Study &Evaluation Scheme

In Collaboration with

Bachelor of Technology
(Computer Science & Engineering)

SPECIALIZATION IN APPLICATION DEVELOPMENT USING CLOUD AND ANALYTICS PLATFORMS

[Applicable w.e.f. Academic Session 2018-19 till revised]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

TEERTHANKER MAHAVEER UNIVERSITY

Study & Evaluation Scheme
Bachelor of Technology

SUMMARY

Programme	:	B. Tech (Computer Science & Engineering) Specialization In APPLICATION DEVELOPMENT USING CLOUD AND ANALYTICS PLATFORMS.
Duration	:	Four year full time (Eight Semesters)
Medium	:	English
Minimum Required Attendance	:	75 %
Maximum Credit	:	217
Minimum credit required for the degree	:	201

Assessment Theory :

Internal	External	Total
40	60	100

Internal Evaluation (Theory Papers)

Class Test I	Class Test I I	Class Test I I	Attendance and Punctuality	Assignment	Total
Best two out of the three					
10	**10**	10	10	10	**40**

Project Phase-1

Internal	External	Total
50	50	100

Evaluation of Practical/ Industrial Training/ Project Phase-2 :

Internal	External	Total
50	50	100

Duration of Examination :

External	Internal
3 hrs.	1 ½ hrs

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester examination and teachers continuous evaluation. (i.e. both internal and external). A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have secured at least 45% marks in aggregate to clear the semester.

Question Paper Structure

1. *The question paper shall consist of 6 questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 2 marks each).*
2. *Out of the remaining five questions, The long answer pattern will have internal choice with unit wise questions with internal choice in each unit. In units having numerical, weightage and information should be available both in the syllabus and the paper pattern. The weightage of Question No. 2 to 6 shall be 10 marks each.*

Internal Evaluation (50 Marks)

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 Marks)

The external evaluation would be conducted by the external examiner based on the experiment conducted during the examination.

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Study & Evaluation Scheme

Programme: B.Tech. (CS) **Application Development Using Cloud And Analytics Platforms**
SEMESTER I

S.N.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	*T*	*P*		*Internal*	*External*	*Total*
1.	EAS116	Engineering Mathematics – I	3	1	0	4	40	60	100
2.	EAS113/213 EAS 112/212	Engineering Chemistry/ Engineering Physics-I	3	1	0	4	40	60	100
3.	IBD111	Software Foundation and Programming (with 'C')	3	0	0	3	40	60	100
4.	EEE 117/ 217 EEC111/211	Basics Electrical Engineering/ Basics Electronics Engineering	3	1	0	4	40	60	100
5.	TMU101	Environmental Studies	1	2	0	3	40	60	100
6.	EHM199	English communication and soft skills – I	1	1	2	2	50	50	100
7.	EAS 163/263 EAS 162/262	Engineering Chemistry (Lab)/ Engineering Physics (Lab)	0	0	2	1	50	50	100
8.	IBD151	Software Foundation and Programming 1 (with 'C') Lab	0	0	4	2	50	50	100
9.	EEE 161/261 EEC 161/261	Basic Electrical Engineering (Lab)/ Basics Electronics Engineering (Lab)	0	0	2	1	50	50	100
10.	EME 161/261 EME 162/262	Engineering Drawing (Lab)/ Workshop Practice (Lab)	0	0	4	2	50	50	100
		Total	**14**	6	**14**	**27**	**450**	**550**	**1000**

SEMESTER II

S. N.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	*T*	*P*		*Internal*	*External*	Total
1.	EAS211	Engineering Mathematics-II	3	1	0	4	40	60	100
2.	EAS 112/212 EAS113/213	Engineering Physics/ Engineering Chemistry	3	1	0	4	40	60	100
3.	EEC 111/211 EEE 117/ 217	Basic Electronic Engineering /Basics Electrical Engineering	3	1	0	4	40	60	100
4.	IBD211	Programming with Python	3	0	0	3	40	60	100
5.	EHM249/ BHM261	English communication and soft skills – II	1	1	2	2	40	60	100
6.	EAS 162/262 EAS 163/263	Engineering Physics Lab/ Engineering Chemistry (Lab)	0	0	2	1	50	50	100
7.	EEC 161/261 EEE 161/261	Basic Electronics Engineering Lab/ Basic Electrical Engineering (Lab)	0	0	2	1	50	50	100
8.	IBD252	Programming with Python Lab	0	0	2	1	50	50	100
9.	EME 161/261 EME 162/262	Workshop Practice (Lab)/ Engineering Drawing (Lab)	0	0	4	2	50	50	100
		Total	**13**	4	**12**	**22**	**400**	**500**	**900**

SEMESTER III

S.N	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	*T*	*P*		*Internal*	*External*	*Total*
1.	ECS305	Data Structure using C	3	1	0	4	40	60	100
2.	IBD311	OOPS with Java	3	0	0	3	40	60	100
3.	EEC 302	Digital electronics & Computer Organization	3	1	0	4	40	60	100
4.	EAS 301	Mathematics III	3	1	0	4	40	60	100
5.	EAS 303	Human Values & Professional Ethics	2	0	0	2	40	60	100
6.	EHM349	English Communication and Soft Skills-III	1	1	2	2	40	60	100
7.	ECS 355	Data Structure using C Lab	0	0	4	2	50	50	100
8.	IBD351	OOPS with Java Lab	0	0	4	2	50	50	100
9.	EEC 351	Digital Logic & Circuit Lab	0	0	2	1	50	50	100
		Total	**15**	**4**	**12**	**24**	**390**	**510**	**900**

SEMESTER IV

S. N	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	*T*	*P*		*Internal*	*External*	*L*
1.	ECS 401	Theory of Computation	3	1	0	4	40	60	100
2.	ECS 405	Computer Based Numerical & Statistical Techniques	3	1	0	4	40	60	100
3.	IBD411	Information Management Basics	3	1	0	4	40	60	100
4.	IBD413	Agile Development Methodologies	3	1	0	4	40	60	100
5.	ECS 406	Operating System	3	1	0	4	40	60	100
6.	EHM 402	Organizational behaviour	3	0	0	3	40	60	100
7.	EHM499	English Communication and soft Skills-IV	0	0	4	2	50	50	100
8.	ECS 453	Computer Based Numerical & Statistical Techniques (Lab)	0	0	2	1	50	50	100
9.	IBD451	Information Management Basics (Lab)	0	0	4	2	50	50	100
10.	IBD453	Agile Development Methodologies Lab	0	0	2	1	50	50	100
11.	ECS 455	OS Lab with software Engineering (LAB)	0	0	2	1	50	50	100
		Total	**18**	**5**	**14**	**30**	**490**	**610**	**1100**

SEMESTER V

S.N	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	*T*	*P*		*Internal*	*External*	*L*
1.	ECS501	Compiler Design and Construction	3	1	0	4	40	60	100
2.	ECS 507	Mobile Communication	3	1	0	4	40	60	100
3.	ECS503	Analysis and Design of Algorithm	3	1	0	4	40	60	100
4.	*IBD513	Cloud Application Development	3	1	0	4	40	60	100
5.	IBD 514	Hadoop Fundamentals	3	1	0	4	40	60	100
6.	ECS 506	ERP System	3	1	0	4	40	60	100
	ECS 502	Computer Architecture							
	ECS 509	Multimedia & Animation							
	EHM503	Engineering and Managerial Economics							
7.	ECS552	Analysis and Design of Algorithm (Lab)	0	0	4	2	50	50	100
8	IBD 552	Cloud Application Development (Lab)	0	0	4	2	50	50	100
9	IBD 553	Hadoop Fundamentals (Lab)	0	0	4	2	50	50	100
10.	ECS591	Industrial Training	0	0	0	2	50	50	100
		Total	**18**	**6**	**12**	32	**440**	**560**	**1000**

*ICM513- Cloud Application Development is included Certification Exam also from IBM

SEMESTER VI

S. N	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	*T*	*P*		*Internal*	*External*	*L*
1.	ECS 612	Natural Language Processing	3	1	0	4	40	60	100
2.	ECS 608	Computer Network	3	1	0	4	40	60	100
3.	*IBD613	Big Data Engineering	3	1	0	4	40	60	100
5.	ECS 606	Real Time Operating System	3	1	0	4	40	60	100
	ECS 607	Soft computing							
	ECS 609	E-Commerce							
	EEC606	Microprocessor & Application							
6.	ECS 657	Computer Network Lab	0	0	2	1	50	50	100
7.	IBD653	Big Data Engineering (Lab)	0	0	2	1	50	50	100
9.	ECS 652	Seminar/Presentation	-	-	-	2	50	50	100
		Total	**12**	**4**	**4**	**20**	**310**	**390**	**700**

*ICM613- Big Data Engineering is included Certification Exam also from IBM

SEMESTER VII

SEMESTER VII									
S.N.	**Course Code**	**Subject**	**Periods**			**Credit**	**Evaluation Scheme**		
			L	***T***	***P***		***Internal***	***External***	***L***
1.	ICM 713	Advanced RDBMS	3	1	0	4	40	60	100
2.	ECS 703	Cryptography & Network Security	3	1	0	4	40	60	100
3.	ICM 715	Spring Framework	3	1	0	4	40	60	100
4.	*ICM716	Artificial Intelligence	3	1	0	4	40	60	100
PRACTICAL LABS									
5.	ICM 753	Advanced RDBMS (Lab)	0	0	4	2	50	50	100
6.	ECS 752	Cryptography & Network Security (Lab)	0	0	4	2	50	50	100
7.	ICM755	Spring Framework (Lab)	0	0	4	2	50	50	100
8.	ICM 756	Artificial Intelligence (Lab)	0	0	4	2	50	50	100
9.	ECS 791	Industrial Training & Presentation	0	0	0	6	50	50	100
10.	ECS 799	Project Work Phase –I (Synopsis, Literature Survey & Presentation)	0	0	10	5	50	50	100
		Total	**12**	**4**	**26**	**35**	**460**	**540**	**1000**

*ICM716- Artificial Intelligence is included Certification Exam also from IBM

SEMESTER VIII

S.N	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	*T*	*P*		*Internal*	*External*	*L*
1.	ECS801	Data Warehousing and Data Mining with R-programming	3	1	0	4	40	60	100
2.	ECS806	Android Programming	3	1	0	4	40	60	100
3.	ECS 807	Concepts of IoT(Internet of Things)	3	1	0	4	40	60	100
4.	ECS809	Pattern Recognition	3 1	1	0	4	40	60	100
	ECS810	Neural Network							
	ECS811	Natural Language Processing							
5.	ECS 851	Data Warehousing and Data Mining with R- programming (LAB)	0	0	3	1.5	50	50	100
6.	ECS854	Android Programming(LAB)	0	0	3	1.5	50	50	100
7.	ECS 899	Project Work Phase-2 (Report, Analysis, Implementation/ Simulation and Presentation)	0	0	16	8	50	50	100
		Total	12	4	22	27	310	390	700

Semester I
Engineering Mathematics-I

Course Code: EAS116 **L-3 T-1 P-0 C-4**

Objective:

- To familiarize the basics of matrices, differential calculus, multiple integrals and vector calculus.
- To solve all problems related to matrices, calculus and vectors.

Course Outcomes:

On successful completion of this course, students will be able to:

- Calculate eigenvalues and eigenvectors, apply Caley-Hamilton theorem, and diagonalizable of symmetric matrices and demonstrate the nature of quadratic forms.
- Demonstrate understanding of
- the derivatives of functions of several variables, viz., partial and total differentiation, and differentiation of implicit functions and optimize the functions of several variables.
- Evaluate double integration and triple integration using Cartesian, polar co-ordinates and the concept of Jacobian of transformation from one coordinate system to another coordinate system.
- Identify the improperness in integrals and evaluate the integrals using appropriate mathematical tools and how to apply beta and gamma integrals keeping improperness in mind.
- Perform gradient, divergence and curl operations in vector and scalar fields, apply Green's theorem, Gauss Theorem, and Stokes theorem as the generalization of fundamental theorem of Integral calculus.

Unit A (Unit A is for building a foundation and shall not be a part of examination)

Some general theorem on deviation-Derivative of the sum or difference of two function, Derivative of product of two functions, Derivative of quotient, Derivative of Trigonometry function, Derivative of inverse Trigonometry function, Logarithms differential, Integration of 1/x, e^x, Integration by simple substitution. Integrals of the type f' (x), [f (x)]^n, $\frac{f'(x)}{f(x)}$, Integration of 1/x, e^x, tan x, cot x, sec x, cosec x , Integration by parts, Integration using partial fractions.

Course Contents-

Unit I **(Lectures 08)**

Determinants- Rules of computation; Linear Equations and Cramer's rule.

Matrices: Elementary row and column transformation; Rank of matrix; Linear dependence; Consistency of linear system of equations; Characteristic equation; Cayley-Hamilton Theorem (without proof); Eigen values and Eigen vectors; Complex and Unitary matrices.

Unit II **(Lectures 08)**

Differential Equation--First order first degree Differential equation: variable separable, Homogeneous method, Linear differential equation method, Exact Differential equation.

Unit III **(Lectures 08)**

Differential Calculus: Leibnitz theorem; Partial differentiation; Euler's theorem; Change of variables; Expansion of 10function of several variables. Jacobians, Error function.

Unit IV **(Lectures 08)**

Multiple Integrals: Double integral, Triple integral, Beta and Gamma functions; Dirichlet theorem for three variables, Liouville's Extension of Dirichlet theorem.

Unit V **(Lectures 08)**

Vector Differentiation:

Vector function, Differentiation of vectors, Formulae of Differentiation, Scalar and Vector point function, Geometrical Meaning of Gradient, Normal and Directional Derivative, Divergence of a vector function, Curl of a vector

Vector Integration:

Green's theorem, Stokes' theorem; Gauss' divergence theorem.

Text Books-

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers.
2. Prasad C., *Engineering Mathematics for Engineers*, Prasad Mudralaya.
3. Dass H.K., Engineering Mathematics Vol-I, S. Chand.

Reference Books-

1. Kreyszig E., *Advanced Engineering Mathematics*, Wiley Eastern.
2. Piskunov N, *Differential & Integral Calculus*, Moscow Peace Publishers.
3. Narayan Shanti, *A Text book of Matrices*, S. Chand

***Latest editions of all the suggested books are recommended.**

Semester I
Engineering Physics-I

Course Code: EAS112/212 **L-3 T-1 P-0 C-4**

Objective: To understand the fundamentals of physics like interference of light, diffraction, Polarization, elements of material science, special theory of relativity etc.

Course Outcome:
Students undergoing this course will have a fundamental understanding of basic physics concepts and its applications in a day to day life & also able to explain the basic understandings of the special theory of relativity, Polarization, elements of material science.

Unit A (Unit A is for building a foundation and shall not be a part of examination)
Optics- Properties of light, Lance, Mirror, Focal length, Intensity, Power, Eye-piece, Work, Energy and its types, Waves, longitudinal and transverse waves, Time period, Frequency

Course Contents-

Unit-I **(08 Lectures)**

Interference of Light: Introduction, Principle of Superposition, Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.

Unit-II **(08 Lectures)**

Diffraction: Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. **Single slit diffraction**: Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. **Resolving Power**: Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.

Unit-III **(08 Lectures)**

Polarization: Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.

Unit-IV **(08 Lectures)**

Elements of Material Science: Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. **Hall Effect:** Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.

Unit-V **(08 Lectures)**

Special Theory of Relativity: Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.

Text Books:

1. Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.
2. Engineering Physics, Bhattacharya & Tandon, Oxford University Press.
3. Optics, Ajay Ghatak, Tata Mc Graw-Hill.
4. H. K. Malik & A.K. Singh, Engineering Physics, McGraw-Hill, latest edition.

Reference Books:

1. F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw-Hill.
2. Concept of Modern Physics, Beiser, Tata McGraw-Hill.
3. R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.

***Latest editions of all the suggested books are recommended.**

Semester I
Engineering Chemistry

Course Code: EAS113/213 **L-3 T-1 P-0 C-4**

Objective:

The basic objective of Engineering Chemistry is to educate the students about the chemical aspects of engineering and to provide leadership in advanced studies of engineering, in industry, academia and government.

Course Outcomes:

Student after successful completion of course must possess skills to think critically and analyze chemical problems. Students are also expected to learn solving chemistry problems with an engineering purview. Laboratory work is intended for students to learn conducting experiments, and analyze experimental data.

Course Contents:

UNIT I **(Lecture 08)**

Water and Its Industrial Applications: Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgon etc.

UNIT II **(Lecture 08)**

Fuels and Combustion: Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.

UNIT III **(Lecture 08)**

Lubricants: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement and Refractories:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, **Refractories.** Introduction, classification and properties of refractories.

UNIT IV **(Lecture 08)**

Polymers: Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.

UNIT V **(Lecture 08)**

A. Instrumental Techniques in chemical analysis: Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law.

B. Water Analysis Techniques: Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.

Text Books:

1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
2. Lee I.D., Inorganic Chemistry.
3. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books:

1. Morrison & Boyd, Organic Chemistry, Prentice Hall
2. Barrow Gordon M., Physical Chemistry, McGraw-Hill.
3. Manahan Stanley E., Environmental Chemistry, CRC Press.

