मौलाना आज़ाद नेशनल उर्दू यूनिवर्सिटी مولانا آزاد نیشنل اُردو یونیورسٹی

MAULANA AZAD NATIONAL URDU UNIVERSITY

(A Central University Established by an Act of Parliament in 1998)

(Accredited "A" Grade by NAAC)

Gachibowli, Hyderabad – 500032, Telangana, INDIA

AICTE Model Curriculum with effect from 2020-21 for MANUU Polytechnics

General Course Structure &

Credit Distribution

DIPLOMA

IN

COMPUTER SCIENCE & ENGINEERING

MANUU POLYTECHNICS

Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hours Practical (P) per week	1 credit

A. Program Credits:

The total number of credits proposed for the three-year Diploma program in Engineering & Technology is 120.

B. Structure of Diploma Engineering Program:

The structure of Diploma Engineering program shall have essentially the following categories of courses with the breakup of credits as given:

Sr. No.	Category	Suggested Breakup of Credits
1.	Humanities & Social Sciences courses	7
2.	Basic Science courses	18
3.	Engineering Science courses	16
4.	Program Core courses (Branch specific)	46
5.	Program Elective courses (Branch specific)	12
6.	Open Elective courses (from other technical and/or emerging subjects)	9
7.	Project work, seminar and internship industry or elsewhere	12
8.	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge etc.]	(non-credit)
	Total	**120**

C. Course code and definition:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
HS	Humanities & Social Sciences Courses
BS	Basic Science Courses
ES	Engineering Science Courses
PC	Program Core Courses
PE	Program Elective Courses
OE	Open Elective Courses
AU	Audit Courses
SI	Summer Internship
PR	Project
SE	Seminar

D. Course level coding scheme:

As per the CBCS Rules and Regulations of Examination Branch of MANUU.

E. Category-wise Courses

HUMANITIES & SOCIAL SCIENCES COURSES [HS]

Note:

I. NumberofHumanities&SocialSciencesCourses:4
II. Credits:7

Sl. No	Code No.	Course Title	Hours per week			Semester	Credits
			L	T	P		
1.		Communication Skills in English	2	0	0	I	2
2.		Sports and Yoga	0	0	2	I	1
3.		Communication Skills in English Lab	0	0	2	I	1
4.		Entrepreneurship and Start-ups	3	0	0	VI	3
Total Credits							**7**

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BASIC SCIENCES COURSE [BS]

Note:

I. Number of Basic Sciences Courses:8
II. Credits:18

Sl. No	Code No.	Course Title	Hours per week			Semester	Credits
			L	T	P		
1.		Mathematics-I	2	1	0	I	3
2.		Applied Physics-I	2	1	0	I	3
3.		Applied Chemistry	2	1	0	I	3
4.		Applied Physics-I Lab	0	0	2	I	1
5.		Applied Chemistry Lab	0	0	2	I	1
6.		Mathematics-II	3	0	0	II	3
7.		Applied Physics-II	2	1	0	II	3
8.		Applied Physics-II Lab	0	0	2	II	1
Total Credits							**18**

ENGINEERING SCIENCE COURSES [ES]

Note:

I. Number of Engineering Sciences Courses:8
II. Credits:16

Sl. No	Code No.	Course Title	Hours per week			Semester	Credits
			L	T	P		
1.		Engineering Graphics	0	0	3	I	1.5
2.		Engineering Workshop Practice	0	0	3	I	1.5
3.		Introduction to IT Systems	2	1	0	II	3
4.		Fundamentals of Electrical &Electronics Engineering	2	1	0	II	3
5.		Engineering Mechanics	2	1	0	II	3
6.		Introduction to IT Systems Lab	0	0	4	II	2
7.		Fundamentals of Electrical &Electronics Engineering Lab	0	0	2	II	1
8.		Engineering Mechanics Lab	0	0	2	II	1
Total Credits							**16**

PROGRAM CORE COURSES [PC]

Note:

a. Number of Program Core Courses :20to30(including lab courses)
b. Credits:**46**
c. Number of contact hours per week of a subject may vary as per subject contents without affecting the subject
credits.

Sl. No	Code No.	Course Title	Hours per week			Semester	Credits
			L	T	P		
1							
.							
.							
n							
Total Credits							**46**

PROGRAM ELECTIVE COURSES [PE]

Note:

1. Number of Program Elective Courses: 4 to 6
2. (Minimum ten Branch Specific courses to be specified for the students to chosen from)
3. Credits:**12**

Sl. No	Code No.	Course Title	Hours per week			Semester	Credits
			L	T	P		
1							
.							
.							
n							
Total Credits							**12**

OPEN ELECTIVE COURSES [OE]

Note:

1. Number of Open Elective Courses:3 to 4 (minimum ten courses to be specified out ofthe suggestive list of open elective courses given as Appendix III)
2. Credits:**9**
3. The Open Elective Courses to be offered preferably in III year(one course may be Offered in V Semester and two courses in VI Semester)
   The students can opt only for those open elective courses that are offered by other than the irrespective departments

Sl. No	Code No.	Course Title	Hours per week			Semester	Credits
			L	T	P		
1							
.							
.							
n							
Total Credits							**9**

PROJECT WORK, SEMINAR AND INTERNSHIP IN INDUSTRY OR ELSEWHERE

Sl. No	Code No.	Course Title	Hoursperweek			Semes-ter	Credits
			L	T	P		
1.		Summer Internship – I (3-4 weeks) after IInd Sem					2
2.		Summer Internship – II (4-6 weeks) after IVth Sem					3
3.		Minor Project	0	0	4	IV	2
4.		Major Project	0	0	2	V	4
5.			0	0	6	VI	
6.		Seminar	1	0	0	VI	1
Total Credits							**12**

Note:

- Summer Internship– I should be under taken in an industry /Govt. or Pvt. Certified Agencies which are in social sector/ Govt. Skill Centres/Institutes/Schemes.
- Summer Internship– I should be under taken in an industry only
- Seminar should be based on real/ live problems of the Industry /Govt / NGO /MSME/ Rural Sector or an innovative idea having the potential of a Start up

AUDITCOURSES[AU]

Note: These are mandatory non-credit courses.

Sl. No	Code No.	Course Title	Hours per week			Semes-ter	Credits
			L	T	P		
1.	DPCC116 NCT	Environmental Science	2	0	0	II	0
2.	DPCC402 SEP	Essence of Indian Knowledge and Tradition	2	0	0	IV	0
3.		Indian Constitution	2	0	0	VI	0
Total Credits							**0**

DESCRIPTION OF BRANCH CODES

Sr. No.	Branch	Code
1.	Civil Engineering	CE
2.	Computer Engineering	CS
3.	Electronics and Communication Engineering	EC
4.	Electrical Engineering	EE
5.	Mechanical Engineering	ME
6.	Production Engineering	PE
7.	Information Technology	IT
8.	Chemical Engineering	CH

INDUCTION PROGRAM

Please refer Appendix IV for guidelines.

The Essence and Details of Induction program an also be understood from the 'Detailed Guide on Student
Induction program', as available on AICTE Portal, although that is for UG students of Engineering & Technology
(Link:https://www.aicteindia.org/sites/default/files/Detailed%20Guide%20on%20Student%20Induction%20program.pdf).

Induction program (mandatory)	**Two-week duration**
Induction program for students to be offered right at the start of the first year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./ Branch &Innovations

F. Mandatory Visits/Workshop/Expert Lectures:

It is mandatory to arrange one industrial visit every semester for the students of each branch.

It is mandatory to conduct a One-week works hop during the winter break after fifth Semester on professional / industry /entrepreneurial orientation.

It is mandatory to organize at least one expert lecture per semester for each branch by inviting resource persons from domain specific industry.

G. Evaluation Scheme:

a. For Theory Courses:

(The weightage of internal assessment is 40% and for End Semester Exam is 60%)

The student has to obtain at least 40% marks individually both in internal assessment

and end semester exams to pass.

b. For Practical Courses:

(The weightage of Internal assessment is 60% and for End Semester Exam is 40%)

The student has to obtain at least 40% marks individually both in internal assessment

and end semester exams to pass.

c. For Summer Internship / Projects / Seminar etc.

Evaluation is based on work done, quality of report, performance in viva-voce, presentation by the student in front of Internship & project review committees consist of HoD,Principal Nominated Member and Concerned Faculty.

Note: The internal assessment is based on the student's performance in mid semester tests

(two best out of three), quizzes, assignments, class performance, attendance, viva-voce in practical,

lab record etc.

F_R (Fail due to shortage of attendance and therefore, to repeat the course)

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Semester I–Pool: 1
Curriculum Structure
(Common to CIVIL, MECH, ECE Branches)

Sl.No	Category of Course	Code No.	Course Title	Hours per week			Total contact hrs/ week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1	Basic Science	DPCC113BST	Mathematics-I	2	1	0	3	40	60	**3**
2	Basic Science	DPCC111BST	Applied Physics-I	2	1	0	3	40	60	**3**
3	Basic Science	DPCC112BST	Applied Chemistry	2	1	0	3	40	60	**3**
4	Engineering Science	DPCE111PCP	Engineering Graphics	0	0	2	2	60	40	**1**
5	Basic Science	DPCC112BSP	Applied Chemistry Lab	0	0	2	2	60	40	**1**
6	Engineering Science	DPCS111PCT	Introduction to IT Systems	2	1	0	3	40	60	**3**
7	Engineering Science	DPCS111PCP	Introduction to IT Systems Lab	0	0	4	4	60	40	**2**
8.	Basic Science	DPCC111BSP	Applied Physics-I Lab	0	0	2	2	60	40	**1**
9	Humanities & Social Science	CCPE055NCP	Sports and Yoga	0	0	2	2	50	--	**1**
	Total Credits									**18**

Semester I- Pool: 2
Curriculum Structure
(Common to CSE, IT, EEE Branches)

Sl. No	Category of Course	Code No.	Course Title	Hours Per week			Total contact hrs/ week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1	Basic Science	DPCC113BST	Mathematics-I	2	1	0	3	40	60	**3**
2	Basic Science	DPCC111BST	Applied Physics-I	2	1	0	3	40	60	**3**
3	Engineering Science	DPCE101EST	Engineering Mechanics	2	1	0	3	40	60	**3**
4	Humanities& Social Science	DPCC111HST	Communication Skills In English	2	0	0	2	20	30	**2**
5	Engineering Science	DPEE111PCT	Fundamentals of Electrical& Electronics Engineering	2	1	0	3	40	60	**3**
6	Humanities &Social Science	DPCC111HSP	Communication Skills in English Lab	0	0	2	2	60	40	**1**
7	Engineering Science	DPCE112PCP	Engineering Workshop Practice	0	0	4	4	60	40	**2**
8	Basic Science	DPCC111BSP	Applied Physics-I Lab	0	0	2	2	60	40	**1**
9	Engineering Science	DPCE111ESP	Engineering Mechanics Lab	0	0	2	2	60	40	**1**
10	EngineeringScience	DPEE111PCP	Fundamentals of Electrical& Electronics Engineering Lab	0	0	4	4	60	40	**2**
11	Audit	DPCC116NCT	Environmental Science	2	0	0	2	20	30	**0**
	Total Credits									21

Semester II–Pool: 1

Curriculum Structure

(Common to CIVIL, MECH, ECE Branches)

Sl.No	Category of Course	Code No.	Course Title	Hours per week			Total con tact hrs/ week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1	Basic Science	DPCC213BST	Mathematics-II	2	1	0	3	40	60	3
2	Basic Science	DPCC211BST	Applied Physics-II	2	1	0	3	40	60	3
3	Humanities &Social Science	DPCC111HST	Communication Skills in English	2	0	0	2	20	30	2
4	Engineering Science	DPEE111PCT	Fundamentals of Electrical& Electronics Engineering	2	1	0	3	40	60	3
5	Engineering Science	DPCE101EST	Engineering Mechanics	2	1	0	3	40	60	3
6	Basic Science	DPCC211BSP	Applied Physics-II Lab	0	0	2	2	60	40	1
7	Engineering Science	DPCE112PCP	Engineering Workshop Practice	0	0	4	4	60	40	2
8	Engineering Science	DPEE111PCP	Fundamentals of Electrical& Electronics Engineering Lab	0	0	4	4	60	40	2
9	Engineering Science	DPCE111ESP	Engineering Mechanics Lab	0	0	2	2	60	40	1
10	Humanities& Social Science	DPCC111HSP	Communication Skills In English Lab	0	0	2	2	60	40	1
11	Audit	DPCC116NCT	Environmental Science	2	0	0	2	20	30	0
Total Credits										21

Semester II – Pool: 2
Curriculum Structure
(Common to CSE, IT, EEE Branches)

Sl.No	Category of Course	Code No.	Course Title	Hours per week			Total contacthrs/week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1	Basic Science	DPCC213BST	Mathematics-II	2	1	0	3	40	60	**3**
2	Basic Science	DPCC211BST	Applied Physics-II	2	1	0	3	40	60	**3**
3	Engineering Science	DPIT111PCT	Introducti on to IT Systems	2	1	0	3	40	60	**3**
4	Engineering Science	DPCE111PCP	Engineering Graphics	0	0	2	2	60	40	**1**
5	Basic Science	DPCC112BST	Applied Chemistry	2	1	0	3	40	60	**3**
6	Basic Science	DPCC211BSP	Applied Physics-II Lab	0	0	2	2	60	40	**1**
7	Engineering Science	DPIT111PCP	Introducti on to IT Systems Lab	0	0	4	4	60	40	**2**
8	Basic Science	DPCC112BSP	Applied Chemistry Lab	0	0	2	2	60	40	**1**
9	Humanities &Social Science	CCPE055NCP	Sports and Yoga	0	0	2	2	50	--	**1**
Total Credits										**18**

Semester III

Curriculum Structure

Diploma in Computer Science & Engineering

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/week	Credits	Scheme of Evaluation	
				L	T	P			CIE	SEE
1.	Program core course	DPCS311PCT	Computer Programming	2	1	0	3	3	40	60
2.	Program core course	DPCS312PCT	Scripting Language(Python)	2	1	0	3	3	40	60
3.	Program core course	DPCS313PCT	Introduction to DBMS	2	0	0	2	2	40	60
4.	Program core course	DPCS315PCT	Digital Logic Design	2	0	0	2	2	40	60
5.	Program core course	DPCS314PCT	OOAD Through UML	2	0	0	2	2	40	60
6.	Program core course	DPCS311PCP	Computer Programming Lab	0	0	4	4	2	60	40
7.	Program core course	DPCS312PCP	Scripting Languages Lab	0	0	4	4	2	60	40
8.	Program core course	DPCS313PCP	DBMS Lab	0	0	4	4	2	60	40
9.	Program core course	DPCS315PCP	Digital Logic Design Lab	0	0	4	4	2	60	40
10.	Summer Internship-I (4 weeks) after IInd Sem	DPCS301SEP	Summer Internship-I					2		50
	Total Credits							**22**		

