key Elements of Organization Behavior • Nature and Scope of Organization Behavior • Importance of Organization Behavior • Disciplines Contributing to O.B • Emerging Challenges and Opportunities for O.B.					
Unit–II:	**No. of Lectures: 09 Hours**		**Marks: 12**		
Individual Perspective / Foundation of Individual Behavior					

(a) Personality:

- Meaning and Definition of Personality
- Factors/Key Determinants of Personality
- Personality Traits

(b) Attitudes:

- Meaning & Nature of Attitude
- Types of Job Attitude
- Components of Attitude
- Functions of Attitude
- Ways to change Attitude

(c) Job Satisfaction:

- Meaning and Definition of Job Satisfaction
- Factors affecting Job Satisfaction
- Ways of measuring Job Satisfaction
- Impact of Job Satisfaction on Work Performance

Unit–III:	No. of Lectures: 08 Hours	Marks: 12

Group Dynamics

- Meaning of Group, Group Dynamics
- Why do people join groups
- Types of Groups
- The Five Stage Model of Group Development
- Group Properties: Group Norms, Group Size, Group Cohesiveness,
- Concept: Group Think, Group Shift

Unit–IV:	No. of Lectures: 09 Hours	Marks: 12

Motivation and Leadership

Motivation:

- Meaning and Definition of Motivation
- Types of Motivation: Financial and Non-Financial
- Theories of Motivation
  a) Maslow's Hierarchy of needs Theory
  b) Theory X and Theory Y
  c) Goal Setting Theory

Leadership:

- Meaning & Importance of Leadership
- Styles of Leadership
- Theories of Leadership
  a) Likert's system of 4
  b) Path Goal Theory
  c) Charismatic Leadership Theory

Unit–V:	No. of Lectures: 08 Hours	Marks: 12

Work Stress

- Meaning, Nature of Stress
- Factors causing Stress
- Consequences of Stress

- Management of Stress

Text Books:

1. Suja R. Nair , Organizational Behavior-Text & Cases, Himalaya Publishing House, 2009 Reprint
2. K.Aswathappa, Organizational Behavior-Text, Cases & Games, , Himalaya Publishing House, 12th Revised Edition

Reference Books:

1. Margie Paraikh, Rajen Gupta, Organizational Behaviour-, Tata McGraw Hill Publishing, 2010 Edition
2. Stephen Robbins, Organizational Behaviour, Vohra-Pearson , 15th Edition
3. P.SubbaRao , Organizational Behaviour Text , Caves and Games , Himalaya Publishing House, 2017 Edition
4. S.S.Khanka , Organizational Behaviour, S.Chand Publishing House, 4th Edition
5. C. B. Gupta, A Textbook of Organizational Behaviour, S.Chand Publications
6. L. M Prasad, Sultan , Organizational Behaviour Chand and Sons

Analog Electronic Circuits Lab					
LAB COURSE OUTLINE					
Course Title:	**Analog Electronic Circuits Lab**	**Short Title:**	**AECL**	**Course Code:**	
Course description:					
This course provides the students with comprehensive study of basic components and circuits of Analog Electronics. It deals with BJT, FET, OpAmp, DAC and ADC.					
Laboratory	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	2	**14**	**28**	**1**	
End Semester Exam (ESE) Pattern:		**Practical (PR)**			
Prerequisite course(s):					
Basic knowledge of Electronics					
Course objectives:					
1. To decide quiescent point for BJT/FET. 2. To evaluate the frequency response of an amplifier. 3. To design the feedback amplifier. 4. To measure parameter of OP-Amp applicability. 5. To Design filter response.					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
1. To design and formulate the operating point parameters of BJT / FET. 2. To measure the effect of bypass capacitor in frequency response. 3. To assess the effect of positive feedback in oscillator. 4. To test OP-Amp as an integrator and differentiator. 5. To measure the performance of OP-Amp low pass/ high pass filter.					
LAB COURSE CONTENT					
Analog Electronic Circuits Lab		**Semester:**	**III**		
Teaching Scheme:		**Examination scheme**			
Practical:	**2 hours/week**	**End semester exam (ESE):**		**25 marks**	
		Internal Continuous Assessment (ICA):		**25 marks**	
Concerned faculty member should suitably frame FIVE laboratory assignments from the following list. 1. BJT/FET Q point & load line. OR Frequency Response of CE-CE cascade 2. Effect of Emitter Bypass Capacitor (CE Configuration). OR					

Cross over distribution & its elimination.

3. Effect of partial feedback for voltage shunt configuration.
   OR
   Output and Frequency of RC Phase Shift Oscillator.

4. OP-AMP as an Integrator & Differentiator.
   OR
   OP-AMP Instrumentation Amplifier.

5. OP-AMP Low Pass Filter.
   OR
   OP-AMP High Pass Filter

Text Books:

1. Millman and Halkais, Integrated Electronics, TMH Publication, 2nd Edition
2. J.V. Wait, L P. Huelsman& G.A. Korn Introduction to Operational Amplifier- Theory and Applications,, Mcgraw Hill, 2nd Edition
3. R. A. Gaikwad, OpAmp and Liner Integrated Circuits, Pearson, 4th Edition

Reference Books:

1. Louis Nashelsky& Robert Boylestad, Electronics Devices and Cercuits Theory, , Pearson Publication, 10th Edition
2. Dr. R. S. Sedha, Electronics Circuits by, S Chand Publication,4th Edition
3. L.K. Maheshwari, Analog Electronics, Laxmi Publications
4. A.K. Maini, Analog Electronics, Khanna Publishing House
5. I.G. Nagrath, Analog Electronics, PHI

Guidelines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the laboratory assignments submitted by the students in the form of journal. Evaluation will be based on the understanding and execution.

Discrete Mathematics Lab					
LAB COURSE OUTLINE					
Course Title:	**Discrete Mathematics Lab**	**Short Title:**	**DML**	**Course Code:**	
Course description:					
This course provides students with a comprehensive study of Discrete Mathematics concepts. Introduction to program design and problem solving using the C/ C++ programming language. Programming topics include set operations such as: union, intersection, difference, power set, graph theory: Dijikstra Algorithm and tree concepts: Prims algorithm, Kruskal's algorithm.					
Laboratory	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	2	**14**	**28**	**1**	
End Semester Exam (ESE) Pattern:		**Practical (PR)**			
Prerequisite course(s):					
Basic Math concept, Basic C concepts					
Course objectives:					
The student will able to					
1. Learn the fundamentals and structure of Discrete Mathematics. 2. Understand programs in C/C++ Language to implement Discrete Mathematics concepts. 3. Learn concepts of graph and spanning tree.					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
1. Solve the problem based on set theory and logical connectives. 2. Identify various number conversion techniques. 3. Apply shortest path techniques in real life. 4. Analyze minimum spanning tree using Prims and Kruskal algorithm					
LAB COURSE CONTENT					
Discrete Mathematics Lab		**Semester:**	**III**		
Teaching Scheme:		**Examination scheme**			
Practical:	**2 hours/week**	**End semester exam (ESE):**	**25 marks**		
		Internal Continuous Assessment (ICA):	**25 marks**		
Concerned faculty member should suitably frame at least FIVE Laboratory assignments from Group - A and FIVE Laboratory assignments from Group – B, using C/C++ programming language from the following list. **Group**: A 1. A program for logical operations using bitwise operators. 2. A program for set operations: Union, Intersection, Difference, Symmetric difference. 3. A program for generation of Power set of a given set.					

4. A program for inter conversion of number system.
5. A program for producing permutation set for given input set.
6. A program for producing combination set for given input set.

