ACADEMIC REGULATIONS & SYLLABUS

First Year B. Tech. (Bachelor of Technology)

Programme (CE/IT/CSE/AI&ML)

Faculty of Technology & Engineering

Chandubhai S. Patel Institute of Technology

Devang Patel Institute of Advance Technology & Research

Charotar University of Science and Technology (CHARUSAT)
CHARUSAT Campus, Off. Nadiad-Petlad Highway, Changa 388 421, Anand,
Gujarat, INDIA Telephone: 02697-265011 & 02697-265021, Email:
info@charusat.ac.in
www.charusat.ac.in

Table of Contents

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

Faculty of Technology and Engineering

Academic Regulations

Bachelor of Technology (CE/IT/CSE/AI&ML) Programme

FACULTY OF TECHNOLOGY AND ENGINEERING
ACADEMIC REGULATIONS

Bachelor of Technology Programmes

To ensure uniform system of education, duration of undergraduate and post graduate programmes, eligibility criteria for and mode of admission, credit load requirement and its distribution between course and system of examination and other related aspects, following academic rules and regulations are recommended.

1) System of Education

   Choice based Credit System (CBCS) with Semester pattern of education shall be followed across The Charotar University of Science and Technology (CHARUSAT) both at Undergraduate and Master levels. Each semester will be at least 90 working day duration. Apart from the programme core courses, provision for choosing University level electives and Programme & Institutional level electives are available under the CBCS.

2) Duration of Programme

   i)   Undergraduate programme   (B.Tech.)

          Minimum   8 semesters (4 academic years)

          Maximum   16 semesters (8 academic years)

3) Eligibility for admissions

   As enacted by Govt. of Gujarat from time to time.

4) Mode of admissions

   As enacted by Govt. of Gujarat from time to time.

5) Programme Structure and Credits

    As per annexure – 1 attached

6) Attendance

   6.1. All activities prescribed under these regulations and listed by the course faculty members in their respective course outlines are compulsory for all students pursuing the courses. No exemption will be given to any student from attendance except on

account of serious personal illness or accident or family calamity that may genuinely prevent a student from attending a particular session or a few sessions. However, such unexpected absence from classes and other activities will be required to be condoned by the Dean/Principal.

6.2. Student attendance in a course should be 80%.

7) Course Evaluation

7.1. The performance of every student in each course will be evaluated as follows:

7.1.1   Internal evaluation by the course faculty member(s) based on continuous assessment. The continuous assessment will be conducted by the respective department /institute.

7.1.2   Final end-semester examination by the University through written paper, practical test, oral test, presentation by the student or a combination of these.

7.1.3   The weightages of continuous assessment and end-semester university examination in overall assessment shall depend on individual course as approved by Academic Council through Board of Studies.

7.1.4   The performance of candidate in continuous assessment and in end-semester examination together (if applicable) shall be considered for deciding the final grade in a course.

7.1.5   In order to earn the credit in a course a student has to obtain grade other than FF.

7.2. Performance in continuous assessment and end-semester University Examination

7.2.1   Minimum performance with respect to continuous assessment as well as end-semester university examination will be an important consideration for passing a course. Details of minimum percentage of marks to be obtained in the examinations are as follows.

Minimum percentage marks to be obtained in end-semester University Examination (for applicable course)	Minimum Overall percentage marks to be obtained in each course.
40%	45%

7.2.2 If a candidate obtains minimum required percentage of marks in end-semester university examination in applicable course but fails to obtain minimum required overall percentage of marks, he/she has to repeat the examination till the minimum required overall percentage of marks are obtained.

8) Grade Point System

1. The total of the internal evaluation marks and end semester examination marks in each course will be converted to a letter grade on a ten-point scale as per the following scheme:

Table 1 Grade Point System (UG)

Range of Marks (%)	≥80	<80 ≥73	<73 ≥66	<66 ≥60	<60 ≥55	<55 ≥50	<50 ≥45	<45
Grade	AA	AB	BB	BC	CC	CD	DD	FF
Grade Point	10	9	8	7	6	5	4	0

2. The student's performance in any semester will be assessed by the Semester Grade Point Average (SGPA). Similarly, his/her performance at the end of two or more consecutive semesters will be denoted by the Cumulative Grade Point Average (CGPA). The SGPA and CGPA are calculated as follows:

(i) SGPA = $\Sigma C_i G_i / \Sigma C_i$ where C_i is the number of credits of course i

G_i is the Grade Point for the course i

and i = 1 to n, n = number of courses in the semester

(ii) CGPA = $\Sigma C_i G_i / \Sigma C_i$ where C_i is the number of credits of course i

G_i is the Grade Point for the course i

and i = 1 to n, n = number of courses of all semesters up to which CGPA is computed.

9) Award of Class

   ❖ The class awarded to a student in the programme is decided by the final CGPA as per the following scheme:

Award of Class	CGPA Range
First Class with Distinction	CGPA ≥ 7.5 & ≤ 10.0
First class	CGPA ≥ 6.0 & < 7.5
Second Class	CGPA ≥ 5.0 & < 6.0
Pass Class	CGPA < 5.0

10) Detention Criteria

   ❖ A student will be promoted to next year only if he/she has cleared all the courses of the year he/she is studying in.

   Link: https://charusat.ac.in/ ⇒ Student's Corner ⇒ Detention Rules

11) Transcript

   ❖ A transcript issued to the student at the time of leaving the university will contain a consolidated record of all the courses taken by him / her, grades obtained and the final CGPA.

   Link: https://charusat.ac.in/ ⇒ Student's Corner ⇒ Transcript

CHOICE BASED CREDIT SYSTEM

Bachelor of Technology (CE/IT/CSE/AI&ML) Programme

Choice Based Credit System

With the aim of incorporating the various guidelines initiated by the University Grants Commission (UGC) to bring equality, efficiency and excellence in the Higher Education System, Choice Based Credit System (CBCS) has been adopted. CBCS offers wide range of choices to students in all semesters to choose the courses based on their aptitude and career objectives. It accelerates the teaching-learning process and provides flexibility to students to opt for the courses of their choice and / or undergo additional courses to strengthen their Knowledge, Skills and Attitude.

1. CBCS – Conceptual Definitions / Key Terms (Terminologies)

   Types of Courses: The Programme Structure consist of 4 types of courses: Foundation courses, Core courses, Elective courses and Non-credit (audit) courses.

   1.1 Foundation Course

   These courses are offered by the institute in order to prepare students for studying courses to be offered at higher levels.

   1.2 Core Courses

   A Course which shall compulsorily be studied by a candidate to complete the requirements of a degree / diploma in a said programme of study is defined as a core course. Following core courses are incorporated in CBCS structure:

   A. University Core courses(UC):

   University core courses are compulsory courses which are offered across university and must be completed in order to meet the requirements of programme. Environmental science will be a compulsory University core for all Undergraduate Programmes.

   B. Programme Core courses(PC):

   Programme core courses are compulsory courses offered by respective programme owners, which must be completed in order to meet the requirements of programme.

1.3 Elective Courses

Generally, a course which can be chosen from a pool of courses and which may be very specific or specialised or advanced or supportive to the discipline of study or which provides an extended scope or which enables an exposure to some other discipline / domain or nurtures the candidates proficiency / skill is called an elective course. Following elective courses are incorporated in CBCS structure:

A. University Elective Courses(UE):

The pool of elective courses offered across all faculties / programmes. As a general guideline, Programme should incorporate 2 University Electives of 2 credits each (total 4 credits).

B. Institute Elective Course (IE)

Institute elective courses are those courses which any students of the University/Institute of a Particular Level (PG/UG) will choose as offered or decided by the University/Institute from time-to-time irrespective of their Programme /Specialisation.

C. Programme Elective Courses(PE):

The programme specific pool of elective courses offered by respective programme.

D. Cluster Elective Course (CE):

An 'Elective Course' is a course which students can choose from the given set of functional course/ Area or Streams of Specialization options (eg. Common Courses to EC/CE/IT/EE) as offered or decided by the Institute from time-to-time.

1.4 Non Credit Course (NC) - AUDIT Course

A 'Non Credit Course' is a course where students will receive Participation or Course Completion certificate. This will be reflected in Student's Grade Sheet but the grade of the course will not be considered to calculate SGPA and CGPA. Attendance and Course Assessment is compulsory for Non Credit Courses.

1.5 Medium of Instruction

The Medium of Instruction will be English.

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY AND ENGINEERING

Teaching & Examination Scheme of B.Tech. Programme (CE/IT/CSE/AI&ML))

First Year Semester-1

| Sr. No. | Course Code | Course Title | Teaching Scheme | | | | | | | | Examination Scheme | | | | Total |
| | | | Contact Hours/ Week | | | | Credit | | | | Theory | | Practical/Project | | |
			Theory	Practical	Tutorial	Total	Theory	Practical	Tutorial	Total	Internal	External	Internal	External	
1	MA143	Engineering Mathematics-I	4	-	1	5	4	-	-	4	30	70	-	-	100
2	CE143	Computer Concepts & Programming	3	4	-	7	3	2	-	5	30	70	50	50	200
3	EE145	Basics of Electronics & Electrical Engineering	3	2	-	5	3	1	-	4	30	70	25	25	150
4	IT144	ICT Workshop	-	2	-	2	-	1	-	1	-	-	25	25	50
5	PY142	Engineering Physics - I	-	2	-	2	-	2	-	2	-	-	50	50	100
6	FS101.01A	Foundation Course on Mathematics and Physics (Audit Course)	-	2	-	2	-	-	-	-	-	-	-	-	-
7	HS101.02 A	Communicative English	-	2	-	2	-	2	-	2	-	-	30	70	100
8		Assignment Practices/Student Counseling/Remedial Classes/Extra Classes/Library Reading/Sports Activity	-	-	-	8	-	-	-	-	-	-	-	-	-
		Total:				33				18					700

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY
FACULTY OF TECHNOLOGY AND ENGINEERING

Teaching & Examination Scheme of B.Tech. Programme (CE/IT/CSE/AI&ML)

First Year Semester-2

Sr. No.	Course Code	Course Title	Teaching Scheme								Examination Scheme				Total
			Contact Hours/ Week				Credit				Theory		Practical/Project		
			Theory	Practical	Tutorial	Total	Theory	Practical	Tutorial	Total	Internal	External	Internal	External	
1	MA144	Engineering Mathematics-II	4	0	1	5	4	-	-	4	30	70	-	-	100
2	CE144	Object Oriented Programming with C++	3	4	-	7	3	2	-	5	30	70	50	50	200
3	ME145	Elements of Engineering	3	2	1	6	3	1	-	4	30	70	25	25	150
4	CL144.02A	Environmental Sciences	-	2	-	2	-	2	-	2	-	-	30	70	100
5	PY143	Engineering Physics - II	-	2	-	2	-	2	-	2	-	-	50	50	100
6	CSE101 / CE145 / IT146	Digital Electronics	2	2	-	4	2	1	-	3	30	70	25	25	150
7	HS201.02A to HS210.02A	A course on Liberal Arts (HS Elective)	-	2	-	2	-	2	-	2	-	-	30	70	100
9		Assignment Practices/Student Counseling/Remedial Classes/Extra Classes/Library Reading/Sports Activity	-	-	-	8	-	-	-		-	-	-	-	-
		Total:				36				22					900

SYLLABI (SEMESTER-1)

FACULTY OF APPLIED SCIENCES
DEPARTMENT OF MATHEMATICAL SCIENCES
MA143 Engineering Mathematics-I

Credits and Hours:

Teaching Scheme	Theory	Tutorial	Total	Credit
Hours/week	4	1	5	4
Marks	100	-	100	

A. Outline of the course:

Sr No.	Title of the unit	Number of hours
1	Higher order derivatives and applications	16
2	Complex numbers and Roots of polynomial Equations	14
3	Matrix Algebra- I	12
4	Partial differentiations	08
5	Applications of Partial differentiations	10
	Total Hours (Theory)	60

Theory Hours: 60

Practical Hours: 00

Total Hours: 60

B. Detailed Syllabus:

1	**Higher order derivatives and applications:**	16 Hours	27%

1.1 Set theory and Function

1.2 Limit, Continuity, Differentiability for function of single variable and its uses. Mean Value Theorem, Local Maxima and Minima

1.3	Successive differentiation: n^{th} derivative of elementary functions: rational, logarithmic, trigonometric, exponential and hyperbolic etc.		
1.4	Leibnitz rule for the nth order derivatives of product of two functions		
1.5	Tests of convergence of series viz., comparison test, ratio test, root test, Leibnitz test. Power seriesexpansion of a function: Maclaurin's and Taylor's series expansion.		
1.6	L'Hospital's rule and related applications, Indeterminate forms		
2	**Complex numbers and Roots of polynomial Equations:**	**14 Hours**	**23%**
2.1	Complex numbers and their geometric representation		
2.2	Complex numbers in polar and exponential forms		
2.3	De Moivre's theorem and its applications		
2.4	Exponential, Logarithmic, Trigonometric and hyperbolic functions.		
2.5	Statement of fundamental theorem of Algebra, Analytical solution of cubic equation by Cardan's method		
2.6	Analytic solution of Biquadratic equations by Ferrari's method with their applications.		
3.	**Matrix Algebra- I:**	**12 Hours**	**20%**
3.1	Definition of Matrix, types of matrices and their properties		
3.2	Determinant and their properties		
3.3	Rank and nullity of a matrix		
3.4	Determination of rank		
3.5	The inverse of a matrix by Gauss Jordan method.		
3.6	Solution of a system of linear equations by Gauss elimination and Gauss Jordan Methods.		
4.	**Partial differentiations:**	**08 Hours**	**13%**
4.1	Partial derivative and geometrical interpretation		
4.2	Euler's theorem with corollaries and their applications		
4.3	Chain rule		
4.4	Implicit functions		
4.5	Total differentials		

5. Applications of Partial differentiations: 10 Hours   10%

5.1 Maclaurin's and Taylor's series expansion in two variables

5.2 Tangent plane and normal line to a surface

5.3 Maxima and Minima

5.4 Langrage's method of multiplier

5.5 Jacobian

5.6 Errors and approximations

C. Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.

- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.

- Attendance is compulsory in lectures/tutorials which carries a 5% component of the overall evaluation.

- Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation.

- Quiz (surprise test) /Oral tests/ Viva/Assignment/Tutorials will be conducted which carries 10% component of the overall evaluation.

Course Outcomes (COs):

At the end of the course, the students will be able to

CO1	develop skill of successive differentiation, utilize appropriate theory and computational techniques to construct Taylor's series with its interval of convergence for using in a variety of applications such as approximating values, creating series representation and behaviour of a functions, use L'Hospital's rule to compute limits of the indeterminate forms.
CO2	perform basic mathematical operations with complex numbers in Cartesian and polar forms, know methods of finding the nth roots of a complex number and solutions of simple polynomial equations, work with functions of complex variable.
CO3	find determinant and inverse of a square matrix, evaluate rank and nullity of a matrix, solve system of linear equations by using concept of matrices which are useful in various fields of engineering.

	CO4	evaluate partial derivatives including higher order derivatives, solve problems using the chain rules, Euler's theorem with corollaries, implicit function and total differentials.
	CO5	expand any function of two variables in ascending power of variables, solve problems using the techniques of multivariable calculus in various branches of engineering.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	2	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	1	-	-	-	-	-	-	-	-	-
CO5	3	2	1	1	1	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Materials:

❖ **Text Books:**

1. Erwin Kreyszig; Advanced Engineering Mathematics, 8th Ed., Jhon Wiley & Sons, India, 1999.

2. H. K. Dass and RajnishVerma; Higher Engineering Mathematics, S Chand & Co Pvt Ltd. 2012.

3. B. S. Grewal; Higher Engineering Mathematics, Khanna Publ., Delhi, 2012

❖ **Reference Books:**

1. M. D. Weir *et al.*; Thomas' Calculus, 11th Ed., PearsonEducation, 2008.

2. James Stewart; Calculus Early Transcendental, 5th Ed., Thomson India, 2007

3. C. R. Wylie and L. C. Barrett; Advanced Engineering Mathematics. 1982., McGraw-Hill Book Company.

4. Michael D. Greenberg; Advanced Engineering Mathematics. Prentice-Hall, 1988.

❖ Web Materials:

1. https://ocw.mit.edu/ans7870/resources/Strang/Edited/Calculus/Calculus.pdf

2. http://nptel.ac.in/courses/111107108/

3. http://nptel.ac.in/courses/122101003/

4. http://nptel.ac.in/courses/111104085/

FACULTY OF TECHNOLOGY & ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING
CE143 Computer Concepts and Programming

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	3	4	-	7	**5**
Marks	100	100	-	200	

A. Outline of the Course:

Sr. No.	Title of the unit	Minimum number of hours
1.	Introduction to 'C' Language.	02
2.	Constants, Variables & Data Types in 'C'	03
3.	Operators and Expression in 'C'	03
4.	Managing Input & Output Operations	01
5.	Conditional Statements & Branching	03
6	Looping	03
7	Arrays	04
8	Character Arrays and Strings	05
9	User-Defined Function in 'C'	05
10	Structures and Unions	03
11	Pointers	06
12	File Management in 'C'	05
13	Dynamic Memory Allocation	02
	Total Hours (Theory)	45

Theory Hours: 45

Practical Hours: 60

Total Hours: 105

B. Detailed Syllabus:

1 Introduction to 'C' language.   02 Hours   05%

Program, Software, Instruction, debugging, compilation and execution of C Program, Difference between Header files & library files, Compiler and Interpreter, Procedure Oriented Language, Importance of C, Basic structure of C, Algorithms & Flowchart.

2 Constants, Variables & Data Types in 'C'   03 Hours   06%

Character set, C tokens, Keywords & Identifiers , Data types , Constants, Variables, Declaration of Variables, Assigning Values to Variables, Declaring a variable as Constant, Defining Symbolic constants.

3 Operators and Expression in 'C'   03 Hours   06%

Classification of operators: Arithmetic, Relational, Logical, Assignment, Increment / Decrement, Conditional, Bitwise, Special Operators. Unary, Binary and Ternary Operators. Arithmetic expression, Evaluation, Type conversion: Implicit &Explicit, Precedence and Associativity, Various library functions from maths.h.

4 Managing Input & Output Operations   01 Hours   02%

Reading a Character, Writing a Character, Various library functions from ctype.h. Formatted Input, Formatted Output

5 Decision Making & Branching   03 Hours   06%

Decision making using simple if, if...else statement, nesting of if...else, else...if Ladder. Switch statements, conditional operator, goto statement.

6 Looping   03 Hours   08%

Need of looping, (pre-test) entry-controlled loop: while, for, (post-test) exit-controlled loop: do...while, difference between Counter- Controlled loops and Sentinel - controlled loops. Nesting of looping statements, use of break & continue, use of if...else in loop, infinite loop.

7 Arrays   04 Hours   08%

Need of array, Declaration & Initialization of 1D array, Programs of 1D. 2D array, Memory allocation of 1D and 2D array, 2D array basic programs.

8	**Character Arrays and Strings**	05 Hours	10%

Difference of character array with numeric array and importance of NULL character. Declaration, Initialization and various input and output methods of string, formatted output of string, arithmetic operations on characters. Various functions of string.h: strlen, strcat, strcmp, strcpy, strrev, strstr, etc. Two dimensional character array (table of strings).

9	**User-Defined Function in 'C'**	05 Hours	14%

Need of modularization, advantages, Introduction to user-defined function, Function Prototype, Function Call, Function Body. Call by value, Actual &Formal Arguments, return value, Categories of functions, Nesting of Functions, Recursion. Array as Function arguments, Storage Classes: Scope, Life of a variable in 'C'.

10	**Structures and Union**	03 Hours	08%

Need of user-defined data type, Structure definition, Declaration and Initialization of variables, Array as member, Array of structure variables. Structure within structure, Structure as function arguments, Union.

11	**Pointers**	06 Hours	14%

Introduction to pointer, declaration & initialization, access value using pointer, indirection (*) operator. Pointers in expressions, scale factor, 1D-array and pointer, pointer with strings, Array of pointers. Pointer as arguments in function, Call by address, Functions returning pointers, Pointers and structures, Chain of Pointers.

12	**File Management in 'C'**	05 Hours	8%

Introduction, Defining and Opening a file, closing a file, modes of file, read & write single character and integer to file, use of fprintf and fscanf functions. Error handling functions, random

access of files using ftell, rewind, fseek, command line argument.

13   Dynamic Memory Allocation   02 Hours   05%

Introduction, memory allocation process. Use of functions:

malloc ( ), calloc ( ), realloc ( ) and free ( ).

Course Outcome (COs):

At the end of the course, the students will be able to

CO1	Demonstrate problem solving skills by developing algorithms and drawing flowcharts to solve simple problems, Understand the process of compiling and executing a C program and recognize various C tokens and datatypes.
CO2	Understanding various programming constructs and applying it for the problems given in hand.
CO3	Demonstrate the use of various data structures like array, file and structure.
CO4	Applying the concepts of top-down modular programing to decompose problem and a program solution into smaller pieces and Analyse how length of the source program can be reduced by using functions.
CO5	Evaluate how pointers are effective in handling arrays, functions and data tables and how pointers support Dynamic memory management.
CO6	Develop C Programs using various methods described above to solve real-world problems.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	-	-	-	-	1	2	2	1	1	2	-
CO2	3	3	2	-	-	-	-	-	1	-	-	2	3	-
CO3	3	2	2	-	-	-	-	-	1	-	-	2	3	-
CO4	3	3	3	-	-	-	-	-	2	-	-	3	3	-
CO5	3	3	3	-	-	-	-	-	2	-	-	3	3	-
CO6	3	3	3	-	-	-	-	-	2	-	1	3	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Materials:

- ❖ **Text book:**
    1. Programming in ANSI C, 8th Edition by E Balagurusamy, MGrawHill
    2. Let us C, 16th Edition by Yashwant Kanetkar, BPB Publication
    3. Programming in C , 2nd Edition by Pradeep Dey & Manas Ghosh

- ❖ **Reference book:**
    1. Head First C by David Griffiths & Dawn Griffiths.
    2. C How to program, 7/E by Deitel&Deitel, Prentice Hall
    3. C: The Complete Reference by Herbert Schildt
    4. Practical C Programming (Third Edition) by Steve Oualline

- ❖ **Web material:**
    1. www.tutorials4u.com/c/
    2. www.cprogramming.com/tutorial.html
    3. www.howstuffworks.com/c.htm
    4. http://www.programmingtutorials.com/c.aspx
    5. http://www.physics.drexel.edu/courses/Comp_Phys/General/C_basics/

- ❖ **Software:**
    1. Code::Blocks
    2. Turbo C

FACULTY OF TECHNOLOGY & ENGINEERING
M & V PATEL DEPARTMENT OF ELECTRICAL ENGINEERING
EE145 Basics of Electronics & Electrical Engineering

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	3	2	0	5	4
Marks	100	50	0	150	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	Basic Electrical Terms and Units	04
2	Electrical Circuit Analysis	07
3	Electrostatic	08
4	Electromagnetism	05
5	AC Fundamentals	05
6	Single Phase AC Series Circuits	05
7	Polyphase Circuits	04
8	Basics of Electronics	07
	Total Hours (Theory)	45

Theory Hours: 45

Practical Hours: 30

Total Hours: 75

B. Detailed Syllabus

1.	Basic Electrical Terms and Units	04 Hours	08%

1.1   Ohm's law, resistor and its coding, properties, temperature co-efficient of resistance, resistance variation with temperature, examples

2.	**Electrical Circuit Analysis**	**07 Hours**	**15%**

2.1 Kirchhoff's current and voltage law, mesh and nodal analysis, Examples

2.2 Series parallel circuits, star-delta transformation

3.	**Electrostatic**	**08 Hours**	**18%**

3.1 Capacitors, charge and voltage, capacitance, electric fields, electric field strength and electric flux density, relative permittivity, dielectric strength, Examples

3.2 Capacitors in parallel and series, Calculation of capacitance of parallel plate and multi plate capacitor, examples

4.	**Electromagnetism**	**05 Hours**	**12%**

4.1 Magnetic field, its direction and characteristics, magnetic flux and flux density, magneto motive force and magnetic field strength, examples

4.2 Faraday's law of electromagnetic induction, Fleming's left hand and right hand rule, Lenz law, force on a current carrying conductor, examples

4.3 Self and mutual inductance

5.	**AC Fundamentals**	**05 Hours**	**12%**

5.1 AC Waveform and definition of its terms, relation between speed and frequency

5.2 Average and RMS value and its determination for sinusoidal wave shapes, examples

6.	**Single Phase AC Series Circuits**	**05 Hours**	**12%**

6.1 R–L and R-C series circuit, power in ac circuits, examples

6.2 R-L-C series circuit, resonance in R-L-C series circuit, relevant examples

7.	**Polyphase Circuits**	**04 Hours**	**08%**

7.1 Phase sequence, voltage and current relations in star and delta connected system

8.	**Basics of Electronics**	**07 Hours**	**15%**

8.1 Electronic Systems: Basic amplifier, voltage, current and

power gain, Basic attenuators, CRO

8.2   Transmission and Signals: Analog and digital signals,
        bandwidth,

8.3   Forward and reverse bias of PN junction diode, Zener diode

8.4   Rectifiers: Half Wave, Full Wave - Centre Tap, Bridge

8.5   Transistor: Bipolar junction transistor, construction and
        biasing, configuration

C. Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, pre-requisite of the subject will be discussed.

- Lectures will be conducted with the aid of multi-media projector, blackboard, OHP etc.

- Attendance is compulsory in lectures and laboratory which carries 5 Marks weightage.

- Two internal exams will be conducted and average of the same will be converted to equivalent of 15 Marks as a part of internal theory evaluation.

- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5Marks as a part of internal theory evaluation.

- Surprise tests/Quizzes/Seminar will be conducted which carries 5 Marks as a part of internal theory evaluation.

- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.

- Experiments/Tutorials related to course content will be carried out in the laboratory.