Semester IV

Curriculum Structure

Diploma in Computer Science & Engineering

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1.	**Mandatory course**	DPCC402SEP	Essence of Indian knowledge and tradition	**2**	**0**	**0**	**2**	**20**	**30**	**0**
2.	**Program core course**	DPCS406PCT	Computer hardware & networking	**2**	**1**	**0**	**3**	**40**	**60**	**3**
3.	**Program core course**	DPCS407PCT	Microprocessors & interfacing	**3**	**1**	**0**	**3**	**40**	**60**	**4**
4.	**Program core course**	DPCS408PCT	Data Structures Through C	**2**	**1**	**0**	**3**	**40**	**60**	**3**
5.	**Program core course**	DPCS409PCT	Software Engineering	**3**	**1**	**0**	**3**	**40**	**60**	**4**
6.	**Program core course**	DPCS406PCP	Computer hardware & networking lab	**0**	**0**	**4**	**4**	**60**	**40**	**2**
7.	**Program core course**	DPCS407PCP	Microprocessors & interfacing lab	**0**	**0**	**4**	**4**	**60**	**40**	**2**
8.	**Program core course**	DPCS408PCP	Data Structures Through C Lab	**0**	**0**	**4**	**4**	**60**	**40**	**2**
9.	**Minor Project**	DPCC401PET	Minor Project	**0**	**0**	**4**	**4**	**60**	**40**	**2**
	Total Credits									**22**

Semester V

Curriculum Structure

Diploma in Computer Science & Engineering

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/ week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1.	Program core course		**Introduction to e-Governance**	2	1	0	3	40	60	3
2.	Program core course		**Internet of Things**	2	1	0	3	40	60	3
3.	Program Elective course		**Program Elective-1**	3	0	0	3	40	60	3
4.	Program Elective course		**Program Elective-2**	3	0	0	3	40	60	3
5.	Open Elective		**Open Elective-1**	3	0	0	3	40	60	3
6.	Summer Internship- II (6 weeks) after IV Semester		**Summer Internship-II**						100	3
7.	Major Project			0	0	2	2			^
	Total Credits									18

Program Elective-1:

1. Fundamentals of A.I
2. VB.Net Programming

Program Elective-2:

1. Web Technologies
2. Java Programming

Open Elective-I:

1. Information Security
2. Software Testing Methodology

Semester VI

Curriculum Structure

Diploma in Computer Science & Engineering

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/ week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1.	Program Elective course		Program Elective-3	2	1	0	3	40	60	3
2.	Program Elective course		Program Elective-4	2	1	0	3	40	60	3
3.	Humanities and Social Science course		Entrepreneurship and Startups	3	0	0	3	40	60	3
4.	Open Elective		Open Elective-2	3	0	0	3	40	60	3
5.	Open Elective		Open Elective-3	3	0	0	3	40	60	3
6.	Mandatory Course		Indian Constitution	2	0	0	2	20	30	0
7.	Major Project			0	0	6	6	120	80	4^
8.	Seminar			1	0	0	1	50	--	1
	Total Credits									**20**

Program Elective-3:

1 Operating Systems
2 Software Project Management

Program Elective-4:

1. Human Computer Interaction
2. Multimedia Technology

Open Elective-3:

1. ICT(Information and Communication Technology)
2. E-Commerce

Open Elective-4:

1. Cloud Computing
2. FOSS (Free and Open Source Software)
   Data Communication and Computer Network

DPCC113BST- Mathematics-I

Course Objectives:

This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus and Basic elements of algebra.

Course Outcomes: By the end of the course, the students are expected to learn (i) The students are expected to acquire necessary background in Trigonometry to appreciate the importance of the geometric study as well as for the calculation and the mathematical analysis. (ii) The ability to find the effects of changing conditions on a system. (iii) Complex numbers enter into studies of physical phenomena in ways that most people cannot imagine. (iv) The partial fraction decomposition lies in the fact that it provides an algorithm for computing the antiderivative of a rational function.

Course Content:

UNIT - I: Trigonometry

Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e^x.

UNIT - II Differential Calculus: Definition of function; Concept of limits. Four standard limits $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to a}\left(\frac{a^x-1}{x}\right)$ and $\lim_{x\to a}(1+x)^{1/x}$.

Differentiation by definition of $x^n, \sin x, \cos x, \tan x, e^x$ *and* $\log_a x$. Differentiation of sum, product and quotient of functions. Differentiation of function of a function. Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.

UNIT - III: Algebra

Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-movier's theorem, its application.

UNIT – IV Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction.

References:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
3.A Text book of Engineering Mathematics for I,II semester by Dr. M.V.S.S N. Prasad by Radiant Publishing House.
4. A Text Book of Intermediate Mathematics I , II year by Telugu Akademi , Telangana
5. Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)
6. V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vi-kas Publishing House.

7. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

APPLIED PHYSICS-I

Course Objectives:

Applied Physics includes the study of a large number of diverse topics all related to materials/things that exist in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which such objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. The course will help the diploma engineers to apply the basic concepts and principles to solve broad-based engineering problems and to understand different technology based applications.

Learning Outcome:

After undergoing this subject, the student will be able to:

a) Identify physical quantities, select their units for use in engineering solutions, and make measurements with accuracy by minimizing different types of errors.
b) Represent physical quantities as scalar and vectors and solve real life relevant problems.
c) Analyse type of motions and apply the formulation to understand banking of roads/railway tracks and conservation of momentum principle to describe rocket propulsion, recoil of gun etc.
d) Define scientific work, energy and power and their units. Drive relationships for work, energy and power and solve related problems.
e) Describe forms of friction and methods to minimize friction between different surfaces.

Course Content:

Unit 1: Physical world, Units, Dimensions and Vectors

Physics – scope and nature– physics in relation to technology, Physical quantities, Fundamental physical quantities, Derived physical quantities with units, examples. S.I. Units of various physical quantities with symbols, Rules for writing SI units. Dimensions of physical quantity, dimensional formulae, principle of Homogeneity of Dimensions, applications of Dimensional Analysis. Scalar and Vector quantities – examples, representation of vector, types of vectors. Addition and Subtraction of Vectors, Resolution of a Vector, Triangle and Parallelogram law of vectors, Scalar and Vector Product, properties with examples, problems solving

Unit 2: Dynamics

Recapitulation of equations of motion in a straight line, acceleration due to gravity, expressions for Maximum Height, Time of ascent, Time of descent and time of flight. Work, energy, power and their SI units, potential Energy and Kinetic Energy examples and their expression. The law of conservation of Energy, verify in the case of freely falling body. simple harmonic motion with examples, conditions of S.H.M, Explanation of simple Harmonic Motion by Reference circle, Expressions for Displacement, Velocity, Acceleration, Time Period and Frequency in S.H.M, simple pendulum and expression for time period of a simple pendulum, second's pendulum, problems solving

Unit 3: Properties of Matter

Introduction to Elasticity, stress and strain, types of stress and strain, Hooke's law moduli of elasticity, young's modulus, Bulk Modulus, Rigidity Modulus. Surface tension: concept, units, cohesive and adhesive forces, angle of contact, applications of surface tension, effect of temperature and impurity on surface tension. Capillarity and its applications in daily life, Experimental determination of surface tension based on capillary rise method. Viscosity and coefficient of viscosity and effect of temperature on viscosity, problems solving

Unit 4: Heat and Thermodynamics

Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples), scales of temperature and their relationship, Expansion of solids, coefficient of linear, Areal and cubical expansions and relation amongst them. Expansion of gases, volume coefficient of a gas and pressure coefficient of a gas, Boyles law, Charles laws, ideal gas Equation, laws of thermodynamics, specific heats and molar specific heats, CP-CV=R, problems solving.

Text Books and References

1.Concepts of physics by HC VERMA, Surya publication, Ghaziabad, india
2.Physics- Resnik and Halliday- Wiley Toppan Publishers- England
3.Physics- intermediate-I &II year- Telugu Academy, Telangana
4.P.k palaniswamy: Atext book of Engineering Physics
5.C.Kittel(Wiley Eastern) : introduction to solid state physics.

Applied Physics-I Lab

Course Objectives:

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

Learning Outcome:

- After undergoing this lab work, the student will be able to:
- Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, Speedometer etc.) for determining dimensions of physical quantities and make measurements with accuracy and precision.
- Differentiate various shapes and determine dimensions of plane, curved and regular surfaces/bodies.
- Apply and Verify laws of forces and determine resultant force acting on a body.
- Appreciate role of friction and measure co-efficient of friction between different surfaces.
- Describe and verify Hook's law and determine force constant of spring body.
- Identify various forms of energy, energy transformations and verify law of conservation of energy.
- Understand viscosity of liquids and determine viscosity of a given liquid.
- Understand use of thermometers to measure temperature under different conditions and different scales of temperature measurements.

List of Practical's :

1. Determination of volume of solid cylinder and sphere, using a Vernier caliper
2. Determination of diameter of a wire, thickness of thin glass plate using a screw gauge.
3. Determination of radius of curvature of a convex and a concave mirror/surface using a speedometer.
4. To verify triangle and parallelogram law of forces.(Concurrent forces)
5. Determination of the acceleration due to gravity at a place using simple pendulum.
6. Determination of force constant of a spring using Hooke's Law.
7. Determination of the surface Tension of a given liquid by capillary Rise Method.
8. Determination of the viscosity of a given liquid by Stoke‟s law
9. Determination of atmospheric pressure at a place using Quill Tube Method
10. To measure room temperature and temperature of a hot bath using mercury thermometer and convert it into different scales.

Applied Chemistry

Course Objectives:

There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw material essentially requires principles and concepts of Applied Chemistry for technicians. On successful completion of this course content will enable technicians to understand, ascertain and analyze and properties of natural raw materials require for producing economical and eco-friendly

finished products:

- Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications
- Solve the engineering problems using concept of Electro chemistry and corrosion.

Learning Outcomes:

At the end of the course student will be able to

1. Understand the classification and general properties of engineering materials such as metal, alloys, glasses, cement, refractory and composite materials using knowledge of chemical bonding.
2. Understand and assess the suitability of water source for domestic and industrial application, effluents and minimize water pollution.
3. Qualitatively analyze the engineering materials and understand their properties and applications.
4. Choosefuelandlubricantssuitableforeconomicalindustrialprocessingtoobtaineco- friendly finished products.
5. a) Ascertain construction, mechanism efficiency of electro chemical cells, solar cell fuel cells
   b)Understand corrosion and develop economical prevention techniques. Course Content:

Unit 1: Atomic Structure, Chemical Bonding and Solutions

Bohr's theory (expression of energy and radius to be omitted), Quantum numbers orbital concept. Shapes of s, p and d orbital's, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration. Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond, coordination bond in NH4+.

Solution–idea of solute, solvent and solution, methods to express the concentration of solution morality (M=mole per liter), ppm.

Unit 2: Water, Chemistry of Fuels and Lubricants

Graphical presentation of water distribution on Earth(pie or bar diagram).Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness. Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc). Water softening techniques – soda lime process, zeolite process and ion exchange process. Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.

Chemistry of Fuels and Lubricants:

Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong"s formula. Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

Lubrication – function and characteristic properties of good lubricant, classification with examples. physical properties (viscosity and viscosity index, oiliness, flash and fire point, could and

pour point only) and chemical properties (coke number, total acid number saponification value)of lubricants.

Unit 3: Engineering Materials

Natural occurrence of metals – minerals, ores of iron, aluminum and copper, gangue (matrix), flux, slag, metallurgy – brief account of general principles of metallurgy. Extraction of iron from hematite ore using blast furnace. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications. Portland cement and hardening, Glasses Refractory and Composite materials. Polymers – monomer, homo and co polymers, simple reactions involved in preparation and their application of thermoplastics and thermo setting plastics(using PVC, PS, PTFE, nylon – 6, nylon – 66, Bakelite only), rubber and vulcanization of rubber.

Unit 4: Electro Chemistry

Electronic concept of oxidation, reduction and redox reactions.

Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems. Industrial Application of Electrolysis –

•Electrometallurgy
•Electroplating
•Electrolytic refining.

Application of redox reactions in electro chemical cells –

•Primary cells – dry cell,
•Secondary cell-commercially used lead storage battery, fuel and Solar cells. Introduction to Corrosion of metals–
•definition, types of corrosion (chemical and electro chemical), H2 liberation and O2 absorption mechanism of electro chemical corrosion, factors affecting rate of corrosion.

Internal corrosion preventive measures –

•Purification, alloying and heat treatment and

External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic nhibitors.

Text Books:

1) Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi,2017-18.
2)Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi,2015.

Applied Chemistry Lab

Course Objectives:

There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus.

This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

Learning Outcomes:

At the end of the course student will be able to

- To express quantitative measurements accurately.
- To practice and adapt good measuring techniques.
- To use various apparatus for precise measurements.
- To understand and differentiate different methods of quantitative analysis.
- To know and understand principles of quantitative analysis using instruments.

LIST OF PRACTICALS:

Perform any 12 (twelve) Laboratory Practical's

Volumetric and Gravimetric analysis:

1Preparation of standard solution of oxalic acid or potassium permanganate.

2To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.

3Standardization of KMnO4solution using standard oxalic acid and Determine the percentage of Iron present in given Hematite ore by KMnO4 solution.

4Iodometric estimation of copper in the copper pyrite ore.

5Volumetric estimation of total acid number (TAN) of given oil.

6Volumetric estimation of

a)Total hardness of given water sample using standard EDTA solution.

b)Alkalinity of given water sample using 0.01M sulphuric acid

7Proximate analysis of coal

a)Gravimetric estimation moisture in given coal sample

b)Gravimetric estimation ash in given coal sample

Instrumental analysis

8. Determine the conductivity of given water sample.
9. Determination of the Iron content in given cement sample using colorimeter.
10. Determination of calorific value of solid or liquid fuel using bomb calorimeter.
11. Determination of viscosity of lubricating oil using Redwood viscometer.
12. Determination of flash and fire point of lubricating oil using Able‟s flash point apparatus.
13. To verify the first law of electrolysis of copper sulfate using copper electrode.
14. Construction and measurement of emf of elector chemical cell (Daniel cell).
15. To study the effect of dissimilar metal combination.

Text Book:

Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi,2017- 18.

Communication Skills in English

Course Objectives:

Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus, the main objectives of this course

- To develop confidence in speaking English with correct pronunciation.
- To develop communication skills of the students i.e. listening, speaking, reading and writing skills.
- To introduce the need for personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc.

Learning Outcome:

At the end of this course, the participants will:

- Develop basic speaking and writing skills including proper usage of language and vocabulary so
- that they can become highly confident and skilled speakers and writers.
- Be informed of the latest trends in basic verbal activities such as presentations, facing interviews and other forms of oral communication.
- Also develop skills of group presentation and communication in team. Develop non-verbal communication such as proper use of body language and gestures.