Group: B

1. A Program for Greatest Common Divisor using Euclidean Algorithm.
2. A Program for Binary search.
3. A Program for Shortest Path algorithm using Dijkstra's.
4. A program for implementation of Kruskal's algorithm.
5. A program for implementation of Prim's algorithm.
6. A Program to Construct a Tree & Perform Insertion, Deletion, Display

Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.

Text Books:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill, 7th Edition
2. Susanna S. Epp, Discrete Mathematics with Applications, Wadsworth Publishing Co. Inc., 4th edition
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, Tata McGraw – Hill, 3rd Edition,

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. ChandrikaPrasasd, Advanced Engineering Mathematics, (ISBN: 9789386173522) Khanna Book Publishing Co. (P) Ltd., Delhi
8. Sashtry, Advanced Engineering Mathematics (ISBN:9788120336094), PHI
9. S. Chakraborty& B.K. Sarkar, Discrete Mathematics and Its Applications, Oxford

Guidelines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the Laboratory assignments submitted by the students in the form of

journal. In the ESE (PR), the students may be asked to perform the practical assignment with minor modification.
Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of the program, execution of the program, type of input and output for the program.

Object Oriented Programming Lab					
LAB COURSE OUTLINE					
Course Title:	**Object Oriented Programming Lab**	**Short Title:**	**OOPL**	**Course Code:**	
Course description:					
This course provides students with a comprehensive study of the C++ programming. Topics includes in this course are basic concepts of C++ programming, The concept of Class and Object, polymorphism, overloading, inheritance, dynamic binding, message passing, class and function template.					

Laboratory	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**
Theory	**1**	**14**	**14**	**2**
Practical	**2**	**14**	**28**	

End Semester Exam (ESE) Pattern:	**Practical (PR)**

Prerequisite course(s):

Fundamental knowledge of Computers and C programming

Course objectives:

1. To understand the concept of class and object.
2. To learn how to implement copy constructors and class member functions.
3. To learn how to overload functions and operators in C++.
4. To learn how containment and inheritance promote code reuse in C++.
5. To understand the concept of class and function Template

Course outcomes:

Upon successful completion of lab Course, student will be able to:

1. Create class and object for various application.
2. Use the concept pointers, constructors, destructors, etc. for dynamic memory management techniques.
3. Apply the concept of inheritance to avoid data duplication.
4. Create and demonstrate operator overloading.
5. Implement class and function template.

LAB COURSE CONTENT			
Object Oriented Programming Lab		**Semester:**	**III**
Teaching Scheme:		**Examination scheme**	
Practical:	**2 hours/week**	**End semester exam (ESE):**	**25 marks**
		Internal Continuous Assessment (ICA):	**25 marks**

LAB COURSE CONTENT

Introduction to Object Oriented Programming

a. Introduction to procedural, modular and object-oriented programming techniques.
b. Limitations of procedural programming.
c. Need of object-oriented programming. Advantages, disadvantages and applications of OOP.
d.Class, objects, abstraction, encapsulation, data hiding, inheritance, polymorphism and message passing.
e. The basics of C++
f. Expressions

Classes and Objects, Function and Operator Overloading

a. Class and objects
b. Constructors and destructors
c. Functions in C++
d. Function Overloading
e. Operator overloading

Pointers and Arrays

a. Introduction, pointer declaration, voids pointers.
b. Pointers to class objects, this pointer.
c. Pointers to members, accessing private members with pointers.
d. Characteristics of arrays, initialization of arrays.
e. Arrays within a class, arrays of objects.
f. Dynamic memory allocation using new and delete operators.
g. One dimensional and two dimensional arrays using pointers.

Inheritance, Virtual functions and Polymorphism

a. Introduction, base and derived classes. Inheritance types, access modifiers.
b. Single inheritance, multiple and multilevel inheritance, hybrid, hierarchical, multipath Inheritance and virtual base classes.
c. Overriding base class members. Constructors and inheritance, calling base class constructor.
d. Static and dynamic binding. Pointers to base and derived classes.
e. Virtual functions, rules for virtual functions, working of virtual functions, pure virtual functions.
f. Virtual base classes

Files and Streams, Managing Console I/O Operations and Templates

a. Concept of a file, file stream operations.
b. Opening a file using constructor and open function, closing a file, detecting end-of-file, file modes, file pointers.
c. Introduction to C++ streams, stream classes, unformatted and formatted I/O.
d. ios class functions and flags, manipulators.
e. Introduction to function template and class template.

Concern faculty member should suitably frame at least SIX Lab assignments from group A and FOUR from group B using C++ programming language from the following list.

Group A

1. Write a program for a simple class and object.
Performing simple arithmetic operations using C++ class and object like,
a. Addition,
b. Subtraction,

c. Multiplication,
d. Division.

2. Write a program for parameterized constructor. Demonstrate the use parameterized constructor by passing different types of parameters to the constructor.
3. Write a program for overloading constructors.
   Demonstrate the concept of overloading constructor functions using class and object.
4. Write a program to find the area of rectangle, triangle and sphere using function overloading.
   To calculate the area of rectangle, triangle and sphere using function overloading and class and object.
5. Write a program to overload unary operator using member function.
6. Write a program to overload binary operator using member function.
7. Write a program for arrays of pointers to objects.
   Declaring an array of pointers to objects using suitable example.
8. Write a program using single inheritance, multiple inheritance and hierarchical inheritance
9. Write a program using multilevel inheritance and hybrid inheritance.
10. Write a program for addition of two matrices using friend function.
11. Write a program to read and write class objects from files.
    Writing/reading class object to/from file.
12. Write a program to format output using ios class functions and flags.
13. Write a program to format output using manipulators.
14. Write a program using class template.
15. Write a program for overloading of template functions.

Group B

1. Write a program for the copy constructor.
2. Write a program to overload unary operator using friend function.
3. Write a program to overload binary + operator using member function for concatenation of two strings.
4. Write a program for matrix multiplication using new and delete dynamic memory allocation operators.
5. Write a program to convert class type data to basic type data.
6. Write a program for run time polymorphism using virtual functions.
7. Write a program for bubble sort using template functions.

Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.

Text Books:

1. E. Balagurusamy, Object Oriented Programming with C++, TataMcGraw Hill, 2011, Sixth Edition
2. Robert Lafore, "Object Oriented Programming in C++", Pearson Education, 2002, Fourth Edition
3. Ashok N. Kamthane, "Object-Oriented Programming with ANSI and Turbo C++",Pearson Education, 2006, 1st Edition

4. Rajesh K. Shukla, "Object-Oriented Programming in C++", Wiley India, 2008, 1st Edition

Reference Books:

1. Yashavant P. Kanetkar, "Let Us C++", BPB Publications, 3rd Edition
2. Venugopal K.R., "Mastering C++", TMH, 2nd Edition.
3. Mahesh Bhave, Sunil Patekar, "Object Oriented Programming with C++", Second Edition, 2012.
4. Herbert Schildt, "The Complete Reference C++", TMH , Fourth Edition, , 2003.
5. R.S. Salaria, Mastering Object-Oriented Programming with C++, Khanna Book Publishing, N.Delhi
6. Balaguruswamy, Programming with Java, TMH
7. D.Samantha, Object Oriented Programming in C++ and Java, PHI
8. TanweerAlam, Internet and Java Programming, Khanna Publishing House

Guidelines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the Laboratory assignments submitted by the students in the form of journal. In the ESE (PR), the students may be asked to perform the practical assignment with minor modification.

Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of the program, execution of the program, type of input and output for the program.

Kavayitri Bahinabai Chaudhari

NORTH MAHARASHTRA UNIVERSITY,

JALGAON (M.S.)