***Latest editions of all the suggested books are recommended.**

Semester I
ESSENTIALS OF SOFTWARE FOUNDATION AND PROGRAMMING (with 'C')

Course Code: IBD 111 **L-3, T-0, P-0, C-3**

Module Title : Software Foundation and Programming - Part 1 (with 'C')
Programme : B.Tech (CSE) in Application Development Using Cloud And Analytics Platforms in association with IBM
Term : 1st year 1st Semester
Credits : 3

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:
Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:
Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Indicative Contents:

Topic	Coverage	No. of Lectures
Unit 1	Brief History of Computing, Introduction to computing	**6**
Unit 2	The Structure of C programs, Literals, variables and types, Expressions, operators, Conditionals, Loops and random numbers, Arrays, Functions, Pointers and Dynamic Memory Allocation, Structures, Applications: searching and sorting, File input and output	**28**
Unit 3	Open Standards, Open Source and IBM, Introduction to Linux, Introduction to PHP	**6**
	Total	**40**

Text Material & resources: IBM Course Material

Essentials of Software Foundation and Programming - Part 1

Detailed Syllabus Contents of Software Foundation and Programming 1 (with 'C')

Unit	Topics
UNIT-1	• Introduction to computer • History • First Computing device • Analog Computers • Digital Computers • Electromechanical digital computers • Modern Computers • Concept of modern computers • Stored Programs • Transistors • Integrated circuits • Introduction to program • Stored program architecture • Machine code • Programming language • Low level language • High level language Forth generation languages • Memory • Input/output • Multitasking • Multiprocessing

UNIT-1	• The internet revolution • Introduction • The ARPANET • TCP/IP • Birth of internet • Birth of world wide web • Applications of world wide web Computer Programming Languages • Introduction • Early programming languages • Procedure Oriented • C language • Object oriented languages • C++,Java • What is C Language • Why C Language • Future in C Language • Summary • Prerequisite in C Language • Installation of C • What is Data Types in C Language with practical • Integers, long and short in C Language with practical • Integers, signed and unsigned in C Language with practical • Chars, signed and unsigned in C Language with practical • Floats and Doubles in C Language with practical •
UNIT-2	• Constants in C with practical • Variables in C with practical • Keywords in C with practical • How to get input from user with practical • C library function – printf() • How to display output to user with practical • C library function – scanf() • Comparison operators • Conditional Constructs • If Keyword • Else if • Flow control • Programs related to Conditional statements
UNIT-2	• for Loop in C Language with practical • While Loop in C Language with practical • Do-While Loop in C Language with practical • Programs related to looping statements • Break in C Language with practical • Continue in C Language with practical • Goto statement in c language • Explaning the usage of break,continue,goto Statements

	• What is a Function in C Language with practical • Passing Values between Functions in C Language with practical • Call by Value in C Language with practical • Call by Reference in C Language with practical
UNIT-2	• Void as a parameter, pointer and result • Parameterizing the main function • External function and the extern declaration. • Header files and their role • An Introduction to Pointers • Pointer Notation in C Language • Back to Function Calls in C Language with practical • Recursion in C Language with practical • What are Arrays in C Language • A Simple Program Using Array • How to Initialize Array in C Language with practical • Pointers and Arrays in C Language with practical • One Dimensional Arrays in C Language with practical
UNIT-2	• Two Dimensional Arrays in C Language with practical • Initializing a 2-Dimensional Array with practical • Pointers and 2-Dimensional Arrays with practical • Pointer to an Array with practical • Passing 2-D array to a Function with practical • Array of Pointers with practical • Three Dimensional Array with practical • Programs related to looping arrays
UNIT-2	• What are Strings in C Language • How to get length of a string in C Language using strlen( ) with practical • How to copy a string in C Language using strcpy( ) with practical • How to concatenate a string in C Language using strcat( ) with practical • How to compare two string in C Language using strcmp( ) with practical
UNIT-2	• What is Structures in C Language • Why Use Structures in C Language • Declaring a Structure in C Language with practical • Accessing Structure Elements in C Language with practical • How Structure Elements are Stored with practical • Array of Structures in C Language with practical • Additional Features of Structures with practical • Uses of Structures with practical
UNIT-2	• Memory allocation and deallocation: malloc() and free() functions • Difference between malloc(),alloc(),realloc() • Arrays of pointers vs. multidimensional • Programs related to looping statements
UNIT-2	• File Input/Output in C Language with practical

	• File Operations in C Language with practical • Opening a File in C Language with practical • Reading from a File in C Language with practical • Closing the File in C Language with practical • A File-copy Program in C Language • Writing to a File in C Language with practical • Closing the File in C Language with practical • File Opening Modes
UNIT-2	• Operations On Bits in C Language with practical • Bitwise Operators with practical • One's Complement Operator with practical • Right Shift Operator with practical • Left Shift Operator with practical • Bitwise AND Operator with practical • Bitwise OR Operator with practical • Bitwise XOR Operator with practical • Enumerated Data Type with practical • Uses of Enumerated Data Type with practical •
UNIT-2	• The C Preprocessor in C Language • Features of C Preprocessor • Macro Expansion in C Language • Macros with Arguments with practical • Macros versus Functions with practical • File Inclusion in C Language with practical • #if and #elif Directives with practical • Miscellaneous Directives in C Language
UNIT-2	• User defined types-why? • Pointers to functions • Analyzing and creating complex declarations • Scopes of declarations, storage classes • Predefined Preprocessor symbols • Macro operators • Pointers to functions • Recurssion • Importance of Recurssion • Implementation of recursion
UNIT-3	• Introduction to linux • Linux commands • Introduction to php • Webpages,websites,web application • Variables in php • Data types in php • Operators in php
UNIT-3	• How to write a script • POST vs GET

	• Global Variables • File uploading in php • Session & cookies • Introduction to mysql • Creating a table • Updating a table • Altering a table • Inserting values in table • Selecting records from a table • Updating records of a table • Drop table query • Parsing data to query string

Semester I
Basic Electrical Engineering

Course Code: EEE117/217 **L-3, T-1, P-0**
C-4

Objective- To understand the fundamental concept of Electrical Engineering like D.C. Network, A.C. Network, Measuring Instruments, Energy Conversion Devices etc.

Course Outcome:

- Students are expected to learn the physical recognition of different electrical components like Resistances, Inductances, Capacitances and their ratings.
- Students are expected to have learnt the verifications of basic laws of electric circuits like Ohm's law and Kirchhoffs' laws.
- Students are expected to connect electric circuits, and able to use electric instruments to perform experiments.
- Cite the operating principles and identify various ac, dc machines and transformers.

Course Contents-

Unit I **(Lectures 10)**

D.C. Network Theory: Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.

Unit II **(Lectures 10)**

Steady State Analysis of A.C. Circuits: Sinusoidal and phasor representation of voltage and Current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.

Unit III **(Lectures 06)**

Basics of Measuring Instruments: Introduction to voltmeter, ammeter, Wattmeter & Energy meter.

Unit IV **(Lectures 06)**

Single phase Transformer: Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.

Unit V **(Lectures 08)**

Three Phase A.C. Circuits: Line and phase voltage/current relations; three phase power, power measurement using two wattmeter method. Introduction to earthing and electrical safety.

Text Books-

1. V. Del Toro, Principles of Electrical Engineering, Prentice-Hall International.
2. W.H. Hayt & J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.

3. Nagrath I.J., Basic Electrical Engineering, Tata McGraw Hill.

Reference Books-

1. Fitzgerald A.E & Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill.
2. A Grabel, Basic Electrical Engineering, McGraw Hill.
3. Cotton H., Advanced Electrical Technology, Wheeler Publishing.

***Latest editions of all the suggested books are recommended.**

Semester I
Basic Electronics Engineering

Course Code: EEC111/211 **L-3, T-1, P-0 C-4**

Objective- To understand the basic concept of Electronics Engineering like p-n Junction, Bipolar Junction Transistor, Field Effect Transistor, Operational Amplifier and switching theory.

Course Outcomes:

On successful completion of this course students will be able to:

- Enumerate the basics of electric circuit elements, related terminologies and fundamental laws governing the operation and analysis of those circuits with DC sources and laws, and also concepts related to magnetic circuits.
- Illustrate common solid-state devices & access their characteristic and explain the basic of logic gates.

Course Contents

UNIT I **(Lectures 08)**

p-n Junction: Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator.

UNIT II **(Lectures 08)**

Bipolar Junction Transistor (BJT): Basic construction, transistor action; CB, CE and CC configurations, input/output characteristics, Relation between α, β & γ, Biasing of transistors: Fixed bias, emitter bias, potential divider bias.

UNIT III **(Lectures 08)**

Field Effect Transistor (FET): Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.

UNIT IV **(Lectures 08)**

Operational Amplifier (Op-Amp): Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.

UNIT V **(Lectures 08)**

Switching Theory: Number system, conversion of bases (decimal, binary, octal and hexadecimal numbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR & NOT, Seven segment display & K map.

Text Books-

1. Robert Boylestad & Louis Nashelsky, Electronic Circuit and Devices, Pearson India.
2. Millman & Halkias, Integrated Electronics, McGraw Hill.
3. Millman & Halkias, Electronics Devices and Circuits, McGraw Hill.
4. Morris Mano M., Digital Design, Prentice Hall.

Reference Books-

1. Sedra and Smith, Microelectronic Circuits, Oxford University Press.
2. Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.
3. Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.

***Latest editions of all the suggested books are recommended.**

Semester I
Environmental Studies

Course Code: TMU101 **L-1 T-2 P-0 C-2**

Objective: ***To create awareness among students about environment protection***.

Course Outcomes: Based on this course, the graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

Course Content:

Unit I (Lectures 08)

Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, concept of sustainability & sustainable development.

Ecology and Environment: Concept of an Ecosystem- its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid & Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.

Unit II (Lectures 08)

Natural Resources: Renewable & Non-Renewable resources; Land resources and landuse change; Land degradation, Soil erosion & desertification. Deforestation: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. Energy Resources: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies. Biodiversity: Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Biogeographical Classification of India

Unit III (Lectures 08)

Environmental Pollutions: Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies.

Unit IV (Lectures 08)

Environmental policies & practices: Climate change & Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context

Unit V (Lectures 08)

Human Communities & Environment: Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case study

Field Work:

1. Visit to an area to document environmental assets; river/forest/flora-fauna etc.
2. Visit to a local polluted site: urban/ rural/industrial/agricultural.
3. Study of common plants, insects, birds & basic principles of identification.
4. Study of simple ecosystem; pond, river etc.

Text Books:

1. "Environmental Chemistry", De, A. K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters, G. M., Prentice Hall India Pvt. Ltd.
3. "Fundamentals of Ecology", Odem, E. P., W. B. Sannders Co.

Reference Books:

1. "Biodiversity and Conservation", Bryant, P. J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication

***Latest editions of all the suggested books are recommended.**

Semester I
English Communication and Soft Skills – I

Course Code: EHM199 **L-1 T-1 P-2 C-2**

Objectives:

1. To remove the phobia of conversing in English.
2. To make the learners able to express themselves among peers & teachers.
3. To enable students improve their vocabulary.
4. To enable the learners introduce themselves in English in their real life situations.

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

1. Remove fear of speaking in English among peers & teachers.
2. Develop the ability to speak in English (even if grammatically not correct).
3. Use vocabulary taught for speaking and writing simple sentence for day to day conversation.
4. Use taught vocabulary for writing applications for different purposes.

Unit – I Fear of Failure, Reasons of Fear of Failure & How to overcome it (12 hours)

- Self-Introduction
- Identifying strengths and weakness
- Fear of Failure: Signs of Fear of Failure, Reasons of Fear of Failure, Strategies to overcome Fear of Failure
- Positive Attitude
- Motivation
- Building Self Confidence

Unit – II Confidence, Presentability, Etiquettes & Manners (10 hours)

- Body Language: Facial Expression, Eye Contact, Gesture, Posture, Tips to have appropriate body language
- Grooming & Dressing Sense
- Etiquette & Manners: Social Etiquettes, Telephonic Etiquettes, Dining Etiquettes, Etiquettes to handle cultural differences, Etiquettes of Effective Conversation.
- Problem Sounds (s-sh,j-z,v-b)

Unit – III Conversation Practice, commonly made mistake & Initiating a conversation (10 hours)

- Vocabulary of commonly used words (50 Words)
- Conversation Practice: At College, At Bank, At Ticket Counter (Railway Station & Movie Theatre)
- How to initiate a conversation
- Commonly made mistakes in conversation
- Basics of Communication: 7Cs of Communication

Unit – IV Application writing (08 hours)

- Format & Style of Application Writing
- Practice of Application writing on common issues.

Reference Books:

- Mitra, Barun. K. "*Personality Development and Soft skills*" New Delhi: Oxford University Press.
- Kumar, Sanjay. & Pushp Lata. "*Communication Skills"* New Delhi: Oxford University Press.
- Carnegie Dale. "*How to win Friends and Influence People*" New York: Simon & Schuster, 1998

- Harris, Thomas. A. "*I am ok, You are ok*" New York: Harper and Row, 1972
- Coleman, Daniel. "*Emotional Intelligence*" Bantam Book, 2006

Methodology:

1. Language Lab software.
2. The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion.
3. Conversational Practice will be effectively carried out by Face to Face & Via Media (Telephone, Audio-Video Clips)
4. Modern Teaching tools (PPT Presentation, Tongue-Twisters & Motivational videos with sub-titles) will be utilized.

Note:

- 2 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning.
- For effective conversation practice, groups will be changed weekly.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
50 Marks		50 Marks		100
40 Marks (Progressive Evaluation) After each unit-completion: Assignments / oral Presentation	10 Marks (Attendance)	25 Marks Midway external assessment (Viva)*	25 Marks (External Viva) **	

- **Note:** *Midway external assessment of 25 marks will be submitted and considered with external evaluation with a total of 50 marks*.

*Parameters of Midway external assessment (Viva)

Content	Dressing sense & Grooming	Confidence	Pronounciation	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

- **Note:** *To take corrective actions, midway assessment will be conducted by 2-member committee of*
- *Director's nominee (not by the faculty teaching English courses) and average of the two would be the 25 marks obtained by the students after two units are completed.*

****Parameters of External Viva**

Content	Dressing sense & Grooming	Confidence	Pronounciation	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

Note: External Viva will be conducted by 3-member committee comprising
a) Faculty teaching the class
b) English faculty from other college of the University (As approved by VC).
c)T&P officer of other colleges of the University (As approved by VC).

Each member will evaluate on a scale of 25 marks and the average of three would be the 25 marks obtained by the students.

Semester I
Engineering Physics (Lab)

Course Code: EAS162/262 **L-0 T-0 P-2 C-1**

LIST OF EXPERIMENTS:

Note: Select any ten experiments from the following list.

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light by Michelson-Morley experiment.
3. To determine the wavelength of monochromatic light by Fresnel's Bi-prism.
4. To determine the Planck's constant using LEDs of different colours.
5. To determine the specific rotation of cane sugar solution using Polarimeter.
6. To verify Stefan's Law by electrical method.
7. To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up.
8. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.
9. To compare Illuminating Powers by a Photometer.
10. To determine the frequency of A.C. mains by means of a Sonometer.
11. To determine refractive index of a prism material by spectrometer.
12. To determine the Flashing & Quenching of Neon bulb.
13. Determination of Cauchy's constant by using spectrometer.
14. To study the PN junction characteristics.
15. To determine the resolving power and dispersive power by a prism.
16. To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode.
17. Study the characteristics of LDR.
18. To study the characteristics of a photo-cell.

Books:

1. B.Sc. Practical Physics, Gupta and Kumar, Pragati Prakashan.
2. B.Sc. Practical Physics, C.L. Arora, S. Chand & Company Pvt. Ltd.

***Latest editions of all the suggested books are recommended.**

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
SOFTWARE FOUNDATION & PROGRAMMING 1 (with 'C')
PART –I LAB

Course Code: IBD151 **L-0, T-0, P-4, C-2**

Programming Concepts based on C and Introductions of IBM Softwares, Introduction of LINUX and Introduction of PHP.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Engineering Chemistry (Lab)

Course Code: EAS163/263 **L-0 T-0 P-2**
C-1

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list.

1. Determination of Total Hardness of a given water sample.
2. Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate
3. To determine the pH of the given solution using pH meter and pH-metric titration.
4. Determination of dissolved oxygen content of given water sample.
5. To find chemical oxygen demand of waste water sample by potassium dichromate
6. Determination of free chlorine in a given water sample.
7. To determine the chloride content in the given water sample by Mohr's method.
8. To prepare the Bakelite resin polymer.
9. To determine the concentration of unknown sample of iron spectrophotometrically.
10. To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer.
11. To determine the flash & fire point of a given lubricating oil.
12. Determination of calorific value of a solid or liquid fuel.
13. Determination of calorific value of a gaseous fuel.
14. Determination of % of O_2, CO_2, % CO in flue gas sample using Orsat apparatus.
15. Proximate analysis of coal sample.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Basic Electrical Engineering (Lab)

Course Code: EEE161/261 **L-0 T-0 P-2 C-1**

List of Experiments-

Note: Select any ten experiments from the following list.

1. To verify the Kirchhoff's current and voltage laws.
2. To study multimeter.
3. To verify the Superposition theorem.
4. To verify the Thevenin's theorem.
5. To verify the Norton's theorem.
6. To verify the maximum power transfer theorem.
7. To verify current division and voltage division rule.
8. To measure energy by a single-phase energy meter.
9. To measure the power factor in an RLC by varying the capacitance
10. To determine resonance frequency, quality factor, bandwidth in series resonance.
11. To measure the power in a 3-phase system by two-wattmeter method
12. To measure speed for speed control of D.C. Shunt Motor.
13. To determine the efficiency of single-phase transformer by load test.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Basic Electronics Engineering (Lab)

Course Code: EEC161/261 **L-0 T-0 P-2 C-1**

List of Experiments:

Note: Minimum eight experiments should be performed-

1. To study the V-I characteristics of p-n junction diode.
2. To study the diode as clipper and clamper.
3. To study the half-wave rectifier using silicon diode.
4. To study the full-wave rectifier using silicon diode.
5. To study the Zener diode as a shunt regulator.
6. To study transistor in Common Base configuration & plot its input/output characteristics.
7. To study the operational amplifier in inverting & non-inverting modes using IC 741.
8. To study the operational amplifier as differentiator & integrator.
9. To study various logic gates & verify their truth tables.
10. To study half adder/full adder & verify their truth tables.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Engineering Drawing (Lab)

Course Code: EME161/261 **L-0 T-0 P-4**
C-2

LIST OF EXPERIMENTS- [All to be performed]

1. To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.
2. To draw the types of lines and conventions of different materials.
3. To draw and study dimensioning and Tolerance.
4. To construction geometrical figures of Pentagon and Hexagon
5. To draw the projection of points and lines
6. To draw the Orthographic Projection of given object in First Angle
7. To draw the Orthographic Projection of given object in Third Angle
8. To draw the sectional view of a given object
9. To draw the development of the lateral surface of given object
10. To draw the isometric projection of the given orthographic projection.

Evaluation Scheme of Practical Examination:
Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

Semester I
Workshop Practice (Lab)

Course Code: EME162/262 **L-0 T-0 P-4 C-2**

List of Experiments:
(Perform any ten experiments selecting at least one from each shop.)

Carpentry Shop:
1. To prepare half-lap corner joint.
2. To prepare mortise & tenon joint.
3. To prepare a cylindrical pattern on woodworking lathe.

Fitting Bench Working Shop:
1. To prepare a V-joint fitting
2. To prepare a U-joint fitting
3. To prepare a internal thread in a plate with the help of tapping process

Black Smithy Shop:
1. To prepare a square rod from given circular rod
2. To prepare a square U- shape from given circular rod

Welding Shop:
1. To prepare a butt and Lap welded joints using arc welding machine.
2. To prepare a Lap welded joint Gas welding equipment.
3. To prepare a Lap welded joint using spot welding machine.

Sheet-metal Shop:
1. To make round duct of GI sheet using 'soldering' process.
2. To prepare a tray of GI by fabrication

Machine Shop:
1. To study the working of basic machine tools like Lathe m/c, Shaper m/c, Drilling m/c and Grinding m/c.
2. To perform the following operations on Centre Lathe:
Turning, Step turning, Taper turning, Facing, Grooving and Knurling
3. To perform the operations of drilling of making the holes on the given metallic work-piece (M.S.) by use of drilling machine.

Foundry Shop:
1. To prepare core as per given size.
2. To prepare a mould for given casting.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Engineering Mathematics- II

Course Code: EAS211 **L-3 T-1 P-0 C-4**

Objective:

To familiarize the basic concept of Differential Equations, Laplace Transform, Fourier series etc.

Course Outcome: On successful completion of this course, students will be able to:

- Take Laplace transformation of different types of functions, derivatives and integrals, and how it converts complex systems into simple algebraic equations to find out solutions.
- Demonstrate the understanding of solving ordinary differential equations using operator methods, method of undetermined coefficients, method of variation of parameters and Laplace transformation techniques.

Course Contents-

Unit I **(Lectures 08)**

Differential Equations: Linear Differential Equation, Linear Differential Equation with constant coefficient: Complementary functions and particular integrals, Linear Differential Equation with variable coefficient: Removal method, changing independent variables, Method of variation of parameters, Homogeneous Linear Differential Equation, Simultaneous linear differential equations.

Unit II **(Lectures 08)**

Series Solutions: Power Series solutions of ODE, Ordinary Point, Singular Points, Frobenius Method.

Special Functions: Legendre equation and Polynomial, Legendre Function, Rodrigue's formula, Laplace definite integral for first and second kind, Bessel equation and Polynomial, Bessel Function, Orthogonal properties and Recurrence Relation for Legendre and Bessel function.

Unit III **(Lectures 08)**

Partial differential equations – Method of separation of variables for solving partial differential equations; Wave equation up to two dimensions; Laplace equation in two-dimensions; Heat conduction equations up to two-dimensions; Equations of transmission Lines.

Unit IV **(Lectures 08)**

Fourier Series: Periodic functions, Trigonometric series; Fourier series; Dirichlet's conditions, Determination of fourier coefficient by Euler's formulae; Fourier series for discontinuous functions, Even and odd functions, Half range sine and cosine series.

Unit V **(Lectures 08)**

Laplace Transform: Laplace transform; Existence theorem; Laplace transform of derivatives and integrals; Inverse Laplace transform; Unit step function; Diratch delta function; Laplace transform of periodic functions; Convolution theorem.

Text Books-

1. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers.
2. Prasad C., Engineering Mathematics for Engineers, Prasad Mudralaya.
3. Das H.K., Engineering Mathematics Vol-II, S. Chand.