Course Outcomes (COs):

On the completion of the course, one should be able to:

CO1	Describe resistors, capacitors and inductors properties, readings and calculation.
CO2	State the basic electrical laws and apply these laws to solve electrical network.
CO3	Identify the property of magnetic materials and understand the laws of emf generation.
CO4	Solve the series and parallel DC circuits and AC circuits for single and poly-phase networks.
CO5	Develop skill and design AC-DC rectification circuits, operate basic electrical and electronics instruments.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO2	2	3	-	-	-	-	-	-	-	-	-	-	1	-
CO3	1	3	-	-	-	-	-	-	-	-	-	-	1	-
CO4	1	2	-	2	-	-	-	-	-	-	-	-	3	-
CO5	1	2	3	-	3	-	-	-	-	-	-	-	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation: "-"

Recommended Study Material:

❖ Text Books:

1. Elements of Electrical Engineering and Electronics by U.A.Patel and R. P. Ajwalia
2. A Text Book of Electrical Technology by B. L. Thareja, S. Chand
3. Principles of Electrical Engineering and Electronics by V. K. Mehta, S. Chand

❖ Reference Books:

1. Electrical Technology by Hughes, Pearson Education.
2. Electrical Engineering Fundamentals by Vincent Del Toro, Pearson Education.

❖ Web Material

1. https://www.electronics-tutorials.ws/

FACULTY OF TECHNOLOGY & ENGINEERING
SMT. KUNDANBEN DINSHA PATEL DEPARTMENT OF INFORMATION TECHNOLOGY
IT144 ICT Workshop

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	0	2	0	2	1
Marks	0	50	0	50	

A. Outline of the course

Sr. No.	Title of the unit	Minimum number of hours
1	Introduction to computer hardware	2
2	PC troubleshooting	2
3	Display unit, Keyboard, Mouse, and TouchPad, Printer	2
4	Power supply & Storage Devices, Assembling the	4
5	Installation of various Operating Systems, DOS Commands	4
6	LINUX commands and scripting	6
7	Professional Document writing using Word Processing	6
8	Batch File Commands & Programming in Windows	4
	Total Hours (Theory)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

The following contents will be delivered to the students during laboratory sessions.

1. **Introduction to computer hardware**   02 Hours   07%

   Definition of computer, Computer hardware, software and

   firmware, history of computer, classification of computer, basic

   parts of digital computer

2. **PC troubleshooting**   02 Hours   07%

Hardware troubleshooting and repairing, Software troubleshooting and repairing

3. **Display unit**   02 Hours   07%

Types of monitors: CRT, LCD, LED, Plasma, OLED, Faults of monitor, Display card

Keyboard, Mouse and Touch Pad (Track Pad)

Types of keyboards: Wired and Wireless

Wired: Din type, PS/2, USB, Wireless: Bluetooth, Infrared(IR), RF

Types of mouse: Wired and Wireless

Wired: Serial port, PS/2, USB, Wireless: Bluetooth, Infrared(IR), RF Types of Track pad and Touch pad

Printer

General features of printer, Classification of printer, Impact printer: Dot matrix, Line printer, Non-impact: Thermal

4. **Power supply & Storage Devices**   04 Hours   13%

SMPS: Working, output connectors, UPS, Stabilizer Types of Memory: Primary storage: Registers, Cache, RAM Other Storage Devices: Floppy, Hard Disk, CD, DVD, Flash

Motherboard

Types of motherboards, Functional block diagram of motherboard, CPU and supporting chips, the introduction of CPU architectures, BIOS, CMOS setup, Faults of the motherboard

Assembling the computer system

Study of the configuration of a computer system, introduction of computer assembling, Different types of cables, Assembling and Disassembling

5. **Installation of various Operating Systems**   04 Hours   13%

Different types of Operating System, Installation of OS on a single machine (Dual Boot)

DOS Commands:

Internal Commands: CLS, DATE, VER, VOL, DIR, COPY CON, TYPE, MKDIR, CHDIR (CD), RMDIR, RENAME, DEL, MOVE,

COPY, PROMPT, DOSKEY, PATH<u>External Commands:</u> ATTRIB, FORMAT, CHKDSK, SCANDISK, TREE, XCOPY. Use of commands with Wild Card Characters: ? (Question Mark) and ***** (Asterisk)

6.	**LINUX Commands and scripting**	06 Hours	20%

Introduction to basics of Linux OS and its variants, what is shell, Commands: clear, man, who, date, who am i, cal, echo, ls, mkdir, cd, cd.., rmdir, pwd, cat, rm, cp, mv, chmod, umask, grep, ps
Prepare scripts using control structures and loops for various actions to perform.

7.	**Professional Document writing using Word Processing Tool**	06 Hours	20%

Microsoft Word: Basic menu introduction, Page layout Margin-Header Footer, Page break, Insert symbols and Equations, Mail Merge, Preparation of Index, Automatic Index generation, Two columns research paper format-Footnote-Cross reference.

Data Processing using Spread Sheet

Microsoft Excel: Cell Address, Row, Column, Header and Footer, Fill handle and drag-&-drop, Format cells, Conditional formatting, Formulas and Functions, Validation, Chart with various options, Filter, Sort.

Creating Dynamic and Informative Slide Show using Presentation Software Microsoft PowerPoint: Slide layout, Slide design (Proper selection based on audience), Header and Footer in slides, Slide transition, Slide Master, Insert Picture-Smart Art, Insert animations to different objects, Hide Slide, Rehearse Timings, Record slide show. How to prepare professional presentation

8.	**Batch File Commands & Programming in Windows**	04 Hours	13%

Batch file commands: CLS, %1, ECHO, SET, CALL, :LABEL, EXIT, GOTO, IF, FOR, REM, etc.
Create batch files for various purposes and execute it, study of AUTOEXEC.BAT file

C. Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Laboratories will be conducted with the aid of multi-media projector, white board, computers, OHP etc.
- Attendance is compulsory in laboratory. This, including assignments/tests/quizzes carries 10 marks in overall evaluation.

Course Outcome (COs):

At the end of the course, the students will be able to

CO1	A student will be having the basic knowledge of computer architecture, peripherals and all the hardware and software basics.
CO2	A student will be able to understand hardware requirement for operating system and able to install it on a machine.
CO3	Analyze and generate the different parsing techniques.
CO4	A student will become familiar with command line interface of Windows and Linux.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO 2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	1	-	-	-	1	-	-	-	-	-	-	2	-
CO3	3	2	2	-	2	-	-	-	-	-	-	-	3	1
CO4	3	-	-	-	1	1	-	-	-	-	-	-	2	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

- ❖ Reference book:
  1. The Complete PC Upgrade and Maintenance Guide, 16th Edition, Mark Minasi, Quentin Docter, Faithe Wempen, SYBEX publication
  2. IBMPC And Clones Govindarajulu, Tata McGraw Hill

❖ Web Materials:

3. http://www.technologystudent.com/elec1/resist1.htm

4. http://www.electronics-tutorials.ws/capacitor/cap_1.html

5. http://en.wikipedia.org/wiki/Inductor

6. http://www.radio-electronics.com/info/formulae/inductance/inductor-inductive-reactance- formulae-calculations.php

7. http://alternatezone.com/electronics/files/PCBDesignTutorialRevA.pdf

8. http://www.scribd.com/doc/39508404/CRO-Manual

9. http://www.computerhope.com/issues/ch001676.html

Credit and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of the Course:

Sr. No.	Title of the Unit	Minimum number of Hours
1	Mechanics Lab	16
2	Thermodynamics Lab	14
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1.	**Mechanics**	16 hours	55%

1.1 **Uncertainties in Measurements:** Sources and estimation of errors, accuracy and precision, systematic error, random error, Significant figure and round off, error propagation

1.2 **Laws of Motion:** Frames of reference. Newton's Laws of motion, Dynamics of a system of particles, Centre of Mass, Projectile motion

1.3 **Collisions:** Elastic and inelastic collisions between particles

1.4 **Momentum and Energy:** Conservation of momentum, Work and energy, Conservation of energy. Motion of rockets

1.5 **Rotational Motion:** Angular velocity and angular momentum. Torque. Conservation of angular momentum

1.6 **Elasticity:** Hooke's law - Simple Stress and Strain: Introduction, Normal and Shear stresses, Stress- Strain Diagrams for ductile and brittle material, Elastic Constants

No. of Experiment

1. Understanding Errors and Uncertainties in the measurements
2. Conservation of Energy, Hook's law
3. Young modulus and elasticity
4. To determine g by Bar Pendulum and Kater's Pendulum.

| 2. | Thermodynamics: | 14 hours | 45% |

2.1 Zeroth Law of thermodynamics and temperature

2.2 First law, second, third law and internal energy, conversion of heat into work

2.3 Various Thermo dynamical Processes, Enthalpy, Gibbs, Helmholtz and Internal Energy functions,

2.4 Transport Phenomena: Viscosity, Conduction and Diffusion

2.5 Applications to specific heat of gases and metals

2.6 Blackbody radiation, Spectral distribution, Derivation of Planck's law

No. of Experiment

1. Specific Heat of Metals
2. Thermal conductivity of materials by Searl's apparatus
3. Heat Transfer and Newton's Law of Cooling
4. Radiation from a black body: Stefan-Boltzmann Law

C. Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Section wise Online Quiz will be taken.
- Lab manual: Student will be required to read the lab material prior to the start of class. A way to ensure this is by lab quizzes and assignments.

- Lab Reports: Student has to write lab reports and submit them hardcopy/electronically. The purpose of this exercise is both to demonstrate your work in lab and to guide you to think a bit more deeply about what you are doing. The act of technical writing also helps improve your communication skills, which are broadly relevant far beyond the physics lab

Course Outcome (COs):

At the end of the course, the students will be able to

CO1	Students will be able to apply and demonstrate the concepts of mechanics to practical engineering problems.
CO2	Understand the basic concepts of thermodynamics such as internal energy, thermodynamic properties, transport phenomena, blackbody radiation.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	1	1	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ Text Books:
1. Physics for Scientists and Engineers by Randall D. Knight, 4th Edition, Pearson
2. University Physics by Hugh D. Young, Roger A. Freedman and A. Lewis Ford, 13th Edition, Pearson
3. Physics by John D. Cutnell& Kenneth W. Johnson, 8th Edition, John Wiley & Sons, Inc.

❖ Reference Books:
1. An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.
2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

3. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.

4. Physics for scientists and Engineers with Modern Phys., J.W. Jewett, R.A. Serway, 2010, Cengage Learning

5. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.

6. Concepts in Thermal Physics, S.J. Blundell and K.M. Blundell, 2nd Ed., 2012, Oxford University Press

❖ **Web Materials:**

1. Uncertainty and error in measurement - https://www.youtube.com/watch?v=pWEflsClyTk

2. Vernier Callipers principle and description (Introduction) - https://www.youtube.com/watch?v=ySRN3yuZUT0

3. Hooke's law - https://www.youtube.com/watch?v=PWQm4ynYVSE

4. Law Of Conservation Of energy in a Simple Pendulum - https://www.youtube.com/watch?v=51RCyBr_nGk, https://www.youtube.com/watch?v=QlViWmQcwpQ

5. Young's modulus of the material of a beam by method of bending of beam - https://www.youtube.com/watch?v=iUhfstf10rk

6. Bar pendulum - https://www.youtube.com/watch?v=3uZ_Boyt_AI

7. Kater's Pendulum - https://www.youtube.com/watch?v=TxbDyv17Jfs

8. Specific Heat of Metals - https://www.youtube.com/watch?v=8gHFaL2990U

9. Thermal conductivity of materials by Searl's apparatus - https://www.youtube.com/watch?v=qKhhcrqhPfY

10. Newton's Law of Cooling - https://www.youtube.com/watch?v=lC9o6ikJlR8

11. Radiation from a black body: Stefan-Boltzmann Law - https://www.youtube.com/watch?v=riRsMfNmicM

FS101.01A: Foundation Course On Mathematics and Physics
_____

Credit Hours:

Teaching Scheme	Theory	Total
Hours/week	2	2
Marks	50	50

Examination Scheme:

Quiz: 50 Marks

A. Objective of the Course:

- The major objective of the course is to strengthen the foundation knowledge of mathematics and physics, which are prerequisites in engineering.
- To clear the concepts of mathematics and physics with interactive modules.