Second Year Engineering

(Computer Engineering / Information Technology)

Faculty of Science and Technology

'A' Grade
NAAC Re-Accredited
3rd Cycle

COURSE OUTLINE

Semester - IV

W.E.F. 2019 – 20

Biology					
COURSE OUTLINE					
Course Title:	**Biology**	**Short Title:**	**BIO**	**Course Code:**	

Course description:

This course is introduced for learning the basic fundamentals of Life sciences (zoology & Botany) to undergraduate students. The goals of the course are to understand the basic principles of Biology and its applications in the field of Engineering.

Lecture	Hours/week	No. of weeks	Total hours	Semester credits
Lecture	**3**	**14**	**42**	**4**
Tutorial	**1**	**14**	**14**	

Prerequisite course(s):

Course objectives:

1. Students will understand the structures and characteristics or functions of basic components of prokaryotic and eukaryotic cells, especially macro-molecules, membranes, and organelles.
2. Students will learn the basic principles of inheritance at the molecular, cellular and Organism levels.
3. Students will test and deepen their mastery of genetics by applying this knowledge in a variety of problem-solving situations.

Course outcomes:

After successful completion of this course the student will be able to:

1. Describe the concepts of modern cell theories and identify the differences in eukaryotic and prokaryotic cells.
2. Explain the major groups of animal and plant kingdom.
3. Demonstrate the advanced techniques in plant and animal tissue culturing, and able to calculate the growth rate of cells through culturing.
4. Classify the microorganisms through different isolation techniques and illustrate microbial culture techniques.
5. Illustrate mechanism involved rDNA technology and apply the different aspects of Biotechnology.

COURSE CONTENT

Biology		**Semester:**	**IV**
Teaching Scheme:		**Examination scheme**	
Lectures:	**3 hours/week**	**End semester exam (ESE):**	**60 marks**
Tutorial	**1 hour/week**	**Duration of ESE:**	**03 hours**
		Internal Sessional Exams (ISE):	**40 marks**

Unit–I:	**No. of Lectures: 08 Hours**	**Marks: 12**

Diversity of Organism and Cell Biology

Introduction: Living systems, Bio-mimicry, Metabolism, Taxonomy, Concept of species, Structural organization of life, Concepts of modern cell, history of cell, Cell theory, Structure of cell:- Cell shape, size and cell number, Types of cells:- Prokaryotic cells and Eukaryotic cells, Chemistry of cells.

Cell Division: Cell cycle, mitosis, meiosis, mitotic cell division, cell cycle check points, meiotic cell division, embryonic cell division, cell death.

Unit–II:	**No. of Lectures: 09 Hours**	**Marks: 12**

Plant and Animal Kingdom

Plant Kingdom:

Introduction to plants, Salient features of major plant groups: Bryophyta, Pteridophyta, Gymnospermae, Angiospermae,

Plant Growth & Development: Introduction, Seed Dormancy, Seed Germination, Phases of growth, Plant growth hormones.

Animal Kingdom:

Animal Classification, Salient features of non-chordates upto phylum level: Phylum porifera, phylum cindaria, phylum ctenophore, phylum platyhelminthes.

Unit–III:	**No. of Lectures: 09 Hours**	**Marks: 12**

Plant Cell and Animal cell culture and Applications

Plant Cell Culture:

Brief introduction to cell culture with respect to the properties of plant cells, Media requirements, Typical media used, Classification of tissue culture, callus culture, cell suspension culture, Application of callus culture and cell suspension culture, Plant cell cultivation Bioreactors

Animal Cell Culture: Brief introduction to animal cell culture, Culture medium: Natural and Artificial media, introduction to balanced salt solutions and simple growth medium, Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium, Animal Bioreactors.

Unit–IV:	**No. of Lectures: 08 Hours**	**Marks: 12**

Microbial Culture and Applications

Introduction, Microbial Culture Techniques, growth curve, Pure culture techniques – microbial culture media, isolation, identification and maintenance of cultures, incidences of microorganisms in soil, water, air, food and sewage, food spoilage organisms, Applications of Microbial Culture Technology.

Unit–V:	**No. of Lectures: 08 Hours**	**Marks: 12**

Biotechnology and its Applications

Definitions, scope of Biotechnology, Recombinant DNA Technology: Making Recombinant DNA, Tools in Genetic Engineering, Polymerase Chain reaction (PCR).

Applications of Biotechnology: Bioinformatics, Biomechanics, Biotechnology of waste treatment, Biosensors, Forensic science, Food Biotechnology, Fermentation Technology.

Text Books:

1. B.D. Singh " Genetics" Kalyani Publications
2. C.B. Pawar"Cell Biology" Himalaya Publications, Third Edition.
3. C.B. Pawar"Cell and Molecular Biology" Himalaya Publications.
4. Text book of Zoology by V.K. Agrawal, S. Chand Publication.
5. Text book of Botany by Dr. B.P. Pandey S. Chand Publication.

6. Text book of Biotechnology by R.C. Dubey, S. Chand Publications

Reference Books:

1. P. K Gupta, Introduction to Biotechnology, Rastogi Publications.
2. B.D.Singh, Biotechnology: Expanding Horizons, Kalyani Publishers, New Delhi, Second Revised Edition, 2008.
3. S.S.Purohit, Biotechnology: Fundamentals and Applications, Agrobios (India), 4th Edition, 2005.
4. Andreas D. Boxevanis, Bioinformatics, Wiley International
5. David W. Mount, Bioinformatics: Sequence and Genome analysis, Cold Spring Harbour.
6. Bruce E Rittmann, RurryL.Mccarty, Environmental Biotechnology: Principles and Applications, Mcgraw Hill international.
7. B. Sivashankar, Food Processing and Preservation, Prentice Hall ,India
8. Bhojwani, S.S.and Rajdan, Plant Tissue Culture: Theory and Practice, Revised Edition, Elsevier
9. Freshney, Culture of Animal Cells, 5th Edition, Wiley-Liss, 2005
10. M.J. Pelczar, Jr. E.C.S. Chan and N.R. Krieg, Microbiology 5th Ed., TMH Book Company.
11. Biology for Engineers (ISBN: 9781121439931), TMH

Digital Electronics					
COURSE OUTLINE					
Course Title:	**Digital Electronics**	**Short Title:**	**DE**	**Course Code:**	
Course description:					
This course is designed to give a brief understanding of the principles of Digital Techniques and designing of several applications. This course covers different types of codes, Boolean laws, SOP & POS form, K-map optimization technique, arithmetic circuits, code converters, Multiplexer, De-multiplexer and their applications, different types of flip-flops and their applications, sequential circuits such as ripple counter, synchronous counter, Mod-n counter, shift resister and its applications.					

Lecture	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**
	3	**14**	**42**	**3**

Prerequisite course(s):
Physics
Course objectives:
1. Students will continue the use of concepts covered in Digital Fundamentals 2. Students will be able to analyze, design, build, and troubleshoot a broad range of combinational circuits using digital ICs. 3. Students will demonstrate understanding of flip-flops, 4. Students will be able to analyze, design, build, and troubleshoot a broad range of counters. 5. Students will be able to analyze, build, and troubleshoot shift registers
Course outcomes:
After successful completion of this course the student will be able to:
1. Develop a digital logic and apply it to solve real life problems. 2. Understand and use of K-Map and Tabular method for simplification of logical expression. 3. Analyze, design and implement combinational logic circuits 4. Analyze and implement the sequential logic circuits using flip-flops. 5. Classify registers and design of the counters.