Reference Books-

1. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.

2. Piskunov N, Differential & Integral Calculus, Moscow Peace Publishers.

3. Narayan Shanti, A Text book of Matrices, S. Chand
4. Bali N.P., Engineering Mathematics-II, Laxmi Publications.
***Latest editions of all the suggested books are recommended.**

Semester II
Engineering Physics-I

Course Code: EAS212/112 **L-3 T-1 P-0 C-4**

Objective: To understand the fundamentals of physics like interference of light, diffraction, Polarization, elements of material science, special theory of relativity etc.

Course Outcome:
Students undergoing this course will have a fundamental understanding of basic physics concepts and its applications in a day to day life & also able to explain the basic understandings of the special theory of relativity, Polarization, elements of material science.

Unit A (Unit A is for building a foundation and shall not be a part of examination)
Optics- Properties of light, Lance, Mirror, Focal length, Intensity, Power, Eye-piece, Work, Energy and its types, Waves, longitudinal and transverse waves, Time period, Frequency

Course Contents-

Unit-I **(08 Lectures)**

Interference of Light: Introduction, Principle of Superposition, Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.

Unit-II **(08 Lectures)**

Diffraction: Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. **Single slit diffraction**: Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. **Resolving Power**: Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.

Unit-III **(08 Lectures)**

Polarization: Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.

Unit-IV **(08 Lectures)**

Elements of Material Science: Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. **Hall Effect:** Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.

Unit-V **(08 Lectures)**

Special Theory of Relativity: Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.

Text Books:

1. Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.
2. Engineering Physics, Bhattacharya & Tandon, Oxford University Press.
3. Optics, Ajay Ghatak, Tata Mc Graw-Hill.
4. H. K. Malik & A.K. Singh, Engineering Physics, McGraw-Hill, latest edition.

Reference Books:

1. F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw-Hill.
2. Concept of Modern Physics, Beiser, Tata McGraw-Hill.
3. R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.

***Latest editions of all the suggested books are recommended.**

Semester II
Engineering Chemistry

Course Code: EAS213/113 **L-3 T-1 P-0 C-4**

Objective:

The basic objective of Engineering Chemistry is to educate the students about the chemical aspects of engineering and to provide leadership in advanced studies of engineering, in industry, academia and government.

Course Outcomes:

Student after successful completion of course must possess skills to think critically and analyze chemical problems. Students are also expected to learn solving chemistry problems with an engineering purview. Laboratory work is intended for students to learn conducting experiments, and analyze experimental data.

Course Contents:

UNIT I **(Lecture 08)**

Water and Its Industrial Applications: Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgon etc.

UNIT II **(Lecture 08)**

Fuels and Combustion: Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.

UNIT III **(Lecture 08)**

Lubricants: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement and Refractories:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, **Refractories.** Introduction, classification and properties of refractories.

UNIT IV **(Lecture 08)**

Polymers: Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.

UNIT V **(Lecture 08)**

A. Instrumental Techniques in chemical analysis: Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law.

B. Water Analysis Techniques: Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.

Text Books:

1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
2. Lee I.D., Inorganic Chemistry.
3. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books:

1. Morrison & Boyd, Organic Chemistry, Prentice Hall
2. Barrow Gordon M., Physical Chemistry, McGraw-Hill.
3. Manahan Stanley E., Environmental Chemistry, CRC Press.

***Latest editions of all the suggested books are recommended.**

Semester II
Basic Electrical Engineering

Course Code: EEE217/117 **L-3 T-1 P-0 C-4**

Objective- To understand the fundamental concept of Electrical Engineering like D.C. Network, A.C. Network, Measuring Instruments, Energy Conversion Devices etc.

Course Outcome:

- Students are expected to learn the physical recognition of different electrical components like Resistances, Inductances, Capacitances and their ratings.
- Students are expected to have learnt the verifications of basic laws of electric circuits like Ohm's law and Kirchhoffs' laws.
- Students are expected to connect electric circuits, and able to use electric instruments to perform experiments.
- Cite the operating principles and identify various ac, dc machines and transformers.

Course Contents-

Unit I **(Lectures 10)**

D.C. Network Theory: Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.

Unit II **(Lectures 10)**

Steady State Analysis of A.C. Circuits: Sinusoidal and phasor representation of voltage and current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.

Unit III **(Lectures 06)**

Basics of Measuring Instruments: Introduction to voltmeter, ammeter, Wattmeter & Energy meter.

Unit IV **(Lectures 06)**

Single phase Transformer: Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.

Unit V **(Lectures 08)**

Three Phase A.C. Circuits: Line and phase voltage/current relations; three phase power, power measurement using two wattmeter method. Introduction to earthing and electrical safety.

Text Books-

1. V. Del Toro, Principles of Electrical Engineering, Prentice-Hall International.
2. W.H. Hayt & J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.
3. Nagrath I.J., Basic Electrical Engineering, Tata McGraw Hill.

Reference Books-

1. Fitzgerald A.E & Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill.
2. A Grabel, Basic Electrical Engineering, McGraw Hill.
3. Cotton H., Advanced Electrical Technology, Wheeler Publishing.

***Latest editions of all the suggested books are recommended.**

Semester II
Basic Electronics Engineering

Course Code: EEC211/111 **L-3 T-1 P-0 C-4**

Objective- To understand the basic concept of Electronics Engineering like p-n Junction, Bipolar Junction Transistor, Field Effect Transistor, Operational Amplifier and switching theory.

Course Outcomes:

On successful completion of this course students will be able to:

- Enumerate the basics of electric circuit elements, related terminologies and fundamental laws governing the operation and analysis of those circuits with DC sources and laws, and also concepts related to magnetic circuits.
- Illustrate common solid-state devices & access their characteristic and explain the basic of logic gates.

Course Contents:

UNIT I **(Lectures 08)**

p-n Junction: Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator.

UNIT II **(Lectures 08)**

Bipolar Junction Transistor (BJT): Basic construction, transistor action; CB, CE and CC configurations, input/output characteristics, Relation between α, β & γ, Biasing of transistors: Fixed bias, emitter bias, potential divider bias.

UNIT III **(Lectures 08)**

Field Effect Transistor (FET): Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.

UNIT IV **(Lectures 08)**

Operational Amplifier (Op-Amp): Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.

UNIT V **(Lectures 08)**

Switching Theory: Number system, conversion of bases (decimal, binary, octal and hexadecimal numbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR & NOT, Seven segment display & K map.

Text Books-

1. Robert Boylestad & Louis Nashelsky, Electronic Circuit and Devices, Pearson India.
2. Millman & Halkias, Integrated Electronics, McGraw Hill.
3. Millman & Halkias, Electronics Devices and Circuits, McGraw Hill.
4. Morris Mano M., Digital Design, Prentice Hall.

Reference Books-

1. Sedra and Smith, Microelectronic Circuits, Oxford University Press.
2. Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.
3. Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.

***Latest editions of all the suggested books are recommended.**

Semester II

PROGRAMMING WITH PYTHON

Course Code: IBD211 **L-3, T-0, P-0, C-3**

Module Title : Programming with Python
Programme : B.Tech (CSE) in Application Development Using Cloud and Analytics Platforms in association with IBM
: 1st year 2nd Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	**40**
Guided study	**20**
Total	**60**

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:

Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Indicative Contents:

Topic	Coverage	No. of Lectures
Unit 1	Art and Science of Programming, Introduction to OOPS, Introduction	**6**
Unit 2	Essentials of Programming (classes, Objects), Features, Inheritance, Polymorphism & Encapsulation, Operator Overloading, I/O in C++, Template Functions, Template Classes, Exception Handling	**24**

Unit 3	XML Basics, Document type definitions (DTDs), XML namespaces, XML schema, XPath, XSL transformation	**6**
Unit 4	Introduction to - Integrated Development Environment – Eclipse, Java Development Tools, Debugging Applications, The Eclipse Architecture, Eclipse Web Tools Platform Project 1.0, Software in Real World	**4**
Total		**40**

Text Material & resources: IBM Course Material

Software Foundation and Programming 1 (with 'C++')

Semester II
English Communication and Soft Skills-II

Course Code: EHM249 **L-1 T-1 P-2 C-2**

Objectives:

1. To enhance the vocabulary of learners to prepare for competitive exams like GATE
2. To develop the ability of sentence construction.
3. To enhance learner's writing ability.
4. To make the learner present himself or herself effectively.

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

1. Learn additional 100 words apart from 50 words learnt in preceding semester (3words/lecture)
2. Write letters effectively.
3. Acquire competence in constructing short sentences dealing day to day activities with grammatical accuracy.
4. Express himself before class / in a group and attain proficiency in deliverance.
5. Acquire adequate knowledge of grammar to prepare for competitive exams like GATE

Course Contents:

Unit – I Vocabulary & Grammar (14 hours)

- Homophones, Homonyms, Synonyms, Antonyms and one-word substitution.
- Parts of Speech, Modals, Tenses and Simple sentence construction.

Unit – II Listening Skills (05 hours)

- Difference between listening & hearing, Types of Listening and Process of listening
- Importance of listening and Barriers to listening

Unit – III Writing Skills (08 hours)

- Letters and Email writing
- Story Narration

Unit – IV Strategies & Structure of Presentation and Problem Sounds (13 hours)

- Managing Time, Audience & Locale, Structure and Organization of Content and 5 W's
- Problem Sounds: S- Sh, J-Z and V-B*

Reference Books:

- Nesfield J.C. "*English Grammar Composition & Usage*" Macmillan Publishers
- Sood Madan "*The Business letters"* Goodwill Publishing House, New Delhi
- Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.

Methodologies:

1. Usage of words in sentences and exercises.

2. Sentence construction on daily activities and conversations.
3. Format and layout to be taught with the help of samples and preparing letters on different subjects.
4. JAM sessions and Picture presentation.
5. Tongue twisters, Newspaper reading and short movies.

Note:

- 3 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning.
- For effective conversation practice, groups will be changed weekly.
- Repeated practice of sound*.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
40 Marks		60 Marks		100
30 Marks (Progressive Evaluation) After each unit-completion: Assignments / oral Presentation	10 Marks (Attendance)	20 Marks Midway external assessment (Oral Presentation) *	40 Marks (Written Examination)	

*Parameters of Midway external assessment (Viva)

Content	**Pronunciation**	**Delivery of Content**	**Question Responsiveness**	**TOTAL**
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note:

Midway Assessment*: To take corrective actions, midway assessment will be conducted by2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 20 marks obtained by the students after two units are completed.The marks in sealed envelope will be send to Examination Department.*

Written Examination*: There would be four questions with internal choice one from each unit of 10 marks.*

Semester II
Engineering Physics (Lab)

Course Code: EAS262/162 **L-0 T-0 P-2 C-1**

LIST OF EXPERIMENTS:

Note: Select any ten experiments from the following list.

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light by Michelson-Morley experiment.
3. To determine the wavelength of monochromatic light by Fresnel's Bi-prism.
4. To determine the Planck's constant using LEDs of different colours.
5. To determine the specific rotation of cane sugar solution using Polarimeter.
6. To verify Stefan's Law by electrical method.
7. To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up.
8. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.
9. To compare Illuminating Powers by a Photometer.
10. To determine the frequency of A.C. mains by means of a Sonometer.
11. To determine refractive index of a prism material by spectrometer.
12. To determine the Flashing & Quenching of Neon bulb.
13. Determination of Cauchy's constant by using spectrometer.
14. To study the PN junction characteristics.
15. To determine the resolving power and dispersive power by a prism.
16. To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode.
17. Study the characteristics of LDR.
18. To study the characteristics of a photo-cell.

Books:

1. B.Sc. Practical Physics, Gupta and Kumar, Pragati Prakashan.
2. B.Sc. Practical Physics, C.L. Arora, S.Chand & Campany Pvt. Ltd.

***Latest editions of all the suggested books are recommended.**

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)			

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Engineering Chemistry (Lab)

Course Code: EAS263/163 **L-0 T-0 P-2 C-1**

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list.

1. Determination of Total Hardness of a given water sample.
2. Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate
3. To determine the pH of the given solution using pH meter and pH-metric titration.
4. Determination of dissolved oxygen content of given water sample.
5. To find chemical oxygen demand of waste water sample by potassium dichromate
6. Determination of free chlorine in a given water sample.
7. To determine the chloride content in the given water sample by Mohr's method.
8. To prepare the Bakelite resin polymer.
9. To determine the concentration of unknown sample of iron spectrophotometrically.
10. To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer.
11. To determine the flash & fire point of a given lubricating oil.
12. Determination of calorific value of a solid or liquid fuel.
13. Determination of calorific value of a gaseous fuel.
14. Determination of % of O_2, CO_2 % CO in flue gas sample using Orsat apparatus.
15. Proximate analysis of coal sample.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Basic Electrical Engineering (Lab)

Course Code: EEE261/161 **L-0 T-0 P-2**
C-1

List of Experiments-

Note: Select any ten experiments from the following list.

1. To verify the Kirchhoff's current and voltage laws.
2. To study multimeter.
3. To verify the Superposition theorem.
4. To verify the Thevenin's theorem.
5. To verify the Norton's theorem.
6. To verify the maximum power transfer theorem.
7. To verify current division and voltage division rule.
8. To measure energy by a single-phase energy meter.
9. To measure the power factor in an RLC by varying the capacitance
10. To determine resonance frequency, quality factor, bandwidth in series resonance.
11. To measure the power in a 3-phase system by two-wattmeter method
12. To measure speed for speed control of D.C. Shunt Motor.
13. To determine the efficiency of single-phase transformer by load test.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Basic Electronics Engineering (Lab)

Course Code: EEC261/161 **L-0 T-0 P-2**
C-1

LIST OF EXPERIMENTS

Note: Minimum eight experiments should be performed-

1. To study the V-I characteristics of p-n junction diode.
2. To study the diode as clipper and clamper.
3. To study the half-wave rectifier using silicon diode.
4. To study the full-wave rectifier using silicon diode.
5. To study the Zener diode as a shunt regulator.
6. To study transistor in Common Base configuration & plot its input/output characteristics.
7. To study the operational amplifier in inverting & non-inverting modes using IC 741.
8. To study the operational amplifier as differentiator & integrator.
9. To study various logic gates & verify their truth tables.
10. To study half adder/full adder & verify their truth tables.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
PROGRAMMING WITH PYTHON LAB

Course Code: ICM251/ IBD251 **L-0, T-0, P-2, C-1**

Programming based on C++ and their Concepts, Basic Java Programming, XML based programming and Eclipse based Programming.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Engineering Drawing (Lab)

Course Code: EME261/161 **L-0 T-0 P-4**
C-2

LIST OF EXPERIMENTS- [All to be performed]

1. To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.
2. To draw the types of lines and conventions of different materials.
3. To draw and study dimensioning and Tolerance.
4. To construction geometrical figures of Pentagon and Hexagon
5. To draw the projection of points and lines
6. To draw the Orthographic Projection of given object in First Angle
7. To draw the Orthographic Projection of given object in Third Angle
8. To draw the sectional view of a given object
9. To draw the development of the lateral surface of given object
10. To draw the isometric projection of the given orthographic projection.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

Semester II
Workshop Practice (Lab)

Course Code: EME262/162 **L-0 T-0 P-4**
C-2

List of Experiments:
(Perform any ten experiments selecting at least one from each shop.)

Carpentry Shop:
1. To prepare half-lap corner joint.
2. To prepare mortise & tenon joint.
3. To prepare a cylindrical pattern on woodworking lathe.

Fitting Bench Working Shop:
1. To prepare a V-joint fitting
2. To prepare a U-joint fitting
3. To prepare a internal thread in a plate with the help of tapping process

Black Smithy Shop:
1. To prepare a square rod from given circular rod
2. To prepare a square U- shape from given circular rod

Welding Shop:
1. To prepare a butt and Lap welded joints using arc welding machine.
2. To prepare a Lap welded joint Gas welding equipment.
3. To prepare a Lap welded joint using spot welding machine.

Sheet-metal Shop:
1. To make round duct of GI sheet using 'soldering' process.
2. To prepare a tray of GI by fabrication

Machine Shop:
1. To study the working of basic machine tools like Lathe m/c, Shaper m/c, Drilling m/c and Grinding m/c.
2. To perform the following operations on Centre Lathe:
Turning, Step turning, Taper turning, Facing, Grooving and Knurling
3. To perform the operations of drilling of making the holes on the given metallic work-piece (M.S.) by use of drilling machine.

Foundry Shop:
1. To prepare core as per given size.
2. To prepare a mould for given casting.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester III
DATA STRUCTURE USING C

Course Code: ECS305 **L-3, T-1, P-0, C-4**

Objective:
To give the practical knowledge and the concept of how the data is exactly stored in memory. It also gives knowledge to perform different operations on data using concept of C programming.

Unit I
Data Structure: Terminology, Operations, Elementary Data Organization, Algorithm Complexity and Time-Space trade-off. **Arrays:** Definition, Representation and Analysis, Single and Multidimensional, address calculation, applications, Character String; String operation; Ordered List, Sparse Matrices. **Stacks:** Array Representation and Implementation, Linked Representation, Operations; Push &Pop; Applications; Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression.

(Lecture 08)
Unit II
Queues: Array Representation and Implementation, Linked Representation, Operations: Create, Add, Delete, Full and Empty, Types; Circular queue, Dequeue, Priority Queue; **Linked List:** Representation and Implementation, Two-way Header List, Traversing and Searching, Overflow and Underflow, Operations; Insertion and deletion; doubly linked list, Garbage Collection and Compaction.

(Lecture 08)
Unit III
Trees: Terminology, Binary Trees; Array and Linked Representation, Types: Complete, Extended. Threaded; Algebraic Expressions: Operations, Huffman algorithm. **Searching and Hashing:** Sequential, Binary, Comparison and Analysis, Hash Table and Functions.

(Lecture 08)
Unit IV
Sorting: Insertion, Bubble, Quick, Two Way Merge, Heap, Sorting on Different Keys, Practical consideration for Internal Sorting. **Binary Search Trees:** Concepts, Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

(Lecture 08)
Unit V
Graphs: Terminology & Representations, Graphs vs. Multi-graphs, Directed, Representations, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees. **File Structures:** Physical Storage, Media File Organization, Organization of records into Blocks, Sequential Files. **Indexing and Hashing:** Indices: Primary, Secondary; Index Files; B+ Tree index Files, B Tree index files; Indexing and Hashing Comparisons.

(Lecture 08)

Course Outcome:
After completing this course the students should be able to:

1. Identify fundamental data structures and algorithms and summarize their typical uses, strengths, and weaknesses.
2. Analyze the complexity of algorithms.
3. Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data.
4. Data structures include: arrays, linked lists, binary trees, heaps, and hash tables.
5. Solve problems computationally through the application of fundamental data structures and algorithms

6. Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
7. Students learn to analyze and compare algorithms for efficiency using Big-O notation.
8. Students implement projects requiring the implementation of the above data structures.

Text Books

1. Lipschutz, S., *Data Structure*, Tata McGraw Hill.
2. Tenenbaum, A.M., *Data Structures using C & C++*, Prentice Hall of India.
3. Kanitkar, Y., *Data Structure using C++*, BPB.

Reference Books

1. Sahani, S.and Horowitz, E., *Fundamentals of Data Structures*, Galgotia
2. Kruse, R., *Data Structures and Program Design in C*, Pearson Education.
3. Cormen, T. H., *Introduction to Algorithms*, Prentice Hall of India.
4. Loudon, K., *Mastering Algorithms With C,*Shroff Publisher & Distributors.