Course Content:

Unit-1 Communication: Theory and Practice

- Basics of communication: Introduction, meaning and definition, process of communication
- etc.
- Types of communication: formal and informal, verbal, non-verbal and written Barriers to effective communication.
- 7 Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).
- Art of Effective communication,
  oChoosing words
  oVoice
  oModulation
  oClarity
  oTime
  oSimplification of words
- Technical Communication.

Unit-2 Soft Skills for Professional Excellence

- Introduction: Soft Skills and Hard Skills.
- Importance of soft skills.
- Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc.
- Applying soft skills across cultures.
- Case Studies.

Unit-3: Reading Comprehension

Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts:

Section-1
Malgudi Days: R.K. Narayan

The Room on Roof: Ruskin Bond "The Gift of the Magi" by
O. Henry
"Uncle Podger Hangs a Picture" Jerome K. Jerome

Section-2
Night of the Scorpion by Nissim Ezekiel, Stopping by Woods on a Snowy
Evening by Robert Frost, Where the Mind is Without Fear by Rabindranath Tagore, Ode to Tomatoes by Pablo Neruda,

Unit-4: Professional Writing The art of
précis writing,
Letters:
business and personnel,
Drafting e-mail, notices, minutes of a meeting etc.
Filling-up different forms such as banks and on-line forms for placement etc.
Vocabulary and Grammar Vocabulary of commonly used words Glossary of administrative terms (English and Hindi) One-word
substitution, Idioms and phrases
etc.
Parts of speech, active and passive voice, tenses etc., Punctuation

References:
1.M. Ashraf Rizvi. Effective Technical Communication. Mc-Graw Hill: Delhi, 2002.

Communication Skills in English – Lab

Course Objectives:

Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:

1. To develop listening skills for enhancing communication.
2. To develop speaking skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality development- Focus will be on developing certain qual- ities which will aid students in handling personal and career challenges, leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Learning Outcome:

- At the end of this course the students will be able to communicate effectively with an increase
- in their confidence to read, write and speak English fluently.
- They will also demonstrate a significant increase in word power.
- The variety of exercises and activities that will be conducted in the Language Lab will develop their skills needed to participate in a conversation like listening carefully and respectfully to others‟ viewpoints; articulating their own ideas and questions clearly and over all students will be able to prepare, organize, and deliver an engaging oral presentation.
- They will also develop non-verbal communication such as proper use of body language and gestures.

Course Content:

Unit 1 Listening Skills

Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

Unit II Introduction to Phonetics

Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.

Unit III Speaking Skills

Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.

Unit IV Building Vocabulary

Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to enhance self-expression and vocabulary of participants.

Recommended Readings:

1. Daniel Jones. The Pronunciation of English. Cambridge: Cambridge University Press, 1956.

Engineering Graphics

Course Objectives:

•To understand the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.

•To develop drafting and sketching skills, to know the applications of drawing equipments, and get familiarize with Indian Standards related to engineering drawings.

•To develop skills to visualize actual object or a part of it, on the basis of drawings.

•To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.

•To understand the basic commands and develop basic skills related to computer aided drafting, of how to draw, modify, and edit basic shapes (2D), using AUTOCAD.

Course Outcomes:

Following outcomes will be achieved:

•Select and construct appropriate drawing scales, use drawing equipment‟s, and understand Indi- an Standards of engineering drawing

•Draw views of given object and components

•Sketch orthographic projections into isometric projections and vice-versa.

• Apply computer aided drafting tools to create 2D engineering drawings

Course Content

Unit – I Basic elements of Drawing

Drawing Instruments and supporting materials: method to use them with applications. Convention of lines and their applications.

Representative Fractions – reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale.

Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning.

Geometrical and Tangency constructions. (Redraw the figure)

Unit – II Orthographic projections

Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications(No question to be asked in examination).

Introduction to orthographic projection, First angle and Third angle method, their symbols.

Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method only)

Isometric Projections

Introduction to isometric projections. Isometric scale and Natural scale. Isometric view and isometric projection.

Illustrative problems related to objects containing lines, circles and arcs shape only. Conversion of orthographic views into isometric view/projection.

Unit – III Free Hand Sketches of engineering elements

Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, washer, locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching)

Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)

Unit – IV Computer aided drafting interface Computer Aided Drafting: concept.

Hardware and various CAD software available. System requirements and Understanding the interface.

Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, sta- tus bar, drawing area, UCS icon.
File features: New file, Saving the file, Opening an existing drawing file, Creating templates, Quit.
Setting up new drawing: Units, Limits, Grid, Snap. Undoing and redoing action.

Computer aided drafting
Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, PolyLine. Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordi- nates. Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers.
Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diame- ter, Radius, Angular Dimensions. ter, Radius, Angular Dimensions.
Continuous, Diame- ter, Radius, Angular Dimensions.

Text Books:
Single line Text, Multiline text.
Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units,
Drawing orientation, plot scale, plot offset, plot area, print preview.
Text: Single line Text, Multiline text.

Environmental Science

Course Objectives:
Technicians working in industries or elsewhere essentially require the knowledge of environmental science so as to enable them to work and produce most efficient, economical and eco-friendly finished products.
•Solve various engineering problems applying ecosystem to produce eco – friendly products.
•Use relevant air and noise control method to solve domestic and industrial problems.

•Use relevant water and soil control method to solve domestic and industrial problems.

•To recognize relevant energy sources required for domestic and industrial applications.

•Solve local solid and e-waste problems.

Course outcomes:
At the end of the course student will be able to

1. Understand the ecosystem and terminology and solve various engineering problems applying ecosystem knowledge to produce eco – friendly products.
2. Understand the suitable air, extent of noise pollution, and control measures and acts.
3. Understand the water and soil pollution, and control measures and acts.
4. Understand different renewable energy resources and efficient process of harvesting.
5. Understand solid Waste Management, ISO 14000 & Environmental Management.

Course Content:
Unit-1 Ecosystem
- Structure of ecosystem, Biotic & Abiotic components
- Food chain and food web
- Global warming -Causes, effects, process, Green House Effect, Ozone depletion

Unit– 2 Air and Noise Pollution
- Definition of pollution and pollutant, Natural and manmade sources of air pollution
- Air Pollutants: Types, Particulate Pollutants: Effects and control of air pollution
- Noise pollution: sources of pollution, Effects and control of Noise pollution

Unit- 3 Water and Soil Pollution
- Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition
- Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste Sources and characteristics of: Municipal solid waste, E- waste, biomedical waste.

Unit– 4 Renewable sources of Energy
- Solar Energy: Basics of Solar energy. Solar pond. Solar water heater, solar dryer.
- Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas.
- Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy.
- New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy

- Sources and characteristics of: Municipal solid waste, E- waste, biomedical waste.

References &Text Books:

1.S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi
2.C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011. First Year Curriculum Structure Common to All Branches 52

Introduction to IT Systems

Course Objectives:

This course is intended to make new students comfortable with computing environment - Learning basic computer skills, Learning basic application software tools, Understanding Computer Hardware, Cyber security awareness

Course outcomes:

At the end of the course student will be able to comfortably work on computer, install and configure OS, assemble a PC and connect it to external devices, write documents, create worksheets, prepare presentations, protect information and computers from basic abuses/ attacks.

Course Content:

UNIT 1:

Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals.

General understanding of various computer hardware components – CPU, Memory, Display, Keyboard, Mouse, HDD and other Peripheral Devices.

UNIT 2:

OS Installation (Linux and MS Windows), Unix Shell and Commands, vi editor.

UNIT 3: HTML4, CSS, making basic personal webpage.

UNIT 4: Office Tools: OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress.

Information security best practices.

Class lectures will only introduce the topic or demonstrate the tool, actual learning will take place in the Lab by practicing regularly.

Suggested Lab Work:

This is a skill course. Topics/concepts taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. This course is all about some theory and a lot of practice.

References:

R.S. Salaria, Computer Fundamentals, Khanna Publishing House

Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House

Online Resources, Linux man pages, Wikipedia

Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett

Introduction to IT Systems Lab

Course Objectives:
This Lab course is intended to practice whatever is taught in theory class of Introduction of IT Systems‟ and become proficient in using computing environment basic computer skills, basic application software tools, Computer Hardware, cyber security features, etc.

Course outcomes:
At the end of the course student will be able to comfortably work on computer, install and configure OS, assemble a PC and connect it to external devices, write documents, create worksheets, prepare presentations, protect information and computers from basic abuses/attacks.

Course Content:

Topics for Practice
1. Browser features, browsing, using various search engines, writing search queries
2. Visit various e-governance/Digital India portals, understand their features, services of- fered
3. Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognise various ports/interfaces and related cables, etc.
4. Install Linux and Windows operating system on identified lab machines, explore various options, do it multiple times
5. Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6. Practice HTML commands, try them with various values, make your own Webpage
7. Explore features of Open Office tools, create documents using these features, do it multi- ple times
8. Explore security features of Operating Systems and Tools, try using them and see what happens.
This is a skill course. More you practice, better it will be.

References:
1. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.
2. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.

Applied Physics –II

Course Objectives

Applied Physics aims to give an understanding of this world both by observation and by prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. The course will help the diploma engineers to apply the basic concepts and principles to solve broad-based engineering prob- lems and to understand different technology based applications.

Learning Outcome:

After undergoing this subject, the student will be able to;

a) Describe waves and wave motion, periodic and simple harmonic motions and solve simple problems. Establish wave parameters: frequency, amplitude, wavelength, and velocity and able to explain diffraction, interference, polarization of waves.

b) Explain ultrasonic waves and engineering, medical and industrial applications of Ultrasonics. Apply acoustics principles to various types of buildings for best sound effect.

c) State basic optical laws, establish the location of the images formed by mirrors and thin con- verging lens, design and assemble microscope using lenses combination.

d) Describe refractive index of a liquid or a solid and will be able to explain conditions for total internal reflection.

e) Define capacitance and its unit, explain the function of capacitors in simple circuits, and solve simple problems.

f) Differentiate between insulators, conductors and semiconductors, and define the terms: po- tential, potential difference, electromotive force.

Course Content

UNIT - 1: Wave motion and Optics

Wave motion, transverse and longitudinal waves with examples, progressive and it's characteristics,Sound waves and their properties, principle of superposition of waves and beat formation. Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications. Light waves and their properties, reflection and refraction, refractive index (snell's law), Critical angle, Total internal reflection and conditions for total internal reflection, applications of total internal reflection in optical fiber,. Image formation by thin lenses, lens formula, power of lens, magnification, problems solving

UNIT -2: Electrostatics and Current Electricity

Charges, Coulombs inverse square law, Electric field, Electric lines of force and their properties, Electric potential and potential difference. Capacitance and its units Capacitor and its principle, Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors.

Electric Current and its units, Ohm's law, Resistance and its units, Conductance, Specific resistance, conductivity, Series and parallel combination of resistances. Kirchhoff's laws, Wheatstone bridge and its applications, Meter Bridge Experiment for determination of specific resistance with neat circuit diagram, problems solving.

UNIT - 3: Electromagnetism

Introduction to magnetism, coulomb inverse square law in magnetism, Magnetic field and its units, , magnetic lines of force, Magnetic induction, magnetic moment and units,

Force on moving charge in magnetic field. Force on current carrying conductor, force on rectangular coil placed in magnetic field. Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter, problems solving.

UNIT - 4: Modern Physics

Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction diode and V-I characteristics Photo- Electric effect, Einsten's photoelectric equation, laws of photoelectric effect, working of photo cell

Nanoscience and Nanotechnology Introduction, nanoparticles and nanomaterials, properties at nanoscale, nanotechnology and applications, problems solving.

Text Books and References

1.Concepts of physics by HC VERMA, Surya publication, Ghaziabad, india
2.Physics- Resnik and Halliday- Wiley Toppan Publishers- England
3.Physics- intermediate-I &II year- Telugu Academy, Telangana
4.P.k palaniswamy: Atext book of Engineering Physics
5.C.Kittel(Wiley Eastern) : introduction to solid state physics.

Applied Physics Labs –II

Course Objectives:

Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

Learning Outcome:

After undergoing this subject, the student will be able to;

a) Apply concept of vibrations and determine the time period of vibrating objects.
b) Use of equipment for determining velocity of ultrasonics in different liquids.
c) Verify optical laws; reflection, refraction from plane interfaces and surfaces.
d) Apply knowledge of optics to determine focal length and magnifying power of optical lenses.
e) Understand uses of electrical components and meters and verify Ohm's law for flow of current.
f) Quantify resistances and verify laws of series and parallel combination of resistances.
g) Measure resistance of a galvanometer and how it is converted into an ammeter and volt- meter.
h) Handle optical fibers and determine numerical aperture of given optical fiber.

List of Practicals/Activities:

1. Determine the Velocity of sound in air using resonance column Apparatus at room temperature and at 0o C.
2. Determine focal length and magnifying power of a convex lens.
3. Determine focal length and magnifying power of a concave lens
4. To verify Ohm‟s law by plotting graph between current and potential difference
5. Determine the resistance and specific resistance of the wire using Meter Bridge
6. To verify laws of resistances in series and parallel combination using meter bridge.
7. Draw the lines of force of combined magnetic field due to bar magnet in earth‟s magnetic field by locating the null points when North pole of the bar magnet pointing towards Geographical North of the Earth.
8. Draw the lines of force of combined magnetic field due to bar magnet in earth‟s magnetic field by locating the null points when North pole of the bar magnet pointing towards Geographical North of the Earth
9. To draw V-I characteristics of a semiconductor diode (Ge, Si) and determine its knee voltage.
10. To measure numerical aperture (NA) of an optical fiber.

Engineering Mechanics

Course Objectives:
Following are the objectives of this course:
1) To obtain resultant of various forces
2) To calculate support reactions through conditions of equilibrium for various structures
3) To understand role of friction in equilibrium problems

Course outcomes:
After completing this course, student will be able to:
1. Identify the force systems for given conditions by applying the basics of mechanics.
2. Determine unknown force(s) of different engineering systems.
3. Apply the principles of friction in various conditions for useful purposes.
4 .Find the centroid and centre of gravity of various components in engineering systems.

Course Contents:

Unit – I Basics of mechanics and force system
Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body.
Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.
Force – unit, representation as a vector and by Bow‟s notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem.
Composition of forces – Resultant, analytical method for determination of resultant for concur- rent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.

Unit– II Equilibrium
Equilibrium and Equilibrant, Free body diagram, Analytical method of analysing equilibrium.
Lami‟s Theorem – statement and explanation, Application for various engineering problems.
Types of beams, supports (hinge, roller and fixed) and loads (vertical, inclined point load & uniformly distributed load) acting on the beam.
Beam reaction for cantilever, simply supported beam with or without overhang – subjected to Point load, uniformly distributed load and combination of loads.