COURSE CONTENT					
Digital Electronics			**Semester:**	**IV**	
Teaching Scheme:			**Examination scheme**		
Lectures:	**3 hours/week**		**End semester exam (ESE):**		**60 marks**
			Duration of ESE:		**03 hours**
			Internal Sessional Exams (ISE):		**40 marks**
Unit–I:		**No. of Lectures: 08 Hours**		**Marks: 12**	
Representation of signed numbers: fixed and floating point numbers. Binary Coded Decimal Code, Gray Code, Error detection and Correction Code –Hamming Code. Boolean Algebra, DeMorgan's Theorem, Simplification of logical Expression using Boolean Algebra and DeMorgan's Theorem.					

Unit–II:	**No. of Lectures: 08 Hours**	**Marks: 12**
Standard representation of logic functions- SOP and POS forms. Min term and Max term. Don't care conditions. Simplification of logic functions-using Karnaugh Map (K- Map) for 2,3 and 4 variables. Quine-McCluskey tabular method -four variables.		
Unit–III:	**No. of Lectures: 09 Hours**	**Marks: 12**
Introduction to combinational Logic circuits. Adders Subtractors-,-Half and Full adder and subtractor truth table and logic circuit.BCD arithmetic. Popular MSI Chips-Digital Comparator (2 and 4 Bits). Code Converters-Gray to Binary and vice versa. Multiplexer -2:1, 4:1 and 8:1.Demultiplexer-1:2, 1:4 and 1:8.Decoders-1:2,2:4 and 3:8.Encoders 8:3 and Priority Encoder.		
Unit–IV:	**No. of Lectures: 08 Hours**	**Marks: 12**
Introduction to sequential Logic circuits. A 1-Bit Memory cell. Bi-stable latch circuit properties. The clocked SR flip flop, J-K,T and D types flip flops. Preset and clear inputs. Registers-SISO, SIPO, PISO AND PIPO 4 –BIT REGISTER. Shift Register-Right shift, left shift and Bidirectional Register. Application of shift Register- Ring and Twisted Ring Counter.		
Unit–V:	**No. of Lectures: 09 Hours**	**Marks: 12**
Counters- Modulus and recycling of counter .Types of counters- Asynchronous and Synchronous .Up, Down and Up-Down Counters Asynchronous Counter-2,3 and 4 Bit Up ,down and Up-Down Counters. Synchronous Counter-2, 3 and 4 Bit Up, down and Up-Down Counters.		
Text Books:		
1. R P Jain, Modern Digital Electronics, MCGraw Hill, 4th Edition 2. A Kumar, Fundamentals' of Digital Circuits" by, Prentice Hall India, 3rd Edition		
Reference Books:		
1. Thomas L Floyd, "Digital Fundamentals", Pearson Prentice Hall, 8th Edition 2. Jr. Charles H. Roth , "Fundamentals of Logic Design", Thomson Brooks, 5th Edition 3. John F. Wakenly, Digital Design, Principles and Practics, Pearson Education, 4th Edition 4. A. Anand Kumar, Digital Electronics, PHI 5. R.Anand, Digital Electronics Khanna Publishing House		

Data Structure & Algorithms					
COURSE OUTLINE					
Course Title:	**Data Structure & Algorithms**	**Short Title:**	**DSA**	**Course Code:**	
Course description:					
The objective of this course is to introduce the students to the fundamentals of Data Structure with concepts of the C/C++/JAVA programming language and enable them to apply these concepts for solving real world problems					
Lecture	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	3	**14**	**42**	**4**	
Prerequisite course(s):					
Discrete Mathematics					
Course objectives:					
1. To study the basic concepts of linear data structures. 2. To study the basic concepts of nonlinear data structures. 3. To study the basic concepts of searching algorithms 4. To study the basic concept of heap sorting algorithm					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. Enumerate the concepts of data and data structure 2. Analyze linear data structures. 3. Analyze nonlinear data structure. 4. Enumerate sorting and searching algorithms 5. Analyze space and time complexity					
COURSE CONTENT					
Data Structure & Algorithms		**Semester:**	**IV**		
Teaching Scheme:		**Examination scheme:**			
Lectures:	**3 hours/week**	**End semester exam (ESE):**	**60 marks**		
		Duration of ESE:	**03 hours**		
		Internal Sessional Exams (ISE):	**40 marks**		
Unit–I:	**No. of Lectures: 08 Hours**		**Marks: 12**		
Introduction to Data Structure					
Basic Terminology: Data, Data Item, Data type, Data Structure Data Structures: Classification, Operations Linear Arrays: Traversing, Insertion and Deletion Pointers and Structures. Static and Dynamic Memory Management					
Unit–II:	**No. of Lectures: 08 Hours**		**Marks: 12**		
Stacks and Queues					

Introduction to Stacks and Queue Stacks: Representation of Stack using Array Applications of stack in Arithmetic expressions, recursion and Tower of Hanoi Queue: Representation of Queue using Array Circular Queue and its implementation		
Unit–III:	**No. of Lectures: 09 Hours**	**Marks: 12**
Linked List		
Concept of linked organization Representation of Linked List in Memory Singly, doubly and circular Linked List Operations on singly and Doubly Linked List such as creation, traversing, searching, insertion, deletion. Representation of Stack and Queue using Linked List		
Unit–IV:	**No. of Lectures: 09 Hours**	**Marks: 12**
Trees		
Basic terminology of Trees Binary trees and its representation in memory Binary Search Trees: Searching, Inserting, Deletion and Traversals using Stacks. Balanced Binary Trees: AVL Search Trees and Rotations Heap and Heap sort		
Unit–V:	**No. of Lectures: 08 Hours**	**Marks: 12**
Algorithms and Searching		
Complexity of Algorithms: Asymptotic Notations Linear Search Algorithm with time complexity Binary Search Algorithm with time complexity Hashing: Hash table, hashing functions, Collision Resolution Techniques		
Text Books:		
1. Seymour Lipschutz, "Data Structures", Schaums Outlines, Tata McGraw Hill, 1st Edition. 2. Ellis Horowitz and SartajSahani, "Fundamentals of Data Structures", Galgotia Publication, 1st Edition.		
Reference Books:		
1. G.S.Baluja, Data Structures through C, Dhanpatrai Publications, 2012 2. Ashok N. Kamthane, Introduction to Data structures in C", Person Publications, 2007 Edition 3. AaromTanenbaum, YedidyahLangsam, Moshe Augenstein, Data structures using C, Pearson Publication, 2nd Edition 4. Alfred Aho, John Hopcroft, Jeffrey Ullman, Data Structures and Algorithms ,Pearson Publications. 5. E.Balagurusamy, Data Structures using C, Tata MacGraw Hill Publications. 6. P.S.Deshpande, O.G.Kakde,"C and Data Structures", dreamtech press Publications. 7. RS Salaria, Data Structures, Khanna Publishing House 8. YashwantKanetkar, Data Structures through C, BPB Publications 9. RB Patel, Expert Data Structures with C++, Khanna Publications		

Computer Organization and Architecture					
COURSE OUTLINE					
Course Title:	**Computer Organization and Architecture**	**Short Title:**	**COA**	**Course Code:**	

Course description:

The aim of this course is to introduce the students to the fundamentals of microprocessor with its internal architecture and programming model, basic operational concept within a computer, main memory & cache memory concept and various arithmetic operations on data.

Lecture	Hours/week	No. of weeks	Total hours	Semester credits
	3	14	42	3

Prerequisite course(s):

Fundamental Knowledge of Digital Electronics and Number System.

Course objectives:

1. To understand 8086 architecture.
2. To study 8086 instruction set.
3. To illustrate single bus architecture of processor.
4. To study various types of memory.
5. To learn various arithmetic operations in 2's compliment system.