B. Detailed Syllabus:

Modules of Mathematics

11th GRADE		
Sr. No.	Topics	Subtopics
1	Complex numbers and quadratic equations	1. Complex numbers 2. De Moivre's theorem and rotation of complex number
2	Sequences and Series	1. Sequences and series 2. Arithmetic progression 3. Geometric progression 4. Sum of some special series
3	Probability	Probability
12th GRADE		
4	Matrices	1. Types of matrices

		2. Operation on Matrices
		3. Inverse of matrix elementary operations
		4. Special types of matrices
		5. Properties of Matrices
5	Continuity and differentiability	1. Differentiability
		2. Differentiation of composite function
		3. Mean value theorem
6	Application of derivatives	1. Rate of change of quantities
		2. Increasing and decreasing functions
		3. Tangents and Normals
		4. Maxima and minima
7	Integrals	Integration by parts
8	Applications of integral	1. Area under simple curve
		2. Area between two curves
9	Probability	1. Conditional probability
		2. Baye's theorem
		3. Binomial distribution

Modules of Physics

Sr. No.	Topic	Content
		11th GRADE
1	**Mechanical Properties of Solids**	1. Elastic behaviour of materials
		2. Elastic moduli
2	**Mechanical Properties of Fluids**	3. Hydrostatics and Bernoulli's principle
		4. Viscosity
		5. Surface tension
3	**Thermal Properties of Matter**	6. Heat and temperature
		7. Change of state and Newton's law of cooling
4	**Oscillators**	8. Introduction to Simple Harmonic Motion (Solution of second order differential order)
		9. Dynamics of simple harmonic motion
		10. Damped forced and resonant oscillators
5	**Thermodynamics**	11. Zeroth and the first law of thermodynamics
		12. Isothermal and adiabatic process
		13. Heat engine and the second law of thermodynamics

		12th GRADE		
6	Ray Optics	14.	Reflection of light by spherical mirrors	
		15.	Refraction, total internal reflection (TIR), refraction at spherical surfaces, and refraction through a prism.	
		16.	Dispersion by a prism, Rainbow, and scattering of light	
		17.	Eye, microscope, and telescope	
7	Semiconductor Electronics Material Devices and Simple Circuits	18.	Band model of metal, semiconductors, and insulators	
		19.	Semiconductor diodes and their application	
		20.	Transistor action and characteristics	
		21.	Transistor as an amplifier and oscillator	
		22.	Transistor as a switch and logic gates	
8	Communication Systems	23.	Basics elements of communication systems	
		24.	Propagation of electromagnetic waves	
		25.	Modulation	

Total hours: 30

D. Instructional Methods and Pedagogy

- The contents of the course will be installed in student's device (Mobile/Laptop).

- Students has to explore the contents by his/her self on SARAS-3D.

- Student can check the self-paced learning outcome by attending the quiz available after the topic/chapter.

- Course mentors will be assign to clear any difficulty in understanding the topic

- One external exam (Quiz based) will be conducted. The students have to secure minimum 80% of marks in the quiz to clear the course.

E. Student Learning Outcomes:

At the end of course, the students will acquire the fundamental knowledge regarding Mathematics and Physics. This will be a stepping stone for technical uplift of knowledge and skill of the student.

F. Recommended Study Material:

Text books:

1. NCERT Book of Mathematics for 11th and 12th standard.
2. NCERT Book of Physics for 11th and 12th standard.

FACULTY OF MANAGEMENT STUDIES
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
HS101.02A Communicative English

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	--	2	--	2	2
Marks	--	100	--	100	

A. Outline of the Course:

Sr. No.	Title of the unit	Minimum number of hours
1.	Introduction to Communicative English	03
2.	Communication Functions	06
3.	Basic Communication Skills I – Listening	03
4.	Basic Communication Skills II – Reading	03
5.	Basic Communication Skills III – Speaking	06
6.	Basic Communication Skills IV – Writing	06
7.	Developing Vocabulary	03
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1. **Introduction to Communicative English**   03 Hours   10%

   English as a Window Language; Varieties of English: British English,
   American English, Indian English; Language Variations; Importance

of English for Academic and Professional Development; Strategies for Language Acquisition; Formal VS Informal English

2.	**Communication Functions**	6 Hours	20%

Greeting and Introducing; Making Requests and Asking for Information; Expressing Likes and Dislikes; Seeking Permission; Giving and Taking Advice; Describing People, Place, Things; Retelling Past Events; Comparing and Contrasting; Persuading; Describing Cause and Effect

3.	**Basic Communication Skills I – Listening**	3 Hours	10%

Importance of Listening as a Language Skill; Basic Listening Skills; Types of Listening; Barriers to Listening; Strategies for Effective Listening; Listening Practice

4.	**Basic Communication Skills II – Reading**	3 Hours	10%

Importance of Reading as a Language Skill, Reading Strategies: Skimming, Scanning, Intensive Reading, Extensive Reading, Strategies for Effective Reading Comprehension, Reading Practice

5.	**Basic Communication Skills III – Speaking**	6 Hours	20%

Importance of Speaking as a Language Skill, Basic Speaking Skills; Paralanguage for Effective Speaking; Strategies for Oral Communication; Extempore and Public Speaking

6.	**Basic Communication Skills IV – Writing**	6 Hours	20%

Importance of Writing as a Language Skill; Process of writing: Prewriting, Drafting, Revision, Editing, Publication; Seven C's of Writing; Sentence Construction – Complex, Compound, Paragraph Development; Letter Writing (Academic Context)

7.	**Developing Vocabulary**	3 Hours	10%

High Frequency Vocabulary (Everyday and Academic use); Words Often Confused and Misused; Useful Phrasal Verbs, Idioms and Proverbs, Homonyms and Homographs; Lexical Range, Word Games

Course Outcome (COs):

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

CO1	Communicate with people using English language functions including greetings, introductions, making and responding to requests, suggestions, invitations and apologies, conducting simple transactions in shops and offices, asking for and giving directions, etc
CO2	Go through a text and identify specific and global information.
CO3	Become more knowledgeable about speaking strategies and speak effectively using appropriate words, expression, tone and pronunciation.
CO4	Be aware about various reading strategies and read and comprehend academic and non-academic prose (text).
CO5	Write systematically using nuances of writing
CO6	Express their opinion and likes and dislikes, advice and convince others in a more polite and accepted way.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	-	-	-	2	-	-	-	3	2	-	-	-
CO2	-	2	-	2	-	-	-	-	-	2	-	2	-	-
CO3	-	-	-	1	-	-	2	-	-	3	2	-	-	-
CO4	-	-	-	-	-	-	-	-	-	2	-	1	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	1	2	2	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ **Text book:**

1. Sanjay Kumar and PushpLata (Second Edition, 2015), Communication Skills, Oxford University Press, New Delhi

2. M V Rodriques (2013), Effective Business Communication, Concept Publishing Company (P) Ltd., New Delhi

3. Krishna Mohan and Meera Banerji (2010), Developing Communication Skills, Macmillan Publications India Ltd., New Delhi

❖ **Reference book:**

1. Mohan and Meenakshi Raman (2006), Effective English Communication, Mcgraw-Hill Publishing Company Limited, New Delhi

2. Geoffrey Leech & Jan Swartvik (1994), A Communicative Grammar of English, Longman Publications, New York

3. Jones Leo (1979), Functions of English, Cambridge University Press, UK

4. European Journal of Language and Literature Studies Vol.1 Nr, 1 April 2015

5. English for Academic Purpose: A Tool for Enhancing Students' Proficiency in English Language Skills

❖ **Web material:**

1. https://www.futurelearn.com/courses/language-assessment

2. https://www.coursera.org/learn/importance-of-listening?#syllabus

3. https://www.futurelearn.com/courses/english-academic-study

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.Tech (CE/IT/CSE/AI&ML) Programme

SYLLABI (SEMESTER-2)

FACULTY OF APPLIED SCIENCES
DEPARTMENT OF MATHEMATICAL SCIENCES
MA144 Engineering Mathematics- II

Credits and Hours:

Teaching Scheme	Theory	Tutorial	Total	Credit
Hours/week	4	1	5	4
Marks	100	-	100	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	First order and First degree Ordinary Differential Equations	08
2	Higher Order Ordinary Linear Differential Equations	12
3	Partial Differential Equations and Applications	10
4	Matrix Algebra –II	10
5	Improper and Multiple Integrals	10
6	Probability and Statistics	10
	Total Hours (Theory)	60

Theory Hours: 60

Practical Hours: --

Total hours: 60

B. Detailed Syllabus:

1. **First order and First degree Ordinary Differential Equations:** 08 Hours 13%

1.1 Modeling of real world problems in terms of first order ODE

1.2 Concept of general and particular solutions

1.3 Initial value problems

1.4 Existence and Uniqueness of solutions by illustrations

1.5	Solutions of first order and first degree differential equations	
1.6	Linear, Bernoulli, Exact and non-exact differential equations	

2. Higher Order Ordinary Linear Differential Equations: 12 Hours   20%

2.1   Model of real world problems of higher order LDE

2.2   General Solution of Higher Order Ordinary Linear Differential Equations with Constant coefficients

2.3   Methods for finding particular integrals viz. variation of parameters and undetermined coefficients

2.4   LDE of higher order with variable coefficients: Legendre's Equations (Special case: Cauchy-Euler equation)

2.5   System of simultaneous first order linear differential equations

3. Partial Differential Equations and Applications: 10 Hours   17%

3.1   Boundary valued problems

3.2   Methods of solutions of first order PDE

3.3   Lagrange's Linear Partial Differential Equations.

3.4   Special types of Nonlinear PDE of the first order

3.5   Solutions of Heat, Wave and Laplace equations using separation of variables.

3.6   Modeling of real world problem in terms of PDE

4. Matrix Algebra –II: 10 Hours   17%

4.1   Revision of matrices, determinant

4.2   Eigenvalues and Eigenvectors of matrices

4.3   Eigenvalues and Eigenvectors of special matrices

4.4   Cayley-Hamilton's Theorem and its applications.

4.5   LU decomposition

5. Improper and Multiple Integrals: 10 Hours   17%

5.1   Improper integrals and their convergence

5.2   Definitions, properties and examples of Gamma, Beta and Error functions

5.3 Evaluation of double and triple integrals

5.4 Change of order of double integration

5.5 Transformation to polar and cylindrical coordinates

5.6 Applications of double and triple integrals

6. **Probability and Statistics:**   10 Hours   16%

6.1 Mean, median, mode and standard deviation

6.2 Combinatorial probability

6.3 Joint and Conditional probability and Bayes theorem

6.4 Random variables, probability distribution functions - Binomial, Poisson, exponential and normal.

C. Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures/tutorials which carries a 5% component of the overall evaluation.
- Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation.
- Quiz (surprise test) /Oral tests/ Viva/Assignment/Tutorials will be conducted which carries 10% component of the overall evaluation.

Course Outcomes (COs):

At the end of the course, the students will be able to

CO1	Formulate models of natural phenomena using differential equations and find its solution using standard methods.
CO2	Identify, analyze and subsequently solve physical problems analytically whose behaviour can be described by linear and nonlinear differential equations.

CO3	Find and explain significant of Eigenvalues and Eigenvectors of a square matrix, use Cayley-Hamilton's theorem to find inverse and power of a square matrix, construct LU decomposition of a square matrix.
CO4	Use advanced techniques to evaluate improper integrals, apply multiple integrals to find area, volume and mass in engineering field.
CO5	Recognize the difference between different measure of central tendency, summarize and interpret data.
CO6	Understand and solve the problems using probability axioms, rules and Bayes theorem, use distributions such as Binomial, Poisson, Exponential and Normal to solve real world problems.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	1	1	-	-	-	-	-	-	-	-	-
CO6	2	2	1	2	1	1	1	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ Text Books:

1. Erwin Kreyszig; Advanced Engineering Mathematics, 8th Ed., Jhon Wiley & Sons, India, 1999.

2. H. K. Dass and Rajnish Verma; Higher Engineering Mathematics, S Chand & Co Pvt. Ltd.

3. Sheldon Ross; A first course in probability. Pearson, 2014.

4. B. S. Grewal; Higher Engineering Mathematics, Khanna Publ., Delhi, 2012

❖ Reference Books:

1. M. D. Weir et al; Thomas' Calculus, 11th Ed., Pearson Education, 2008.

2. James Stewart; Calculus Early Transcendental, 5th Ed., Thomson India, 2007

3. C. R. Wylie and L. C. Barrett; Advanced Engineering Mathematics. 1982, McGraw-Hill Book Company.

4. Michael D. Greenberg; Advanced engineering mathematics. Prentice-Hall, 1988.

5. R. V. Hogg, E. A. Tanis and D. L. Zimmerman; Probability and Statistical Inference, 9th edition, Prentice Hall, 2015.

6. Zafar Ahsan; Differential Equations and Their Applications, φ Learning, Pvt Ltd,Third Edition (2017).

❖ URL Links:

1. http://nptel.ac.in/courses/122107037/
2. http://nptel.ac.in/courses/111107108/
3. http://nptel.ac.in/courses/122103012/
4. http://nptel.ac.in/courses/122104018/
5. http://nptel.ac.in/courses/111106100/
6. http://nptel.ac.in/courses/122101003/
7. https://ocw.mit.edu/courses/mathematics/18-02-multivariable-calculus-fall-2007/lecture-notes/
8. https://nptel.ac.in/courses/111105041/

FACULTY OF TECHNOLOGY & ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING
CE144 Object Oriented Programming with C++

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	3	4	-	7	5
Marks	100	100	-	200	

A. Outline of the Course:

Sr. No.	Title of the unit	Minimum number of hours
1	Principles of object-oriented Programming	02
2	Introduction of C++	03
3	Tokens and Expressions & Control Structure	02
4	Functions	04
5	Classes and objects'	07
6	Constructor and Destructors	03
7	Operator Overloading	06
8	Inheritance	06
9	Pointers and Virtual Functions	06
10	Managing Console I/O Operations	02
11	Working with Files	04
	Total Hours (Theory)	45

Theory Hours: 45

Practical Hours: 60

Total Hours: 105

B. Detailed Syllabus:

1   **Principles of object-oriented Programming**   02 Hours   5%

Basic concept of object-oriented Programming, Benefits of OOP, Difference between object-oriented language and procedure-oriented language