***Latest editions of all the suggested books are recommended.**

Semester III
OOPS with JAVA

Course Code: IBD311

L-3, T-0, P-0, C-3

Module Title : OOPS with Java
Programme : B.Tech (CSE) in Application Development Using Cloud And Analytics Platforms in association with IBM
Term : 2nd year - 3rd Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:
Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Indicative Contents:

Topic	Coverage	No. of Lectures
Unit 1	Introduction to Java and Eclipse, Object-Oriented Programming, Introduction to SDLC, Introduction to UML, Java Basics (The basic building blocks of Java, variables and primitive types, Objects and Messages, String & StringBuffer, Wrapper classes, Building Classes	**8**
Unit 2	Debugging, Inheritance and Refactoring, Interfaces, Collections, Serialization and Streams, Exceptions and Exception Handling, Utility Classes, Threads and Synchronization	**12**

Unit 3	Java Beans, Web Component Introduction, Java Servlets, Java Servlets API, Java Server Pages, JSP Spécification and Syntax, Page Designer	**10**
Unit 4	Debugging Web Applications, Web Archive Deployment Descriptor, Http: Session Management, Cookie API, Management of Application Data, URL Rewriting	**4**
Unit 5	JSP Expression Language, JSP Tag Files – Custom Tags, Xdoclets Annotations, Connecting to database, Web Application Security, Java EE Packaging and deployment, Best Practices for Server side Application	**6**
	Total	**40**

Text Material & resources: IBM Course Material OOPS with JAVA

Semester III
DIGITAL ELECTRONICS &COMPUTER ORGANIZATION

Course Code: EEC302 **L-3, T-1, P-0, C-4**

Objective:
To manage the computer hardware and to study the overall architecture & organization of the computer system.

Unit I
Number System: Data representation, Data Types and Number Systems, Binary Number System, Octal & Hexa-Decimal Number System; Fixed Point Representation; 1's &2's Complement; Binary Fixed Point Representation; Arithmetic Operation on Binary Numbers; Overflow &Underflow; Floating Point Representation; Codes: ASCII, EBCDIC Codes, Gray Code, Excess-3 & BCD; Error Detection & Correcting Codes; Binary Storage and Registers.

(Lecture 08)

Unit II
Boolean algebra: Definition, Properties, Law's. **Digital Logic Circuits**: Logic Gates: AND, OR, NOT Gates and their Truth Tables, NOR, NAND &XOR Gates; Demorgan's Theorem; Map Simplification; Minimization Techniques: K Map Two, Three and More variables maps; Sum of Product & Product of Sums; Don't care conditions; Combination & Sequential Circuits; Half adder &Full adder; Full subtractor and decimal adder, Code Conversion; Multilevel NAND and NOR Circuits; Multiplexers and Demultiplexers; ROM Working & Circuit.

(**Lecture 08)**

Unit III
Sequential logic: Flip-Flops: RS, D, JK & T Flip-Flop, Triggering in flip flops, Analysis of Clocked Sequential Circuits; State Reduction and Assignment; flip flop excitation tables; Design procedure and Design of Counters; Design with equations; Registers; Counters and the memory unit; Shift registers; Ripple counters and Synchronous counters; Timings sequence digital logic families; Processor organization; General Register Organization; Stack Organization and Addressing Modes.

(**Lecture 08)**

Unit IV
Computer Registers and I/O: Registers transfer logic; Intel Register Transfer; Arithmetic Logic and Shift Micro Operation; Conditional; Constant Statement; Fixed Point Binary Data Floating Point Data; Instruction Codes; Input-output organizations- I/O Interface; Properties of simple I/O Devices and their controller; Isolated vs. Memory-mapped I/O; Modes of data transfer; Synchronous & Asynchronous data transfer.

(Lecture 08)

Unit V
Computer Organization: Block Level Description of the Functional Units as Related to the Execution of a Program; Fetch; decode and Execute Cycle. **Memory organization:** Auxiliary Memory; Magnetic Drum; Disk & Tape; Semi-conductor memories; Memory; Hierarchy; Associative memory; Virtual memory; Address space & memory space; Address mapping; page table; Page replacement; segmentation; Cache memory; Hit ratio; Mapping techniques; Writing into Cache.

(L**ecture 08)**

Course Outcome: At the end of the course the students should be able:
1. Understand fundamental concepts and techniques used in digital electronics.
2. Understand and examine the structure of various number systems and its application in digital design.
3. Understand, analyze and design various combinational and sequential circuits.

4. Identify and prevent various hazards and timing problems in a digital design.
5. To develop skill to build, and troubleshoot digital circuits.

Text Book

1. Mano, M., *Computer System Architecture*, Prentice Hall of India.
2. Mano, M., *Digital Logic*, Prentice Hall of India.
3. Stallings, W., *Computer Organization,* Prentice Hall of India.

Reference Books

1. Tannenbaum, O., *Structured Computer Organization*, Prentice Hall of India.
2. Hayes, P.J., *Computer Organization*, McGraw Hill.

***Latest editions of all the suggested books are recommended.**

Semester III
MATHEMATICS-III

Course Code: EAS301 **L-3, T-1, P-0, C-4**

Unit I

Functions of a Complex Variable: Analytic functions; C-R equations and harmonic functions; Line integral in the complex plane; Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions; Liouvilles theorem.

(Lecture 08)

Unit II

Functions of a Complex Variable II: Representation of a function by power series; Taylor's and Laurent's series; Singularities, zeroes and poles; Residue theorem, evaluation of real integral of the type $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$.

(Lecture 08)

Unit III

Statistical Techniques: Moments, Moment generating functions, Skewness, Kurtosis, Curve Fitting and Solution of Equations: Method of least squares and curve fitting of straight line and parabola, Solution of cubic and bi-quadratic equations, Correlation and Regression, Binomial distribution, Poisson distribution, Normal distribution.

(Lecture 08)

Unit -IV

Propositional Calculus: Propositions: Algebra, Conditional; Truth tables; Logical Equivalence andimplications; Converse; Inverse; Contra-positive; Bi-conditional statements; Negation of Compound statements; Tautologies and Contradiction; Normal Forms; Arguments; Fallacies; Quantifiers,.

(Lecture 08)

Unit -V

Set Theory: Concepts, Operations, Identities, Venn diagram, Cartesian product.**Relation**: Definition, Types, Pictorial representation, Composition.**Function**:Definition, classification, types and composition.

Combinatorics: Principles, Permutation and Combination, Recurrence Relations and Generating Functions,Mathematical Induction.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to understand:

1. Analyticity of function of complex variables.
2. Residues, complex integration as Cauchy's theorem on integration.
3. Statistical techniques as correlation and regression.
4. The concept and applications of propositional and predicate calculus.
5. The concepts needed to test the logic of a program.
6. The discrete structures such as sets, relations and functions.
7. Permutations and combinations, recurrence relations and generating functions.

Text Books

1. Grewal B.S., *Higher Engineering Engineering Mathematics*, Khanna Publishers.
2. Prasad C., *Engineering Mathematics for Engineers*, Prasad Mudralaya.

3. Das H.K., *Engineering Mathematics Vol-II*, S. Chand.
4. Kumar, S.S., *Discrete Mathematics,* S. Chand.

Reference Books

1. Kreyszig E., *Advanced Engineering Engineering Mathematics*, Wiley Eastern.
2. Piskunov N, *Differential & Integral Calculus*, Moscow Peace Publishers.
3. Narayan Shanti, *A Text book of Matrices*, S. Chand.
4. Bali N.P., Engineering Engineering Mathematics-III, Laxmi Publications.
5. Lipchitz, S. & Lipson S., *Discrete Mathematics*, Outline series Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.

Semester III
HUMAN VALUES & PROFESSIONAL ETHICS

Course Code: EAS303

L	T	P	C
2	0	0	2

Objective: Science, Technology and Engineering as knowledge and as Social and Professional Activities.

Course Contents

Unit I

Effects of Technological Growth: Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: sustainable development Energy Crisis: Renewable Energy Resources Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations, Environmental **(Lecture 08)**

Unit II

Ethics Appropriate Technology Movement of Schumacher; later developments Technology and developing notions. Problems of Technology transfer, Technology assessment impact analysis. Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology. **(Lecture 08)**

Unit III

Ethics of Profession: Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of technologists. codes of professional ethics. Whistle blowing and beyond, Case studies. **(Lecture 10)**

Unit IV

Profession and Human Values: Values Crisis in contemporary society Nature of values: Value Spectrum Of good life Psychological values: Integrated personality; mental health Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution. **(Lecture 08)**

Unit V

Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity Moral and ethical values: Nature of moral judgments; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility. **(Lecture 08)**

Course Outcome:

After completion of the course the students shall be able to understand:

1. Importance of Resources , Renewable Energy, Technology, Sustainable Development
2. Ethics in developing and using Technologies
3. Ethics for business and profession, organizational groups
4. Inculcation the importance of human values, moralities in profession and crisis management
5. Understanding the corporate responsibilities in regard of society

Text Books:

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2nd Ed) 2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991. 3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.

*Latest editions of all the suggested books are recommended.

Semester-III
English Communication and Soft Skills-III

Course Code: EHM349 **L-1, T-1, P-2, C-2**

Objectives:

1. To enable the learners to upgrade their knowledge of grammar and vocabulary to prepare for competitive exams like GATE.
2. To enable the learner to improve their listening.
3. To enable the learners to improvise their voice modulation in reading and speaking.
4. To enable the learners to enhance their writing and comprehensive skills in English
5. To enable the learners to proactively participate in activities in situational context.

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

1. Revise the usage of English grammar in day to day context.
2. Acquire adequate knowledge of grammar to prepare for competitive exams like GATE.
3. Use advance English language by using variety of words i.e. idioms and phrases in variety of sentences in functional context.
4. Improve their listening to understand the basic content.
5. Improvise their voice modulation while reading and speaking something.
6. Enhance writing and comprehension skills in English.
7. Present simple power point presentation (PPt).
8. Proactively participate in activities in situational context (like impromptu).

Unit – I Grammar & Vocabulary (14 hours)

- Correction of Common Errors (with recap of English Grammar with its usage in practical context.)
- Synthesis of sentences: Simple, complex and compound Sentences
- Transformation of sentences
- Commonly used Idiom & Phrases (Progressive learning whole semester)

Unit – II Essence of Effective listening & speaking (12 hours)

- Listening short conversation/ recording (TED talks / Speeches by eminent personalities) *Critical Review of these abovementioned*
- Voice Modulation: Five P's - Pace, Power, Pronunciation, Pause, and Pitch.
- Impromptu
- Power Point Presentation (PPt) Skills**:** Nuances of presenting PPTs

Unit – III Reading and Comprehension Skills (08 hours)

- Strategies of Reading comprehension: Four S's
- How to solve a Comprehension (Short unseen passage: 150-200 words)
- Reading Newspaper (Progressive learning whole semester)

Unit – IV Writing Skills (06 hours)

- Essentials of a paragraph
- Paragraph writing (100-120 words)

Reference Books:

1. Allen, W. *"Living English Structure*" Pearson Education, New Delhi.

2. Joseph, Dr C.J. & Myall E.G. "*A Comprehensive Grammar of Current English*" Inter University Press, Delhi
3. Wren & Martin "*High School English Grammar and Composition*" S.Chand & Co.Ltd., New Delhi.
4. Norman Lewis "*Word Power Made Easy*" Goyal Publications & Distributers, New Delhi.
5. Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi.
6. Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.
7. Agrawal, Malti "*Professional Communication*" Krishana Prakashan Media (P) Ltd. Meerut.

Note: For effective communication practice, groups will be changed weekly

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
40 Marks		60 Marks		100
30 Marks (Progressive Evaluation) After each unit-completion: Assignments / oral Presentation	10 Marks (Attendance)	20 Marks Midway external assessment (Oral Presentation) *	40 Marks (Written Examination)	

*Parameters of Midway external assessment (Viva)

Content	**Pronunciation**	**Delivery of Content**	**Question Responsiveness**	**TOTAL**
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note:

***Midway Assessment**: To take corrective actions, midway assessment will be conducted by2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 20 marks obtained by the students after two units are completed.The marks in sealed envelope will be send to Examination Department.*

***Written Examination**: There would be four questions with internal choice one from each unit of 10 marks.*

Semester III
DATA STRUCTURE USING C (LAB)

Course Code: ECS355 **L-0, T-0, P-4, C-2**

1. To write programs implementing Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort.
2. To write programs implementing Searching programs: Linear Search, Binary Search.
3. To write programs Array implementation of Stack, Queue, Circular Queue, Linked List.
4. To write programs implementing Stack, Queue, Circular Queue, Linked List using dynamic memory allocation.
5. To write program implementing Binary tree.
6. To write programs implementing Tree Traversals (pre-order, in-order, post-order).
7. To write programs implementing graph traversal (BFS, DFS).
8. To write programs implementing minimum cost spanning tree, shortest path.

Course Outcome: At the end of the course the student should be able to understand:

1. Implementation of sorting techniques.
2. Implementation of searching techniques.
3. All the operations on Stack, Queue, Linked List.
9. Data representation and operations using tree and graph.
10. Concept of recursion and its types with examples.

Semester III
OOPS with JAVA (LAB)

Course Code: IBD351 **L-0, T-0, P-4, C-2**

To work on Eclipse and Write Java programs based on theory paper topics with complete details

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5-point scale which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Semester III
DIGITAL LOGIC & CIRCUIT (LAB)

Course Code: EEC351 **L-0, T-0, P-2, C-1**

1. To study of following combinational circuits: Multiplexer, Demultimplexer and Encoder. Verify truth tables of various logic functions.

2. To study of various combinational circuits based on: AND/NAND Logic blocks and OR/NOR Logic blocks.
3. To study various waveforms at different points of a transistor bi-stable multi-vibrator and its frequency variation with different parameters.
4. To design a frequency divider using IC-555 timer.
5. To study various types of registers and counters.
6. To study Schmitt trigger circuit.
7. To study transistor as table multi-vibrator.
8. Experimental study of characteristics of CMOS integrated circuits.
9. Interfacing of CMOS to TTL and TTL to CMOS.
10. BCD to binary conversion on digital IC trainer.
11. Testing of digital IC by automatic digital IC trainer.
12. To study OP-AMP as Current to Voltage & Voltage to Current converters & comparator.

Course Outcome: At the end of the course the student should be able to understand:

1. Creation of different combinational circuits with its truth table.
2. Design of various registers and transistor.
3. Implementation of CMOS integrated circuit and conversion.
4. BCD to binary conversion

Semester IV
THEORY OF COMPUTATION

Course Code: ECS401 **L-3, T-1, P-0, C-4**

Objective:
To gain knowledge of Computer Automation and Computation.

Course Contents

Unit-I
Fundamentals: Strings, Alphabet, Language, Operations, Finite state machine, Definitions, Finite automaton model, acceptance of strings and languages, Deterministic finite automaton and non deterministic finite automaton, Transition diagrams and language recognizers, Chomsky hierarchy of languages. **(Lecture 08)**

Unit-II
Finite Automata: NFA with € transitions-Significance, Acceptance of languages. Conversions and Equivalence, Equivalence between NFA with and without null transitions, NFA to DFA conversion, Minimization of FSM, Equivalence between two FSM`s, Finite Automata with output-Moore and Mealy machines. **(Lecture 08)**

Unit-III
Regular Languages: Regular sets, Regular expressions, Identify rules, Constructing finite Automata for a given regular expressions, Conversion of finite automata to regular expressions, Pumping lemma of regular sets.
Grammar Formalism: Regular grammars-right linear and left linear grammars, Equivalence between regular linear grammar and FA, Context free grammar, Derivation trees, Sentential forms, Rightmost and leftmost derivation of strings.
(Lecture 08)

Unit-IV
Context Free Grammars: Ambiguity in context free grammars. Minimization of context free grammars, Chomsky normal form, Greiback normal form, Pumping lemma for context free languages.
(Lecture 08)

Unit-V
Push Down Automata: Push down automata, Definition, Model, Acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, Introduction to Tuning Machine, TM Definition, TM Model, Design of TM. **(Lecture 08)**

Course Outcome: At the end of the course the student should be able to understand:

1. Basics of Computational theory.
2. Difference between different Machines along with their conversions and minimization of finite automata.
3. Grammar formulism and regular expression used in machines.
4. About different grammars and their conversion from one to another.
5. To study, explore and design the PDA and Turing Machines.

Text Books:

1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science (Automata, Languages and Computation)", PHI
2. Hopcroft, Ullman, "Introduction to Automata Theory, Language and Computation", Nerosa Publishing House

Reference Books:

1. Martin J. C., "Introduction to Languages and Theory of Computations", TMH
2. Papadimitrou, C. and Lewis, C.L., "Elements of theory of Computations", PHI
3. Cohen D. I. A., "Introduction to Computer theory", John Wiley & Sons
4. Kumar Rajendra, "Theory of Automata (Languages and Computation)", PPM

*Latest editions of all the suggested books are recommended.

Semester IV
COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES

Course Code: ECS405 **L-3, T-1, P-0, C-4**

Objective:

To study about the solution of systems of linear equations, Solution of systems of nonlinear equations, Interpolation: Finite difference, Curve fitting, Cubic Spline and Approximation, Frequency Chart, Regression analysis, Time series and forecasting, Testing of Hypothesis.

Course Contents

Unit I

Linear Equations: Direct Method; Gauss Jordan and Gauss Elimination Methods; Pivoting; Iterative methods; Jacobi and Gauss Seidel methods;

(Lecture 08)

Unit II

Non-Linear Equations: Bisection Method, Regula-Falsi Method, Newton-Raphson Method, Rate of Convergence, Numerical Integration and Differentiation; Trapezoidal and Simpson's rule, Derivatives from Newton's Forward polynomial.

(Lecture 08)

Unit III

Interpolation: Finite Difference; Newton's Forward and Backward Interpolation Formulae; Central Difference Formulae; Gauss Forward and Backward Difference Formulae; Newton's Divided Difference Formula; Lagrange's Interpolation Formula.

(Lecture 08)

Unit IV

Representation and Analysis: Curve Fitting; Cubic Spline and Approximation: Method of Least Squares, Fitting of Straight Lines, Polynomials and Exponential Curves.**Frequency Chart:** Histogram, Frequency Curve, Pi-chart.**Regression analysis:** Linear and Non-linear, Multiple Regression.

(Lecture 08)

Unit V

Time Series and Forecasting: Moving Averages; Smoothening of curves; Forecasting Models and Methods; Statistical Quality Controls Methods, **Testing of Hypothesis:** Test of Significance; Chi-square Test; T-Test; ANOVA; F-Test; Application to Medicine; Agriculture.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to understand:

1. Solve large systems of simultaneous linear equations.
2. Find solutions of non-linear equations using bisection method, Newton's methods and False Position method and implement using a computer. Also solve integration with the help of Trapezoidal rule and Simpson's rules.
3. Solve Finite differences with the help of some operators like Shift operator and also find data after analysis of given data using various numerical methods like Newton's method, Lagrange's method etc and implement using a computer.
4. Employ appropriate regression models to determine statistical relationships.

5. Apply basic statistical inference techniques, including confidence intervals, hypothesis testing and analysis of variance, to science/engineering problems.

Text Books:

1. Raman, R., *Computer Oriented Numerical Methods*, Prentice Hall of India.
2. Grewal, B. S., *Numerical Methods in Engineering and Science*, Khanna Publishers.
3. Gupta, S. P., *Statistical Methods*, Sultan and Sons.

Reference Books:

1. Veerarajan, T. Ramachandran, T., *Theory and Problems in Numerical Method*, Tata McGraw Hill.
2. Niyogi, P., *Numerical Analysis and Algorithms,* Tata McGraw Hill.
3. Scheld, F., *Numerical Analysis*, Tata McGraw Hill.
4. Balaguruswamy, E., *Numerical methods,* Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.