Course outcomes:

After successful completion of this course the student will be able to:

1. To draw and explain internal architecture of 8086 with its register organization.
2. Explain various arithmetic and logical 8086 instructions and assembler directives.
3. Explain single bus architecture within the processor with complete execution cycle.
4. Explain various types of memories and solve numerical on cache memory design.
5. Explain and solve arithmetic operations like multiplication using booths algorithm and bit pairing method.

COURSE CONTENT

Computer Organization and Architecture		Semester:	IV
Teaching Scheme:		**Examination scheme**	
Lectures:	**3 hours/week**	**End semester exam (ESE):**	**60 marks**
		Duration of ESE:	**03 hours**
		Internal Sessional Exams (ISE):	**40 marks**

Unit–I:	No. of Lectures: 08 Hours	Marks: 12

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit
Instruction Set Architecture of a CPU (8086/ 8088) :-

- 8086 Internal Architecture
- 8086 Programming Model
- 8086 Register Organization
- 8086 Memory Segmentation
- 8086 Addressing modes

Difference between 8086 and 8088		
Unit–II:	**No. of Lectures: 08 Hours**	**Marks: 12**
8086 Instruction Set Macro and Procedure 8086 Assembler Directives (Basic Directives) DOS/BIOS Interrupts 8086 Memory Banking		
Unit–III:	**No. of Lectures: 09 Hours**	**Marks: 12**
Basic operational concepts – Connection between processor and main memory Instruction formats - zero, one, two, three and One & half address instruction formats Basic Processing Unit:- Some fundamental concepts, Instruction Execution, Hardwired and Micro-programmed Control Unit. I/O device Interface – USB RISC and CISC		
Unit–IV:	**No. of Lectures: 08 Hours**	**Marks: 12**
Important characteristics of memory system Memory Organization: Memory interleaving, Hierarchical memory organization Cache memory, cache size vs. block size, mapping functions, Concepts of - replacement algorithms and write policies. Introduction to – SRAM, DRAM, ROM,PROM, EPROM, Flash Memory		
Unit–V:	**No. of Lectures: 09 Hours**	**Marks: 12**
Number representation: Signed & magnitude, 1s & 2s Compliment. Integer addition & subtraction, Overflow Multiplication of numbers: Booth's algorithm, Bit pairing of multipliers Division : Restoring and non-restoring Division Algorithms Floating Point system: Normalization, Representation in IEEE Single & Double precision formats.		
Text Books:		
1. Douglas V Hall, Microprocessor and Interfacing, Programming and Hardware, Tata McGraw Hill, Revised 2nd Edition. 2. Yu-Cheng Liu and Glenn A. Gibson , Microcomputer Systems: The 8086/8088 Family. Architecture, Programming and Design, Prentice Hall of India, 2nd Edition 3. Carl Hamacher, Computer Organization and Embedded Systems, McGraw Hill Higher Education, , 6th Edition 4. David A. Patterson and John L. Hennessy , Computer Organization and Design: The Hardware/Software Interface , Elsevier, 5th Edition		
Reference Books:		
1. John P. Hayes , Computer Architecture and Organization, WCB/McGraw-Hill, 3rd Edition 2. William Stallings, Computer Organization and Architecture: Designing for Performance, by		

Pearson Education, 10th Edition
3. Vincent P. Heuring and Harry F. Jordan, Computer System Design and Architecture, Pearson Education, 2nd Edition
4. Hamacher, Vransic, Zaky, Computer Organization, McGraw Hill International, 5th Edition
5. Peter Abel, IBM PC Assembly Language and Programming, Pearson,, 5th edition
6. John E. Uffenbeck, The 8086/ 8088 Family: Design, Programming and Interfacing, Pearson, 3rd Edition
7. A. Ray and K. Bhurchandi ,Advanced Microprocessors and Peripherals: Architecture, Programming & Interfacing", Tata McGraw Hill, 3rd Edition
8. B. Ram, Computer Fundamentals Architecture and Organization, New Age International
9. Rajaraman, Computer Organization & Architecture, PHI Learning

Finance & Accounting					
COURSE OUTLINE					
Course Title:	**Finance & Accounting**	**Short Title:**	**FA**	**Course Code:**	
Course description:					
This course deals with the basic concepts of Financial management and Accounting, primary and secondary markets, will be helpful for the managerial level work in engineering field					
Lecture	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	3	**14**	**42**	**3**	
Prerequisite course(s):					
Course objectives:					
1. To provide basic knowledge Business Accounting and Costing. 2. To study accounting concepts, conventions & standard. 3. The study fundamental concepts of Financial Management 4. To gain basic knowledge about Finance for planning & control.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. Understand the meaning, scope, significance, legal aspects and applications of accounting in Engineering field . 2. Understanding and use of book-keeping and the distinction of accounting with book-keeping. 3. Understand and apply Concept Double Entry System, Journal, Ledger for accounting purpose. 4. Understand both the theoretical and practical role of financial management in business corporations. 5. Exposure to primary and secondary markets.					
COURSE CONTENT					
Finance & Accounting			**Semester:**	**IV**	
Teaching Scheme:			**Examination scheme**		
Lectures:	**3 hours/week**		**End semester exam (ESE):**	**60 marks**	
			Duration of ESE:	**03 hours**	
			Internal Sessional Exams (ISE):	**40 marks**	
Unit–I:	**No. of Lectures: 08 Hours**		**Marks: 12**		
Theoretical Framework					
Meaning and Scope of Accounting Accounting Concepts, Principles and Conventions Accounting Standards –Concepts, Objectives, Benefits Elementary study of AS- 1, 2, 3, 6, 9, 10 Users of Financial Accounting Information					

Unit–II:	No. of Lectures: 09 Hours	Marks: 12
Fundamentals of Double Entry Book Keeping System		
Study of Double Entry Book Keeping System Advantages of double Entry Book Keeping System Comparison of Double Entry Book Keeping System with Single Accounting System Types of Accounts- Personal – Impersonal: Real and Nominal 2.5. Rules for Passing Journal Entries for Different Types of Accounts		
Unit–III:	**No. of Lectures: 09 Hours**	**Marks: 12**
Accounting Process		
Journal – Meaning Importance and Utility of Journal Specimen of Journal - Recording of Journal Entries Ledger –Meaning, Need of Ledger Specimen of Ledger -Ledger Posting -Balancing Trial Balance -Meaning and Utility Specimen of Trial Balance – Preparation of Trial Balance Final Accounts for Sole Proprietors Preparation of Trading, Profit And Loss Account and Balance Sheet		
Unit–IV:	**No. of Lectures: 08 Hours**	**Marks: 12**
Scope and Objectives of Financial Management		
Approaches to Financial Management: Traditional View-Modern View- Investment Decisions-Dividend Decisions- Liquidity and Profitability Comparison with Accounting and Economics Financial Management's Importance in Business: Significance of Financial Controller Finance Manager as a Facilitator- Organization Chart of Finance Function- Reason for Centralizing Finance Function Financial Objectives of Business Firm: Profit Maximization Wealth Maximization Value Maximization Other Maximization Objectives		
Unit–V:	**No. of Lectures: 08 Hours**	**Marks: 12**
Raising Finance		
Short term Financing Introduction & Characteristics Sources of Short term Finance Long Term Financing Need for long term financing Sources of Long Term Finance Risk analysis in Capital Budgeting & Sensitivity analysis Primary & Secondary Markets Meaning, Importance & Role Market intermediaries: brokers, dealers, investment bankers		

Bid, Ask or Offer, bid-ask spread, Bull and bear, blue chips, day trading, stop loss, BSE/ NSE Indices
Text Books:
1. Ravi M. Kishore, Financial Management, Taxman Publication, 8th Edition
Reference Books:
1. P. V. Kulkarni B. G. Satyaprasad, Humalaya Publishing House, 3rd Edition 2. Ms. TaralJuthani Ms Urvi Mehta, Book keeping and Accountacy, Target Publication, 1st Edition

Digital Electronics Lab					
LAB COURSE OUTLINE					
Course Title:	**Digital Electronics Lab**	**Short Title:**	**DEL**	**Course Code:**	

Course description:

This course is designed to give a brief understanding of the principles of Digital Techniques and designing of several applications. This course covers different types of codes, Boolean laws, SOP & POS form, K-map optimization technique, arithmetic circuits, code converters, Multiplexer, De-multiplexer and their applications, different types of flip-flops and their applications, sequential circuits such as ripple counter, synchronous counter, Mod-n counter, shift resister and its applications.