2   **Introduction of C++**   03 Hours   3%

What is *C++*, Simple *C++* Program, Applications of *C++*
Introduction to class, object and creating simple program
using class, Structure of *C++* program

| 3 | **Tokens and Expressions & Control Structure** | 02 Hours | 4% |

Type compatibility, Dynamic initialization, Reference
variables Scope Resolution Operator, Memory Management,
Operator, Manipulators, Type cast operator

| 4 | **Functions** | 04 Hours | 8% |

The main function, simple functions, call by reference, return
by reference, inline functions, overloaded functions, default
arguments

| 5 | **Classes and objects** | 07 Hours | 16% |

Limitation of *C* structure, declaring class and defining
member function, making outside function inline, Nesting
member function, Private member function arrays within a
class, memory allocation of objects, Static data members and
Member functions, Arrays of Objects, Object as a function
argument, Friend functions, Returning objects, const
Member functions.

| 6 | **Constructor and Destructors** | 03 Hours | 9% |

Introduction to Constructors, Parameterized Constructors,
Multiple Constructors in class, Constructors with default
argument, Dynamic initialization of Constructors, Dynamic
Initialization of objects, Copy Constructor, Dynamic
Constructor, Destructors

| 7 | **Operator Overloading** | 06 Hours | 11% |

Introduction, Defining Operator overloading, overloading
unary and binary operators, overloading binary operator using
friend function, rules for overloading operators, Type
Conversion

| 8 | **Inheritance** | 06 Hours | 13% |

Introduction, Defining a derived class, Example of Single, Inheritance, Public and private inheritance. Multilevel, multiple and hierarchical Inheritance, Hybrid Inheritance Virtual Base Class, abstract class nesting of classes, constructors in derived classes

9	Pointers and Virtual Functions Introduction, pointer to object, this pointer, pointer to derived class, Virtual functions, pure virtual functions	06 Hours	16%
10	Managing Console I/O Operations Introduction, C++ stream, C++ stream classes, Unformatted and formatted console I/O Operations	02 Hours	5%
11	Working with Files Introduction, Classes for file stream operations, Opening and closing a file, Detecting End of File, File modes, file pointers and their manipulations, Sequential I/O operations, Error Handling during File operations, Command-line arguments	04 Hours	10%

Course Outcome (COs):

At the end of the course, the students will be able to

CO1	Comprehend the difference between the top-down and bottom-up approach
CO2	Explain how C++ improves C with object-oriented features.
CO3	Acquire a knowledge of the syntax and semantics of the C++ programming language.
CO4	Recognize and apply features of object oriented design such as encapsulation, polymorphism, inheritance and data abstraction of systems based on object identity.
CO5	Apply and Illustrate the Process of virtual, pure virtual function, data file manipulations Using C++ and complex programming situations
CO6	Evaluate, write, debug, and test basic C++ codes using the approaches introduced in the course.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	-	-	-	1	-	-	-	-	-	1	-
CO2	1	1	1	-	1	-	-	-	-	-	-	-	1	-
CO3	2	1	3	-	3	-	-	-	-	-	-	1	1	-
CO4	3	3	3	1	3	2	2	-	-	-	-	1	3	1
CO5	3	2	2	-	3	1	1	-	1	-	1	2	2	1
CO6	2	2	3	-	3	1	-	-	1	-	2	3	3	1

Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

If there is no correlation, put "-"

Recommended Study Material:

❖ Text book:
1. Programming with C++ by E.Balagurusami(TMH)
2. Object Oriented Programming in Turbo C++ by Robert Lafore (Galgotia)

❖ Reference book:
1. Let us C++ by Yashwant Kanetkar, BPB Publication
2. C++ How to program, by Deitel & Deitel, Prentice Hall
3. C++ Programming Bible, by Al Stevens and Clayton Walnum, Prentice Hall
4. The Complete Reference, by Herbert Schildt, Tata McGraw Hill

❖ Web material:
1. http://www.stroustrup.com/C++.html
2. http://www.cplusplus.com/doc/tutorial/
3. http://www.learncpp.com/
4. http://www.cprogramming.com/tutorial/c++-tutorial.html
5. http://www.tutorialspoint.com/cplusplus/index.html

❖ Software:
1. Code::Blocks
2. Dev-C++
3. Turbo C++

FACULTY OF TECHNOLOGY & ENGINEERING
CHAMOS MATRUSANSTHA DEPARTMENT OF MECHANICAL ENGINEERING
ME145 Elements of Engineering

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	3	2	1	6	4
Marks	100	50	0	100	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
Part: A		
1	Fundamentals of Engineering Graphics	05
2	Projections & Section of Solid	05
3	Orthographic Projection	05
4	Isometric Projections	05
5	Computer Graphics	03
Part: B		
6	Introduction of Mechanical Engineering	02
7	Steam and Steam Generator	03
8	Internal Combustion Engines	03
9	Refrigeration and Air Conditioning Systems	03
Part: C		
10	Scope of Civil Engineering	02
11	Introduction to Surveying	04
12	Elements of building Construction	05
Total Hours(Theory)		45

Theory Hours: 45

Practical Hours: 30

Total Hours: 75

B. Detailed Syllabus:

Part: A

1	**Fundamentals of Engineering Drawing**	05 Hours	11 %

1.1 Importance of engineering drawing, drawing instruments and materials, BIS and ISO

1.2 Different types of lines used in engineering practice, methods of projections as per SP 46-1988.

1.3 Engineering scale.

1.4 Engineering curve.

2	**Projections & Section of Solid**	05 Hours	11 %

2.1 Projection of solids

2.2 Sectional view

2.3 True shape of Sections

2.4 Auxiliary Inclined Plane (AIP), Auxiliary Vertical Plane (AVP)

3	**Orthographic Projection**	05 Hours	11 %

3.1 Principle projection

3.2 Methods of first and third angle projection with examples / problems

4	**Isometric Projections**	05 Hours	11 %

4.1 Terminology, Isometric scale

4.2 Isometric view and Isometric projection with examples / problems

5	**Computer Graphics**	03 Hours	7 %

5.1 Introduction of computer graphics

5.2 Demonstration of CAD Modeling software

5.3 Training of Fusion 360 software

Part: B

6	**Introduction of Mechanical Engineering**	02 Hours	4 %

6.1 Prime movers and its types, Sources of energy

6.2 Basic terminology: Force and mass, Pressure, Work, Power, Energy, Heat, Temperature, Units of heat, Specific heat capacity, Interchange of heat, Change of state, Internal energy, Enthalpy, Entropy, Efficiency

6.3 Zeroth Law and First Law of Thermodynamic, Boyle's law, Charle's law and Combined gas law, Relation between Cp and Cv

7	**Steam and Steam Generator**	03 Hours	7 %

7.1	Introduction to steam formation and its types		
7.2	Introduction to steam table		
7.3	Boiler definition and its classification		
7.4	Cochran boiler.		
8	**Internal Combustion Engines**	**03 Hours**	**7 %**
8.1	Introduction		
8.2	Basic terminology of I.C. engine		
8.3	Types of I. C. engines		
9.	**Refrigeration and Air Conditioning Systems**	**03 Hours**	**7 %**
9.1	Introduction to refrigeration and air conditioning		
9.2	Basic terminology, Principal and application of refrigeration		
9.3	Vapour compression refrigeration system,		
9.4	Window and split air conditioning systems		

Part: C

10.	**Scope of Civil Engineering**	**02 Hours**	**4 %**
10.1	Scope of Civil Engineering,		
10.2	Branches of civil engineering,		
10.3	Role of civil engineer		
11.	**Introduction to Surveying**	**04 Hours**	**9 %**
11.1	Definition of surveying,		
11.2	Objects of surveying, Uses of surveying,		
11.3	Primary divisions of surveying, Principles of surveying,		
11.4	List of classification of surveying, Definition: Plan and Map, Scales : Plain scale and Diagonal scale, Conventional Symbols		
11.5	Introduction to linear and angular measurements, Concepts of land profiling		
12.	**Elements of building Construction**	**05 Hours**	**11 %**
12.1	Types of building, Design loads,		
12.2	Building components (super structure and substructure),		
12.3	Principles of Planning,		
12.4	Basics Requirements of a building Planning,		
12.5	Types of Residential Building,		

C. Instructional Methods and Pedagogy:

- At the starting of the course, delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of Multi-Media projector, Black Board, OHP etc.
- Attendance is compulsory in lectures and laboratory.
- Internal exams/Unit tests/Surprise tests/Quizzes/Seminar/Assignments etc. will be conducted as a part of continuous internal theory evaluation.
- The course includes a laboratory, where students will get opportunities to build appreciation for the concepts being taught in lectures.
- Experiments/Tutorials related to course content will be carried out in the laboratory.
- In the lectures and laboratory discipline and behavior will be observed strictly.

Course Outcome (COs):

At the end of the course, the students will be able to

CO1	Describe the fundamentals of engineering drawing, engineering scale and engineering curve.
CO2	Use the concept of projection and section of solids for given applications.
CO3	Visualize three-dimensional of engineering components through orthographic, sectional orthographic and isometric drawing and use the computer for geometric modeling.
CO4	Describe the fundamental principles of mechanical engineering and different mechanical system.
CO5	Explain the importance of civil engineering and land surveying.
CO6	Describe the different building components, building planning and design of residential building.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO 2	POS 3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

- ❖ Text book:
    1. N. D. Bhatt & V. M. Panchal, "Engineering Drawing", Charotar Publishing House Pvt. Ltd.
    2. P. J. Shah, "Engineering Graphics", S. Chand Publishing & Co.
    3. P.S.Desai, S.B.Soni, "Elements of Mechanical Engineering", Atul Prakashan, Ahmedabad
    4. S.M.Bhatt, H.G.Katariya, J.P.Hadiya, "Elements of Mechanical Engineering", Books India Publication, Ahmedabad.
    5. Khasia R.B. and Shukla R.N., "Elements of Civil Engineering", Mahajan Publication.
    6. Punamia B.C., "Surveying", Vol. I & II.
- ❖ Reference book:
    1. P.B. Patel & P.D. Patel, "Engineering Graphics", Mahajan Publishing House.
    2. Arunoday Kumar, "Engineering Graphics", Tech-Max Publication.
    3. M.L. Agrawal & R.K. Garg, "Engineering Drawing", Vol. I, Dhanpatrai & Co.
    4. Dr. Sadhu Singh, "Elements of Mechanical Engineering", S.CHAND Publication, New Delhi

5. V.K.Manglik, "Elements of Mechanical Engineering", PHI Learning, Delhi.

6. Kandya Anurag, "Elements of Civil Engineering", Charotar Publishing House Pvt. Ltd.

7. Kanetkar T.P. & Kulkarni S.V., "Surveying and Levelling", Vol. I & II.

❖ **Web Materials:**

1. http://nptel.ac.in/courses/112103019/

2. http://nptel.ac.in/downloads/112105125/

3. http://nptel.ac.in/syllabus/syllabus.php?subjectId=105104101

4. http://nptel.ac.in/courses/105107122/

5. https://law.resource.org/pub/in/bis/S01/is.sp.46.2003.pdf

FACULTY OF TECHNOLOGY AND ENGINEERING
M. S. PATEL DEPARTMENT CIVIL ENGINEERING
CL144.02 A Environmental Sciences

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of The Course:

Sr. No.	Title of the Unit	Minimum Number of Hours
1	Multidisciplinary nature of environmental Sciences	03
2	Environmental Pollution	07
3	Ecology & Ecosystems	05
4	Biodiversity and Conservation	04
5	Natural Resources	04
6	Human Communities and the Environment	07
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1. **Multidisciplinary nature of environmental studies**   03 Hours   11%

1.1   Definition, scope and importance

1.2   Earths-Evolution and Systems

1.3   Components of the Environment: Biotic, Abiotic, Atmosphere,

Lithosphere, Hydrosphere, Biosphere

1.4   Concept of sustainable development

2. **Environmental Pollution**   07 Hours   23%

2.1	Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution		
2.2	Nuclear hazards and human health risks		
2.3	Solid waste management: Control measures of urban and industrial waste		
2.4	Pollution case studies – Ganga/Yamuna River, Bhopal Gas Tragedy, Delhi Air Pollution, Effect of Pandemics on the Environment		
3.	**Ecology & Ecosystems**	**05 Hours**	**17%**
3.1	Concept of an ecosystem, Structure and function of an ecosystem		
3.2	Producers, consumers and decomposers		
3.3	Energy flow in the ecosystem, Food chains, food webs and ecological pyramids		
3.4	Case studies of the following ecosystems: Forest ecosystem, Grassland ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers)		
4.	**Biodiversity and Conservation**	**04 Hours**	**13%**
4.1	Introduction – Definition: genetic, species and ecosystem diversity		
4.2	Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values		
4.3	Hot-sports of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.		
4.4	Endangered and endemic species of India, Conservation of biodiversity Biodiversity Act 2002/ BD Rule 2004: Mandate & Functions of		
4.5	National Biodiversity Authority (NBA), Role of State Biodiversity Board (SBB) and Biodiversity Management Committees(BMC).		
5.	**Natural Resources**	**04 Hours**	**13%**
5.1	Renewable and non-renewable resources		
5.2	Recyclable and Non-recyclable resources		
5.3	Energy resources: Growing energy needs, use of alternate energy sources. Case studies.		
5.4	Role of an individual in conservation of natural resources		
6.	**Human Communities and the Environment**	**07 Hours**	**23%**

6.1 Pandemics: Causes, Effects, Impact on the Environment: Positive & Negative, Lessons to learn

6.2 Floods, Cyclones, Earthquakes, Landslides & Forest Fires

6.3 Human population growth: Impacts on environment, human health and welfare.

6.4 Case Studies: Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents, etc.

C. Instructional Method and Pedagogy:

The course is based on practical learning. Teaching will be facilitated by Slides Presentations, Reading Material, Discussions, Case Studies, Ted Talks, Videos, Task-Based Learning, Projects, Assignments and various Individual and Interpersonal activities like, Critical reading, Group work, Independent and Collaborative Research, Presentations, etc.