Unit– III Friction
Introduction - Theory of Friction - Angle of friction - Laws of Friction – Static and Dynamic Frictions- Wedge Friction, Screw-jack and Differential Screw- jack Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.

Unit– IV Centroid
Introduction to Centroid, Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle). Centroid of T, L, I, Channel section, Z section, Unsymmetrical I section and Built-up sections.

Text Book:
1.Khurmi, R.S., Applied Mechanics, S. Chand &Co. NewDelhi.

Engineering Mechanics Lab

Course Objectives:

Following are the objectives of this course:

1) To obtain resultant of various forces
2) To calculate support reactions through conditions of equilibrium for various structures
3) To understand role of friction in equilibrium problems
4) To know fundamental laws of machines and their applications to various engineering problems

Course outcomes:

After completing this course, student will be able to

1. Identify the force systems for given conditions by applying the basics of mechanics.
2. Determine unknown force(s) of different engineering systems.
3. Apply the principles of friction in various conditions for useful purposes.
4. Find the centroid and centre of gravity of various components in engineering systems.
5. Select the relevant simple lifting machine(s) for given purposes.

List of Practical to be performed:

1. To study various equipments related to Engineering Mechanics.
2. To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
3. Determine resultant of concurrent force system applying Law of Polygon of forces using force table.
4. Determine resultant of concurrent force system graphically.
5. Determine resultant of parallel force system graphically.
6. Verify Lami‟s theorem.
7. Study forces in various members of Jib crane.
8. Determine support reactions for simply supported beam.
9 .Obtain support reactions of beam using graphical method.
10. Determine coefficient of friction for motion on horizontal and inclined plane.
11. Determine centroid of geometrical plane figures.

Text Book:

1. Khurmi, R.S., Applied Mechanics, S.Chand & Co. New Delhi.

Fundamentals of Electrical and Electronics Engineering

Course Objectives:

To provide basic knowledge of the different elements and concepts of electrical engineering field and to learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, Digital Electronics and their applications to help students deal with electrical and electronics engineering principles and applications in industrial processes of different fields.

Course outcomes:

1.Understand the basics of analog and digital electronics
2.Analyze eclectic and magnetic circuits
3.Understand the working of transformers and machines.

Course Contents:

UNIT I Overview of Electronic Components & Signals:

Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non- periodic signals, average, rms, peak values.

UNIT II Overview of Analog and Digital Circuits:

Operational Amplifiers-Ideal Op-Amp, Practical op amp, Application of Op-Amp as amplifier, adder, differentiator and integrator.
Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Gates-Functional Block Approach.

Unit III Electric and Magnetic Circuits:

EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, Electromagnetic induction, Faraday‟s laws of electromagnetic induction, Lenz‟s law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.

Unit IV A.C. Circuits, Transformers and Machines

Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; General construction and principle of transformer; Emf equation and transformation ratio of transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.

Text Book:

1.Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House

Fundamentals of Electrical and Electronics Engineering Lab

Course Objectives:
To provide basic knowledge of the different elements and concepts of electrical engineering field and to learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, Digital Electronics and their applications to help students deal with electrical and electronics engineering principles and applications in industrial processes of different fields.

Course Outcomes:
At the end of the course student will be able to:
1. Understand basic principle and operation of electric circuits and machines.
2. Solvebasicproblemsrelatedtoelectricalcircuitsandmachines.Explain the operation of different electrical technologies.
3. Demonstrate an understanding of the control systems.
4. Understand the basic circuit elements
5. Understand different types of signal waveforms.
6. Understand logic gates and apply them in various electronic circuits.
7. Understand the basic concepts of op-amps, and their applications.
8. Use relevant electric/electronic protective devices safely.

List of Experiments & Approx. Hrs.
1. Determine the value of given resistor using digital multimeter to confirm with colour code.02
2. Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter.02
3. Use LCR-Q tester to measure the value of given capacitor and inductor. 02
4. Connect capacitors in series and parallel combination on bread board and measure its value using multimeter. 02
5. Measure voltage, current and power in 1-phase circuit with resistive load. 02
6. Measure voltage, current and power in R-L series circuit. 02
7. Test the performance of PN-junction diode. 02
8. Test the performance of Zener diode. 02
9. Determine the current gain of CE transistor configuration. 03
10. Determine the transformation ratio (K) of 1-phase transformer. 03

Text Book:
Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House,2018

Mathematics-II

Course Objectives: This course is designed to give a comprehensive coverage at an introductory level to the subject of matrices, Integral Calculus coordinate geometry, Basic elements of vector algebra and First Order Differential Equations.

Course Outcomes: By the end of the course the students are expected to learn

(i) The students are expected to acquire necessary background in Determinants and Matrices so as to appreciate the importance of the Determinants are the factors that scale different parameterizations so that they all produce same overall integrals, i.e. they are capable of encoding the inherent geometry of the original shape.
(ii) The cumulative effect of the original quantity or equation is the Integration
(iii) The coordinate geometry provides a connection between algebra and geometry through graphs of lines and curves.
(iv) Tell the difference between a resultant and a concurrent force to model simple physical problems in the form of a differential equation, analyze and interpret the solutions

Course Content:

UNIT - I: Determinants and Matrices

Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.

UNIT - II:Integral Calculus

Integration as inverse operation of differentiation. Simple integration by substitution, by parts and by partial fractions (for linear factors only). Use of formulas $\int_0^{\pi/2} \sin^n x\,dx$, $\int_0^{\pi/2} \cos^n x\,dx$ and $\int_0^{\pi/2} \sin^m x \cos^n x\,dx$ for solving Simple problems Where m and n are positive integers.

Applications of integration for on evaluation of area bounded by a curve and axes (simple problems)

UNIT - III: Co-Ordinate Geometry

Equation of straight line in various standard forms (without proof), inter section of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula. General equation of a circle and its characteristics. To find the equation of a circle, given:

i. Centre and radius,
ii. Three points lying on it and
iii. Coordinates of end points of a diameter;

Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Problems on conics when their foci, directories or vertices are given.

UNIT-IV: Differential Equations

Solution of first order and first degree differential equation by variable separation method (simple problems). MATLAB – Simple Introduction.

References:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
3.A Text book of Engineering Mathematics for I,II, III semester by Dr. M.V.S.S N. Prasad by Radiant Publishing House.
4. A Text Book of Intermediate Mathematics I , II year by Telugu Akademi , Telangana
5. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
6. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
7. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

Engineering Workshop Practice

Course Objectives:

- To understand basic engineering processes for manufacturing and assembly.
- To understand, identify, select and use various marking, measuring, and holding, striking and cutting tools and equipment's
- To understand and interpret job drawings, produce jobs, and inspect the job for specified
- Dimensions
- To understand the various types of wiring systems and acquire skills in house wiring
- To understand, operate, control different machines and equipment's adopting safety practice

Course outcomes

At the end of the course, the student will be able to:

CO1 Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines

CO2 Understand job drawing and complete jobs as per specifications in allotted time

CO3 Inspect the job for the desired dimensions and shape

CO4 Operate, control different machines and equipment's adopting safety practices

Course Content:

S.No. Details Of Practical Content

I Carpentry: i) Demonstration of different wood working processes, like plaining, marking, chiseling, turning of wood etc ii) One simple job involving any one joint like mortise and tendon dovetail, bridle, half lap etc.

Fitting: i)Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc. ii) One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc

II Welding: i) Demonstration of different welding tool. ii) Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding. iii) One simple job involving butt and lap joint

Sheet Metal Working: i) Demonstration of different sheet metal operations like sheet cutting, bending, edging, lancing, soldering, and riveting. ii) One simple job involving sheet metal operations and soldering and riveting

III Electrical House Wiring: Practice on simple lamp circuits (i) one lamp controlled by one switch by surface conduit wiring, (ii) Lamp circuits- connection of lamp and socket by separate switches,

IV Demonstration: i) Demonstration of measurement of Current, Voltage, Power and Energy. ii) Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. iii) Tools for Cutting and drilling

References:

1. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015

Semester III

Curriculum Structure

Diploma in Computer Science & Engineering

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/week	Credits	Scheme of Evaluation	
				L	T	P			CIE	SEE
1.	Program core course	DPCS311PCT	Computer Programming	2	1	0	3	3	40	60
2.	Program core course	DPCS312PCT	Scripting Languages(Python)	2	1	0	3	3	40	60
3.	Program core course	DPCS313PCT	Introduction to DBMS	2	0	0	2	2	40	60
4.	Program core course	DPCS315PCT	Digital Logic Design	2	0	0	2	2	40	60
5.	Program core course	DPCS314PCT	OOAD THROUGH UML	2	0	0	2	2	40	60
6.	Program core course	DPCS311PCP	Computer Programming Lab	0	0	4	4	2	60	40
7.	Program core course	DPCS312PCP	Scripting Languages Lab	0	0	4	4	2	60	40
8.	Program core course	DPCS313PCP	DBMS Lab	0	0	4	4	2	60	40
9.	Program core course	DPCS315PCP	Digital Logic Design Lab	0	0	4	4	2	60	40
10.	Summer Internship-I (4 weeks) after IInd Sem	DPCC301SEP	Summer Internship-I					2		
	Total Credits							**22**		

Computer Programming

Number of Credits:3 (L:2; T:1; P:0)

Course Learning Objectives:

To enable student, develop structured solutions to problems and implementing them using computers. This involves two parts: i) Formulating a solution for a given problem as a well-defined sequence of actions, and ii) Expressing solution in a machine-readable form or a programming language. For the second part, we will learn the common units of programming languages. The first part can only be learned through the repeated practice of solving problems.

Course outcomes:

Student should be able to computationally formulate basic problems and write code snippets to execute them. The focus of the course as mentioned above should be on example-based learning. The basic nitty gritties can be skipped, however, the application part should be clear. For instance, when to use an array, when to use loop and when to use conditional statements.

UNIT I

Programming constructs Sequential structure: History, Various types of data, Arithmetic operators, Assignment statement, Assignment operators,printf, scanf, Type conversion techniques, Macro define

Selective Structure: Relational operators - Logical operators - Logical expressions - Conditional operator – bit wise operators -Conditional statements - Multi way condition statement - Switch statement

Repetitive structures: Iterative loops, Nesting, break, continue statements null statement, comma operator.

UNIT II

Arrays, Strings and Functions: Array - Array declaration - Access to array elements - Initialization of Array elements and - Arrays as arguments String – Declaration of Strings – various String Functions. Function- Return statement – Function prototypes - local and external variables – Automatic and static variables, Recursion.

UNIT III

Pointers: Pointer Address and de-referencing operators - Declaration, Assignment and Initialization of a pointer - Pointer Arithmetic - Pointer comparison, conversion parameter passing by reference – Relation between arrays and pointer – String manipulation using pointer - Pointer arrays - Pointer to function- Dynamic memory management functions.

UNIT IV

Structures and Unions: Structures initialization, access concept - Size of a structure - Pointers to structure – Relationship between structure and function - Structures function arguments and function values - Relation between structure and arrays –Structure containing pointers –self Referential structure – Unions

File processing and Preprocessor directives: File processing facility - Preprocessor directives.

Recommended Books:

1. Let Us C, YashavantKanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.
7. Outline of Programming with C, Byron Gottfried, Schaum, McGraw-Hill

Scripting Languages (Python)

Number of Credits:3 (L: 2, T: 1, P: 0)

Course Learning Objectives:

To learn how to work with a scripting language.

Course outcomes:

At the end of the course student will be able to build program with a scripting language and will be able to learn any other scripting language on their own.

UNIT I:

Introduction, Variables and Data Types History, Features, setting up path, Installation and Working with Python, Basic Syntax Understanding Python variables, Numeric data types, using string data type and string operations, Basic Operators, understanding coding blocks, Defining list and list slicing, Other Data Types (Tuples, List, Dictionary -Python, Arrays, Associative)

UNIT II:

Control Structures Conditional blocks using if, else and elif, For loops and iterations, while loops, Loop manipulation using continue, break and else (and pass in Python), Programming using conditional and loops block Functions, Modules and Packages, Importing own module as well as external modules.

UNIT III:

File I/O, Text Processing, Regular Expressions Understanding read functions, Understanding write functions, Programming using file operations, Powerful pattern matching and searching, Power of pattern searching using regex

UNIT IV:

Frameworks Frameworks - Web2Py, Django, Ruby on Rails, Struts (any one of these or any other)

Recommended Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.
6. Beginning Python using Python 2.6 and Python 3, James Payne, Wrox publishing
7. Practical Programming: An Introduction to Computer Science using Python 3, Paul Gries, The Pragmatic Bookshelf

Introduction to DBMS

Number of Credits: 2 (L: 2, T: 0, P: 0)

Course Learning Objectives:

It covers the development of database-driven applications using the capabilities provided by modern database management system software. The concepts include conceptual modeling, relational database design and database query languages.

Course Content:

As a part of the lab, project work is included.

UNIT 1: Introduction to Databases

Definition of DBMS with Example, Characteristics of database approach, History of databases, Applications of databases, Advantages and Disadvantages of Data Bases, Types of DBMS,DBMS Architectures, Users in DBMS Environment.

UNIT-2 Relational Data models Relational Algebra & Relational Calculus:

Entity Relationship Diagram Model:

Notation for ER Diagrams, Entities and its types, Attribute and its types, Entity sets, ER diagrams with examples. Relationship, Types of Relationship, Relationship Sets, mapping constraints, DBMS Schemas and Instances, Data Independence, Relational Model Concepts, Relational Integrity Constraints, Operations in Relational Model, Practices for creating a Relational Model, Advantages & Disadvantages of using Relational Model

Relational Algebra and Relational Calculus

UNIT 3: Normalization and Transaction Processing

Functional Dependencies, Normal form and its types for relational databases,

Transaction Processing:ACID Properties

UNIT 4:

S**QL& PL/SQL**:

SQL: Schema definition, Constraints, Queries, and Views; Security; Introduction to SQL programming Techniques

PL/SQL: Data types, control structures, cursor management, triggers, exceptions, functions, procedures recursion and packages.

Recommended Books:

1. Introduction to Database Management Systems: Kahate, Atul · 2006.
2. Beginning PL/SQL From Novice to Professional By DonaldBales · 2007.
3. Database management systems , Panneerselvam,Rr. · 2018.
4. Database Management Systems, RaghuRamakrishnan, Johannes Gehrke.
5. Oracle PL/SQL Programming, 6th Edition by Steven Feuerstein, Bill PribylReleased February 2014 Publisher(s): O'Reilly Media, Inc.
6. Fundamentals of Database Systems, Book by RamezElmasri.

Digital Logic Design

Number of Credits: 3 (L: 2, T: 0, P: 0)

Course Objectives:

The objectives are to study

1. To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.

2. To prepare students to perform the analysis and design of various digital electronic circuits.

Course Outcomes:

After studying this course, the students would gain enough knowledge

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.