Laboratory	Hours/week	No. of weeks	Total hours	Semester credits
	2	14	28	1

End Semester Exam (ESE) Pattern:

Prerequisite course(s):

Physics

Course objectives:

1. To acquire the basic knowledge of digital logic levels and application of
2. Knowledge to understand digital electronics circuits.
3. To prepare students to perform the analysis and design of various digital electronics circuits

Course outcomes:

Upon successful completion of lab Course, student will be able to:

1. Generate a logic circuit for Boolean expression using basic gates.
2. Design a simplified logic circuit using K-Map/ QM method.
3. Create a higher order combinational circuit from lower order combinational circuit.
4. Modify any logic circuit of any type register.
5. Deploy a counter of any modulus using flip-flops.

LAB COURSE CONTENT

Digital Electronics Lab		Semester:	IV
Teaching Scheme:		**Examination scheme**	
Practical:	**2 hours/week**		

Concern faculty member should suitably frame at least FIVE laboratory assignments using any logic simulators like Atanua, Cedar logic etc. from the following list.

1. Verify the truth tables of logic gates OR, AND, NOT, NOR, NAND
2. Design of 4 bit Gray to binary Code Converter.
3. Realization of adders and substractor using IC 7486 and 7404.
4. Realization of 2:4 decoder using basic gates.
5. Realization of 8:1 Mux using basic gates.
6. Verify the truth table of J-K, T, and D Flip-flops using ICs.

7. Verify 4-bit register using IC 7495 8.Verify Decade counter using IC 7490 Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.
Text Books:
1. R P Jain, "Modern Digital Electronics " , MCGraw Hill, 4th Edition 2. A Kumar, "Fundamentals of Digital Circuits" by, Prentice Hall India, 3rd Edition
Reference Books:
1. Thomas L Floyd, "Digital Fundamentals", Pearson Prentice Hall, 8th Edition 2. Jr. Charles H. Roth , "Fundamentals of Logic Design", Thomson Brooks, 5th Edition 3. John F. Wakenly, Digital Design, Principles and Practices, Pearson Education , 4th Edition Anand Kumar, Digital Electronics, PHI 4. R.Anand, Digital Electronics Khanna Publishing House
Guide lines for ICA:
Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Data Structure & Algorithms Lab					
LAB COURSE OUTLINE					
Course Title:	**Data Structure & Algorithms Lab**	**Short Title:**	**DSAL**	**Course Code:**	
Course description:					
This laboratory provides students with a comprehensive study of the C/C++/JAVA programming language in data structures. Classroom lectures stress the strengths of C/C++/JAVA which provide students with the means of writing efficient codes for different data types and data structures.					
Laboratory	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**	
	2	**14**	**28**	**1**	
End Semester Exam (ESE) Pattern:		**Practical (PR)**			
Prerequisite course(s):					
Discrete Mathematics					
Course objectives:					
1. To study linear data structure 2. To study nonlinear data structure 3. To study inter conversions of mathematical notations 4. To study searching and sorting techniques					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
1. Evaluate linear data structure 2. Evaluate inter conversions of mathematical notations 3. Evaluate Tree traversals 4. Evaluate nonlinear data structure. 5. Evaluate searching and sorting techniques.					
LAB COURSE CONTENT					
Data Structure & Algorithms		**Semester:**	**IV**		
Teaching Scheme:		**Examination scheme**			
Practical:	**2 hours/week**	**End semester exam (ESE):**		**25 marks**	
		Internal Continuous Assessment (ICA):		**25 marks**	
Concern faculty member should suitably frame at least FOUR laboratory assignments from the Group A and FOUR experiments from the Group B using C/C++/JAVA from the following list. **(Group A)** 1. Implementation of stack using array or linked list. Performing simple operations like push, pop and display with respect to stack. 2. Implementation of multi-stack / multi-queue in one array. Performing simple operations like push, pop and display with respect to multi-stack.					

3. Implementation of queue using array or linked list.
Performing simple operations like insertion and deletion of an element into the queue.
4. Implementation of circular queue using array or linked list.
Performing simple operations like insertion and deletion of an element into the circular queue.
5. Conversion of infix expression to postfix expression.
Performing simple conversions of given infix expression into postfix expression.
6. Conversion of postfix expression to infix expression.
Performing simple conversions of given postfix expression into infix expression.

(Group B)

1. Implementation of double linked list & perform insertion, deletion and searching.
Performing the operations on double linked list like insertion, deletion and searching.
2. Creation of binary tree & perform all non-recursive traversals.
Create the binary tree and perform the In-order, Preorder and Post-order traversal.
3. Creation of binary search tree & perform insertion, deletion and printing in tree shape.
Create the Binary Search tree performing the operations on BST like insertion, deletion and printing in tree shape.
4. Create a hash table and handle the collision using linear probing with or without replacement
Creation of hash Table and handle the collision using linear probing with or without replacement.
5. Write a program to construct an AVL tree for the given set of keys. Also write function for deleting a key from the given AVL tree.
6.Implementation of Heap sort algorithm Sort the input data using Max-heap/Min-heap algorithm

Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.

Text Books:

1. Seymour Lipschutz, "Data Structures", Schaums Outlines, Tata McGraw Hill, 1st Edition.
2. Ellis Horowitz and SartajSahani, "Fundamentals of Data Structures", Galgotia Publication, 1st Edition
3. Michael T. Goodrich and Roberto Tamassia, Data Structure and Algorithms in JAVA, John Willey and Sons, 4th Edition.

Reference Books:

1. G.S.Baluja, Data Structures through C, Dhanpatrai Publications, 2012
2. Ashok N. Kamthane, Introduction to Data structures in C", Person Publications, 2007 Edition
3. AaromTanenbaum, YedidyahLangsam, Moshe Augenstein, Data structures using C, Pearson Publication, 2nd Edition
4. Alfred Aho, John Hopcroft, Jeffrey Ullman, Data Structures and Algorithms ,Pearson Publications.
5. E.Balagurusamy, Data Structures using C, Tata MacGraw Hill Publications.

6. P.S.Deshpande, O.G.Kakde,"C and Data Structures", dreamtech press Publications.
7. RS Salaria, Data Structures, Khanna Publishing House
8. YashwantKanetkar, Data Structures through C, BPB Publications
9. RB Patel, Expert Data Structures with C++, Khanna Publications

Guidelines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the practical assignments submitted by the students in the form of journal. In the ESE (PR), the students may be asked to perform the practical assignment with minor modification.

Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of the program, execution of the program, type of input and output for the program.

Computer Organization and Architecture Lab					
LAB COURSE OUTLINE					
Course Title:	**Computer Organization and Architecture Lab**	**Short Title:**	**COAL**	**Course Code:**	
Course description:					
This laboratory provides students with a comprehensive study of the basic concepts of 8086 microprocessor and its programming. The lab provides the students with the means of writing efficient 8086 assembly language programs, use of software interrupts & their functions, and single step execution of a program.					