Semester IV
INFORMATION MANAGEMENT BASICS

Course Code-IBD411 **L-3, T-1, P-0, C-4**

Module Title : Information Management Basics
Course : IBD 411
Programme : B.Tech (CSE) in Application Development Using Cloud And Analytics Platforms in association with IBM
: 2nd year 4th Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:

Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Indicative Contents:

Topic	Coverage	No. of Lectures
Unit 1	Relational Databases, Installation and Planning, Data Modeling, Data Modeling and Database Design, Relational Databases, Introduction to RDBMS, Understanding a Table, Relational Concepts	**8**
Unit 2	Database Query Languages, Simple SQL Queries, Retrieving Data from Multiple Tables, Scalar Functions and Grouping, Database Query	**8**

	Languages, Column Functions and Grouping, Union, Using Sub-queries	
Unit 3	Relational Database Design, Views and Results during DB Design, Problem Statement, Relational Database Design, Entity Relationship Model, Data and Process Inventories, Tuple Types, From Tuple Types to Tables, Integrity Rules, Indexes, Logical Data Structures	**14**
Unit 4	Distributed Databases, Distributed Data, Physical Database Design, Physical Implementation, Intermediate SQL, Maintaining Data, Information Storage and Retrieval, Data Moving Data, Mapping- DB2 vs. Oracle	**10**
	Total	**40**

Text Material & resources: IBM Course Material

Information Management Basics

Semester IV
AGILE DEVELOPMENT METHODOLOGIES

Course Code-IBD413 **L-3, T-1, P-0, C-4**

Module Title : AGILE DEVELOPMENT METHODOLOGIES

Course : IBD 413
Programme : B.Tech (CSE) in Application Development Using Cloud And Analytics Platforms in association with IBM Term : 2nd year 4th Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:

Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Text Material & resources: IBM Course Material
Agile Methodologies

Semester IV
OPERATING SYSTEM

Course Code-ECS406 **L-3, T-1, P-0, C-4**

Objective: To provide an understanding of the functions and modules of an operating system and study the concepts underlying its design and implementation.

Course Contents Unit I

Operating System: History, Types: Batch System, Time Sharing System, Real Time System, Multiprogramming, Distributed System; Functions; Services; System calls; System programs; Virtual machines. **(Lecture 08)**

Unit II

Process Management: Concept, States, Control Block, Scheduling; CPU, Criteria, Algorithms, Preemptive& Non Preemptive. **(Lecture 08)**

Unit III

Process Synchronization: Critical Section, Race Condition, Synchronization Hardware, Semaphores, Classical Problems of Synchronization.

Deadlocks: Characterization, Avoidance, Detection & Recovery. **(Lecture 08)**

Unit IV

Memory Management: Contiguous Allocation, External and Internal Fragmentation, Paging &Segmentation.

Virtual Memory: Concept, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing. **(Lecture 08)**

Unit V

File Management: Directory Structure, Allocation Methods; Contiguous; Linked; Indexed: Free
Space Management; Disk: Structure, Scheduling Algorithms, Management. **(Lecture 08)**

Course Outcome: At the end of the course the student should be able to understand:

1. Describes the functionality of operating system.
2. Describes process, its management and synchronization.
3. Concept of deadlock, how it is detected and prevented.
4. Concept of memory and its management and various processes to manage it.
5. Concept of file management and its various techniques.

Text Books

1. Silbershatz, A. and Galvin, P., *Operating System Concept*, Addison-Wesley.
2. Nutt, G., *Operating Systems*, Addison-Wesley.
3. God bole, A., *Operating System*, Prentice Hall of India.

References Books

1. Flynn, M., *Understanding Operating System*, Thomson Press.
2. Tannenbaum, O., *Operating System Concept*, Addison-Wesley.
3. Joshi, R.C., and Tapaswi, S., *Operating Systems*, Wiley-Dreamtech.

*Latest editions of all the suggested books are recommended.

Semester IV
ORGANIZATIONAL BEHAVIOR

Course Code: EHM402

L	T	P	C
3	0	0	3

Objective:

The objective of this syllabus is to make the students aware about how to study the behavior of the employees who are working in organization and to motivate them so that the organization can get the work done through people.

Course Content

Unit I

Concept, Nature, Characteristics, Models of Organizational Behavior, Management Challenge, Organizational Goal.Global challenges and Impact of culture.

(Lecture 08)

Unit II

Perception: Concept, Nature, Process, Importance; Attitudes and Workforce Diversity.

Personality: Concept, Nature, Types and Theories of Personality Shaping, Learning: Concept and theories of Learning.

(Lecture 08)

Unit III

Motivation: Concepts and Their Application, Principles, Theories, Motivating a Diverse Workforce. **Leadership:** Concept, Function, Style and Theories of Leadership-Trait, Behavioral and Situational Theories. Analysis of Interpersonal Relationship, Group Dynamics: Definition, Stages of Group Development, Formal and Informal Groups, Group Decision Making.

(Lecture 08)

Unit IV

Organizational Power and Politics: Concept, Sources of Power, Approaches to Power, Political Implications of Power; Knowledge Management & Emotional Intelligence in Contemporary Business Organization. **Organizational Change:** Concept, Nature, Resistance to change, Managing resistance to change, Implementing Change.

(Lecture 08)

Unit V

Conflict: Concept, Sources, Types, Functionality and Dysfunctional of Conflict, Classification of Conflict Intra, Individual, Interpersonal, Intergroup and Organizational, Resolution of Conflict, Stress: Understanding Stress and Its Consequences, Causes of Stress, Managing Stress.
Organizational Culture: Concept, Characteristics, Elements of Culture, Implications of Organization culture.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to understand:

1. Concept and importance of organizational behavior, challenges for management
2. Perception and Thinking process of individual, personality traits and its importance to organization
3. Theories of motivation and leadership and its importance, applicability into business
4. Flow and formation of powers and politics in organizational groups
5. Culture and Conflicts- Group difference and its outcomes, Stress Management

Text Books:

1. W Newstrom John, Organizational *Behavior: Human Behavior at Work*, Tata McGraw Hill
2. Fred,Luthans, *Organizational Behaviour*, Tata McGraw Hill

3. Shane L Mc. Steven, Glinow Mary Ann Von & Sharma Radha R., "*Organizational Behavior*" Tata McGraw Hill

Reference Books

1. Robbins Stephen P., *Organizational Behavior* Pearson Education
2. Hersey Paul, "*Management of Organsational Behavior: Leading Human Resources*" Blanchard, Kenneth H and Johnson Dewey E., Pearson Education

*Latest editions of all the suggested books are recommended.

Semester IV

English Communication and Soft Skills-IV

Course Code: EHM 499 L-1, T-1, P-2, C-2

Objective: To enable students enhance their four quadrant of communication- Listening, Speaking, Reading and Writing.

List of Practical: (Total: 40 Hours)

1.Practice on syllable, word stress and intonation.	**(02 hours)**
2.Practice on vocabulary building: word games.	**(02 hours)**
3.Practice of self introduction and introducing others.	**(04 hours)**
4.Practice on sentence structures using technical terms.	**(02 hours)**
5.Practice on comprehension: reading news paper and short stories.	**(04 hours)**
6.JAM session (just a minute session) on various topics.	**(02 hours)**
7.Welcome speech, introductory speech, vote of thanks & farewell speech	**(04 hours)**
8.Debate on current issues.	**(04 hours)**
9.Role play in diverse situations to build confidence.	**(04 hours)**
10. Extempore speech on various topics.	**(04 hours)**
11. Group discussion on current topics.	**(04 hours)**
12. Mock interview	**(04 hours)**

Reference Books:

1. Balasubramanian T., *A Textbook of English Phonetics for Indian Students*, Macmillan India Ltd., Madras. 1995.
2. Sethi J & Dhamija P.V., *A Course in Phonetics and Spoken English*, Prentice Hall of India, New Delhi. 1989.
3. Allen, W.S., *Living. English Speech*, London. Longman, 1965
4. Taylor Grant, *English Conversation Practice*, Tata McGraw Hill New Delhi.
5. Mohan Krishna and Banerji Meera, *Developing Communication Skills*, MacMillan India Ltd., Delhi
6. Jones, D., *English Pronouncing Dictionary*, University Bookstall, New Delhi. 2008.
7. Pandey L.U.B & Singh R. P., *A Manual of Practical Communication*, A.I.T. B.S. Publication India Ltd. Krishna Nagar, Delhi.
8. Pandey L.U.B & Singh R. P., *A Manual of Practical Communication*, A.I.T. B.S. Publication India Ltd. Krishna Nagar, Delhi.
9. Gupta Rajhans, *Communication: Practical Manual*, Pragati prakashan, Meerut, 2006.
10. Hornby A.S., *Oxford Advanced Learners Dictionary of Current English*, 7th Edition.

Learning Outcome:

1. Students will be able to pronounce English words properly.
2. They will be able to use words properly in sentences.
3. They will be able to overcome stage fright, nervousness and indecisiveness.
4. They will be able to speak in English on current issues.
5. They will be able to comprehend and interpret various facets of life and nature.
6. They will be able to make various kinds of speech.

7. They will be able to deliver dialogues in different situations.
8. They will be able to participate in group discussion.
9. They will be able to face interview.

Evaluation Scheme

Evaluation: 100 Marks

Internal Evaluation		*External Evaluation*		*Total*
50		50		100
Progressive Evaluation: Lab Activities / Assignment / Oral Presentation	*Attendance*	Midway External Assessment (Viva)*	External (Viva)**	
40	10	25	25	

Note: *Midway external assessment of 25 marks will be submitted and considered with external evaluation with a total of 50 marks.*

***Parameters of Midway External Assessment (Viva): 25 Marks**

Content	*Language*	*Oral Presentation*	*Body Language*	*Question Responsiveness*	*Total*
5	5	5	5	5	25

Note: *To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 25 marks obtained by the students after 50% syllabus is completed.*

****Parameters of External Viva**

Content	*Language*	*Oral Presentation*	*Body Language*	*Question Responsiveness*	*Total*
5	5	5	5	5	25

Note: External Viva will be conducted by 3-member committee comprising
a) Faculty teaching the class
b) English faculty from other college of the University (As approved by VC).
c)T&P officer of other colleges of the University (As approved by VC).

Each member will evaluate on a scale of 25 marks and the average of three would be the 25 marks obtained by the students.

Semester IV
COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES (LAB)

Course Code: ECS453 **L-0, T-0, P-2, C-1**

1. To write a program implementing floating point arithmetic operations i.e., addition, subtraction, multiplication and division.
2. To write a program to deduce errors involved in polynomial interpolation.
3. To write programs implementing Algebraic and transcendental equations using Bisection, Newton-Raphson, Iterative, method of false position, rate of conversions of roots in tabular form for each of these methods.
4. To write a program implementing formulae by Bessel's, Newton, Sterling, and Lagrange's.
5. To write a program implementing method of least square curve fitting.
6. To write a program implementing numerical differentiation.
7. To write a program implementing numerical integration using Simpson's 1/3 and 3/8 rules, trapezoidal rule.
8. To write a program showing frequency chart, regression analysis, Linear square fit, and polynomial fit.

Course Outcome: At the end of the course the student should be able to understand:

1. Implementing floating point arithmetic operations and deduce errors involved in polynomial interpolation.
2. Implementing Algebraic and transcendental equation.
3. Implementing formulae by Bessel's, Newton, Sterling, and Lagrange's.
4. Implementing method of least square and showing frequency chart, regression analysis etc.
5. Implementing numerical integration and differentiations.

Semester IV
INFORMATION MANAGEMENT BASICS (LAB)

Course Code: IBD451 **L-0, T-0, P-4, C-2**

To Study Database Management System with Relational Concepts, Study SQL Queries working on IBM DB2 Database.

LIST OF EXPERIMENTS

1. To write a program to Create Table, SQL for Insertion, Deletion, Update and Retrieval using aggregating functions.
2. To write a program in PL/SQL, Understanding the concept of Cursors.
3. To write a program for implementing Join, Union & intersection etc.
4. To write a program for Creating Views, Writing Assertions Triggers.
5. To write a program for Creating Forms, Reports etc.
6. To write codes for generating read and update operator in a transaction using different situations.
7. To write a program to Implement 2PL concerning central algorithm.
8. To develop code for understanding of distributed transaction processing.

Students are advised to use Developer 2000 Oracle 8+ version for above experiments.
However, depending on the availability of Software's students will use Server/DB2 for implementation.

Course Outcome:
After completion of the course the students shall be able to understand:

1. Creation of Table structure along with the integrity rules.
2. All DML, DDL commands.
3. Implementation of various joins operations.
4. Basic programming knowledge of PL/SQL Code.

Semester IV
AGILE DEVELOPMENT METHODOLOGIES (LAB)

Course Code: IBD453 **L-0, T-0, P-2, C-1**

To Study UML and other modelling Concepts using Visual Basic Map and other mapping.

Semester IV

OS lab with Software Engineering (LAB)

Course Code: ECS455

L	T	P	C
0	0	2	1

LIST OF EXPERIMENTS

1. To implement CPU Scheduling Algorithms
• FCFS
• SJF
• SRTF
• PRIORITY
• ROUND ROBIN
2. Simulate all Page Replacement Algorithms
• FIFO
• LRU

3. Simulate Paging Technique of Memory Management

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

SOFTWARE ENGINEERING LAB

For any given case/ problem statement do the following;

1. Prepare a SRS document in line with the IEEE recommended standards.
2. Draw the use case diagram and specify the role of each of the actors. Also state the precondition, post condition and function of each use case.
3. Draw the activity diagram.
4. Identify the classes. Classify them as weak and strong classes and draw the class diagram.
5. Draw the sequence diagram for any two scenarios.
6. Draw the collaboration diagram.
7. Draw the state chart diagram.
8. Draw the component diagram.
9. Perform forward engineering in java. (Model to code conversion)
10. Perform reverse engineering in java. (Code to Model conversion)
11. Draw the deployment diagram.

Semester V

COMPILER DESIGN AND CONSTRUCTION

Course Code: ECS501 **L-3,T-1,P-0,C-4**

Objective: To understand the basics of a compiler, complete steps of processes that take place during compilation.

Course Contents

Unit 1

Compiler Structure: Compilers and Translators, Phases, Pass Structure, Bootstrapping. **Programming Languages:** High level languages, Lexical and syntactic structure, Data elements, Data Structure, Operations, Assignments, Program unit, Data Environments, Parameter Transmission.

Lexical Analysis: Lexical Analyzer, Role, Design Approach, Implementation, LEX Capabilities. **Regular Expressions:** Transition Diagrams, Finite state Machines. **Syntactic Specifications of Programming Languages:** CFG, Derivation, Parse tree, Ambiguity, Capabilities.

(Lecture 08)

Unit II

Parsing Techniques: Bottom–Up, Shift-Reduce, Operator Precedence, Top-Down with backtracking, Recursive Descent, Predictive, LR (SLR, Canonical LR, LALR), Syntax Analyzer Generator, YACC.

(Lecture 08)

Unit III

Intermediate Code Generation: Forms**,** Three Address Code, Quadruples & Triples, Syntax Directed translation mechanism and attributed definition, Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, Procedure Calls, Case Statements, Postfix Translation.

(Lecture 08)

Unit IV

Run Time Memory Management: Static and Dynamic storage allocation, Stack based memory allocation schemes, Symbol Table management. **Error:** Semantic, Detection and Recovery for Lexical Phase, Syntactic phase.

(Lecture 08)

Unit V

Code Optimization and Code Generation: Local Optimization, Loop Optimization, Peephole Optimization, Basic blocks and flow graphs, DAG (Directed Acyclic Graph), Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection.

(Lecture 08)

Course Outcome: At the end of the course the student should be able to understand:

1. Understand the structure of compiler.
2. Understand the basic techniques used in compiler construction such as lexical analysis, top-down, bottom-up parsing, intermediate code generation.
3. Ability to design parsing tables from grammars.
4. -Understand the basic data structures used in compiler construction such as abstract syntax trees, symbol tables, three-address code.
5. Develop syntax directed translation scheme.

Text Books

1. Alfred, V.A., Ullman, J.D., *Principles of Compiler Design*, Narosa Publishing House.
2. Aho, A.V., Sethi, R. and Ullman, J.D, *Compiler: Principle, Techniques and Tools*, Addison-Wesley.

Reference Books

1. Holub, H.C., *Compiler Design in C*, Prentice Hall.
2. Apple, A.W., *Modern Compiler Implementation in C: Basic Design*, Cambridge press.

*Latest editions of all the suggested books are recommended.

SEMESTER V
MOBILE COMMUNICATION

Course Code: ECS507

L	T	P	C
3	1	0	4

Objective:

The objective of this course is to understand fundamental concepts of mobile computing. These include mobility and service management, data management, routing in mobile ad hoc and sensor networks, and security issues for mobile systems

Course Contents

Unit I

Introduction: Issues in mobile computing, Study of Electromagnetic Spectrum: Radio wave, Microwave, Infrared, Overview of wireless communication, Cellular concept, sharing of Wireless channels: FDMA, TDMA, CDMA.

(Lecture 08)

Unit II

Global System for Mobile Communication (GSM): Architecture, Mobility Management, and Network signaling; General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes.

(Lecture 08)

Unit III

Mobile Data Communication: WLANs (Wireless LANs); IEEE 802.11 standard; Mobile IP; Wireless Application Protocol (WAP); Mobile Internet Standards; WAP Gateway and Protocols; Wireless Markup Languages (WML).

(Lecture 08)

Unit IV

Third Generation (3G) Mobile Services: International Mobile Telecommunications 2000 (IMT 2000) vision; Wideband Code Division Multiple Access (W-CDMA); and CDMA 2000: Quality of services in 3G. **(Lecture 08)**

Unit V

Wireless Local Loop (WLL): Architecture, Technologies; Global Mobile Satellite Systems; Case studies of Iridium and Global star systems; Bluetooth technology and Wi-Max. **(Lecture 08)**

Course Outcome:

After completion of the course the students shall be able to:

1. Explain brief introduction to Mobile technology and generations.
2. Understand the WLAN Communication.
3. Understand 3 Generation services
4. Understand Ad hoc network protocols
5. Understand wireless application protocols & its security

Text Books

1. Lin, Y. B. and Chlamatac, I, *Wireless and mobile Networks Architecture,* John Wiley & Sons.
2. Pandya, R., *Mobile & Personnel communication Systems and Services*, Prentice Hall India.
3. Jochen, S, *Mobile communications,* Pearson Education.

Reference Books:

1. Talukdar, A. K. and Yaragal, R., *Mobile Computing,* Tata McGraw Hill.
2. Theodore, S. R., *Wireless Communication- Principles and Practices*, Pearson Education.

*Latest editions of all the suggested books are recommended

Semester V

ANALYSIS AND DESIGN OF ALGORITHM

Course Code: ECS503 **L-3, T-1, P-0, C-4**

Objective: To gain the technical knowledge about designing of algorithms and their analysis. **Course Contents**

Unit I

Algorithms: Design paradigms, Motivation, Concept of algorithmic efficiency, Run Time Analysis Asymptotic Notations, Divide and conquer, Structure of divide-and-conquer algorithms, Binary search, Quick sort, Analysis of divide and conquer.

(Lecture 08)

Unit II

Greedy Method: Paradigms; Exact optimization solution (minimum cost spanning tree), approximate solution (Knapsack problem), Single source shortest paths.

Unit III **(Lecture 08)**

Dynamic Programming: Concepts, Dynamic programming vs. divide and conquer, Applications, Shortest path in graph, Matrix multiplication, Traveling salesman Problem (TSP), Longest Common sequence(LCS).

(Lecture 08)

Unit IV

Graph searching and Traversal: Methods (Depth First search (DFS) and Breadth First Search (BFS)), back tracking, 8-Queen problem, Knapsack problem.

(Lecture 08)

Unit V

Brach and Bound: LC searching Bounding, FIFO branch and bound, LC, Applications, 0/1Knapsack problem, Traveling Salesman Problem.

Computational Complexity: Complexity Measures, Polynomial vs. Non-polynomial Time complexity, NP- hard and NP-complete classes, Examples.

(Lecture 08)

Course Outcome: At the end of the course the student should be able to understand:

1. Correctness of algorithms using inductive proofs.
2. Describe the dynamic-programming paradigm.
3. Describe the greedy paradigm and explain when an algorithmic design situation calls for it.
4. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems.