2. To understand and examine the structure of various number systems and its application in digital design.

3. The ability to understand, analyze and design various combinational and sequential circuits.

4. Ability to identify basic requirements for a design application and propose a cost effective solution.

5. The ability to identify and prevent various hazards and timing problems in a digital design.

6. To develop skill to build, and troubleshoot digital circuits.

Unit I:

Number Systems & Boolean Algebra Introduction to different number systems – Binary, Octal, Decimal, Hexadecimal Conversion from one number system to another.

Logic Gates Logic Gates – AND, OR, NOT, NAND, NOR , XOR, XNOR: Symbolic representation and truth table Implementation of Boolean expressions and Logic Functions using gates Simplification of expressions .

Boolean variables – Rules and laws of Boolean Algebra De-Morgan's Theorem Karnaugh Maps and their use for simplification of Boolean expressions

Unit II:

Combinational Logic Circuits Arithmetic Circuits – Addition, Subtraction, 1's 2's Complement, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel and Series Adders Encoder, Decoder Multiplexer – 2 to 1 MUX, 4 to 1 MUX, 8 to 1 MUX. Applications De-multiplexer – 1 to 2 DEMUX, 1- 4 DEMUX, 1- 8 DEMUX

Unit III:

Sequential Logic Circuits Flip Flops – SR,JK, T, D, FF, JK-MS, Triggering Counters – 4 bit Up – Down Counters, Asynchronous/ Ripple Counter, Decade Counter- Mod 3, Mod 7 Counter, Johnson Counter, Ring Counter Registers – 4bit Shift Register: Serial In Serial Out, Serial in Parallel Out, Parallel In Serial Out, Parallel In Parallel Out .

Unit IV:

Memory Devices Classification of Memories – RAM Organization, Address Lines and Memory Sixe, Static RAM, Bipolar RAM, cell Dynamic RAM, D RAM, DDR RAM Read Only memory – ROM organization, Expanding memory, PROM, EPROM, EEPROM, Flash memory Data Converters – Digital to Analog converters, Analog to Digital Converter

Recommended Books:

1. Digital principles & Applications Albert Paul Malvino& Donald P. Leach McGraw Hill Education;

Eighth edition ISBN: 978-9339203405

2. Digital Electronics Roger L. TokheimMacmillian McGraw-Hill Education (ISE Editions); International 2

Revised ed edition ISBN: 978-0071167963

3. Digital Logic And Computer Design (Old Edition) By, M. Morris Mano

4. Digital Electronics – an introduction to theory and practice William H. Gothmann Prentice Hall India

Learning Private Limited; 2 edition ISBN: 978-8120303485

5. Fundamentals of Logic Design Charles H. Roth Jr. Jaico Publishing House; First edition ISBN: 978-8172247744

6. Digital Electronics R. Anand Khanna Publications, New Delhi (Edition 2018) ISBN: 978-93-82609445

OBJECT-ORIENTED ANALYSIS & DESIGN THROUGH UML

Number of Credits:3 (L: 2, T: 0, P: 0)

COURSE OVERVIEW:

This course emphasizes on Object Oriented software design and application of design patterns. Various types of design patterns are taught. Focus will be on Object Oriented Analysis of the system requirements followed by system design. This course helps in learning software design in a real-world perspective.

COURSE OBJECTIVES:

1. To describe the object-oriented software development process, including object- oriented

methodologies and work flow

2. To explain various UML diagrams

COURSE OUTCOMES:

At the end of the course student will be able to:

1. Analyze the requirements and generate use cases

2. Perform Object oriented analysis

3. Perform overall design using various UML diagrams

UNIT I: Introduction to UML

Introduction to UML: Importance of modeling, principles of modeling, object-oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT II: Basic and Advanced Structural Modeling

Basic Structural Modeling: Class & Object Diagrams terms, Concepts & Modeling techniques.

Classes, Relationships, common Mechanisms used in class and object diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT III: Basic Behavioral and Advanced Behavioral Modeling

Basic Behavioral Modeling: Use cases, Use case Diagrams, Activity Diagrams.

Advanced Behavioral Modeling Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT IV

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.

2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object-Oriented Design in UML, Pearson Education.

2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.

3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.

4. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.

Computer Programming Lab

Number of Credits: 2 (L: 0, T: 0, P: 4)

Course Learning Objectives:

This Lab course is intended to practice what is taught in theory class of 'Computer Programming' and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below.

Course outcomes:

Student should be able to write code snippets, and then compile, debug and execute them.

S.No.	Topics for Practice
1	Familiarization with programming environment (Editor, Compiler, Raptor tool etc.)
2	Programs using I/O statements and various operators
3	Programs using expression evaluation and precedence
4	Programs using decision making statements and branching statements
5	Programs using loop statements
6	Programs to demonstrate applications of n dimensional arrays
7	Programs to demonstrate use of string manipulation functions
8	Programs to demonstrate parameter passing mechanism
9	Programs to demonstrate recursion
10	Programs to demonstrate use of pointers
11	Programs to demonstrate command line arguments
12	Programs to demonstrate dynamic memory allocation
13	Programs to demonstrate file operations

Recommended Books:

1. Let Us C, YashavantKanetkar

2. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House

3. C Programming Absolute Beginner's Guide, Dean Miller and Greg Perry

4. The C Programming Language, Kernighan and Ritchie, Prentice Hall of India

5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill

6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGE Learning.

Scripting Languages Lab

Number of Credits 2 (L: 0, T: 0, P: 4)

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Scripting Languages' and become proficient in scripting. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below

Course outcomes:

At the end of the course student will be able to build program with a scripting language and will be able to learn any other scripting language on their own.

S.No.	Topics for Practice
1	Practice basic coding syntax
2	Write and execute scripts based on data types
3	Write and execute Python scripts with conditionals and loops
4	Write and execute Scripts based on Functions and Modules
5	File Processing scripts
6	Write and execute Regular Expressions
7	Write and execute SQL Queries
8	Write and execute scripts using DBI
9	Develop a simple web application

Recommended Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.
6. Beginning Python using Python 2.6 and Python 3, James Payne, Wrox publishing
6. Practical Programming: An Introduction to Computer Science using Python 3, Paul Gries, The Pragmatic Bookshelf

Introduction to DBMS Lab

Number of Credits: 1 (L: 0, T: 0, P: 4)

MYSQL software with command line is recommended for practicing lab experiments.

Course Learning Objectives:
This Lab course is intended to practice whatever is taught in theory class of 'Introduction to DBMS'. A few sample case studies are listed with some suggested activities. More case studies may be added to this list. You need to develop these case studies, apply all relevant concepts learnt in theory class as the course progress, and identify activities/operations that may be performed on the database. It will be a good idea to also use concepts learnt in the course on Software Engineering/SSAD

Course outcomes:
After completing the course, the students will understand

(i) how to design a database, database-based applications.
(ii) (ii) How to use a DBMS (iii) the critical role of database system in designing several information system-based software systems or applications.

DBMS Lab:

1) Basic practise about ER-Diagram Software's
2) Design a ER Diagrams, ER Diagram to Relational Database and vice versa For e.g. university.
3) Examples Using software tool for ER diagrams Eg: Bank, College Database
4) Applying relational model and creating various tables for writing SQL statements using DDL commands, create, alter, and drop.
5) Applying relational model and creating various tables for writing SQL statements using DML commands insert, select, delete, update.
6) Implementing integrity constraints in SQL using Primary Key , Foreign key, NOT NULL
7) Queries on SQL joins
8) Working on SQL function
9) create the views,synonyms,index
10) queries on functional dependencies and normal forms.

This is a skill course. More student practice and try to find solution on their own, better it will be.

Reference Books:

1. Elmasri&Navathe, Fundamentals of Database Systems, Pearson Education
2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, Tata McGraw-Hill, New Delhi, India.
Computer Engineering Curriculum Structure 344
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, McGraw-Hill, New Delhi, India.
4. Introduction to Database Systems, C.J.Date, Pearson Education
5. Introduction to SQL, Rick F.VanderLans, Pearson Education

Digital Logic Design Lab

Number of Credits: 1 (L: 0, T: 0, P: 4)

Objective:

To provide practical experience with the implementation of digital circuits. Gives a good basis for studying computer engineering.

Course Learning Outcomes:

A student who successfully fulfills the course requirements will have demonstrated: 1. An ability to operate laboratory equipment. 2. An ability to construct, analyze, and troubleshoot simple combinational and sequential circuits. 3. An ability to design and troubleshoot a simple state machine. 4. An ability to measure and record the experimental data, analyze the results, and prepare a formal laboratory report.

1. To verify the truth tables for all logic gates– NOT OR AND NAND NOR XOR XNOR Using CMOS Logic gates and TTL Logic Gates
2. Implement and realize Boolean Expressions with Logic Gates
3. ImplementHalfAdder,FullAdder,HalfSubtractor,FullsubtractorusingICs
4. Implement parallel and serial full-adder using ICs
5. DesignanddevelopmentofMultiplexerandDe-multiplexerusingmultiplexerICs
6. Verification of the function of SR,D,JK and T Flip Flops
7. Design controlled shift registers
8. Construct a Single digit Decade Counter(0-9)with7segmentdisplay
9. TodesignaprogrammableUp-DownCounterwitha7segmentdisplay.
10. Study of different memory ICs
11. Study Digital- to –Analog and Analog to Digital Converters
12. Simulate in Software(such as PSpice) an Analog to Digital Converter

Recommended Books:

1. Digital principles & Applications Albert Paul Malvino & Donald P. Leach McGraw Hill Education;
EighteditionISBN:978-9339203405
2. Digital Electronics Roger L. Tokheim Macmillian McGraw-Hill Education (ISE Editions); International 2RevisedededitionISBN:978-0071167963

3. Digital Electronics – an introduction to theory and practice William H. Gothmann Prentice Hall
IndiaLearningPrivateLimited;2editionISBN:978-8120303485,
4.Fundamentals of Logic Design Charles H. Roth Jr. Jaico Publishing House; First edition ISBN: 978-8172247744
5. DigitalElectronicsR.AnandKhannaPublications,NewDelhi(Edition2018)ISBN:978-93-82609445.

Diploma in Computer Science & Engineering

Semester IV

Curriculum Structure

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/week	Credits	Scheme of Evaluation	
				L	T	P			CIE	SEE
1.	Mandatory course	DPCC402SEP	Essence of Indian knowledge and tradition	2	0	0	2	0	20	30
2.	Program core course	DPCS406PCT	Computer hardware & networking	2	1	0	3	3	40	60
3.	Program core course	DPCS407PCT	Microprocessors & interfacing	3	1	0	3	4	40	60
4.	Program core course	DPCS408PCT	Data Structures Through C	2	1	0	3	3	40	60
5.	Program core course	DPCS409PCT	Software Engineering	3	1	0	3	4	40	60
6.	Program core course	DPCS406PCP	Computer hardware & networking lab	0	0	4	4	2	60	40
7.	Program core course	DPCS407PCP	Microprocessors & interfacing lab	0	0	4	4	2	60	40
8.	Program core course	DPCS408PCP	Data Structures Through C Lab	0	0	4	4	2	60	40
9.	Minor Project	DPCC401PET	Minor Project	0	0	4	4	2	60	40
	Total Credits							22		

Essence of Indian Knowledge and Tradition

Learning Outcomes:

1) To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the important roots of knowledge system.

2) To make the students understand the traditional knowledge and analyse it and apply it in their day to day life

Course Outcomes:

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

1. Identify the concept of Traditional knowledge and its importance.

2. Understand the need and importance of protecting traditional knowledge.

3. Illustrate the various enactments related to the protection of traditional knowledge.

4. Explain the importance of Traditional knowledge in Agriculture and Medicine.

UNIT I:

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge (Unani / Siddha/ Ayurveda), Indigenous Knowledge (IK)

UNIT II:

Protection of traditional knowledge: The need for protecting traditional knowledge, Significance of traditional knowledge Protection, value of traditional knowledge in global economy, Role of Government to harness traditional knowledge

UNIT III:

Traditional Knowledge in different Sectors: Traditional knowledge and engineering, Traditional medicine system, traditional knowledge in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of traditional knowledge

Suggested Reading:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. "Knowledge Traditions and Practices of India" Kapil Kapoor.
3. Madhya Himalayi Sanskriti mein Gyan, Vigyan evam Paravigyan by Prof PC Pandey.
Suggested Online Link: Web Links:
1. https://www.youtube.com/watch?v=LZP1StpYEPM
2. http://nptel.ac.in/courses/121106003/

COMPUTER HARDWARE & NETWORKING

Number of Credits: 3 (L: 2, T: 1, P: 0)

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:
To understand the basic concept and working principles of Computers hardware's
To understand the different topologies,

Course Outcome:

Ability to prepare and estimate approximate cost and materials required for a network
Skill to prepare different wires and test LANs and trouble shoot networking devices and solve the problem.
Ability to provide correct power backup to the computer hardware devices.

UNIT I:

PC Hardware and Software Components- Hardware used for I/P, O/P & inside computer case. System board components used for communication among devices-Types of Software (ROM BIOS, OS, and Application Software)- Functions of BIOS- The boot process POST and important beep codes, Know about different connectors.

UNIT II:

System Board- Types of system boards, Various Types of Buses, The CPU & the chipset – CPU form factor, CPU slots and sockets- Different types of RAM, Buses(ISA, MCA, EISA, USB, Firewire, AGP,PCI)- Setting the CPU, CMOS setup and data protection.

UNIT III:

Troubleshooting hard drives & data recovery- Optimizing Hard drive – disk cleanup, disk fragmentation. disk backup. Bootable rescue disk, diagnostic software's, viruses, detection software, Anti-Static tools, How to isolate computer problems, Surge protection & battery backup Stand by UPS, Inline UPS, Line-interactive UPS, intelligent UPS.

UNIT IV:

Introduction to Networks and Topologies, Classification of Networks – LAN, MAN, WAN-OSI Reference Model- TCP/IP Reference Model- Basic Topologies such as Bus, Ring, Star and Hybrid- Network Addressing, LAN Cables and Connectors, wireless network adapter, Coaxial Cables, Twisted-Pair Cables, Optical Fiber Cables, and Connectors- LAN Devices- repeaters, Hubs, Switches, Network Interface Cards (NICs), Routers, Modem, Introduction to Network Addressing, IP Address Classes, IP Subnetting.