Course Outcomes (COs):

At the end of the course, students will be able:

CO1	To perceive the elementary knowledge about natural environment and its relation with science.
CO2	To identify and analyze human impacts on the environment.
CO3	To understand the facts and concepts of natural and energy resources thereby applying them to lessen the environmental degradation.
CO4	To Initiate new and innovative environmental friendly practices.
CO5	To communicate on recent environmental problems thereby creating awareness among society.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	3
CO2	-	-	-	-	-	-	3	-	-	-	-	-	-	3
CO3	-	-	-	-	-	2	3	-	-	-	-	-	-	3
CO4	-	-	2	-	-	-	3	-	-	-	-	-	2	-
CO5	-	-	-	-	-	-	-	-	-	2	-	-	2	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) No correlation "-"

Recommended Study Material:

❖ **Text Books:**

1. Varandani, N.S., Basics of Environmental Studies
2. Sharma, J. P., Basics of Environmental Studies

❖ **Reference Books:**

1. Shah Shefali & Goyal Rupali, Basics of Environmental Studies
2. Agrawal, K.C., Environmental Pollution : Causes, Effects & Control
3. Dameja, S. K., Environmental Engineering & Management
4. Rajagopalan, R., Environmental Studies, Oxford University Press
5. Wright Richard T. & Nebel Bernard J., Environmental Science
6. Shah, S.G., Shah, S.G. & Shah, G. N., Basics of Environmental Studies, Superior Publications, Vadodara

❖ **Web Materials:**

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT Delhi/Environmental%20Air%20Pollution/index.htm
2. http://nptel.iitm.ac.in/video.php?subjectId=105104099
3. http://apollo.lsc.vsc.edu/classes/met130/notes/chapter1/vert_temp_all.html
4. http://www.epa.gov
5. http://www.globalwarming.org.in
6. http://nopr.niscair.res.in
7. http://www.indiaenvironmentportal.org.in
8. http://nbaindia.org/

FACULTY OF APPLIED SCIENCES
DEPARTMENT OF PHYSICAL SCIENCES
PY 143 Engineering Physics - II

Credit and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of the Course:

Sr. No.	Title of the Unit	Minimum number of Hours
1	Electricity and magnetism Lab	12
2	Light and Optics Lab	8
3	Modern Physics Lab	10
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1   **Electricity and magnetism**   12 hours   35%

1.1   Charge, Conductors and Insulators, Coulomb's law, The electric field

1.2   Principle of Superposition, Electric potential energy, Electric potential

1.3   Capacitance and capacitors, The electric potential inside a parallel plate capacitor, electron current,

1.4   Conductivity and resistivity, resistance and Ohm's law, Kirchhoff's laws and basic circuit, energy and power

1.5   Magnetic field, The magnetic field of a current, magnetic dipoles

1.6   Ampere's law and solenoids, Magnetic forces on current-carrying wires

1.7   Magnetic properties of matter, Induced currents, Lenz's law, Faraday's law,

1.8   Induced currents: Three Applications, Inductors, LC Circuits, LR Circuits, LRC Circuits

No. of Experiment

1. Measurement of capacitance by the bridge method
2. Induction and LR, LC, and LRC Circuits
3. Magnetic field along the axis of a coil
4. Time Constant of RC Circuit
5. Measurement of susceptibility of paramagnetic solution (Quinck`s Tube Method)

| 2 | **Wave and Optics:** | 08 hours | 25% |

2.1   Classification of waves: Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Travelling) Waves, Pressure of a Longitudinal Wave. Energy Transport

2.2   Intensity of Wave, Standing (Stationary) Waves in a String: Fixed and Free Ends, Longitudinal Standing Waves and Normal Modes, Superposition of Waves, Propagation of electromagnetic waves

2.3   Diffraction and Interference, reflection, refraction, refractive index,

2.4   Basics of LASER Physics, Total Internal reflection, Basics of optical fiber, Acceptance angle and Numerical aperture

No. of Experiment

1. The wavelength of light, LASER, and Diffraction
2. Numerical Aperture and Bending Losses in Optical fiber
3. Standing (Transverse) Waves and resonance Using Vibrating Strings. Melde's Experiment

| 3 | **Modern Physics:** | 10 hours | 30% |

3.1   Planck's quantum theory, Planck's constant and light as a collection of photons

3.2 Photo-electric effect and Compton scattering. De Broglie wavelength and matter waves

3.3 Davisson- Germer experiment, Wave-particle duality, Heisenberg uncertainty principle-impossibility of a particle following a trajectory

3.4 Two slit interference experiment with photons, atoms and particles; Radioactivity: stability of nucleus; Law of radioactive decay

No. of Experiment

1. The Photoelectric Effect; photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light

2. Frank hertz experiment; To determine the ionization potential of mercury

3. To determine value of Planck's constant using LEDs of at least 4 different colours

C. Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Section wise Online Quiz will be taken.
- Lab manual: Student will be required to read the lab material prior to the start of class. A way to ensure this is by lab quizzes and assignments.
- Lab Reports: Student has to write lab reports and submit them hardcopy/electronically. The purpose of this exercise is both to demonstrate your work in lab and to guide you to think a bit more deeply about what you are doing. The act of technical writing also helps improve your communication skills, which are broadly relevant far beyond the physics lab

Course Outcome (COs):

CO1	Students would be able to describe the static and dynamic electric and magnetic fields for technologically important structures.
CO2	Ability to identify and illustrate physical concepts and terminology used in optics and other wave phenomena.

CO3	Students would be able to appreciate the need for quantum mechanics, wave particle duality, uncertainty principle etc. and their applications.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	1	1	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	2	1	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ Text Books:
1. Physics for Scientists and Engineers by Randall D. Knight, 4th Edition, Pearson
2. University Physics by Hugh D. Young, Roger A. Freedman and A. Lewis Ford, 13th Edition, Pearson
3. Physics by John D. Cutnell& Kenneth W. Johnson, 8th Edition, John Wiley & Sons, Inc.

❖ Reference Books:
1. Electricity and Magnetism, Edward M. Purcell, 1986 McGraw-Hill Education
2. Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.
3. Fundamentals of Optics, F.A. Jenkins and H.E. White, 1981, McGraw-Hill
4. Principles of Optics, Max Born and Emil Wolf, 7th Edn. 1999, Pergamon Press.
5. Optics, AjoyGhatak, 2008, Tata McGraw Hill
6. Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill.
7. Introduction to Modern Physics, Rich Meyer, Kennard, Coop, 2002, Tata McGraw Hill
8. Introduction to Quantum Mechanics, David J. Griffith, 2005, Pearson Education.

❖ Web Materials:

1. Measurement of capacitance by the bridge method - https://www.youtube.com/watch?v=loZC-2A3LLg

2. Phasor Diagram of RL, RC and RLC Circuits - https://www.youtube.com/watch?v=HaFrY0qQ-NU

3. Magnetic field along the axis of a coil - https://www.youtube.com/watch?v=S0N4eVg7I3Y

4. Quinck`s Tube Method - https://www.youtube.com/watch?v=yzgdq8uUfO4

5. The wavelength of light, LASER - https://www.youtube.com/watch?v=desLn3tMLcc

6. Numerical Aperture and Bending Losses in Optical fiber - https://www.youtube.com/watch?v=b7dLcINlvwE, https://www.youtube.com/watch?v=Wh9knsYSodI

7. Melde's Experiment - https://www.youtube.com/watch?v=pvX5y95Sye0, https://www.youtube.com/watch?v=1CyFsGk-_l4

8. The Photoelectric Effect - https://www.youtube.com/watch?v=6VqNz4oT0ng, https://www.youtube.com/watch?v=kcSYV8bJox8

9. Frank hertz experiment - https://www.youtube.com/watch?v=aFLnOglBxDk

10. To determine value of Planck's constant using LEDs - https://www.youtube.com/watch?v=fmbSTt8dDWs

FACULTY OF TECHNOLOGY & ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING
CSE101 Digital Electronics

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	2	2	1	5	3
Marks	100	50	-	150	

A. Outline of the Course:

Sr. No.	Title of the unit	Minimum number of hours
1.	Number Systems	05
2.	Simplification of Boolean functions	05
3.	Combinational Circuits	08
4.	Sequential circuits	08
5.	Processor Logic Design	04
	Total Hours (Theory)	30

Theory Hours: 30

Practical Hours: 30

Total Hours: 60

B. Detailed Syllabus:

1	**Number Systems**	05 Hours	12%

Different Radix Number Systems, Number base conversions, Complements, Signed and Unsigned Numbers, Digital arithmetic (Binary Addition and Subtraction (normal and with complements)), Binary codes, Code Conversion, Binary Logic and Logic Gates

2	**Simplification of Boolean functions**	05 Hours	20%

Boolean Algebra (Basic Definitions, Axioms, Postulates and Theorem, Boolean functions: Canonical and Standard Form, Maxterm and Minterm, SOP and POS), Simplification of

Boolean functions using Boolean theorems and postulates, Simplification of Boolean functions using K-map (up to 4 variable K-map), Realize logic circuit using Basic gates and Universal gates

| 3 | Combinational Circuits | 08 Hours | 28% |

Design Procedure, Half Adder, Half Subtractor, Full Adder, Full Subtractor, Binary parallel adder/subtractor, BCD adder, Magnitude comparator, Encoder, Priority Encoder, Decoder, Multiplexer, De-multiplexer, Implementation of Boolean functions using decoder and multiplexer, Analysis procedure of combinational circuits

| 4 | Sequential circuits | 08 Hours | 28% |

Latches and flip-flops with logic gate based designs, characteristic tables, excitation tables, Triggering of flip-flops, Design procedure for sequential circuits, Registers, Shift Registers, Asynchronous and Synchronous Counters, Modulo counters and Johnson counters

| 5 | Processor Logic Design | 04 Hours | 12% |

Memory Unit, Processor Organization, Arithmetic and Logic circuit, Processor unit, common bus architecture

Course Outcome (COs)

At the end of the course, the students will be able to

CO1	Use knowledge of various number systems, binary codes to solve conversion problems
CO2	Apply concepts of Boolean Algebra and other optimization techniques to optimize Boolean functions and implement them using logic gates
CO3	Design and construct the combinational and sequential logic circuits
CO4	Examine and Evaluate the performance and working of digital logic circuits
CO5	Extend the knowledge of digital logic circuits for processor logic design.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	-	-	-	-	1	1	-	-	1	1	-
CO2	3	3	2	1	1	-	-	1	1	1	-	1	1	1
CO3	3	1	3	3	3	1	1	1	1	1	-	1	2	1
CO4	3	3	2	3	2	1	1	1	1	1	-	1	2	1
CO5	3	2	3	3	3	1	1	1	1	1	-	2	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ Text book:

1. Digital Logic and Computer Design, 1st Edition by M. Morris Mano, Prentice-Hall of India Private Limited

2. Fundamentals of Digital Circuits, 4th Edition by A Anand Kumar, PHI Learning Private Limited

❖ Reference book:

1. Digital Design, 5th Edition by M. Morris Mano, Michael D. Ciletti, Pearson Education Inc
2. Digital Electronics, 1st Edition by Anil K Maini, John Wiley & Sons Limited

3. Digital Electronics and Logic Design, 1st Edition, B Somanathan Nair, Prentice Hall of India Private Limited

❖ Web material:

1. https://www.javatpoint.com/digital-electronics

2. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/

3. https://nptel.ac.in/courses/108105132

4. https://archive.nptel.ac.in/courses/117/106/117106114/

❖ Software:

1. tinkerCAD

2. DEEDS

3. Logisim

FACULTY OF TECHNOLOGY & ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING
CE145: Digital Electronics

Credits and Hours:

Teaching Scheme	Theory	Practicals	Tutorials	Total	Credit
Hours/week	2	2	1	5	3
Marks	100	50	-	150	

Pre-requisite courses:

- Basic Electronics

A., Outline of the Course:

Sr. No.	Title of the Unit	Minimum number of hours
1.	Number Systems	05
2.	Simplification of Boolean functions	05
3.	Combinational Circuits	08
4.	Sequential circuits	08
5.	Processor Logic Design	04
	Total Hours (Theory)	30