Text Books

1. Coremen, L.,*Introduction to Algorithms*, Prentice Hall of India.
2. Sahani, S.,*Fundamentals of Computer Algorithms*, Galgotia.

Reference Books

1. Bratley, B., *Fundamental of Algorithms*, Prentice Hall of India.
2. Goodrich, M.T., *Algorithms Design*, John Wiley.
3. Aho, A.V., *The Design and analysis of Algorithms,* Pearson Education.

*Latest editions of all the suggested books are recommended.

Semester V
CLOUD APPLICATION DEVELOPMENT

Course Code: ICM513 **L-3, T-1, P-0, C-4**

Module Title : Cloud Application Development

Programme : B.Tech (CSE) in Cloud & Mobile Based Application Development in association with IBM

: 3rd year 1st Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:

Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Text Material & resources: IBM Course Material

Cloud Application Development

B.Tech (CSE) Semester V
HADOOP FUNDAMENTALS

Course Code: IBD514 **L-3, T-1, P-0, C-4**

Module Title	**HADOOP FUNDAMENTALS**
Programme	**B.Tech (CSE) in Application Development Using Cloud and Analytics Platforms in association with IBM** **3rd year 1st Semester**

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.

In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:
Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Indicative Contents:

Topic	Coverage	No. of Lectures
Unit 1	• What is big data? • What is Hadoop? • Working with BigInsights • Hadoop architecture • Hands-on lab • MapReduce • Hands-on lab	**16**
Unit 2	Introduction to BigInsights Analytics for Business Analysts Importing Data to InfoSphere BigInsights BigSheets Workflow BigSheets Collections BigSheets Navigation Working with BigSheets Collections BigSheets Readers and Extensions	**24**
	Total	**40**

Text Material & resources: IBM Course Material

Hadoop Fundamentals

Semester V
ERP System

Course Code: ECS506

L	T	P	C
3	1	0	4

Objective:
To understand the factors that lead to the development of ERP System as well as to understand the working principles of different modules of ERP System.

Course Contents

Unit I

ERP & related technologies: Overview (evolution, Definition , Advantages),Business process Re-Engineering; Systems: Management information, Decision support, Executive information, Supply chain management, Implementation life cycle, future description of ERP.

(Lecture 08)

Unit II

ERP - Modules "An Overview": Functions and Processes of Resource Management, Basic Modules of ERP System-HRD, Personnel Management, Training and Development, Skill Inventory , Reason for the growth of ERP market.

(Lecture 08)

Unit III

ERP - Resource Management Perspective: Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management In global scenario, dynamic data management in complex global scenario.

(Lecture 08)

Unit IV

ERP – Information System Perspective: Evolution of Application Software Technology Management, Technology Partners, Supply Chain Management, Customer Relationship Management, Information Communication Technology, E-Business, EDI

(Lecture 08)

Unit V

ERP-Key Managerial Issues: Concept Selling, IT Infrastructure, Implication of ERP Systems on Business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, Resistance to change, Public Service and Organizations (PSO) Project, ERP Selection issues, Return on Investment, Pre and Post Implementation Issues. **(Lecture 08)**

Course Outcome:
After completion of the course the students shall be able to:

1. Design and implement an e-commerce application with a shopping cart.
2. Integrate the waterfall model in the development of e-commerce applications.
3. Integrate user-centered design guidelines in developing user-friendly websites.
4. Evaluate the bullwhip effect in a supply chain, analyze the causes, and recommend possible solutions.
5. Analyze different types of portal technologies and deployment methodologies commonly used in the industry.
6. Analyze the effectiveness of network computing and cloud computing policies in a multi-location organization.
7. Analyze real business cases regarding their e-business strategies and transformation processes

and choices.

Text Books

1. Leon, A., *Enterprise Resource Planning*, Tata McGraw Hill.

Reference Books

1. Sadagopan, S. *Enterprise Resource Planning*, Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.

Semester V

COMPUTER ARCHITECTURE

Course Code: ECS502 **L-3, T-1, P-0, C-4**

Objective:
To gain the knowledge of the topics of computer architecture like parallel computing, processor designing principles and multiprocessor scheduling strategies etc.

Course Contents

Unit I

Parallel Computing: Concepts, Architecture, Classification Schemes, Applications, Parallelism in Uni-processor Systems, Parallel Computer structures.
Pipelining Processing: An overlapped Parallelism, Instructions and Arithmetic.

(Lecture 08)

Unit II

Principles of Designing Pipelined Processors: Internal forwarding and register tagging, Hazard detection and resolution, Job sequencing and collision prevention, Characteristics of Vector processing, multiple vector task dispatching, SIMD array processors, Masking and Data routing.

(Lecture 08)

Unit III

SIMD Interconnection Network: Static, Dynamic networks, Cube interconnection network, Shuffle Exchange and Omega Network, SIMD matrix multiplication.
Multiprocessor Architecture: Tightly and loosely coupled multiprocessors.

(Lecture 08)

Unit IV

Multiprocessor Scheduling: Strategies and Deterministic Scheduling Models, Data Flow computing and Data Flow Graph, 8 Bit and 16 Bit Intel Microprocessor Architecture and Register set.

(Lecture 08)

Unit V

Assembly Language Programming Based on Intel 8085: Instructions: Data Transfer, Arithmetic, Logic, Branch operations; Looping Counting, Indexing, Programming Techniques, Counters and Time Delays, Stacks and Subroutines, Conditional call and Return Instructions, Advanced Subroutine Instructions.

(Lecture 08)

Course Outcome: At the end of the course the student should be able to understand:

1. How computer hardware has evolved to meet the needs of multiprocessing systems.
2. Understand the major components of a computer including CPU, memory, I/O and storage.
3. Basic understanding of assembly programming.
4. Understand design principles in instruction set design.
5. Understand parallelism both in terms of a single processor and multiple processors.

Text Books

1. Hwang, K., *Computer Architecture and parallel processing*, McGraw Hill
2. Peterson, L., *Quantitative approach to computer architecture*, Morgan Kaufman.
3. Hwang, K., *Advanced Computing Architecture*, McGraw Hill.

References Books

1. Tabak, D., *Advanced Microprocessor*, McGraw Hill.
2. Hall, D.V, *Microprocessor and Interfacing, Program and hardware*, Tata McGraw Hill.

1. *8085*,Goankar, R.S., *Microprocessor architecture, programming and application with the* *Latest

editions of all the suggested books are recommended.

Semester V
MULTIMEDIA AND ANIMATION

Course Code: ECS509

L	T	P	C
3	1	0	4

Objective:
To learn the core knowledge of multimedia systems and animation.
Course Contents

Unit I

Multimedia: History, Objects, Scope in Business and Work, Production and Planning of Multimedia applications, Hardware, Memory and Storage devices, Communication devices, Software, Tools: Presentation and Object gen7eration, Video, Sound, Image capturing, Authoring, Card and Page based authoring.

(Lecture 08)

Unit II

Production and Planning: Multimedia building blocks, Text, Sound (MIDI), Digital Audio File Formats, MIDI under windows environment, Audio and Video capture.

(Lecture 08)

Unit III

Multimedia Techniques: Basic drawing, Advance animations, Macromedia products, Creating multilayer, Combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

(Lecture 08)

Unit IV

Digital Audio: Concepts, Sampling variables, Compression of sound: Loss-Less, Lossy and silence compressions.

(Lecture 08)

Unit V

Representation and Compression: Multimedia monitor bitmaps, Vector drawing, Lossygraphic compression, Colors, Image file formatted animations image standards: JPEG compression, Video representation, Video compression, MPEG standards, MHEG standards; Multimedia Applications, Planning and Costing proposal preparation, and Financing, Case study of a typical industry.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to understand:

1. The main focus emphasizes on content related to introduction of multimedia, it's applications, supporting hardware and hardware tools which provide basic information about multimedia

2. It provide the basic information about the phase performing planning and production of a multimedia application using it's objects like text, sound and their specifications like MIDI with proper capturing.

3. It emphasizes on multimedia drawing tools and techniques with the effect of animation using multi layer concepts supported by flash incorporating text, audio, video and graphics.

4. It concentrates on different compression approaches like lossy and lossless with the specifications of sampling variables associated with digital audio

5. It concentrates on image and video standards using JPEG, MPEG, MHEG along with color models and multimedia monitor bitmaps to properly represent a multimedia application.

Text Books

1. Andreas H., *Multimedia Basics*, Firewall Media.
2. Tay V., *Multimedia: Making It Work*, Tata McGraw Hill.
3. Buford J. M. K, *Multimedia Systems*, Addison-Wesley.

Reference Books

1. Agarwal R. and Tiwari B.B., *Multimedia Systems*, Excel Books.
2. Rosch W. L., *Multimedia Bible*, Sams Publishing.
3. Ken M.,Croteau J., *Flash 4 Web Special Effects, Animation And Design Handbook*, Dreamtech.
4. Villamil-Casanova J., Molina L., *Multimedia-Production, Planning And Delivery*, Pearson Education.

*Latest editions of all the suggested books are recommended.

Semester V

ENGINEERING AND MANAGERIAL ECONOMICS

Course Code: EHM503 **L-3, T-1, P-0, C-4**

Objective:

To understand the Scope of Economics, Demand Forecasting and Market Study.

Course Contents

Unit-I

Introduction: Meaning, Nature and Scope of Economics, Meaning of Science, Engineering and Technology, Managerial Economics and its scope in engineering perspective.

(Lecture 08)

Unit-II

Demand: Basic Concepts Demand Analysis, Law of Demand, Determinates of Demand, Elasticity of Demand-Price, Income and cross Elasticity, Uses of concept of elasticity of demand in managerial Decision.

(Lecture 08)

Unit-III

Forecasting: Demand forecasting Meaning, significance and methods of demand forecasting, production function, Laws of returns to scale & Law of Diminishing returns scale.

Short and Long run Cost curves: fixed cost, variable cost, average cost, marginal cost, Opportunity cost.

(Lecture 08)

Unit-IV

Market Study: Market Structure Perfect Competition, Imperfect competition: Monopolistic, Oligopoly, Duopoly sorbent features of price determination and various market conditions.

(Lecture 08)

Unit-V

Inflation: National Income, Inflation and Business Cycles Concept of N.I. and Measurement, Meaning of Inflation, Type causes & prevention methods, Phases of business cycle.

(Lecture 08)

Course Outcome: At the end of the course the student should be able to understand:

1. Concept and meaning of Economics/Managerial Economics, its applicability in context of Engineering.
2. Concepts and theories of demand & supply, its estimation and responsible factors for them.
3. Demand forecasting in business, Law of production and returns.
4. Concepts of market, different kind of it, price mechanism in different conditions.
5. Economic Status of the country by the concepts of GDP, GNP, NI, Inflation and their effects on business.

Text Books

1. Koutsoyiannis, *A : Modern Microeconomics*, ELBS.
2. Kakkar, D.N., *Managerial Economics for Engineering*, New Age International publication.

Reference Books

1. Dwivedi, D.N., *Managerial Economics*, Vikas Publishing.
2. Maheshwari, Y., *Managerial Economics*, Prentice Hall of India.

*Latest editions of all the suggested books are recommended.

B.Tech (CSE) Semester V

ANALYSIS AND DESIGN OF ALGORITHM (LAB)

Course Code: ECS552 **L-0, T-0, P-4, C-2**

1. To write a program in C/C++ for insertion and deletion into binary search tree.
2. To write a program in C/C++ for creation of a Red Black tree and all the associated operations.
3. To write a program in C/C++ for implementing an AVL tree and all the associated operations.
4. To write a program in C/C++ for multiplication of two matrices using Stassen's matrix multiplication method.
5. To write a program in C/C++ to solve Knapsack problem.
6. To write a program in C/C++ to implement shortest path algorithms (Dijkastra's and Bellman's Algorithms).
7. To write a program in C/C++ for finding the minimum cost Spanning Tree in a connected graph. To write a program in C/C++ for solving 8-Queen's problem.
8. To write a program in C/C++ for finding the number of connected components in a Graph.

Course Outcome: At the end of the course the student should be able to understand:

1. Implementation of BST and RB Tree.
2. Implementation of AVL tree and operations.
3. Implementation of Dynamic and greedy approach and its problems.
4. Implementation of graph and its applications.

Semester V
CLOUD APPLICATION DEVELOPMENT (LAB)

Course Code: IBD552 **L-0, T-0, P-4, C-2**

To Study Client and Server side applications using IBM Rational Tools.

Semester V
HADOOP FUNDAMENTALS (LAB)

Course Code: IBD553 **L-0, T-0, P-4, C-2**

To Study Client and Server side applications using IBM Rational Tools.

B.Tech (CSE) Semester V
INDUSTRIAL TRAINING

Course Code: ECS591 **L-0, T-0, P-0, C-2**

Students will attend Industrial training of six weeks in any industry or reputed organization after the IV semester examination in summer vacation. The evaluation of this training shall be included in the V semester evaluation.

The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the IV semester and shall be the nodal officer for coordination of the training.

Students will also be required to prepare an exhaustive technical report of the training undertaken during the V semester which will be duly signed by the officer under whom training was taken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Director of the college.

The student at the end of the V semester will present his report about the training before a committee constituted by the Director of the College which would be comprised of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director.

The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.

Not more than three students would form a group for such industrial training/ project submission.

The marking shall be as follows.

Internal: 50 marks
By the Faculty Guide - 25 marks
By Committee appointed by the Director – 25 marks

External: 50 marks
By Officer-in-charge trainee in industry – 25 marks
By External examiner appointed by the University – 25 marks

Course Outcome: At the end of the course the student should be able to understand:

1. Ability to demonstrate the use, interpretation and application of an appropriate international engineering standard in a specific situation.
2. Ability to analyze a given engineering problem, identify an appropriate problem solving methodology , implement the methodology and propose a meaningful solution.

3. Ability to apply prior acquired knowledge in problem solving.
4. Ability to work in a team.
5. Ability to effectively communicate solution to problems (oral, visual, written).
6. Ability to manage a project within a given time frame.
7. Ability to adopt a factual approach to decision making.

Semester VI
NATURAL LANGUAGE PROCESSING

Course Code: ECS612

L	T	P	C
3	1	**0**	4

Objective:

This introductory course gives an overview of many concepts, techniques, and algorithms in machine learning, beginning with topics such as classification and linear regression and ending up with more recent topics such as boosting, support vector machines, hidden Markov models, and Bayesian networks. The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is statistical inference as it provides the foundation for most of the methods covered.

Course Contents

Unit I

Introduction: Machine learning problems, Types of learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised Learning: Vapnik-Chervonenkis (VC) Dimension, Probably Approximately Correct (PAC) Learning, Noise, Learning Multiple Classes, Regression, Model Selection and Generalization. **(Lecture 08)**

Unit II

Bayesian Decision Theory:Classification, Losses and Risks, Association Rules, **Dimensionality Reduction:**Subset Selection, Principal Components Analysis, Multidimensional Scaling, Linear Discriminant Analysis. **(Lecture 08)**

Unit III

Clustering: Mixture Densities, k-Means Clustering, Expectation-Maximization Algorithm, Supervised Learning after Clustering, Hierarchical Clustering, **Classification:** Decision Trees, Univariate Trees, Pruning, Rule Extraction from Trees, Learning Rules from Data.

(Lecture 08)

Unit IV

Artificial Neural Networks: Introduction, neural network representation, perceptrons, multilayer networks and back propogation algorithm. (**Lecture 08)**

Unit V

Local Models: Introduction, Competitive Learning, Radial Basis Functions, Incorporating Rule-Based Knowledge, Normalized Basis Functions, Competitive Basis Functions, Learning Vector Quantization, Hierarchical Mixture of Experts.

(Lecture 08)

Course Outcome:

On completion of the course students will be expected to:

1. Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.

Text Books:

1. Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2010.
2. Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.
3. Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012.

Reference Books:

1. Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007.

*Latest editions of all the suggested books are recommended.

B.Tech (CSE) Semester VI
COMPUTER NETWORK

Course Code: ECS608 **L-3, T-1, P-0, C-4**

Objective:
To familiarize with the layered design and protocols of computer networks, including the Internet.

Course Contents

Unit I
Network: Goals, Applications, Components; Direction of Data flow networks, Categories, Types of Connections, Topologies, Protocols and Standards, ISO / OSI model, Transmission Media, Types, ISDN, Routers.

(Lecture 08)

Unit II
Medium Access Sub-Layer: Channel Allocations, ALOHA protocols, Error detection and correction: Parity, LRC, CRC, Hamming code, Flow Control and Error control; Stop and wait, Go back-N, ARQ, Selective repeat ARQ, Sliding Window, HDLC, Ethernet: IEEE-802.3, 802.4, 802.5, 802.11, FDDI, SONET , Bridges.

(Lecture 08)

Unit-III
Network Layer: Internet works, Packet Switching and Datagram Approach, IP addressing methods, Sub netting, Routing: Distance Vector, Link State.

(Lecture 08)

Unit IV
Transport Layer: Duties, Multiplexing, Demultiplexing, Sockets.
Protocols: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Congestion Control, Quality of Services (QOS), Integrated Services.

(Lecture 08)

Unit V
Application Layer: Domain Name Space (DNS), File Transfer Access and Management, Electronic Mail, Virtual Terminals, WWW, Security, Cryptography.

(Lecture 08)

Course Outcome: At the end of the course the student should be able to understand:

1. Understand networking protocols and their hierarchical relationship hardware and software.
2. Understand MAC layer and its functionality.
3. Understand network layer and its functionality.
4. Understand transport layer and its functionality.
5. Understand application layer and its functionality.

Text Books
1. Forouzan, B.A., *Data Communication and Networking*, Tata McGraw Hill.
2. Achyut, S. G., *Data Communications & Networks*, Tata McGraw Hill.
3. Forouzan, B.A., *TCP/IP Protocol Suit*, Tata McGraw Hill.

Reference Books

1. Stallings, W., *Data and Computer Communication*, Macmillan Press.
2. Keshav, S., *An Engineering Approach on Computer Networking*, Addison-Wesley.
3. Larry, L.P. and Peter, S.D., *Computer Network,* Harcourt Asia.

*Latest editions of all the suggested books are recommended.

Semester VI
BIG DATA ENGINEERING

Course code: IBD613

L-3, T-1, P-0,C-4

Module Title	:	**Big Data Engineering**
Programme	:	**B.Tech (CSE) in Application Development Using Cloud and Analytics Platforms in association with IBM**
	:	**3rd year 6th Semester**

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	16
Guided study	16
Total	32

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.

In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:
Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Text Material & resources: IBM Course Material
Big Data Engineering

Semester VI
REAL TIME OPERATING SYSTEM

Course Code: ECS606

L	T	P	C
3	1	0	4

Objective:

To impart the basic knowledge among the students about Real Time System. Through which they can understand the concepts, along with that it has various case studies which will be helpful for its better understanding.

Course Contents

Unit I

Real Time System: Concept; Priorities; Embedded Systems; Task; Classification &Requirements; Deadlines; Soft and Hard Real Time Systems.

(Lecture 08)

Unit II

Real Time Operating System: Evolution, Firm Real Time Systems, Task Management, Inter Process Communication, Case Studies: Maruti II, HART OS, VRTX.

(Lecture 08)

Unit III

Scheduling: Characterizing Real Time Systems and Tasks, Task Assignment, Fixed and Dynamic Priority, Unprocessed (RM and EDF), Multiprocessor (Utilization Balancing, Next-fit for RM & Bin-Packing Assignment for EDF).

(Lecture 08)

Unit IV

Tools: Programming Languages, Real Time Databases.

Applications: Real Time Communication, FDDI, Specification and Verification using Duration Calculus,; Flow Control, Protocols for Real Time (VTCSMA, Window, IEEE 802.3, IEEE 802.4, IEEE 802.5, Stop and Go Protocol, Media Access Protocol)

(Lecture 08)

Unit V

Fault: Concept, Classes, Fault Tolerant Real Time System, Clock; Need, Synchronization, Issues in Real Time Software Design.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to:

1. Describe the function of real time system
2. Analyze and design a real-time system.
3. Apply formal methods for scheduling real-time systems
4. Describe the communication method
5. Characterize and describe reliability and fault tolerance issues and approach.