Laboratory	**Hours/week**	**No. of weeks**	**Total hours**	**Semester credits**
	2	**14**	**28**	**1**

End Semester Exam (ESE) Pattern:	**Practical (PR)**
Prerequisite course(s):	
Fundamental knowledge of DOS/Windows Commands and 8086 Assembly Language Programming	
Course objectives:	
1. How to write algorithm and develop the logic of any program. 2. To assemble and execute 8086 assembly language program. 3. To debug the 8086 assembly language program in single step mode. 4. To use software interrupts in an 8086 assembly language program. 5. To perform operations on BCD numbers.	
Course outcomes:	
Upon successful completion of lab Course, student will be able to:	
1. Apply DOS/BIOS interrupts and its functions for input and output operations. 2. Identify and apply 8086 assembly language macro. 3. Understand and apply 8086 assembly language NEAR and FAR procedure 4. Apply various string matching operations. 5. Write program for BCD to HEX conversion and BCD addition.	

LAB COURSE CONTENT			
Computer Organization and Architecture Lab		**Semester:**	**IV**
Teaching Scheme:		**Examination scheme**	
Practical:	**2 hours/week**	**End semester exam (ESE):**	**25 marks**
		Internal Continuous Assessment (ICA):	**25 marks**
Concerned faculty member should suitably frame at least 10 laboratory assignments using 8086			

Assembly Language Programming from the following list.

1. Study of DOS and BIOS interrupts and 8086 Assembler Directives.
2. Program using MACRO: Display personal information using MACRO.
3. Program for Addition/Subtraction of 2 numbers using NEAR procedure.
4. Program for Addition/Subtraction of 2 numbers using FAR procedure.
5. Program for Multiplication/Division of 2 numbers using NEAR procedure.
6. Program for Multiplication/Division of 2 numbers using FAR procedure
7. Program to find out Factorial of any given number using recursive procedure.
8. Program for Password Verification
9. Program to add two BCD numbers.
10. Program for BCD to HEX conversion.
11. Program for HEX to BCD conversion.
12. Program to display System Date/Time.
13. Program using Structure.
14. Program to generate Fibonacci Series.
15. Program for block transfer from one segment to another segment
16. Program to sort the given array in ascending and descending order.

Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.

Text Books:

1. Douglas V Hall, Microprocessor and Interfacing, Programming and Hardware, Tata McGraw Hill, Revised 2nd edition.
2. "IBM PC Assembly Language and Programming", 5th edition by Peter Abel, Pearson.

Reference Books:

1. John E. Uffenbeck, The 8086/ 8088 Family: Design, Programming and Interfacing", By Pearson.
2. A. Ray and K. Bhurchandi , Advanced Microprocessors and Peripherals: Architecture, Programming & Interfacing, Tata McGraw Hill, 3rd Edition by
3. Barry B Bray, "The Intel Microprocessors-Architecture, Programming and Interfacing", Pearson LPE/PHI, 7th Edition.
4. B. Ram, Computer Fundamentals Architecture and Organization, New Age International
5. Rajaraman, Computer Organization & Architecture, PHI Learning

Guidelines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Guidelines for ESE:

ESE will be based on the practical assignments submitted by the students in the form of journal. In the ESE (PR), the students may be asked to perform the practical assignment with minor modification. Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of the program, execution of the program, type of input and output for the program.

IT Workshop

LAB COURSE OUTLINE

Course Title:	**IT Workshop**	**Short Title:**	**ITW**	**Course Code:**	

Course description:

This course deals with the basic simulation operations like one dimensional, two dimensional array, matrix manipulations, vectors, trigonometric functions like sine, tan , cosine with Matlab / Scilab simulation software.

	Hours/week	**No. of weeks**	**Total hours**	**Semester credits**
Theory	**1**	**14**	**14**	**2**
Laboratory	**2**	**14**	**28**	

End Semester Exam (ESE) Pattern:	**Practical (PR)**

Prerequisite course(s):

Fundamental concepts of Mathematics

Course objectives:

1. To familiarize the students in introducing and exploring MATLAB/Scilab / Any other equivalent open source software.
2. To enable the students on how to approach for solving Engineering problems using simulation tools.
3. To prepare the students to use MATLAB/Scilab / Any other equivalent open source software in their project works.
4. To provide a foundation in use of this software for real time applications

Course outcomes:

Upon successful completion of lab Course, student will be able to:

1. Discuss basics of MATLAB/Scilab open source simulation software
2. Demonstrate Mathematical operations in MATLAB /Scilab
3. Illustrate plotting operations on linear expression
4. Demonstrate relational and logical operations on matrix
5. Use of matrix manipulation operations

LAB COURSE CONTENT

IT Workshop		**Semester:**	**IV**
Teaching Scheme:		**Examination scheme**	
Theory	**1 hour / week**	**End semester exam (ESE):**	**25 marks**
Practical:	**2 hours/week**	**Internal Continuous Assessment (ICA):**	**25 marks**

Creating a One-Dimensional Array (Row / Column Vector) Exercise – Creating a vector of even whole numbers between 31 and 75;
Creating a Two-Dimensional Array (Matrix of given size) and (A) Performing Arithmetic

Operations - Addition, Subtraction, Multiplication and Exponentiation. (B) Obtaining Modified Matrix - Inverse, Transpose, with Appended and Deleted Elements;

Performing Matrix Manipulations - Concatenating, Indexing, Sorting, Shifting,Reshaping, Resizing and Flipping about a Vertical Axis / Horizontal Axis;

Creating ArraysX& Y of given size (1 x N) and Performing
(A). Relational Operations - >, <, ==, <=, >=, ~=
(B). Logical Operations - ~, &, |, XOR

Generating a set of Commands on a given Vector (Example: X = [1 8 3 9 0 1]) to
(A). Add up the values of the elements (Check with **sum**)
(B). Compute the Running Sum (Check with **sum**), where Running Sum for element j = the sum of the elements from 1 to j, inclusive.
(C). Compute the Sine of the given X-values (should be a vector).
Also, Generating a Random Sequence using **rand() / randn()** functions and plotting them.

Evaluating a given expression and rounding it to the nearest integer value using Round, Floor, Ceil and Fix functions; Also, generating and Plots of
(A) Trigonometric Functions - sin(t), cos(t), tan(t), sec(t), cosec(t) and cot(t) for a given duration
(B). Logarithmic and other Functions – log(A), log10(A), Square root of A, Real nth root of A.

Generating a Sinusoidal Signal of a given frequency (say, 100Hz) and Plotting with Graphical Enhancements - Titling, Labeling, Adding Text, Adding Legends, Adding New Plots to Existing Plot, Printing Text in Greek Letters, Plotting as Multiple and Sub-Plots; Also, Making Non-Choppy and Smooth Plot of the functions,
$f(x) = \sin(1/x)$ for $0.01 < x < 0.1$ and $g(x) = (\sin x) / x$.

Concern faculty member should suitably frame at least FOUR laboratory assignments from the Group A and FOUR laboratory assignments from the Group B using MatLab / SciLab / any other equivalent open source software from the following list.

Group- A

Matrix operation

1. Create one/two Dimensional Array
2. Insertion and Deletion of element in array.
3. Perform arithmetic operations on array (Addition, Subtraction, Multiplication, Division, Exponentiation, Inverse, Transpose etc.)
4. Performing Matrix Manipulation-Concatenating, Indexing, Sorting, Shifting, Reshaping, Resizing and Flipping about a Vertical Axis/ Horizontal Axis.
5. Perform Relational and Logical operations on two matrix like

a. Relational Operations- >, <, ==, <=, >=, ~=.

b. Logical Operations- ~, &, |, XOR

Group - B

Write an expression and Perform Plot operation

1. Write a linear and differential expression and round it to the nearest integer value using Round, Floor, Ceil and Fix operations.
2. Using linear expression plot the

a. Trigonometric functions-sin(t), cos(t), tan(t), cot(t), sec(t), cosec(t).

b. Logarithmic functions- $\log(A)$, $\log_{10}(A)$, Square root of A, Real n'th root of A.