Theory Hours: 30

Practical Hours: 30

Total Hours: 60

B. Detailed Syllabus:

1. **Number Systems**.   05 Hours   12%
    Different Radix Number Systems. Number base conversion
    Complements Signed and Unsigned Numbers Digital arithmetic

(Binary Addition and Subtraction (normal and with compliments)) Binary codes Code Conversion Binary Logic and Logic Gates

2.	**Simplification of Boolean Function**	05 Hours	20%

Basic Definitions, Axioms, Postulates and Theorem Boolean functions: Canonical and Standard Form Maxterm and Minterm, SOP and POS Simplification of Boolean functions using Boolean theorems and postulates Simplification of Boolean functions using K-map (up to 4 variable K-map) Realize logic circuit using Basic gates and Universal gates

3.	**Combinational Circuits**	08 Hours	28%

Design Procedure Half Adder, Half Subtractor, Full Adder, Full Subtractor Binary parallel adder/Subtractor , BCD adder Magnitude comparator encoder, priority encoder, decoder, multiplexer, demultiplexer Implementation of Boolean function using decoder and multiplexer Analysis procedure of combinational circuits

4.	**Sequential circuits**	08 Hours	28%

Latches and flip-flops with logic gate based designs, characteristic table, excitation table Triggering of flip-flops Design procedure for sequential circuits Registers Shift Registers Asynchronous and Synchronous Counters, Modulo counters, Johnson counter

5.	Processor Logic Design	04 Hours	12%

Memory Unit Processor Organization Arithmetic and Logic circuit
Processor unit common bus architecture

Course Outcome:

At the end of the course, the students will be able to

CO1	Use knowledge of various number systems, binary codes to solve conversion problems
CO2	Apply concepts of Boolean Algebra and other optimization techniques to optimize Boolean functions and implement them using logic gates
CO3	Design and construct the combinational and sequential logic circuits
CO4	Examine and Evaluate the performance and working of digital logic circuits
CO5	Extend the knowledge of digital logic circuits for processor logic design.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PO12	PSO1	PSO2
CO1	3	1	1	-	-	-	-	1	1	-	-	1	1	-
CO2	3	3	2	1	1	-	-	1	1	1	-	1	1	1
CO3	3	1	3	3	3	1	1	1	1	1	-	1	2	1
CO4	3	3	2	3	2	1	1	1	1	1	-	1	2	1
CO5	3	2	3	3	3	1	1	1	1	1	-	2	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Materials:

❖ Text book:
1. Digital Logic and Computer Design, 1st Edition by M. Morris Mano, Prentice-Hall of India Private Limited
2. Fundamentals of Digital Circuits, 4th Edition by A Anand Kumar, PHI Learning Private Limited

❖ Reference book:
1. Digital Design, 5th Edition by M. Morris Mano, Michael D. Ciletti, Pearson Education Inc
2. Digital Electronics, 1st Edition by Anil K Maini, John Wiley & Sons Limited
3. Digital Electronics and Logic Design, 1st Edition, B Somanathan Nair, Prentice Hall of India Private Limited

❖ Web material:
1. https://www.javatpoint.com/digital-electronics
2. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/

3. https://nptel.ac.in/courses/108105132

4. https://archive.nptel.ac.in/courses/117/106/117106114/

❖ **Software:**

1. tinkerCAD

2. DEEDS

3. Logisim

FACULTY OF TECHNOLOGY & ENGINEERING
DEPARTMENT OF INFORMATION TECHNOLOGY
IT146: Digital Electronics

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	2	2	1	5	3
Marks	100	50	-	150	

A. Outline of the Course:

Sr. No.	Title of the unit	Minimum number of hours
1.	Number Systems	05
2.	Simplification of Boolean functions	05
3.	Combinational Circuits	08
4.	Sequential circuits	08
5.	Processor Logic Design	04
	Total Hours (Theory)	30

Total hours (Theory): 30

Practical Hours: 30

Total hours: 60

B. Detailed Syllabus:

1	**Number Systems**	05 Hours	12%

Different Radix Number Systems, Number base conversions, Complements, Signed and Unsigned Numbers, Digital arithmetic (Binary Addition and Subtraction (normal and with complements)), Binary codes, Code Conversion, Binary Logic and Logic Gates

2	**Simplification of Boolean functions**	05 Hours	20%

Boolean Algebra (Basic Definitions, Axioms, Postulates and Theorem, Boolean functions: Canonical and Standard Form,

Maxterm and Minterm, SOP and POS), Simplification of Boolean functions using Boolean theorems and postulates, Simplification of Boolean functions using K-map (up to 4 variable K-map), Realize logic circuit using Basic gates and Universal gates

3	Combinational Circuits	08 Hours	28%
	Design Procedure, Half Adder, Half Subtractor, Full Adder, Full Subtractor, Binary parallel adder/subtractor, BCD adder, Magnitude comparator, Encoder, Priority Encoder, Decoder, Multiplexer, De-multiplexer, Implementation of Boolean functions using decoder and multiplexer, Analysis procedure of combinational circuits		
4	Sequential circuits	08 Hours	28%
	Latches and flip-flops with logic gate based designs, characteristic tables, excitation tables, Triggering of flip-flops, Design procedure for sequential circuits, Registers, Shift Registers, Asynchronous and Synchronous Counters, Modulo counters and Johnson counters		
5	Processor Logic Design	04 Hours	12%
	Memory Unit, Processor Organization, Arithmetic and Logic circuit, Processor unit, common bus architecture		

Course Outcome (COs):

At the end of the course, the students will be able to

CO1	Use knowledge of various number systems, binary codes to solve conversion problems
CO2	Apply concepts of Boolean Algebra and other optimization techniques to optimize Boolean functions and implement them using logic gates
CO3	Design and construct the combinational and sequential logic circuits
CO4	Examine and Evaluate the performance and working of digital logic circuits
CO5	Extend the knowledge of digital logic circuits for processor logic design.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	-	-	-	-	1	1	-	-	1	1	-
CO2	3	3	2	1	1	-	-	1	1	1	-	1	1	1
CO3	3	1	3	3	3	1	1	1	1	1	-	1	2	1
CO4	3	3	2	3	2	1	1	1	1	1	-	1	2	1
CO5	3	2	3	3	3	1	1	1	1	1	-	2	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ Text book:

1. Digital Logic and Computer Design, 1st Edition by M. Morris Mano, Prentice-Hall of India Private Limited

2. Fundamentals of Digital Circuits, 4th Edition by A Anand Kumar, PHI Learning Private Limited

❖ Reference book:

1. Digital Design, 5th Edition by M. Morris Mano, Michael D. Ciletti, Pearson Education Inc
2. Digital Electronics, 1st Edition by Anil K Maini, John Wiley & Sons Limited
3. Digital Electronics and Logic Design, 1st Edition, B Somanathan Nair, Prentice Hall of India Private Limited

❖ Web material:

1. https://www.javatpoint.com/digital-electronics
2. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/
3. https://nptel.ac.in/courses/108105132
4. https://archive.nptel.ac.in/courses/117/106/117106114/

❖ Software:

1. tinkerCAD
2. DEEDS
3. Logisim

COURSES ON LIBERAL ARTS (SEMESTER-2)

FACULTY OF MANAGEMENT STUDIES
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
HS201.02A Painting

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	An Introduction to Painting	02
2	Drawing from Nature and Object	04
3	Colour Design and Colour Value	06
4	Composition and Perspective	06
5	Figure Drawing and Proportion	04
6	Sketching	04
7	Contemporary Issues in Painting	04
	Total Hours(Practical)	30

Theory Hours: --

Practical Hours: 30

Total hours: 30

B. Detailed Syllabus:

1. **An Introduction to Painting**   02 Hours   06%

   - An Introduction to Painting

   - Principles of Composition

   - Medium and Techniques of Painting

   - History of Painting: Folk Indian Painting / Western Painting

   2D and 3D Painting

2. **Drawing from Nature and Object**   04 Hours   12%

- Objects of Drawing: Nature and Manmade / Artificial Objects

- Drawing Still / Live Objects

- Drawing from Memory

- Drawing from Life

3. **Light and Shade**   06 Hours   18%

- **Color Theory**:

    Color wheel (primary/secondary, complementary),
    transparency/opacity, hue, value (intensity, brightness),
    chroma (saturation, purity) & temperature (warm/cold)

- **Color Contrast & Attributes**:

    Interaction, harmony, psychology/mood, culture &
    expression

- **Media Characteristics & Surfaces**:

    Acrylic, oil, paper, wood & canvas (primed/unprimed)

4. **Composition and Perspective**   06 Hours   18%

- **Composition:**

    Space, movement, balance, asymmetry, rhythm, shapes,
    proportion & lighting

- Perspective: An approximate reproduction

- **Types of Perspectives:**

- Linear Perspective, One-point Perspective, Two-point
    Perspective, Three-point Perspective, Four-Point Perspective

5. **Figure Drawing and Proportion**   04 Hours   12%

- Proportions of the Human Body

- Three views – **Anterior (front), Lateral (side) and Posterior
    (back)**

- Fundamental Proportion – The Big Three

6. **Sketching**   04 Hours   12%

- Sketching and Freehand

- Sketching Techniques

- Sketch and Drawing Medium

7. Contemporary Issues in Painting   04 Hours   12%
    - Contemporary Indian Art
    - Pioneers of Contemporary Indian Art
    - Contemporary Issues in Painting

C. Instructional Methods and Pedagogy:

Teaching will be practical based on the hands on experiences, live and interactive sessions. It will run in the workshop mode. Four Workshops (each of a day) will be organised during the semester.

Evaluation

The students will be evaluated continuously in the form of their consistent performance throughout the semester. There is no theoretical evaluation. There is just practical evaluation. The evaluation (practical) is schemed as 30 marks for internal evaluation and 70 marks for external evaluation.

Internal Evaluation

Students' performance in the course will be evaluated on a continuous basis through the following components:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Participation	-	05	05
2	Performance/ Activities	-	05	05
3	Project	-	15	15
4	Attendance	-	05	05
			Total	30

External Evaluation

University Practical examination will be for 70 marks and will test the performance, activities and creative presentations of the students with reference to the course selected:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Viva / Practical	-	70	70
			Total	70

Course Outcome (COs):

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

CO1	have cultivated a sense of creativity.
CO2	be appreciative of art history, art criticism and aesthetics.
CO3	be able to recognize the elements of arts in painting.
CO4	have better cognizance and association of meaning of colors, shapes, and composition.
CO5	be able to acknowledge the principles of painting as in design and colors, concept, medium and formats.
CO6	have instantaneous painting experience about designing, lights, shades and colors and such other important aspects.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:
❖ Reference Books
   1. A.N. Hodge (2007) *The History of Art: The Essential Guide to Painting Through the Ages* Arcturus Foulsham, London

2. David Lewis (1984) Pencil *Drawing Techniques* Watson-Guptill Publications, New York

3. John C Van Dyke L H D (1895) *A Text Book of the History of Painting* Longmans Green and Co., London

4. Sarah Parks (2014) Drawing *Secrets Revealed - Basics How to Draw Anything* North Light Books, Ohio

❖ **Web Material**
1. https://conceptartempire.com/what-are-the-fundamentals/

2. https://www.creativebloq.com/art/painting-techniques-artists-31619638

3. https://www.thesprucecrafts.com/perspective-in-paintings-2578098

4. https://www.thehansindia.com/posts/index/Hans/2016-05-19/Origin-of-painting-in-India/229138

FACULTY OF MANAGEMENT STUDIES
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
HS202.02A Photography

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	An Introduction to Photography	03
2	Camera and Operating System	05
3	Light and Shade	10
4	Composition	09
5	Contemporary Issues in Photography	03
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1. **An Introduction to Photography**   03 Hours   10%

   - Art, Design and Visualization

   - Basics of Photography and Various Types of Photography

   - Basics of Post Production

   - A Brief History of Photography:

   - Early Experiments and Later Developments

2. **Camera and Operating System**   05 Hours   16%

- Role of Camera in the Photography
- Types of Camera

    Pin-hole, box, folding, large and medium format cameras, single lens reflex (SLR) and twin lens reflex (TLR), miniature, subminiature and instant camera

- Principal Parts of Photographic Camera

    Lens, Aperture, Shutters, various types and their functions, focal plane shutter and in-between the lens shutter, shutter synchronization, self-timer

- Types of Lenses

    Single (meniscus), achromatic, symmetrical and unsymmetrical lenses, telephoto, zoom, macro, supplementary and fish-eye lenses

- Different Models of Camera, their Features and Operating Systems
- Camera and Size of the Image, Speed and Power of Lens

3. **Light and Shade**   10 Hours   34%

- Reflection and refraction of light
- Dispersion of light through a glass prism, lenses
- Colour Filters:

    Different kinds, Red, yellow, green, neutral density, half filters, filter factor, colour correction filter

- Photographic Light Sources:

    Natural source, the Sun, nature and intensity of the sunlight at different times of the day, different weather conditions

- Artificial light sources:

    Nature, intensity of different types of light sources used in photography namely; (i) Photo flood lamp, (ii) Spot light, (iii) Halogen lamp, Barn doors and snoot, lighting stands

    Flash unit: Bulb flash and Electronic flash, main components, electronic flash units, studio flash, slave unit, multiple flash, computer flash, x-contact, exposure table

4. **Composition**   09 Hours   30%

- Different kinds of image formations
- Principal focus and focal length of the lens
- Depth of field, angle of view and perspective
- Perspective and composition
- Rules of composition

5. Contemporary Issues in Photography   03 Hours   10%
   - Present Day Photography
   - Contemporary Photographers and their Contributions
   - Major Issues in Contemporary Photography

C. Instructional Methods and Pedagogy:

Teaching will be practical based on the hands on experiences, live and interactive sessions. It will run in the workshop mode. Four Workshops (each of a day) will be organised during the semester.