Recommended Books:

1 Enhanced Guide to Managing And Maintaining Your PC --Jean Andrews (Thomson)
2 Basics of Networking -- NIIT PHI publication
3 PC Hardware A Beginners Guide -- Gilster (TMH)
4 Trouble Shooting Your PC -- Stone & poor
5 Computer Installation & Servicing -- D. Balasubramaniam

MICROPROCESSORS & INTERFACING

Number of Credits: 3 (L: 3, T: 1, P: 0)

Course Objectives:

1. To develop the skill & knowledge of Computer's Internal Operation and Design.
2. To investigate the programmer's model of a microprocessor, appreciate methods of connecting common peripheral devices, and understand the ways in which microprocessors can be used in automated systems.

Course Outcomes:

1. The objective of this course is to provide extensive knowledge of microprocessor based

systems and interfacing techniques.

2. Identify/explain the operation of the components of a typical microprocessor; the role of

ALU, registers, stack and the use of interrupts.

3. Appreciate the link between the compiler, linker, assembler, emulator and debugger, and

understand their roles in the development of software for microprocessor systems,

4. Gain hands-on experience in interfacing peripherals.

Unit I:

An overview of 8085-Architecture of 8086 Microprocessor-Special functions of General purpose registers-8086 flag register and function of 8086 Flags-Addressing modes of 8086- Instruction set of 8086-Assembler directives.

UNIT II:

Assembly language programs involving logical-Branch & Call instructions- sorting- evaluation of arithmetic expressions-string manipulation. Pin diagram of 8086-Minimum mode and maximum mode of operation- Memory interfacing to 8086 (Static RAM & EPROM) - Need for DMA- DMA data transfer Method- Interfacing with 8237/8257.

UNIT III:

8255 PPI – various modes of operation and interfacing to 8086- Interfacing Keyboard, Displays, 8259 PIC Architecture and interfacing cascading of interrupt controller and its importance.

UNIT IV:

Serial data transfer
schemes. Asynchronous and Synchronous data transfer schemes.
8251USART architecture and interfacing.

Recommended Books:

1. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Micro Processors & Interfacing – Douglas U. Hall, 2007.
3. The 8088 and 8086 Micro Processors – PHI, 4th Edition, 2003.
4. Micro Computer System 8086/8088 Family Architecture, Programming and Design – ByLiu and GA Gibson, PHI, 2nd Ed.,

Data Structures through C

Number of Credits: 3 (L: 2, T: 1, P: 0)

Course Learning Objectives:

To provide strong foundation for implementing programming language to formulate, analyse and develop solutions related to various data structures problems.

Course outcomes:

Have a good understanding of Data Structures and its applications in algorithms

UNIT I:

Introduction to Data Structures: Basic Terminology, Classification of Data Structures, Operations on Data Structures.

Linked Lists: Singly Linked List, Representation in Memory, Operations on a Single Linked List, Circular Linked Lists, Doubly Linked Lists.

UNIT II:

Linear Data Structures- Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on a Stack, Applications of Stacks-Infix-to-Postfix Transformation, evaluating Postfix Expressions. Queues: Introduction to Queues, Array Representation of Queues, Operations on a Queue, Types of Queues-Dequeue, Circular Queue, Applications of Queues-Round Robin Algorithm, Sparse Matrix and its Representation.

UNIT III:

Searching And Sorting: Introduction to different sorting techniques – selection, insertion, bubble,

quick and merge. Introduction to different searching techniques – sequential and binary.

UNIT IV:

Non-Linear Data Structures - Trees: Basic Terminologies, Definition and Concepts of Binary Trees, Representations of a Binary Tree using Arrays and Linked Lists, Operations on a Binary Tree-Insertion, Deletion, Traversals, Types of Binary Trees.

GRAPHS: Graph Terminologies, Representation of Graphs- Set, Linked, Matrix, Graph Traversals.

Recommended Books:

1. Data Structures, R.S. Salaria, Khanna Book Publishing, New Delhi

2. Data Structures Using C, Reema Thareja, Oxford University Press India.

3. Classic Data Structures, SamantaDebasis, Prentice Hall of India.

4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press, India.

5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.

6. Data Structures and Algorithms: Concepts, Techniques and Applications, G. A. V. Pai, McGraw Hill Education, India.

Software Engineering

Number of Credits: 3 (L: 2, T: 1, P: 0)

Course Objectives:

1) Inculcate essential technology and software engineering knowledge and skills essential to build reasonably complex usable and maintainable software iteratively.

2) Emphasize on structured approach to handle software development.

3) Enhance communication skills.

Course outcomes:

The proposed course is expected to provide an introduction to software engineering concepts and techniques to undergraduate students, thus enabling them to work in a small team to deliver a software system. The course content and project will introduce various software technologies, process and project management skills that are needed for the delivery of software in a team setting.

UNIT I:

Introduction to Software Engineering, Lifecycle, Software Development Models & Architecture: Classical Waterfall Model, Iterative Waterfall Model, Spiral Model, Incremental process model, Rapid application development model(RAD), RAD Model vs Traditional SDLC, Agile Development Models, Agile Software Development, Extreme Programming (XP)SDLC V Model, Comparison of different life cycle models

UNIT II: Development Activities - Requirements Gathering and Analysis, Design Concepts, Software architecture and Architectural styles, Basic UI design, Effective Coding and Debugging techniques.

UNIT III: Software Testing Basics, Unit, Integration, System and Acceptance Testing, Introduction to various testing techniques (e.g. Stress testing), Writing and executing test cases, Quality of service (Qos), Quality Assurance.

UNIT IV: Project Management - Project management concepts, Configuration and Release Management, Version Control and its tools (Git), Release Planning, Change Management, Software Maintenance, Project Metrics

Recommended Books:

1. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.

2. Software engineering, Ian Sommerville, Pearson Education

3. An Integrated Approach to Software Engineering, Pankaj Jalote, Springer Verlag

4. Software Engineering, Nasib Singh Gill, Khanna Book Publishing Co. India.

5. Software Engineering, K. K. Agarval, Yogesh Singh, New Age International Publishers

COMPUTER HARDWARE & NETWORKING LAB

Number of Credits: 2 (L: 0, T: 0, P: 4)

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following:

1. To understand the basic concept and working principles of Computers hardware,
2. To understand the different topologies,

Course Outcome:

1. Ability to prepare and estimate approximate cost and materials required for a network
2. Skill to prepare different wires and test LANs and trouble shoot networking devices and solve the problem.
3. Ability to provide correct power backup to the computer hardware devices.

CYCLE I:

1. Identify motherboard components, RAM identification, removal, installation.
2. CMOS setup, Print a summary of your system Hardware, Upgrading memory.
3. Hard drive, optical drive installation.
4. Trouble shooting keyboard ,monitor, printer
5. Printer Problems: laser printer> a) Printer never leaves warm-up mode. b) Paper Jam message is displayed. c) Printed messages are distorted
6. Installation of operating system.

CYCLE II:

1. Installation of Network card.
2. Preparing the UTP cable for cross and direct connections using crimping tool.
3. Installation of a switch, Router and connecting systems to a network switch.
4. Installation of a modem (internal, external or USB) and connecting to internet.
5. Using FTP for uploading and downloading files.
6. Installation and configuring the proxy server for internet access.

Recommended Books:

1 Enhanced Guide to Managing And Maintaining Your PC --Jean Andrews (Thomson)
2 Basics of Networking -- NIIT PHI publication
3 PC Hardware A Beginners Guide -- Gilster (TMH)
4 Trouble Shooting Your PC -- Stone & poor

MICROPROCESSORS & INTERFACING LAB

Number of Credits: 2 (L: 0, T: 0, P: 4)

Course Objective:

1. To Implement and Design Microprocessors Interfacing with 8086
2. To investigate the programmers model of a microprocessor, appreciate methods of connecting common peripheral devices, and understand the ways in which Microprocessors can be used in automated systems.

Course Outcome:

1. The objective of this course is to provide hands-on programming with microprocessor using simulation software.
2. Appreciate the link between the compiler, linker, assembler, emulator and debugger, and understand their roles in the development of software for microprocessor systems.

Cycle I:

1. Write an assembly language program to add two numbers of 16-bit data
2. Write an assembly language program to subtract two numbers of 16-bit data
3. Write an assembly language program to add two numbers of BCD data
4. Write an assembly language program to multiply two numbers of 16-bit data
5. Write an assembly language program to divide 16-bit number with 8-bit number.
6. Write an assembly language program to search the largest number in an array
7. Write an assembly language program to sort the numbers in an array
8. Write an assembly language program to find LCM of two 16-bit data
9. Write an assembly language program for factorial of a number.
10. Write an assembly language program for generating Fibonacci Series.

Cycle II:

1. Write an assembly language program to search for a given pattern in a string
2. Write an assembly language program to reverse of a string
3. Write an assembly language program to display a message.
4. Write an assembly language program to move data from one location to another location.
5. Write a program for generating multiplication table for a given number
6. Write an assembly language program to count number of ones and zeros in a 8-bit number.
7. Write an Assembly language programs for keyboard and Display controller with 8279

Recommended Books:

1. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Micro Processors & Interfacing – Douglas U. Hall, 2007.
3. The 8088 and 8086 Micro Processors – PHI, 4th Edition, 2003.
4. Micro Computer System 8086/8088 Family Architecture, Programming and Design – ByLiu and GA Gibson, PHI, 2nd Ed.,

Data Structures Through C Lab

Number of Credits: 2 (L: 0, T: 0, P: 4)

Course Learning Objectives:

This Lab course is intended to practice whatever is taught in theory class of 'Data Structures', 'Algorithms' and is an extension of previous course on 'Computer Programming'. Students should work on problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below. This Lab course requires a good coordination between theory course in Data Structures and Algorithms.

Course outcomes:

Student will be able to write programs for creating and doing different operations on various data structures. Student will be able to use/implement various algorithms learnt in the course on Algorithms. In summary student will have a good command over Data Structures and its applications in Algorithms.

1. Exercises on creation, insertion, deletions and display of elements in a singly linked list
2. Exercises on creation, insertion, deletions and display of elements in a doubly linked list
3. Write a program to Implement a stack
4. Write a program to implement a queue
5. Write a program to create a sparse matrix
6. Write a program to create a binary tree and its traversal operations
7. Exercise on Selection sort
8. Exercise on insertion sort
9. Exercise on bubble sort
10. Implement a program for merge sort on two sorted lists of elements
11. Exercises on linear search 6. Exercise on binary search
12. Write a program to implement Breadth First Search (BFS)
13. Write a program to implement Depth First Search (DFS)
14. Write a program to implement a binary tree of integers
15. Write a program to find the minimum depth of a binary tree

Recommended Books:

1. Data Structures, R.S. Salaria, Khanna Book Publishing, New Delhi
2. Data Structures Using C, Reema Thareja, Oxford University Press India.
3. Classic Data Structures, SamantaDebasis, Prentice Hall of India.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press, India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning, India.
6. Data Structures and Algorithms: Concepts, Techniques and Applications, G. A. V. Pai, McGrawHill Education, India.

Semester V

Curriculum Structure

Diploma in Computer Science & Engineering

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/ week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1.	Program core course		Introduction to e-Governance	2	1	0	3	40	60	3
2.	Program core course		Internet of Things	2	1	0	3	40	60	3
3.	Program Elective course		Program Elective-1	3	0	0	3	40	60	3
4.	Program Elective course		Program Elective-2	3	0	0	3	40	60	3
5.	Open Elective		Open Elective-1	3	0	0	3	40	60	3
6.	Summer Internship- II (6 weeks) after IV Semester		Summer Internship-II						100	3
7.	Major Project			0	0	2	2			^
	Total Credits									18

Program Elective-1:

1. Fundamentals of A.I
2. VB.Net Programming

Program Elective-2:

1. Web Technologies
2. Java Programming

Open Elective-I:

1. Information Security
2. Software Testing Methodology

Course Code	Course Title	Semester
TO BE DEFINED	**Introduction to E-Governance**.	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Learning Objectives:

To Cover the concept of E-Governance and to understand how technologies and business model shape the government for improving citizen services and to understand how technologies and business models shape the contours of government for improving citizen services and bringing in transparency.

Course out comes:

Through exposure to introductory ideas and practices followed in a selected number of e-Gover-nance initiatives in India, the course will help students to understand and appreciate the essence ofe-Governance.

Course Content:

UNIT-I:

Exposure to emerging trends in ICT for development; Understanding of design and implementation Of e-Government projects, e-governance lifecycle.

UNIT-II:

NeedforGovernmentProcessRe-engineering(GPR);Nationale-GovernancePlan(NeGP)forIndia;SMARTGovernments & Thumb Rules

UNIT-III:

Architecture and models of e-Governance, including Public Private Partnership (PPP); Need for Innovation and Change Management in e-Governance; Critical Success Factors; Major issue includingcorruption,resistance for change-Security and Cyber laws

UNIT-IV:

Focusing on Indian initiatives and their impact on citizens; Sharing of case studies to highlight bestpractices in managing e-Governance projects in Indian context. Visits to local e-governance sites(CSC,eSeva,PostOffice,PassportSevaKendra,etc)aspartofTutorials.

ReferenceBooks:

1. ManagingTransformation–ObjectivestoOutcomes.JSatyanarayana,PrenticeHallIndia
2. TheState,ITandDevelopment.KennethKenniston,RKBaggaandRohitRajMathur,SagePublicationsIndiaPvt Ltd.
3. e-Government-TheScienceofthePossible.JSatyanarayana,PrenticeHall,India
4. http://www.csi-sigegov.org/publications.php
5. https://negd.gov.in
6. https://www.nisg.org/case-studies-on-e-governance-in-india

Course Code	Course Title	Semester
TO BE DEFINED	**INTERNET OF THINGS**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives:

To introduce the terminology, technology and its applications

- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web-based services on IoT devices

Course Outcomes:

Understanding of IoT value chain structure (device, data cloud), application areas and

- technologies involved. Understand IoT sensors and technological challenges faced by IoT devices, with a focus on
- wireless, energy, power, and sensing modules Market forecast for IoT devices with a focus on sensors
- Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi

UNIT-I:

Introduction to Internet of Things- Definition and Characteristics of IoT, Sensors, Actuators, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Agriculture and Industry.

UNIT-II:

IoT and M2M- Software defined networks, network function virtualization, difference between SDN and NFV for IoT, Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT-III:

IoT Physical Devices and Endpoints- Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C), **Programming** – Basic Python program using Arduino & Raspberry PI Connecting LED, Buzzer, speed control of DC Motor.

UNIT-IV:

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
3. Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895

REFERENCE BOOKS:

1. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
2. Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
3. N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014.

Course Code	Course Title	Semester
TO BE DEFINED	**Fundamentals of AI.**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Learning Objectives:

To introduce students to the domain of Artificial Intelligence.

Course Content:

UNIT -I: Introduction

Overview and Historical Perspective, Turing test, Physical Symbol Systems and the scope of Symbolic AI, Agents.

UNIT -II: Search

Heuristic Search: Best First Search, Hill Climbing, Beam Search, Tabu Search

Randomized Search: Simulated Annealing.