Generating a Sinusoidal Signal of a given frequency (say, 100Hz) and Plotting with Graphical Enhancements – Title, Labeling, Adding Text, Adding Legends.

3. Generating multiple and subplot for sine, cos, square, triangular etc.
4. Creating a vector X with elements, $X_n = \frac{(-1)^{n+1}}{(2n-1)}$ and adding up 100 elements of the vector, X; And, plotting the functions, x, x^3, e^x and $\exp(x^2)$ over the interval 0<x<4 on
   (A) A Rectangular Plot

   (B) A Semi log Plot

   (C) A log-log Plot

Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.

Text Books:

1. Y. Kirani Singh and B.B. Chaudhari, "MATLAB Programming", PHI, 1st Edition, 2010

Reference Books:

1. Stephen J. Chapman, "MATLAB Programming for Engineers", Thomsan Learning, 3rd Edition, 2007
2. Amos Gilat, "MATLAB An Introduction with Applications", Wiley India, 1st Edition, 2010
3. Rudra Pratap, " Getting Started with MATLAB 7", OXFORD, 1st Indian Edition, 2006
4. www.scilab.org

Guidelines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.
Guidelines for ESE:
ESE will be based on the practical assignments submitted by the students in the form of journal. In the ESE (PR), the students may be asked to perform the practical assignment with minor modification. Evaluation will be based on the paper work of algorithm, understanding of the logic and the syntax, quality of the program, execution of the program, type of input and output for the program.

Environmental Studies					
COURSE OUTLINE					
Course Title:	**Environmental Studies**	**Short Title:**	**EVS**	**Course Code:**	
Course description:					
The course aims to percolate the importance of environmental science and environmental studies.					
COURSE CONTENT					
Environmental Studies		**Semester:**	**IV**		
		Examination scheme			
		End Semester Exam (ESE):	**60 marks**		
		Duration of ESE:	**03 hours**		
		Internal Continuous Assessment (ICA):	**40 marks**		
Unit–I:	**No. of Lectures: 02 Hours**				
Multidisciplinary nature of environmental studies Definition, scope and importance Need for public awareness.					
Unit–II:	**No. of Lectures: 08 Hours**				
Natural Resources : **Renewable and non-renewable resources** Natural resources and associated problems. a. Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b. Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c. Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d. Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e. Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. f. Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.					
Unit–III:	**No. of Lectures: 06 Hours**				
Ecosystems • Concept of an ecosystem.					

- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :-
  a. Forest ecosystem
  b. Grassland ecosystem
  c. Desert ecosystem
  d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit–IV:	No. of Lectures: 08 Hours	

Biodiversity and its conservation

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographic classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- Hot-sports of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit–V:	No. of Lectures: 08 Hours	

Environmental Pollution

Definition

- Cause, effects and control measures of :-
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Marine pollution
  e. Noise pollution
  f. Thermal pollution
  g. Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.

- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit–VI:	No. of Lectures: 07 Hours	

Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear
- Accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness.

Unit–VII:	No. of Lectures: 06 Hours	

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Program
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

Unit–VIII:	No. of Lectures:	

Field work

- Visit to a local area to document environmental assets, river / forest / grassland / hill /

mountain

- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

Guidelines for ICA:

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Reference Books:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
9. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadhav, H &Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
13. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
16. Rao M N. &Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
17. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
18. Survey of the Environment, The Hindu (M) Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
19. ErachBharucha, Textbook of Environmental Studies, University Press
20. MP Poonia& SC Sharma, Environmental Studies, Khanna Publishing House
21. Rajagopalan, Environmental Studies, Oxford University Press

Internship - I

Internship is a mandatory and non-credit course. It is mandatory for all admitted students to undergo Internship during the degree course. The course Internship – I shall be of THREE weeks duration during summer vacation after Semester - IV. Following are the intended objectives of internship training:

- Will expose Technical students to the industrial environment, which cannot be simulated in the classroom and hence creating competent professionals for the industry.
- Provide possible opportunities to learn, understand and sharpen the real time technical / managerial skills required at the job.
- Exposure to the current technological developments relevant to the subject area of training.
- Experience gained from the 'Industrial Internship' will be used in classroom discussions.
- Create conditions conducive to quest for knowledge and its applicability on the job.

Students shall choose to undergo Internship / Innovation / Entrepreneurship related activities for Internship. Students shall choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/ NGO's/ Government organizations / Micro / Small / Medium enterprises / academic institutions / research institutions. In case student want to pursue their family business and don't want to undergo internship, a declaration by a parent may be submitted directly to the Department Head / TPO.

During the last year of FOUR year Bachelor of Engineering course the student should take project work, as specified in the curriculum, based on the knowledge acquired by the student during the degree course and during Internship. The project work provides an opportunity to build a system based on area where the student likes to acquire specialized skills. The work may also be on specified task or project assigned to the student during Internship.

The internship activities and list of sub-activities for Internship – I are as under.

- Inter/ Intra Institutional Activities:
    - Training with higher Institutions such as IITs, NITs, University Departments, Recognized Research Labs etc.
    - Soft skill training organized by Training and Placement Cell of the respective institutions
    - Online certification courses by SWAYAM, NPTEL, QEEE etc.
    - Learning at Departmental Lab/Tinkering Lab/ Institutional workshop
    - Working for consultancy/ research project within the institutes
    - Training on Software (As per the need of respective branch)
    - Field Survey / Case Study
- Internship:
    - Internship with Industry/Govt. / NGO/ PSU/ Any Micro/ Small/ Medium enterprise/ academic institutions / research institutions
    - Online Internship

Faculty Mentor/Supervisors have to play active roles during the internship and minimum 20 students are to be supervised by each faculty mentor or as per the departmental strength. Mentor shall be responsible for selection of Internship activities by the student under his/her supervision and shall avoid repetition of activities by the student. The college / Institute shall facilitate internship for the students.

Every student is required to prepare a file for Internship – I containing documentary proofs (daily training diary, comprehensive report and completion certificate) of the activities done by him/her. The students should record in the daily training diary the day to day account of the observations, impressions, information gathered and suggestions given, if any. It should contain the sketches & drawings related to the observations made by the students. The daily training diary should include Date, Time of Arrival, Time of Departure, Main points of the day. The daily training diary should be signed after every day by the supervisor/ in charge of the section where the student has been working.

After completion of Internship, the student should prepare a comprehensive report to indicate what he / she has observed and learnt in the training period. The report should include Internship Objectives (in measurable terms), Internship Activities, and Internship Outcome.

The completion certificate should be signed by the supervisor / in charge of the section where the student has been working with performance remark as Satisfactory / Good / Excellent.

The evaluation of Internship – I shall be in Semester – V. The evaluation shall be done by expert committee constituted by the concerned department including Department Head/ TPO/ faculty mentor or guide. It should be evaluated on the basis of the following criteria:

- Regularity in maintenance of the diary.
- Adequacy & quality of information recorded.
- Originality.
- Adequacy and purposeful write-up.
- Practical applications, relationships with basic theory and concepts taught in the course.
- Skill / knowledge acquired

Hence the satisfactory completion of Internship – I shall be submitted to the university at the end of Semester - VIII of FOUR year Bachelor of Engineering course. Only after successfully completion of Internship- I (during summer vacation after Semester – IV) and Internship- II (during summer vacation after Semester – VI), Internship should be printed in the final year mark sheet as COMPLETED.