Text Books

1. Krishna, C.M., *Real Time Systems*, McGraw Hill.
2. Jane, W.S., *Real Time Systems*, Pearson Education.

Reference Books

1. Levi, S. T. and Agarwal K., *Real Time Systems*, McGraw Hill.
2. Joseph, M., *Real Time System: Specification, Validation & Analysis*, Prentice Hall of India.

*Latest editions of all the suggested books are recommended.

Semester VI
SOFT COMPUTING

Course Code: ECS607 **L-3,T-1,P-0,C-4**

Objective:
To provide understanding of emerging field of fuzzy neural network and its application into various areas is covered.

Course Contents

Unit I
Neural Networks: History, Overview of Biological Neuro-system, Mathematical Models.

Artificial Neural Networks: Architecture, Learning: Rules, Paradigms, Supervised, Unsupervised and Reinforcement Learning; Training Algorithms: Perceptions, Training rules, Back Propagation Algorithm, Multilayer Perception Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

(Lecture 08)

Unit II
Fuzzy Logic: Fuzzy Logic, Classical and Fuzzy Sets, Membership Function; Fuzzy rule generation.

(Lecture 08)

Unit III
Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

(Lecture 08)

Unit IV
Fuzzy Arithmetic: Numbers, Linguistic Variables, Arithmetic Operations on Intervals &Numbers, Lattice, Equations, Logic: Classical, Multi-valued, Propositions; Qualifiers, Linguistic Hedges.

(Lecture 08)

Unit V
Uncertainty based Information: Information & Uncertainty, Non specificity of fuzzy & crisp sets, Fuzziness of Fuzzy Sets.

(Lecture 08)

Course Outcome:
After completion of the course the students shall be able to:

1. Understand the need for Soft Computing;
2. Understand different uses of Soft Computing in various areas;
3. Understand the steps involved in the development of Soft Computing;
4. Acquire a working knowledge of some popular tools for Soft Computing;
5. Design, implement and verify computing systems by using appropriate Soft Computing techniques and tools

Text Books
1. Simon, H., *Neural Networks,* Prentice Hall of India.
2. Kosko, B., *Neural Networks for Signal Processing*, Prentice Hall of India.
3. Klir, G. and Youn, B., *Fuzzy Logic & Fuzzy sets*, Prentice Hall of India.

Reference Books:
1. Kazuo, T., *An Introduction to Fuzzy Logic for Practical Applications*, Springer.

*Latest editions of all the suggested books are recommended.

Semester VI
E-COMMERCE

Course Code: ECS609

L	T	P	C
3	1	0	4

Objective:

To understand the modern day e-commerce applications and how they are implemented physically.
To understand the working of various protocols used in e-commerce applications.

Course Contents

Unit I

E-Commerce: Definition, History, Advantages and Disadvantages, Types, E-business vs. E-commerce, E-Commerce: technology and prospects, incentives for engaging in electronic commerce, needs of e-commerce, E-commerce models.

(Lecture 08)

Unit II

Network Infrastructure for E-Commerce: Industry Framework, Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipment; Broad band telecommunication(ISDN, ATM, FRAMERELAY).

(Lecture 08)

Unit III

Mobile Commerce:

Introduction: Mobile commerce, advantages and disadvantages, e-commerce vs m-commerce, Mobile computing: Framework, Applications; Wireless application protocol, WAP technology; Mobile Information devices.

(Lecture 08)

Unit IV

Electronic Payment Systems: Overview, SET protocol, payment gateway, certificate, Types; Digital tokens: Smart cards, Credits Cards, Magnetic strip cards, E-cheques based EPS; online bank Risk.

On-line Commerce Environments: Servers and commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers; open market.

(Lecture 08)

Unit V

EDI: Applications in business, Legal: E-commerce law, Forms of agreement, Government policies and Agenda, EDI vs. E-Commerce, Value added network, EDI versus Internet and EDI over Internet.

Electronic Commerce Providers: On-line Commerce options: Company profiles.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to:

1. Understand what is meant by the term ‘e-commerce’ and the need of ecommerce.
2. Understand the role of information systems in organizations, the strategic management processes, and the implications for the management.
3. Learn about the importance of managing organizational change associated with information systems implementation.
4. Use the application software skills such as analyzing spreadsheets, creating database, and Web browsing, that they have learned in other courses to apply to real-world business problems.
5. Learn about the importance of managing organizational change associated with information systems implementation.

Text Books

1. Kalakota, R., *Frontiers of E-Commerce,* Addison-Wesley.
2. Leon, A., *Enterprise Resource Planning*, Tata McGraw Hill.

Reference Books

1. Sadagopan, S. *Enterprise Resource Planning*, Tata McGraw Hill.
2. Bajaj, K. and Nag, D., *E-Commerce: The cutting edge of Business,* Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.

Semester VI
MICROPROCESSOR & APPLICATION

Course Code: EEC606	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

Objective:

To study the evolution of microprocessors & how to do assembly language programming with the help of interfacing.

Course Contents

Unit I

Introduction to Microprocessor: 8085 Evolution of Microprocessor, Register Structure, ALU, Bus Organization, Timing and Control, Instruction set. Architecture of 16-bit Microprocessors: Architecture of 8086; (Bus Interface Unit, Execution unit) Register Organization, Bus operation, Memory segmentation. **(Lecture 08)**

Unit II

Assembly Language Programming: Addressing Modes and instruction set of 8086, Arithmetic and Logic instructions, Program Control Instructions (jumps, conditional jumps, and subroutine call), Loop and string instructions, Assembler Directives.

(Lecture 08)

Unit III

CPU Module: Signal Description of pins of 8086 and 8088, Clock generator, Address and Data bus Demultiplexing, Buffering Memory Organization, Read and Write cycle Timings, Interrupt Structures, Minimum Mode and Maximum Mode Operations.

(Lecture 08)

Unit IV

Peripheral Interfacing: Programmed I/O, Interrupt Driven, I/O, DMA, Parallel I/O, (8255-PPI, Parallel port), 8253/8254 programmable Timer/Counter Interfacing with ADC.

(Lecture 08)

Unit V

Peripheral Interfacing (Contd.): 8259 Programmable Interrupt controller, 8237 DMA controller Concept of Advanced 32 bit Microprocessors: Pentium Processor.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to:

1. Understanding the basic building blocks of a microcontroller device in general. ™
2. Knows the terminologies like embedded and external memory devices,
3. CISC and RISC processors etc. ™
4. Knows the architecture and silent features of 8051 microcontrollers.
5. n-depth understanding of specialist bodies of knowledge within the engineering discipline.
6. 2.1 Application of established engineering methods to complex engineering problem solving.
7. 2.2 Fluent application of engineering techniques, tools and resources.
8. 2.3 Application of systematic engineering synthesis and design processes.

Text Books:

1. Gaonkar Ramesh S., *Microprocessor Architecture, Programming, and Applications with*

the8085, Pen Ram International Publishing.
2. Ray, A.K. &Burchandi, K.M., *Advanced Microprocessors and Peripherals: ArchitectureProgramming and Interfacing*, Tata McGraw Hill.
3. Hall D.V, *Microprocessors Interfacing*, Tata McGraw Hill.
4. B.P. Singh &Renu Singh, *Microprocessors and Microcontrollers*, New Age International.
5. U.S.Shah, Microprocessor ,Tech Max Publications

Reference Books:

1. Liu and Gibson G.A., *Microcomputer Systems: The 8086/8088 Family*, Prentice Hall (India).
2. Brey, Barry B., *INTEL microprocessors*, Prentice Hall (India).
3. Ram B., *Advanced Microprocessor & Interfacing*, Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.

Semester VI
Computer Network (LAB)

Course Code: ECS657 **L-0, T-0, P-4, C-2**

1. To write a program in C illustrating use of TCP Sockets.
2. To write a program in C illustrating use of simple UDP.
3. To write a program in C illustrating use of Raw Sockets (like packet capturing and filtering)
4. To write a program in C illustrating concept of Sliding Window Protocol.
5. To write a program in C for Address Resolution Protocol.
6. To write a program in C for implementing Routing Protocols.
7. To write a program in C illustrating for Open Shortest Path first Routing Protocol.

Course Outcome: At the end of the course the student should be able to understand:

1. Implementing networking protocols of various OSI layers in C / C++ / Java.
2. Implementing routing protocols in C / C++ / Java.
3. Study of various networking and inter – networking devices.
4. Study of some important computer networking tools in UNIX / Windows environment.
5. Studying client – server programming using TCP and UDP sockets
6. Study of important command line utilities involved in computer networks

Semester VI
Big Data Engineering (LAB)

Course Code: IBD653 **L-0,T-0,P-2,C-1**

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To Study and Practices on InfoSphere BigInsights and perform Hands on lab exercise

- Working with BigInsights
- MapReduce
- Introduction to BigInsights Analytics for Business Analysts
- Importing Data to InfoSphere BigInsights
- BigSheets Workflow
- BigSheets Collections
- BigSheets Navigation
- Working with BigSheets Collections
- BigSheets Readers and Extensions

Semester VI

Seminar I

Course Code: ECS-692 **L T PC 0 0 0 2**

Selection of topic:

All students pursuing B.tech. shall submit the proposed topic of the seminar in the first week of the semester to the course coordinator. Care should be taken that the topic selected does not directly relate to the subject of the courses being pursued. The course coordinator shall then forward the list to the concerned Seminar Committee. The topics will then be allocated to the students along with the name of the faculty guide.

Preparation of the seminar

1. The student shall meet the guide for the necessary guidance for the seminar work.
2. During the next two to four weeks the student should read the primary literature germane to the seminar topic. Reading selection should continuously be informed to the guide.
3. After necessary collection of data and literature survey, the students must prepare a report. The report shall be arrange in the sequence consisting of the following:-

a. Top Sheet of transparent plastic.
b. Top cover.
c. Preliminary pages.
(i) Title page
(ii) Certification page.
(iii) Acknowledgment.
(iv) Abstract.
(v) Table of Content.
(vi) List of Figures and Tables.
d. Chapters (Main Material).
e. Appendices, If any.
f. Bibliography/ References.
g. Back Cover (Blank sheet).
h. Back Sheet of Plastic (May be opaque or transparent).

For Guide

If you choose not to sign the acceptance certificate , please indicate reasons for the same from amongst those given below:

i) The amount of time and effort put in by the student is not sufficient;
ii) The amount of work put in by the student is not adequate
iii) The report does not represent the actual work that was done / expected to be done;
iii) Any other objection (Please elaborate)

General points for the seminar

1. The report should be typed on A4 sheet. The Paper should be of 70-90 GSM.
2. Each page should have minimum margins as under
   a. Left 1.5 inches
   b. Right 0.5 Inches
   c. Top 1 Inch
   d. Bottom 1 Inch (Excluding Footer, If any)
3. The printing should be only on one side of the paper
4. The font for normal text should Times New Roman, 12 size for text and 14 size for heading and should be typed in double space. The references may be printed in Italics or in a different font.
5. The Total Report should not exceed 30 pages including top cover and blank pages.

6. One copy completed in all respect as given above is to be submitted to the guide. That will be kept in departmental/University Library.

7. The power point presentation should not exceed 15 minutes which include 5 minutes for discussion/Viva.

Seminar will be evaluated out of total 100 marks. In Internal Evaluation marks will be awarded out of 50 and in external evaluation also marks will be awarded out of 50 on the basis of vivavoce. Internal evaluation will be exercised by the Internal Evaluation Committee of college.

Semester VII
SPRING FRAMEWORK

Course Code: ICM715 **L-3, T-1, P-0, C-4**

Module Title : SPRING FRAMEWORK
Programme : B.Tech (CSE) in Cloud & Mobile Based Application Development in association with IBM
: 4th year 1st Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:
Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Text Material & resources: IBM Course Material
Spring Framework

Semester VII
CRYPTOGRAPHY & NETWORK SECURITY

Course Code: ECS703

L-3 ,T-1,P-0,C-4

Objective: To gain knowledge about various cryptographic methods.

Course Contents

Unit I

Network Security: Attacks; Services & Mechanisms; Conventional Encryption: Classical Encryption Techniques, Model and Steganography. **(Lecture 08)**

Unit II

Encryption Schemes: DES: Standard, Strength; Block Cipher Design Principles; Block Cipher Modes of Operation: Triples DES; Placement & Encryption Function: Key Distribution, Random Number Generation, Placement of Encryption Function. **(Lecture 08)**

Unit III

Public-Key Cryptography: Principles; RSA Algorithm; Key Management; Fermat's &Euler's Theorems; Primarily Miller Test; Chinese Remainder Theorem.

(Lecture 08)

Unit IV

Message Authentication & Hash Functions: Authentication: Requirements, Protocol, Functions, Message Authentication Codes, Hash Functions, Birthday Attacks, Security Of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA),

Digital Signatures: Digital Signature Standard (DSS), Proof of Digital Signature Algorithm.

(Lecture 08)

Unit V

IP Security: Electronic Mail Security; Pretty Good Privacy (PGP); S/MIME; Authentication Header; Encapsulating Security Payloads; Combining Security Associations; Key Management,.

Web Security: Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set);

System Security: Intruders; Viruses; Firewall Design Principles; Trusted Systems.

(Lecture 08)

Course Outcome: At the end of the course the student should be able to understand:

1. Basic understanding of network services & types of attacks.
2. Cryptography algorithms for encryption.
3. Principle of public cryptography.
4. Principle of authentications.
5. Network security & virus attacks.

Text Book

1. Stallings, W., *Cryptography and Network Security: Principles and Practice*, Prentice Hall.
2. Kahate, A., *Cryptography and Network Security*, Tata McGraw Hill.

Reference Book

1. Johannes, A. B., *Introduction to Cryptography*, Springer.

*Latest editions of all the suggested books are recommended.

Semester VII
ADVANCED RDBMS

Course Code: ICM713 **L-3, T-1, P-0, C-4**

Module Title : Advanced RDBMS
Programme : B.Tech (CSE) in Cloud & Mobile Based Application Development in association with IBM
: 4th year 1st Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	40
Guided study	20
Total	60

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:
Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Indicative Contents:

Topic	Coverage	No. of Lectures
Unit 1	Overview of DB2 9 on Linux, UNIX and Windows, Command Line Processor (CLP) and GUI usage, The DB2 environment	**10**
Unit 2	Creating databases and data placement, Creating database objects, Moving data	**8**
Unit 3	Backup and recovery, Locking and concurrency, Investigating DB2 locking	**10**
Unit 4	Problem determination, Application issues and performance, Application performance tools, Security	**12**
	Total	**40**

Text Material & resources: IBM Course Material

Advanced RDBMS

Semester VII
ARTIFICIAL INTELLIGENCE

Course Code: ICM716 **L-3, T-1, P-0, C-4**

Module Title : Artificial Intelligence
Programme : B.Tech (CSE) in Cloud & Mobile Based Application Development in association with IBM
: 4th year 1st Semester

***Time required in terms of Student Learning*: -**

Learning	Hours
Contact Classes	**32**
Guided study	**28**
Total	**60**

Aim & Objectives:

Teaching and Learning Approach:

The course will focus on using a teacher-student interactive and decision-oriented learning exercises.

For the active learning mode in the course to be effective, participating in class discussions is extremely important along with self paced learning to clear the concepts of software.
In addition to the lectures, discussions and demonstrations, students would be required to work on sample applications and exercises

Guided Study:

Guided study will include Online learning from IBM Career Education @ Campus Portal, text readings, articles on contemporary issues in organization, assignments, case analysis and power point presentations.

Assessment:

Assessment of the student will be based on mid-term and end term examination and continuous assessment subject to class participation, assignments and presentations.

Text Material & resources: IBM Course Material

Artificial Intelligence

Semester VII
Spring Framework (LAB)

Course Code: ICM755 **L-0, T-0, P-4, C-2**

To study software testing practices and their uses.

Semester VII
CRYPTOGRAPHY & NETWORK SECURITY (LAB)

Course Code: ECS752 **L-0, T-0, P-4, C-2**

1. To write a program in C to implement Caesar cipher.
2. To write a program in C to implement "Vigenere Cipher" technique.
3. To write a program in C to implement Extended Euclid Algorithm.
4. To write a program in C to implement Chinese remainder theorem.
5. To write a program in C to implement Diffie Hellman algorithm
6. To write a program in C to implement Play-fair Cipher.
7. To write a program in C to implement RSA algorithm.
8. To configure a mail agent to Digital Signature and send a mail and verify the correctness of this system.
9. To configure the Windows Firewall feature in Windows XP Service Pack 2.

Course Outcome: At the end of the course the student should be able to understand:

Implement cryptographic algorithms configuring email and window firewalls in different operating systems.

Semester VII
ADVANCED DBMS (LAB)

Course Code: ICM753 **L-0, T-0, P-4, C-2**

Practical on DB2, Creating databases and data placement, Creating database objects, Moving data, Security and related exercises.

1. Creating databases and data placement
2. Creating database objects, Moving data
3. Backup and recovery
4. Locking and concurrency
5. Investigating DB2 locking
6. Application issues and performance
7. Application performance tools
8. Security

Semester VII
ARTIFICIAL INTELLIGENCE(LAB)

Course Code: ICM756 **L-0, T-0, P-4, C-2**

To study Bluemix UI, IBM Bluemix Eclipse tools, : Build a Twitter Influencer Application in Bluemix , Dev Ops, MBaaS on Bluemix platform, introduction to Big Data Sets and based on theoretical syllabus..

1. Data Management service - Build an BI application using Map Reduce Service to perform analytics for Big Data Sets.

B.Tech (CSE) Semester VII
DIGITAL IMAGE PROCESSING

Course Code: ECS-716

L	T	P	C
3	0	0	3

Objective:

- To gain the knowledge of digital image processing which includes topics like image enhancement, restoration, compression, segmentation etc.

Course Contents

Unit I

Digital Image Fundamentals: Representation; Elements of visual perception; Simple image formation model; Image sampling and quantization; Basic relationships between pixels; Imaging geometry; Review of matrix theory results: Row and Column ordering, Toeplitz, Circulant and Block matrices; Review of image transforms: 2D-DFT, FFT, WALSH, HADAMARD, HAAR, DCT and wavelet transforms.

(Lecture 08)

Unit II

Image Enhancement: Spatial domain methods: Point processing, Intensity transformations, histogram processing; Image subtraction and averaging; Spatial filtering: Smoothing, Sharpening, Frequency domain methods; Filtering: Low pass, High pass filtering, Homomorphic filtering; Generation of spatial masks from frequency domain specifications.

(Lecture 08)

Unit III

Image Restoration: Degradation model; Diagonalization of circulant and block Circulant matrices;Algebraic approaches: Inverse filtering, Wiener filtering, Constrained least squares restoration, Interactive restoration, Geometric transformations; Fundamentals of color image processing: Color models; RGB, CMY, YIQ, HIS; pseudo color image processing, intensity slicing, Gray level to color transformation.

(Lecture 08)

Unit IV

Image Compression: Redundancy: Coding, Inter Pixel, Psycho Visual; Fidelity criteria; Models; Elements of information theory; Error free compression: Variable length, Bit plane, Lossless predictive, Lossy compression, Lossy predictive, Transform coding. JPEG, MPEG, fractals.

(Lecture 08)

Unit V

Image Segmentation: Detection of discontinuities: Point, Line and Edge and Combined detection; Edge linking and Boundary description; Local and global processing using HOUGH transform; Thresholding; Region oriented segmentation: Basic formulation, Region growing by pixel aggregation, Region splitting and merging; Use of motion in segmentation; Representation and description.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to:

1. To study the image fundamentals and mathematical transforms necessary for image processing.
2. To study the image enhancement techniques
3. To study image restoration procedures.
4. To study the image compression procedures.
5. To study the image segmentation and representation techniques.