UNIT -III:

Finding Optimal Paths: Branch and Bound, A*, IDA*, Divide and Conquer approaches, Beam StackSearch.

Problem Decomposition: Goal Trees, AO*, Rule Based Systems, Rete Net.Game

UNIT -IV:

Planning and Constraint Satisfaction: Domains, Forward and Backward Search, Goal Stack Planning,Plan Space Planning, Graph plan, Constraint Propagation.

Logic and Inferences: Propositional Logic, First Order Logic, Soundness and Completeness, Forwardand Backward chaining.

Reference Books:

1. Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India)
2. https://nptel.ac.in/courses/106106126/
3. Stefan Edelkamp and Stefan Schroedl. Heuristic Search, Morgan Kaufmann.
4. Pamela McCorduck, Machines Who Think: A Personal Inquiry into the History and
5. Prospects of Artificial Intelligence, A K Peters/CRC Press
6. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill.
7. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, Prentice
8. Hall
9. M.C. Trivedi, A classical approach to Artificial Intelligence, Khanna Publishing House

Course outcomes:

Student will have general idea about Artificial Intelligence, will be able to explore AI tools effectively.

Course Code	Course Title	Semester
TO BE DEFINED	**VB.NET Programming**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objective:

- To understand the .NET Programming concepts.
- To understand the integrated development environment.
- To understand Graphical User Interface (GUI) programming.
- Design, formulate, and construct applications with VB.NET
- Integrate variables and constants into calculations applying VB.NET
- Implement lists and loops with VB.NET controls and iteration
- Separate operations into appropriate VB.NET procedures and functions
- Assemble multiple forms, modules, and menus into working VB.NET solutions
- Create VB.NET programs using multiple array techniques
- Build integrated VB.NET solutions using files and structures with printing capabilities
- Translate general requirements into data-related solutions using database concepts

Course Outcome:

On completion of course, the students will able to:

- Apply .NET programming concepts in problem solving
- Implement GUI applications.
- Determine logical alternatives with VB.NET decision structures

Student will able to Develop window Form and Web based Application

UNIT I:

Introduction to Visual Basic.NET - Features of Visual Basic. What is .NET Framework - Component of .NET – CLR and Library –NET - Understand the IDE, .NETAssemblies- Private & shared assemblies - Benefits of .NET assemblies.

.NET Programming fundamentals in VB (Console Application): Variable declaration and types – User defined data types – Scope and life of a variable – Arrays & Constraints, OOPs Concepts, – Control flow statements – Writing programs using control flow statements – Procedures and Functions – Recursion concept in VB.NET - Exception Handling in VB.NET.

UNIT II:

Developing Windows Applications:

Design aspects ofVB.NET forms, Elements of User Interface– Properties of Controls – Text box, Label, command button, check box and list box Common properties of the above controls – enable , disable controls, control arrays, Menus and common dialogue control – creating menus at design time and runtime, create short cut keys for pulldown menus common dialogue control, Fundamentals of graphics in vbLine and shape controls in creating graphics – paint picture

method –Display and printing information fundamentals of printing, printer object – printing with print form method.

UNIT III:

Developing Web Application:

Introduction to Web Forms – Creating buttons, Text boxes, Labels and Literals in Web forms - Creating Place holders, hidden Field Control and Creating Upload - Controls Web forms - Working with Check boxes, Radio buttons, Tables and Panels in Web forms - Know how to use Images, List boxes, Drop-down lists, Hyper links and link buttons in Web Forms.

UNIT IV:

Data Access with ADO.NET

Introduction to ADO.NET data objects, Accessing data with Server explorer - Accessing data with data adapters and data sets - Multiple Table Connection - Data binding with controls like Text Boxes, List Boxes, Data grid etc. - Navigating data source - Data Grid View, Data form wizard - Data validation – Connection Objects, Command Objects, Data Adapters, Dataset Class - Features and advantages with ADO.NET.

Text Books and References:

1 Visual basic.NET Programming Steven Holzner Dream tech
2 VB.NET PROGRAMMING BY T. GADDIS (Dreamtech)
3 Microsoft Visual Basic. Net step by step By Halvosrson (**PHI**)
4 OOP with Microsoft Visual Basic.Net By Reynold Hacrtte (**PHI**).

Course Code	Course Title	Semester
TO BE DEFINED	**Web Technologies**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives:

1. To introduce HTML & CSS
2. To introduce PHP language for server-side scripting
3. To introduce XML and processing of XML Data.
4. To introduce Client-side scripting with Javascript.

Course Outcomes:

1. Understand the basics of Web Design and HTML
2. Develop Web pages using HTML and CSS
3. Understand XML and Web Browsers.
4. Provide Logic on web pages using Java Script.
5. Apply the basic concepts of website development using PHP
6. Develop websites and Database connectivity.

UNIT- I

Principles of Web Design and Introduction to HTML

Anatomy of Web page, Format, Elements, Navigation, Building, Launching and maintaining web site - HTML – Introduction, Format of web page, Tags and attributes, Formatting text.

HTML & CSS: HTML – Adding images - Positioning Lists – Colors - Connecting to hyperlinks, Tables, Forms, Frames - CSS – Introduction - Inline styles - Embedded style sheets - Linking external style sheets - Positioning elements – Backgrounds - Element dimensions- Borders-Colors.

UNIT- II

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java.

UNIT-III

Client-side Scripting: Introduction to JavaScript, JavaScript language – declaring variables, scope of

variables, functions. event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

UNIT - IV

Introduction to PHP

Fundamentals of PHP – Operators - Conditional Statements - Loops – Strings – String Methods – Arrays- Array Methods. **Advanced PHP:** Functions - Passing arguments - Scope and lifetime of variables - Recursive functions - Object orientation in PHP - Working with forms in PHP, Database concepts - Connecting to Database - Retrieving data.

TEXT BOOKS:

1) Principles of Web Design -- Sklar, TMH
2) HTML complete reference -- Powell, THH
3) Internet & World Wide Web -- Dietel & Dietel, Pearson education
4) Straight to the point PHP -- Laxmi Publications
5) Basics of Web Site Design -- NIIT – PHI
6) WWW Design with HTML -- Xavier (TMH)
7) Web Technologies, Uttam K Roy, Oxford University Press
8) The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

REFERENCE BOOKS

1. Web Programming, building internet applications, Chris Bates 2″ edition, Wiley Dreamtech

2. Java Script, D.Flanagan

3. Beginning Web Programming-Jon Duckett WROX.

Course Code	Course Title	Semester
TO BE DEFINED	**JAVA Programming**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Learning Objectives:

Open source platforms play significant role in the corporate world and are gaining popularity because these are freeware and ease of access. Java is a simple, portable, distributive, robust, secure, dynamic, architecture neutral, object oriented programming language. This technology allows the software designed and developed once for an idealized 'virtual machine' and run on various computing platforms. Companies of all sizes are using Java as the main programming platform to develop various applications/projects worldwide.

Course outcomes:

So, after learning this course, student can float themselves as Java developer in the software industry as well this course works as foundation course for advance Java programming for the forthcoming semester.

Course Content:

Unit – I (Introduction to Java)

Describe Internet role, advantages and, environment setup of Java,Differentiate between POP and OOP,

List important OOP fundamentals,Write simple programs using java

Unit – II (Building Blocks of the Language)

Explain Data types: constant and variables, State the steps to implement programs for Arrays and String Handling, List different types of operators ,State the steps to implement small programs using Decision & Control Structures

Unit – III (Object Oriented Programming Concepts, Inheritance, Packages)

Define Objects and Classes and methods, Explain Constructors & its types, Object as a parameter, constructor overloading. Describe Inheritance and method overriding, List the types of Inheritance , Describe Creating package, importing package, access rules for packages, class hiding rules in a package.

Unit– IV (Interfaces, Exception Handling & Multi threaded Programming)

Define interface.Explain inheritance on interfaces, implementing interface, multiple inheritance using interface, Describe Abstract & final classes.

Explain errors, & exceptions, List types of errors, Define thread, creating threads, multi threading, thread priority & synchronization.

Text Books

The complete reference Java -- Pattrick Naughten, Herbert Schildt TMH company Limited, New Delhi.

References

1. Java Foundations of Programming – NIIT, PHI 5. Programming with Java -- Balagurusamy, TM
2. Java for Programmers, P.J. Deitel and H.M. Deitel, Pearson education (OR)
3. Java: How to Program P.J. Deitel and H.M. Deitel, PH

Course Code	Course Title	Semester
TO BE DEFINED	**Information Security**	**5**

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Learning Objectives: To learn how to evaluate and enhance information security of IT infrastructure and organisations.

Course Outcomes: Understanding of security needs and issues of IT infrastructure. Have basic skills on security audit of networks, operating systems and application software.

UNIT I:

Introduction to Information Security, Various aspects of information security (PAIN), Security Fea- tures of Operating Systems – Authentication, Logs, Audit Features, File System Protection, User Priv- ileges, RAID options, Anti-Virus Software, etc.

UNIT II:

Understanding security weaknesses in popular networking protocols – IP, TCP, UDP, RIP, OSPF, HTTP, SMTP, etc.; security weaknesses in common networking devices – Hub, switch, router, WiFi; Security solutions to mitigate security risk of networking protocols (IPSec, HTTPS, etc) and devices (VLAN, VPN, Ingress Filtering, etc) .

UNIT III:

Basics of Cryptography, PKI, Security considerations while developing softwares .
Network Security Products – Firewall, IDS/IPS, VPN Concentrator, Content Screening Gateways, etc.

UNIT IV:

Introduction to Security Standards – ISO 27001, Indian IT Act, IPR Laws; Security Audit procedures; Developing Security Policies; Disaster Recovery, Business Continuity Planning .

REFERENCE BOOKS AND WEB ADDRESSES:

1. Information Security and Cyber Laws, Sarika Gupta, Khanna Publishing House
2. RFCs of protocols listed in content (https://www.ietf.org)
3. Various Acts, Laws and Standards (IT Act, ISO27001 Standard, IPR and Copyright
4. Security Guideline documents of Operating Systems (OS Manual, Man Pages, etc)
5. https://www.cert-in.org.in/
6. https://www.sans.org

Course Code	Course Title	Semester
TO BE DEFINED	**Software Testing Methodology**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives: Inculcate essential software testing knowledge and skills, required to reasonably test a system under development in a systematic manner.

Course Outcomes: Student will develop skills to understand the system, choose suitable testing methods, strategies, tools and technology, execute and report the test. Student will also be able to understand need and usage of test automation and gain expertise in at least 1 test automation tool.

UNIT I: Basics:
Introduction to Software Quality basics: Verification and validation, quality perspectives, Testing terminology, Software Testing Life Cycle (STLC), "V" model of Testing, QA process, cost of testing, types of tests.

UNIT II: Writing Test Cases:
Writing test cases, Functional Testing, non-functional testing, (Performance testing), UI testing. Preparing test data, Writing Unit test, Integration test and User Acceptance Tests, preparing test scenarios from Software requirements.

UNIT III: Test Execution and Management:
Test execution, Test Oracles, test planning, test strategy including when to stop testing, test-coverage - Traceability matrix, JIRA, Bugzilla and other bug tracking tools. Test data mining, test reporting.

UNIT IV: Test Automation :
Why automation, when not to automate, writing simple automated test cases, learn and practice any one automated testing framework like Selenium .

Reference Books:

1. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.
2. Bugzilla (https://www.bugzilla.org/)
3. JIRA (https://www.atlassian.com/software/jira)

Semester VI

Curriculum Structure

Diploma in Computer Science & Engineering

Sl. No	Category	Code No.	Course Title	Hours perweek			Total contact hrs/ week	Scheme of Evaluation		Credits
				L	T	P		CIE	SEE	
1.	Program Elective course		Program Elective-3	2	1	0	3	40	60	3
2.	Program Elective course		Program Elective-4	2	1	0	3	40	60	3
3.	Humanities and Social Science course		Entrepreneurship and Startups	3	0	0	3	40	60	3
4.	Open Elective		Open Elective-2	3	0	0	3	40	60	3
5.	Open Elective		Open Elective-3	3	0	0	3	40	60	3
6.	Mandatory Course		Indian Constitution	2	0	0	2	20	30	0
7.	Major Project			0	0	6	6	120	80	4^
8.	Seminar			1	0	0	1	50	--	1
	Total Credits									**20**

Program Elective-3:

1. Operating Systems
2. Software Project Management

Program Elective-4:

1. Human Computer Interaction
2. Multimedia Technology

Open Elective-3:

1. ICT(Information and Communication Technology)
2. E-Commerce

Open Elective-4:

1. Cloud Computing
2. FOSS (Free and Open Source Software)
3. Data Communication and Computer Network

Course Code	Course Title	Semester
TO BE DEFINED	**Operating Systems**	**6**

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives:

A general introduction to various ideas in implementation of operating systems, particularly UNIX. Introduce to various options available so as to develop capacity to compare, contrast, and evaluate the key trade-offs between different designs choices.

Course Outcomes:

Students should be able to demonstrate basic knowledge about Operating System, be able to apply OS concepts such as processes, memory and file systems to system design, able to configure OS in an efficient and secure manner.

UNIT I:

Overview of Operating System, basic concepts, UNIX/LINUX Architecture, Kernel, services and systems calls, system programs.

UNIT II:

Process Management: Process concepts, operations on processes, IPC, Process Scheduling, Multithreaded programming Memory management: Memory allocation, Swapping, Paging, Segmentation, Virtual Memory, various faults.

UNIT III:

File management: Concept of a file, access methods, directory structure, file system mounting, file sharing and protection, file system structure and implementation, directory implementation, free space management, efficiency and performance. Different types of file systems

UNIT IV:

I/O System: Mass storage structure - overview, disk structure, disk attachment, disk scheduling algorithms, swap space management, RAID types.

OS Security: Authentication, Access Control, Access Rights, System Logs

Recommended Books:

1. Operating System Concepts, Silberschatz and Galvin, Wiley India Limited

2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education

3. Operating Systems, Internals and Design Principles, Stallings, Pearson Education, India

4. Operating System Concepts, Ekta Walia, Khanna Publishing House

5. Modern Operating Systems, Andrew S. Tanenbaum, Prentice Hall of India

6. Operating systems, Deitel&Deitel, Pearson Education, India Course

Course Code	Course Title	Semester
TO BE DEFINED	**Software Project Management**	**6**

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal. models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects. Assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows.

Course Outcomes

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resources with the application of suitable protect management tools.

UNIT- I :Conventional Software Management:

The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics. Pragmatic software cost estimation.

UNIT- II :Improving Software Economics:

Reducing Software product size, Improving software processes, improving team effectiveness. Improving automation, Achieving required quality, peer inspections. The old way and the new- The principles of conventional software engineering. Principles of modem software management, transitioning to an iterative process.