Evaluation

The students will be evaluated continuously in the form of their consistent performance throughout the semester. There is no theoretical evaluation. There is just practical evaluation. The evaluation (practical) is schemed as 30 marks for internal evaluation and 70 marks for external evaluation.

Internal Evaluation

Students' performance in the course will be evaluated on a continuous basis through the following components:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Participation	-	05	05
2	Performance/ Activities	-	05	05
3	Project	-	15	15
4	Attendance	-	05	05
			Total	30

External Evaluation

University Practical examination will be for 70 marks and will test the performance, activities and creative presentations of the students with reference to the course selected:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Viva / Practical	-	70	70
			Total	70

Course Outcome (COs):

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

CO1	Understand, appreciate and demonstrate innovative approach, beauty and acute acumen in the area of photography
CO2	Develop photography skills and become familiar with the functions and importance of the visual elements of nature and artificial objects
CO3	Become independent thinkers who will contribute inventively and critically to culture through the making of art photography
CO4	Have thorough understanding and acute sense of light and shade, composition, and presentation of a piece of an art
CO5	Experiment and Represent the cultivated sense and skills in Photography to the mass
CO6	Prepare an impressive portfolio encompassing holistic approach to art and other the areas of study

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	-	-	-	-	-

CO6	-	-	-	-	-	-	-	-	-	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ **Reference Books**

1. Maria Short, Sri-Kartini Leet and Elisavet Kalpaxi (2020) Context and Narrative in Photography-Routledge, New York.

2. Kevin Los (2010) Improve Your Photography: 50 Essential Digital Photography Tips & Techniques Digital Photography Series, New York.

❖ **Web Material**

1. https://photographylife.com/photography-basics

2. https://artofvisuals.com/the-basics-of-photography-introduction-to-photography-tutorials/

3. https://www.photographytalk.com/beginner-photography-tips/camera-basics-for-beginners

4. https://www.makeuseof.com/tag/5-photography-tips-for-beginners/

5. https://annamcnaught.com/blog/basics-of-photography

FACULTY OF MANAGEMENT STUDIES
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
HS205.02A Media and Graphic Design

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	An Introduction to Media and Graphic Design	03
2	Layout and Design	07
3	Form and Space	06
4	Computer Graphics	04
5	Fonts	04
6	Basic Print Media	03
7	Contemporary Issues in Graphic Design	03
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1. **An Introduction to Media and Graphic Design**   03 Hours   10%
   - Creating Art, Art in Context and Art as Inquiry
   - History of Graphic Design
   - Constructional, Representational, and Simplification Drawing

2. **Layout and Design**   07 Hours   23%

- Layout, Design and Aesthetics

- Elements of Design

- Principles of Design:

    Harmony, Balance, Rhythm, Perspective, Emphasis, Orientation, Repetition and Proportion

- Impact/function of Design

- Indigenous design practices

- Role of design in the changing social scenario

| 3. | Form and Space | 06 Hours | 20% |

- Types of Forms: Man-made, Nature

- Types of Space: Negative and Positive

- Composition of Form and Space to create Layout
    Exploring Creativity

| 4. | Computer Graphics | 04 Hours | 12% |

- An Introduction to Graphic Software

- Flash, Coreldraw, Illustrator and Photoshop

- Pre-press Process

| 5. | Fonts | 04 Hours | 12% |

- Construction of Type

- Anatomy of Type

- Visual Language

- Creating Logo and Symbol

| 6. | Basic Print Media | 03 Hours | 10% |

- An Introduction to Press and its Development Phases

- Types of Press

- Types of Printing Technologies

- Post-press Processes

| 7. | Contemporary Issues in Graphic Design | 03 Hours | 10% |

- Present Day Graphic Designs

- Contemporary Designers and their Contribution

- Major Contemporary Issues in Graphic Design

C. Instructional Methods and Pedagogy:

Teaching will be practical based on the hands on experiences, live and interactive sessions. It will run in the workshop mode. Four Workshops (each of a day) will be organised during the semester.

Evaluation

The students will be evaluated continuously in the form of their consistent performance throughout the semester. There is no theoretical evaluation. There is just practical evaluation. The evaluation (practical) is schemed as 30 marks for internal evaluation and 70 marks for external evaluation.

Internal Evaluation

Students' performance in the course will be evaluated on a continuous basis through the following components:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Participation	-	05	05
2	Performance/ Activities	-	05	05
3	Project	-	15	15
4	Attendance	-	05	05
			Total	30

External Evaluation

University Practical examination will be for 70 marks and will test the performance, activities and creative presentations of the students with reference to the course selected:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Viva / Practical	-	70	70
			Total	70

Course Outcome (COs):

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

CO1	have cultivated a sense of creativity.
CO2	be appreciative of art and designs, art criticism and aesthetics.
CO3	be able to recognize the elements of arts in graphic design.
CO4	have better cognizance and association with the meaning of designs, shapes, colors, print and medium.
CO5	be able to design graphics using computer softwares like Photoshop, CorelDraw, and Illustrator.
CO6	have cultivated a sense of creativity.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	2	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ **Reference Books**

1. Ellen Lupton and Jennifer Cole Philips (2008) Graphic *Design: The New Basics*, Princeton Architectural Press, New York

2. Ryan Hembree (2011) *The Complete Graphic Designer: A Guide to Understanding Graphics and Visual Communication* Rockport Publishers, Beverly

❖ **Web Material**

1. https://99designs.com/blog/tips/graphic-design-basics/

2. https://edu.gcfglobal.org/en/beginning-graphic-design/fundamentals-of-design/1/

3. https://ultragraphicsmt.com/10-basic-concepts-to-improve-your-graphic-design/

4. https://www.jcsocialmedia.com/graphic-design/

FACULTY OF MANAGEMENT STUDIES
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
HS209.02A Dramatics

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	Introduction to Drama	06
2	History of Drama and Contemporary Theatre	06
3	Theatre Design and Techniques	06
4	Technicalities of Stage Performance	08
5	Contemporary Trends in Drama	04
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1. **Introduction to Drama**   06 Hours   20%

   - Introduction to performing arts
   - Drama - An art, a socializing activity, & a way of learning
   - Form of Drama
   - Elements of Drama
   - Types of Drama

2. **History of Drama and Contemporary Theatre**   06 Hours   20%

- Important world dramatists & drama–from Greek to modern
- Evolution of contemporary theatre in the context of developments in Indian theatre
- Major Movements in Drama

| 3. | Theatre Design and Techniques | 06 Hours | 20% |

- Theatre Architecture
- Stage craft: Set, light, costume, make up, sound, props
- Theatre techniques: from selection of script to final performance

| 4. | Technicalities of Stage Performance | 08 Hours | 26% |

- Selection of plot and character
- Improvisation
- Movement
- Voice, Speech, Imagination
- Character Development
- Scene Enactment

| 5. | Contemporary Trends in Drama | 04 Hours | 14% |

- New Tendencies in theatre
- Drama and Society
- Using drama for Social Change and Education

C. Instructional Methods and Pedagogy:

Teaching will be practical based on the hands on experiences, live and interactive sessions. It will run in the workshop mode. Four Workshops (each of a day) will be organised during the semester.

Evaluation

The students will be evaluated continuously in the form of their consistent performance throughout the semester. There is no theoretical evaluation. There is just practical evaluation. The evaluation (practical) is schemed as 30 marks for internal evaluation and 70 marks for external evaluation.

Internal Evaluation

Students' performance in the course will be evaluated on a continuous basis through the following components:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Participation	-	05	05
2	Performance/ Activities	-	05	05
3	Project	-	15	15
4	Attendance	-	05	05
			Total	30

External Evaluation

University Practical examination will be for 70 marks and will test the performance, activities and creative presentations of the students with reference to the course selected:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Viva / Practical	-	70	70
			Total	70

Course Outcome (COs):

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

CO1	be aware about the concept of performing art and its nuances.
CO2	display a working knowledge of historic of drama, its development and current trends in dramatics.
CO3	demonstrate skills in the technical/design preparation and execution of a theatre performance.
CO4	demonstrate the ability to work collaboratively.
CO5	develop essential transferable skills in various relevant areas of the theatre.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ **Reference Books**

1. Bridget Panet (2009) Essential Acting: A Practical Handbook for Actors, Teachers and Directors Routledge, New York.

2. Tom Bancroft (2012) Character Mentor: Learn by Example to Use Expressions, Poses, and Staging to Bring Your Characters to Life Focal Press, New York

❖ **Web Material**

1. https://entertainism.com/elements-of-drama

2. https://www.rcboe.org/cms/lib/GA01903614/Centricity/Domain/5069/the%20elements%20of%20drama.pdf

3. https://marrzipandrama.co.nz/the-6-elements-of-drama/

4. https://www.backstage.com/magazine/article/theater-trends-broadway-2019-66726/

FACULTY OF MANAGEMENT STUDIES
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
HS210.02A Contemporary Dance

Credits and Hours:

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	-	2	-	2	2
Marks	-	100	-	100	

A. Outline of the course:

Sr. No.	Title of the unit	Minimum number of hours
1	Introduction to dance	04
2	Types of Dance	06
3	Basic Elements of Dance	04
4	Technical Skills in Professional Contemporary Dance	06
5	Contemporary Trends in Dance	10
	Total Hours (Practical)	30

Theory Hours: --

Practical Hours: 30

Total Hours: 30

B. Detailed Syllabus:

1. **Introduction to dance**   04 Hours   14%

   - Dance as a Performing Art

   - Dance as a Medium of Expression

   - History and Development of Dance

2. **Types of Dance**   06 Hours   20%

   - Western dance and classical dance

   - Salsa, rumba, hip hop, tap dance, belly dance, etc.

- Indian Classical Dance forms: Odissi, Bharatanatyama, Kathak, Kathakali, Kuchipudi etc.
- Other Regional dance forms in India

3. Basic Elements of Dance   04 Hours   14%
   - Movements of different parts of a body for Expression
   - Concepts of: Nritya, Laya and Taal

4. Technical Skills in Professional Contemporary Dance   06 Hours   20%
   - Dance technique: alignment, balance, co-ordination, flexibility and control
   - Expressive / presentation skills: Dynamic energy, physical engagement with the given material and stage, etc.
   - Skills and processes of rehearsal and production: physical energy, stamina and athleticism

5. Contemporary Trends in Dance   10 Hours   32%
   - Prevalent trends and techniques in contemporary dance
   - Future trends in contemporary dance form
   - On Stage Performance

C. Instructional Methods and Pedagogy:

Teaching will be practical based on the hands on experiences, live and interactive sessions. It will run in the workshop mode. Four Workshops (each of a day) will be organised during the semester.

Evaluation

The students will be evaluated continuously in the form of their consistent performance throughout the semester. There is no theoretical evaluation. There is just practical evaluation. The evaluation (practical) is schemed as 30 marks for internal evaluation and 70 marks for external evaluation.

Internal Evaluation

Students' performance in the course will be evaluated on a continuous basis through the following components:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Participation	-	05	05
2	Performance/ Activities	-	05	05
3	Project	-	15	15
4	Attendance	-	05	05
			Total	30

External Evaluation

University Practical examination will be for 70 marks and will test the performance, activities and creative presentations of the students with reference to the course selected:

Sl. No.	Component	Number	Marks per incidence	Total Marks
1	Viva / Practical	-	70	70
			Total	70

Course Outcome (COs):

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

CO1	be able to develop ability to express through the form of dance.
CO2	have enhanced aesthetic sensitivity.
CO3	have improved concentration, mental alertness, quick reflex action, and physical agility.
CO4	be able to express a natural way human feelings and expressions by creating harmony.
CO5	be able to deliver contemporary dance performance.
CO6	be able to develop ability to express through the form of dance.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO3	-	-	-	-	-	-	-	-	2	2	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	2	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), No correlation:"-"

Recommended Study Material:

❖ Reference Books

1. Helene Scheff, Marty Sprague and Susan Mc Greeve. (1939) *Experiencing dance from student to dance artist*. Human kinetics, New York

2. Robin Grove, Catherine J. Stevens, Shirley McKenzie (2005) Thinking in Four Dimensions: Creativity and Cognition in Contemporary Dance. Melbourne university press, Melbourne

❖ Web Material

1. https://www.liveabout.com/what-is-contemporary-dance-1007423#:~:text=Contemporary%20dance%20is%20a%20style,body%20through%20fluid%20dance%20movements.

2. https://dancemagazine.com.au/2014/01/whats-contemporary-dance-days/

3. https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00071/full

4. https://www.thehindu.com/features/friday-review/dance/what-is-contemporary-dance/article5096022.ece