Text Books

1. Gonzalez R. C., Woods R. E., *Digital Image Processing*, Pearson Education.
2. Jain A. K., *Fundamentals Of Digital Image Processing*, Pearson Education.

Reference Books

1. Pratt W. K., *Digital Image Processing*, John Wiley and Sons.
2. Boyle R., Sonka M., Hlavac V., *Image Processing, Analysis And Machine Vision*, Vikas Publishing House.

*Latest editions of all the suggested books are recommended.

B.Tech (CSE) Semester VII
DATA COMPRESSION

Course Code: ECS713

L	T	P	C
3	0	0	3

Objective:

Data compression is often referred to as coding, where coding is a very general term encompassing any special representation of data which satisfies a given need. Information theory is defined to be the study of efficient coding and its consequences, in the form of speed of transmission and probability of error. Data compression may be viewed as a branch of information theory in which the primary objective is to minimize the amount of data to be transmitted. The purpose of this paper is analyzing a variety of data compression algorithms.

CourseContents:

Unit - I:

Introduction Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

(Lecture 08)

Unit – II:

Huffman coding The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression. **(Lecture 08)**

Unit-III:

Arithmetic Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The BurrowsWheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markoy Compression. **(Lecture 08)**

Unit – IV:

Mathematical Preliminaries for Lossy Coding Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization. **(Lecture 08)**

Unit-V:

Vector Quantization Advantages of Vector Quantization over Scalar Quantization, The Linde-BuzoGray Algorithm, Tree structured Vector Quantizer. Structured VectorQuantizer.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to:

1. Broad knowledge of compression techniques as well as the mathematical foundations of data compression.
2. Factual knowledge about existing compression standards or commonly-used compression utilities.
3. Understanding of the ubiquity and importance of compression technologies in today's environment.
4. Elementary understanding of the need for modeling data.

Text Books:

1.Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers

Reference Books:

1. Rafael C. Gonzalez and Richard E. Woods: Digital Image Processing, Addison-Wesley.
2. Gilbert Held: Data and Image Compression, John Wiley & Sons Ltd.

*Latest editions of all the suggested books are recommended.

B.Tech (CSE) Semester VII
Python

Course code: ECS 714 **L- 3, T-0, P-0, C-3**

Objective: Python is a useful scripting language for developers and describes how to design and program Python applications. To learn how to use lists, tuples, and dictionaries in Python programs. It also define structure and components of a Python program. To learn how to write loops and decision statements in Python.

Course Content

Unit - I
Introduction History, Features, Setting up path, Working with Python, Basic Syntax ,Variable and Data Types , Operator Conditional Statements If ,If- else ,Nested if-else Looping For, While ,Nested loops Control Statements Break, Continue ,Pass **(Lecture 08)**

Unit - II
String Manipulation Accessing Strings ,Basic Operations ,String slices ,Function and Methods Lists Introduction ,Accessing list ,Operations ,Working with lists ,Function and Methods Tuple Introduction ,Accessing tuples ,Operations ,Working ,Functions and Methods**(Lecture 08)**

Unit - III
Dictionaries Introduction,Accessing values in dictionaries, Working with dictionaries, Properties ,Functions Functions Defining a function , Calling a function, Types of functions ,Function Arguments ,Anonymous functions ,Global and local variables
(Lecture 08)

Unit - IV
Modules Importing module ,Math module ,Random module ,Packages ,Composition Input-Output Printing on screen ,Reading data from keyboard ,Opening and closing file ,Reading and writing files ,Functions **(Lecture 08)**

Unit - V
Exception Handling Exception ,Exception Handling ,Except clause ,Try ? finally clause ,User Defined Exceptions
OOPs concept Class and object , Attributes ,Inheritance ,Overloading ,Overriding ,Data hiding
(Lecture 08

Course Outcome
After successful comletion of this course, students will be able to:

1. To understand why Python is a useful scripting language for developers..
2. To learn how to use lists, tuples, and dictionaries in Python programs.
3. To learn how to use indexing and slicing to access data in Python programs.
4. To define the structure and components of a Python program.
5. To learn how to write loops and decision statements in Python.
6. To learn how to write functions and pass arguments in Python.

7. To learn how to build and package Python modules for reusability.
8. To learn how to read and write files in Python.
9. To learn how to design object-oriented programs with Python classes.

Text Books

1. Learning Python by Mark Lutz, David Ascher Shop O'Reilly - O'Reilly Media
2. Beginning Python Magnus Lie Hetland , Goodreads
3. Python Programming for the Absolute Beginner third edition Ross DawsonGoodreads

Reference Books

1. Learn Python the Hard Way, Zed A. Shaw , Goodreads
2. Python Essential Reference, David M. Beazley, Addison Wesley

*Latest editions of all the suggested books are recommended.

Semester VII

INDUSTRIAL TRAINING PRESENTATION (8WEEKS)

Course Code: ECS791 **L-0, T-0, P-0, C-4**

Students will have to undergo industrial training of six weeks in any industry or reputed organization after the VI semester examination in summer. The evaluation of this training shall be included in the VII semester evaluation.
s
The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the VI semester and shall be the nodal officer for coordination of the training.

Students will prepare an exhaustive technical report of the training during the VII semester which will be duly signed by the officer under whom training was undertaken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Director of the college.

The student at the end of the VII semester will present his report about the training before a committee constituted by the Director of the College which would comprise of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director.

The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.

Not more than three students would form a group for such industrial training/ project submission.

The marking shall be as follows.

Internal: 50 Marks
By the faculty guide - 25 marks
By committee appointed by the director – 25 marks

External: 50 Marks
By officer-in-charge trainee in industry – 25 marks
By external examiner appointed by the university – 25 marks

Semester VII

PROJECT WORK PHASE- 1

(Synopsis, Literature Survey & Presentation)

Course Code: ECS799 **L-0, T-0, P-8, C-4**

A group of students, not more than three, will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified in the starting of the VII semester.

The group will carry out the literature search and collect required material for carrying out the project.

The group will prepare a report not exceeding 15 pages at the end of semester.

The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester the student shall present the progress of project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner.

The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director.

The marking shall be as follows.

Internal: 50 Marks
By The Faculty Guide - 50 Marks
By Committee Appointed By the Director – 50 Marks

External: 50 Marks
By External Examiner Appointed By the University – 50 Marks

Semester VIII

DATA WAREHOUSING AND DATA MINING WITH R-PROGAMMING

Course Code: ECS801

L	T	P	C
3	1	0	4

Objective:

- Data warehouse is used to manage the old data and mining is used for finding the appropriate information for decision making. The course provides knowledge of Data warehousing and Data mining. To provide the knowledge of programming in R and how to use R for effective data analysis.

Course Contents

Unit I

*Data Warehousing: U**nderstanding data warehouse, features of data warehouse, integrating heterogeneous databases, comparison of data warehouse and operational data, benefits of data warehousing, problems of data warehousing, data warehouse applications, data warehouse types, types of data stored in a data warehouse, extract transform load***.

(Lecture 08)

Unit II

History and Overview of R programming : Introduction to R,The S Philosophy, Basic Features of R, Free Software Design of the R , System Limitations of R, R Resources, Installation and getting started with the R interface.

(Lecture 08)

Unit III

Data Warehousing Architecture: Operational Data, Store, Detailed, Lightly andHighlysummarized, Meta-Data; Archive/Backup; Manager: Load, Warehouse, Query; Architecture models: 2-Tier, 3-Tier and 4-Tier, data warehouse design approaches, data warehouse models.

(Lecture 08)

Unit IV

Data Manipulation (dplyr, reshape2 packages) and Scoping Rules of R: Data Frames, The dplyr Package, dplyr Grammar, Installing the dplyr package, select(), filter(), arrange(), rename(), mutate(), group_by(), A Diversion on Binding Values to Symbol, Scoping Rules, Lexical Scoping: Why Does It Matter?, Lexical vs. Dynamic Scoping, Application: Optimization

(Lecture 08)

Unit V

Control Structures and Functions and Loop Functions: Control Structures, if-else, for Loops, Nested for loops, while Loops , repeat Loops, next, break, Functions in R programming.

Major data mining techniques; Cluster detection, Decision trees; Memory-based reasoning; Link analysis; Neural networks; Genetic algorithms; Applications; Benefits.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to:

1. Have deeper understanding of database systems and their underlying theory to be able to
2. Improve decision making process.
3. To understand why R-Programming is a useful language for developers.
4. Be able to design the physical model of data warehouse.
5. To define the structure and components of an R-Programming program.

6. To learn how to write loops and decision statements in R-Programming.
7. To learn how to read and write files in R-Programming

Text Books

1. Paul R. P., *Fundamentals Of Data Warehousing*, John Wiley and Sons.
2. Inmon W. H., *Building the Operational Data Store*, John Wiley and Sons.
3. R Programming for Data Science, by Roger D. PengUsing R for Introductory Statistics, by John Verzani, Chapman & Hall/CRC, 2004, ISBN 1584884509 Advanced R, by Hadley Wickham, ISBN 9781466586963

Reference Books

1. Anahony S., *Data Warehousing In the Real World: A Practical Guide for Building DecisionSupport Systems*, John Wiley and Sons.

2.Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd.,

3. R Programming for Data Science, by Roger D. PengUsing R for Introductory Statistics, by John Verzani, Chapman & Hall/CRC, 2004, ISBN 1584884509 Advanced R, by Hadley Wickham, ISBN 9781466586963

*Latest editions of all the suggested books are recommended.

Semester VIII

Android Programming

Course Code: ECS806

L	T	P	C
3	1	0	4

Objective: The objective of this course module is to provide the sound knowledge of Android Development. It helps the students to develop various apps using Android for different types of mobile devices and tablets.

Course Contents

Unit - I

Overview: What is Android, Features of Android, Setting up Android Environment, Android Architecture, Application Framework. Application components (activities, services, Broadcast receivers, content providers). First sample application, Anatomy of Android application, Main activity file, Manifest file, Strings file, R file, Layout file, Running the application.

(Lecture 08)

Unit - II

Emulator-Android Virtual Device, Organizing and accessing the resources, Fragments, Intents & Filters, Basic UI Design, Form widgets, Text Fields, UI Controls, UI Layouts.

(Lecture 08)

Unit - III

Event Handling: Event Listeners and Handlers, Event Listeners Registration. Preferences, Menus, Custom Components, Tabs and Tab Activity **(Lecture 08)**

Unit – IV

Styles and Themes, Drag and Drop, Content Provider (SQLite Programming, SQLiteOpenHelper, SQLiteDatabase, Cursors). **(Lecture 08)**

Unit - V

Location Based Services, Sending Emails, Sending SMS **(Lecture 08)**

Course Outcome

After completion of this course students will have understanding of:

1. Android Framework for Application Development
2. Emulators to be used
3. Event handling in android
4. Basics of styles and themes in Android

Text Books:

1. Carmen Delessio., *Sams Teach Yourself Android Application Development in 24 Hours*, SAMS
2. Reto Meier, Wrox *Professional Android Application Development*, Paperback

Reference Books:

1. Jonathan Simon, *Head First Android Development*, O'Reilly

*Latest editions of all the suggested books are recommended.

Semester VIII
Concepts of IoT (Internet of Things)

Course Code: ECS807

L	T	P	C
3	1	0	4

Objective: The course aims to introduce students to the concepts underlying the Internet of Things (IoT) through a series of lectures on the various topics that are important to understand the state-of-the-art as well as the trends for IoT. In order to pass the course, the students should be able to:

Course Contents

Unit I

Introduction to Internet in general and Internet of Things: Introduction to Internet: layers, protocols, packets, services; Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, WiFi 802.11, cellular Internet access, and Machine-to-Machine (M2M). **(Lecture 08)**

Unit II

IoT Technology Fundamentals: IoT definitions: overview, applications, potential & challenges, and architecture; Devices and gateways, Local and wide area networking; Data management, Business processes in IoT, Everything as a Service(XaaS), IoT Analytics, Knowledge Management. **(Lecture 08)**

Unit III

IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home. **(Lecture 08)**

Unit IV

IoT Architecture-State of the Art – Introduction, State of the art, **Architecture Reference Model-** Introduction, Reference Model and architecture, IoT reference Model; IoT Reference Architecture**:** Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. **(Lecture 08)**

Unit V

Real-World Design Constraints- Introduction, Technical Design constraints, Data representation and visualization, Interaction and remote control. Uses of IoT in Industrial Automation, Commercial Building Automation, Wireless communication, etc. **(Lecture 08)**

Course Outcomes:

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

1. Describe the concept of IoT, its fundamentals
2. Describe IoT architecture, and protocols
3. Conceptually describe countermeasures for Internet of Things devices
4. Compare and contrast the threat environment based on industry and/or device type.
5. Contrast the constraints of real world design.

Textbook:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

Reference Books:

1. Vijay Madisetti and Arshdeep Bahga, **"Internet of Things (A Hands-on-Approach)",** 1st Edition, VPT, 2014.

2. Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013

*Latest editions of all the suggested books are recommended.

Semester VIII
PATTERN RECOGNITION

Course Code: ECS-809

L	T	P	C
3	1	0	4

Unit-I
Introduction: Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

(Lecture 08)

Unit-II
Statistical Patten Recognition: Bayesian Decision Theory, Classifiers, Normal density and discriminate functions.

(Lecture 08)

Unit – III
Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminate analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

(Lecture 08)

Unit - IV
Nonparametric Techniques: Density Estimation, Parzen Windows, K-Nearest Neighbor Estimation, Nearest Neighbor Rule, Fuzzy classification.

(Lecture 08)

Unit - V
Unsupervised Learning & Clustering: Criterion functions for clustering, Clustering Techniques: Iterative square - error partitional clustering – K means, agglomerative hierarchical clustering, Cluster validation.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to understand:

1. Identify, interpret and analyze stakeholder needs.
2. Identify and apply relevant problem solving methodologies
3. Implement and test solutions
4. Communicate effectively in ways appropriate to the discipline, audience and purpose.
5. Work as an effective member or leader of diverse teams within a multi-level, multi-disciplinary and multi-cultural setting

Reference Books:

1. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification”,
2. C. M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2009.
3. S. Theodoridis and K. Koutroumbas, “Pattern Recognition”, 4th Edition, Academic Press, 2009.
Data Mining & Data Warehouse

*Latest editions of all the suggested books are recommended.

Semester VIII
NEURAL NETWORK

Course Code: ECS-810

L	T	P	C
3	1	0	4

Unit-I:
Neuro computing and Neuroscience Historical notes, human Brain, neuron Mode, Knowledge representation, N.N Learning process: Supervised and unsupervised learning, Error correction learning, competitive learning, adaptation.

(Lecture 08)

Unit-II:
Basic Models of Artificial neurons, activation Functions, aggregation function, single neuron computation, multilayer perceptron, least mean square algorithm, gradient descent rule, nonlinearly separable problems in NN.

(Lecture 08)

Unit-III
Multilayered network architecture, back propagation algorithm, heuristics for making BP algorithm performs better, approximation properties of RBF networks and comparison with multilayer perceptron.

(Lecture 08)

Unit-IV
Recurrent network and temporal feed-forward network, implementation with BP, self organizing map and SOM algorithm, properties of feature map and computer simulation. Principal component and Independent component analysis.

(Lecture 08)

Unit-V
Analyticity of activation function, Complexity analysis of network models, Soft computing, Neuro-Fuzzy-genetic algorithm Integration.

(Lecture 08)

Course Outcome:

After completion of the course the students shall be able to:

1. Describe basic types of artificial neural networks.
2. Design and implement neuron based system.
3. Designing and working of back propogation algorithm.
4. Understand basic learning algorithms of artificial neural networks.
5. Understand the concept of soft computing and neuro- fuzzy-genetic algorithms and their uses.

Reference Books:

1. J.A. Anderson, An Intoduction to Neural Networks, MIT
2. Hagen Demuth Beale, Neural Network Design, Cengage Learning
3. R.L. Harvey, Neural Network Principles, PHI
4. Kosko, Neural Network and Fuzzy Sets, PHI

Semester VIII
NATURAL LANGUAGE PROCESSING

Course Code: ECS-811

L	T	P	C
3	1	0	4

Objective:

This introductory course gives an overview of many concepts, techniques, and algorithms in machine learning, beginning with topics such as classification and linear regression and ending up with more recent topics such as boosting, support vector machines, hidden Markov models, and Bayesian networks. The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is statistical inference as it provides the foundation for most of the methods covered.

Course Contents

Unit I

Introduction: Machine learning problems, Types of learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised Learning: Vapnik-Chervonenkis (VC) Dimension, Probably Approximately Correct (PAC) Learning, Noise, Learning Multiple Classes, Regression, Model Selection and Generalization. **(Lecture 08)**

Unit II

Bayesian Decision Theory:Classification, Losses and Risks, Association Rules, **Dimensionality Reduction:**Subset Selection, Principal Components Analysis, Multidimensional Scaling, Linear Discriminant Analysis. **(Lecture 08)**

Unit III

Clustering: Mixture Densities, k-Means Clustering, Expectation-Maximization Algorithm, Supervised Learning after Clustering, Hierarchical Clustering, **Classification:** Decision Trees, Univariate Trees, Pruning, Rule Extraction from Trees, Learning Rules from Data.

(Lecture 08)

Unit IV

Artificial Neural Networks: Introduction, neural network representation, perceptrons, multilayer networks and back propogation algorithm. (**Lecture 08)**

Unit V

Local Models: Introduction, Competitive Learning, Radial Basis Functions, Incorporating Rule-Based Knowledge, Normalized Basis Functions, Competitive Basis Functions, Learning Vector Quantization, Hierarchical Mixture of Experts.

(Lecture 08)

Course Outcome:

On completion of the course students will be expected to:

2. Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.

Text Books:

4. Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2010.
5. Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.
6. Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012.

Reference Books:

2. Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007.

*Latest editions of all the suggested books are recommended.

Semester VIII
DATA WAREHOUSING AND DATA MININGWITH R-PROGAMMING (LAB)

Course Code: ECS851

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To develop an application to implement defining subject area, design of fact dimension table, data mart.
2. To develop an application to construct a multidimensional data.
3. To develop an application to implement data generalization and summarization technique.
4. To develop an application to extract association rule of data mining.
5. To develop an application for classification of data.
6. To develop an application for decision tree.
7. To develop an application to implement R PROGRAMMING loops.
8. To develop an application to implement structure and components of an R-Programming

Course Outcome:

The practical of this subject should be provided in such a manner that it gives students hands on:

1. Modeling and design of data warehouses.
2. Install and Configure WEKA Tool
3. Demonstrate WEKA Explorer, Mining techniques and Attribute Relation File
4. Format (ARFF).
5. Compare various Data Mining techniques available in WEKA

Semester VIII
ANDROID PROGRAMMING (LAB)

CourseCode: ECS854

L	T	P	C
0	0	3	1.5

List of Experiments

1. Creating Applications with Multiple Activities and a Simple Menu using ListView
2. Creating Activities For Menu Items and Parsing XML Files
3. Writing Multi-Threaded Applications
4. Using WebView and Using the Network
5. Graphics Support in Android
6. Preferences and Content Providers
7. Location Services and Google Maps in Android

Course Outcome:
After completion of the course the students shall be able to:
1. Have Knowledge of Android applications.
2. Design and develop mobile application

Semester VIII
PROJECT WORK PHASE-2
(Report, Analysis, Implementation/Simulation and Presentation)

Course Code: ECS899 **L-0, T-0, P-16, C-8**

Students should devote themselves to prepare something tangible, which could be a working model of their thoughts based on their subject of choice.

The project shall be finalized by the students based on the VII semester project work report and shall be completed and submitted at least one month before the last teaching day of the VIII semester, date of which shall be notified in the academic calendar.

The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester student shall present the final project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner.

The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director.

The marking shall be as follows.

Internal: 50 Marks
By The Faculty Guide - 25 Marks
By Committee Appointed By the Director – 25 Marks

External: 50 Marks
By External Examiner Appointed By the University – 50 Marks