UNIT- III :Life cycle phases:

Engineering and production stages, inception. Elaboration, construction, transition phases.

UNIT-IV: Artifacts of the process:

The artifact sets. Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

TEXT BOOKS

1. Software Project Management. Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tate McGraw Hd.

REFERENCE BOOKS

1. Applied Software Project Management, Andrew SteIbian 8 Jennifer Greene, O'Reilly. 2006
2. Head First PMP, Jennifer Greene & Andrew Steliman, ORoiHy.2007
3. Software Enneeñng Project Managent. Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Ale Project Management, Jim Highsniith. Pearson education, 2004
5. The art of Project management. Scott Berkun. O'Reilly, 2005.
6. Software Project Management in Practice. Pankaj Jalote. Pearson Educabon,2002.

Course Code	Course Title	Semester
TO BE DEFINED	**Human Computer Interaction**	**6**

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives:

To gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing; become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans; be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation; appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user.

Course Outcomes:

Understanding and apply HCI and principles to interaction design.able to design certain tools for blind or Physically Challenged people.

UNIT – I:

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design, A brief history of Screen design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT – II:

process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT- III:

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT- IV:

HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction.

TEXT BOOKS

1. the essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech.
2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education

REFERENCE BOOKS:

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human –Computer Interaction, D. R. Olsen, Cengage Learning. 5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

Course Code	Course Title	Semester
TO BE DEFINED	**Multimedia Technologies**	6

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives: To introduce the domain of Multimedia Technologies, which explain the technologies underlying digital images, videos and audio contents, including various compression techniques and standards, and the issues to deliver multimedia content over the Internet.

Course Outcome: To understand various aspects of Multimedia and related standards. Student will be able to build multimedia content and applications and also multimedia enable Web applications and mobile applications.

UNIT I:

Introduction to Multimedia- Multimedia Foundation and Concepts: Multimedia Hardware, Multimedia Software, Multimedia operating systems, Multimedia communication system.

UNIT II:

Basic Compression Techniques Video and Audio Data Compression Techniques – Lossy and Lossless. Example algorithms/standards: Huffman, RLE, JPEG, MPEG, MP3, MP4, LZMA, FLAC, ALAC.

UNIT III:

Content Development and Distribution Desktop publishing (Coral Draw, Photoshop), Multimedia Animation & Special effects (2D/3D animation, Flash) .

UNIT IV:

Introduction to Digital Imaging Basics of Graphic Design and use of Digital technology, Definition of Digital images, Digital imaging in multimedia.

Recommended Books:

1. An Introduction to Multimedia Authoring, A. Eliens
2. Fundamentals of Multimedia, Prentice Hall/Pearson, Ze-Nian Li & Mark S. Drew.
3. Multimedia and Animation, V.K. Jain, Khanna Publishing House, Edition 2018
4. Fundamentals of Multimedia, Ramesh Bangia, Khanna Book Publishing Co., N. Delhi (2007)

Course Code	Course Title	Semester
TO BE DEFINED	**ICT(Information and Communication Technology)**	6

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives:

This course aims at acquainting the students with basic ICT tools which help them in their day to day and life as well as in office and research. Course outcomes:After completion of the course, student will be able to understand in all below units.

UNIT-I:

Fundamentals of Internet: What is Internet?, Internet applications,Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet, Browser –Types of Browsers,Introduction to Social Networking: Twitter, Tumblr, LinkedIn, Facebook, flickr, Skype, yahoo, YouTube, WhatsApp

UNIT-II:

Definition of E-mail -Advantages and Disadvantages –User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, MessageComposition, Mail Management. G-Suite: Google drive, Google documents, Google spread sheets, Google Slides and Google forms.

UNIT-III

Overview of Internet security, E-mail threats and secure E-mail, Viruses and antivirus software, Firewalls, Cryptography, Digital signatures, Copyright issues. What are GOI digital initiatives in higher education? (SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, eacharya, e-Yantra and NPTEL).

UNIT-IV

Recommended Co-Curricular Activities:

Suggested student hands on activities : (a) Create your accounts for the above social networking sites and explore them, establish a video conference using Skype. (b). Create an Email account for yourself- Send an email with two attachments to another friend. Group the email addresses use address folder . (C) Register for one online course through any of the online learning platforms like NPTEL, SWAYAM, Alison, Codecademy.

Reference Books :

1. In-line/On-line : Fundamentals of the Internet and the World Wide Web, 2/e – byRaymond Greenlaw and Ellen Hepp, Publishers : TMH
2. Internet technology and Web design, ISRD group, TMH.
3. Information Technology – The breaking wave, Dennis P.Curtin, Kim Foley, Kunai Sen and Cathleen Morin, TMH

Course Code	Course Title	Semester
TO BE DEFINED	**E-Commerce**	6

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

UNIT I:

Electronic Commerce: Overview, Definitions, Advantages And Disadvantages Of Ecommerce, threats of E-commerce, Managerial Prospective, Rules and Regulations For controlling E-commerce, Cyber Laws.

UNIT II:

Technology :Relationship Between E-Commerce and Networking, Different Types of Networking For E-commerce, Internet, Internet and Extranet, EDI System Wireless Application Protocol : Definition, Hand Held Devices, Mobility and Commerce, Mobile computing, Wireless Web, Web Security, Infrastructure Requirement Form E-Commerce.

UNIT III:

Business Models Of E-Commerce And E-Strategy :Overview, Strategic, Methods for developing E-commerce, Business - to - Business (B2B),Business - to - Consumer (B2C) ,Consumer - to - Consumer (C2C),Consumer - to - Business (C2B), Business - to - Government (B2G) ,Government - to - Business (G2B) ,Government - to - Citizen (G2C) Four C's (Convergence, Collaborative Computing, Content Management and Call Center), Payment through card system, E-Cheque, E-Cash, E-Payment Threats and protections.

UNIT IV:

E-Marketing, Scm And Risk Of E-Commerce :Overview, Security for E-commerce, Security Standards, Firewall, Cryptography, Key Management, Passward system, Digital certificates, Digital signatures ,Home-Shopping, E-Marketing, Tele-Marketing.

REFERENCE BOOKS:

1. E-Commerce-M . M. Oka- EPH
2. Electronic Bharat – TMH Commerce- Technologies & Application – Bhaskar
3. E-Commerce McGraw Hill :Strategy Technologies and Applications – Tata

Course Code	Course Title	Semester
TO BE DEFINED	**FOSS (Free and Open Source Software)**	**6**

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Learning Objectives: Exposure to free and open source software philosophy and tools.
Course outcomes: Student will be able to work with FOSS tools, find and evaluate FOSS alternatives for any software requirement.

Course Content:

UNIT I: FOSS PHILOSOPHY Understanding the FOSS Community and FOSS Philosophy, Benefits of Community based Software Development, Guidelines for working with FOSS community, Requirements for being open, free soft- ware, open source software, FOSS Licensing Models, FOSS examples .

UNIT II: LINUX Linux Installation and Hardware Configuration, Boot Process, Dual-Booting Linux and other Operat- ing Systems, Kernel Options during Boot, X Windows System Configuration, System Administration (Server Administration, Backup and Restore Procedures, Strategies for keeping a Secure Server).

UNIT III: Programming Tools and Techniques Libreoffice Tools; Samba: Cross platform; Introduction about LAMP; Brief Introduction to Program- ming using languages like Java /Python / Perl; Database Systems Mysql, PostgreSQL or equivalent; Open Source UML Tools; Introduction to Mobile Programming; Version Control Systems like SVN, Git or equivalent; Project Management Tools; Bug Tracking Systems; Package Management Systems.

UNIT IV: FOSS CASE STUDIES: Some example case studies of FOSS implementation.

Suggested Lab Work: This is a skill course. Topics/tools taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. Students should explore features of various FOSS tools/applications on a Linux system. Teacher should give weekly tasks as assignment. Learnings from this course should be used in the major project.

Reference Books:

1. **Linux in a Nutshell, by Ellen Siever**
2. Philosophy of GNU URL: http://www.gnu.org/philosophy/.
3. Linux Administration URL: http://www.tldp.org/LDP/lame/LAME/linux-admin-made- easy/
4. Version control system URL: http://git-scm.com/.
5. Samba: URL : http://www.samba.org/.
6. Libre office: http://www.libreoffice.org/.

Course Code	Course Title	Semester
TO BE DEFINED	**Cloud Computing**	5

Scheme of Instruction	**Scheme of Examination**
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Learning Objectives:

- To explain model of cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

Course Outcomes: Ability to understand the virtualization and cloud computing concepts.

UNIT- I:

Systems Modelling, Clustering and Virtualization:Distributed System Models and Enabling Technologies. Computer Clusters for Scalable Parallel Computing. Virtual Machines and Virtualization of Clusters and Data centers. Foundations: Introduction to Cloud Computing, migrating into a Cloud, Enriching the Integration as a Service‟ Paradigm for the Cloud Era. The Enterprise Cloud Computing Paradigm.

UNIT- II:

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS):Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service. Secure Distributed Data Storage in Cloud Computing. Aneka, Comet Cloud, T-Systems‟, Workflow Engine for Clouds. Understanding Scientific Applications for Cloud Environments.

UNIT -III:

Monitoring, Management and Applications:An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Production for HPC on Clouds.

UNIT-IV:

Best Practices in Architecture Cloud Applications in the AWS cloud, Building Content Delivery Networks Clouds, Resource Cloud Mashups.

Reference Books:

1.Cloud Computing: Principles and Paradigms by Rajkumar Bi.
2 Distributed and Cloud Computing. Kal Hwang. Geoffeiy C.Fox. Jack J.Dongarra. Elsevier. 2012.

Course Code	Course Title	Semester
TO BE DEFINED	**Data Communication and Computer Network**	6

Scheme of Instruction	Scheme of Examination
Total Duration: 45 Hrs	Maximum Score : 100
Periods / Week: 3L	Internal Evaluation: 40
Credits: 3 (L:2,T:1,P:0)	End/ External Evaluation: 60
Instruction Mode: Lecture	Exam Duration: 3 Hours

Course Objectives:

On completion of the study of the subject the student should be able to comprehend the following: To introduce the concepts of data communication, familiarize with different network topologies, the OSI model and to familiarize with various communication protocols.

Course Outcome:

On completion of the subject, the student will be able to:

- Identify different types of network topologies and their architecture
- Identify various protocols used in communication
- Understand the different web applications.

UNIT I:

Basics of Data Communication & Networking Introduction – concepts of data communication – analog signal, analog transmission – digital signal, digital transmission – simplex, duplex, full duplex – OSI Model – OSI functions – physical layer, data link layer, network layer, transport layer, session layer, presentation layer and application layer, Network topologies – bus, star, ring – switching basics – circuit switching – packet switching – message switching – router – routing. Categories of computer network – LAN,MAN,WAN – Ethernet – introduction – properties – addresses – Ethernet frame 802.3 format – MAC — token ring – introduction – properties – operation.

UNIT II:

Transmission media – guided, unguided media – twisted pair, UTP, STP, Coaxial cable, optical fiber – comparison of transmission media characteristics – Shannon capacity- Concepts of WLAN -Bluetooth – overview – application. Transmission mechanism – addressing – packet forwarding – intranet – point-to-point and point to multi point networks.

UNIT III:

Internet – introduction – internetworking devices – repeaters – bridges – routers – gateways – brief history of internet – ARPA net – www – internal architecture of ISP. Ways of accessing the internet – introduction – PSTN ISDN – background of ISDN– ISDN architecture -TCP/IP basics – Use of IP address – TCP/IP examples – IP datagrams –Communication using TCP/IP — routers - TCP basics – features of TCP – relation between TCP & IP – ports and sockets – Connection.

UNIT IV:

Web Applications Domain name system (DNS) – DNS Name space – Electronic mail – Mail box – sending and receiving an email – email anatomy – POP – SMTP server – complete journey of an email message – browser based emails – file transfer using FTP — Data transfer connection – TELNET Introduction and brief history of WWW – basics of WWW– remote login.

Recommended Books:

1 Data Communication and Networking by Godbole TMH
2 Computer Networks by Andrew S. Tanenbaum 4th Ed. PHI.
3 Data and Computer Communications: William Stallings 7 th edition. PHI.
4 Data Communication and Networking: BehrouzForouzan 3rd edition.TMH.
5 Computer Communications and Network Technologies by Michael A.Gallo& William Hancock Thomson.

MINOR PROJECT

Course Objectives:

1. To enable students learn by doing.
2. To develop capability to analyse and solve real world problems
3. To develop innovative ideas among the students

Course Outcomes: Students should be able to do the following:

1. To provide innovative solutions
2. To work in a team
3. To manage time and resources in the best possible manner

Students are required to choose a topic for minor project related to the courses of this semester. Student has to implement and present the project as per the given schedule. During the implementation of the project, student has to follow the schedule given below. Report of the project work has to be submitted for evaluation.

Schedule:

S.No	Description	Duration
1.	Problem Identification / Selection	4 weeks
2.	Preparation of Abstract	1 week
3.	Design, Implementation & Testing of the Project	5 weeks
4.	Documentation & Project Presentation	2 weeks

Guidelines for the Award of marks:

S.No.	Description	CIE Max. Marks 60	SEE Max. Marks 40
1.	Weekly Assessment	20	--
2.	Design/ Implementation	20	10
3.	Presentation	10	10
4.	Viva Voce	10	10
5.	Report	-	10

Final Minor Project demonstration and PPT presentation is to be evaluated for the entire class together by the entire faculty handling Minor project for that class.

MAJOR PROJECT

Course Objectives:

1. To impart team building and management skills among students.
2. To instill writing and presentation skills for completing the project.
3. Plan, Analyse, Design and implement a project.

Course Outcomes: Students should be able to do the following:

1. Find the solution of identified problem with the help of modern Technology and give priority to real time scenarios.
2. Plan to work as a team and to focus on getting a working project done and submit a report within a stipulated period of time.
3. Prepare and submit the Report and deliver presentation before the departmental Committee.

Students are required to choose a topic for major project related to the courses of this semester. Student has to implement and present the project as per the given schedule. During the implementation of the project, student has to follow the schedule given below. Report of the project work has to be submitted for evaluation.

Schedule:

S.No	Description	Duration
1.	Problem Identification / Selection	5 weeks
2.	Preparation of Abstract	2 week
3.	Design, Implementation & Testing of the Project	12 weeks
4.	Documentation & Project Presentation	5 weeks

Guidelines for the Award of marks:

S.No	Description	CIE Max. Marks 120	SEE Max. Marks 80
1.	Weekly Assessment	30	--
2.	Design/ Implementation	50	20
3.	Presentation	20	20
4.	Viva Voce	20	20
5.	Report	-	20

Final Major Project demonstration and PPT presentation is to be evaluated for the entire class together by the entire faculty handling Major Project for that class.