C24_CURRICULUM

DIPLOMA IN

CIVIL ENGINEERING

Offered By

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING TELANGANA HYDERABAD

TEACHING AND EXAMINATION SCHEME

Sl. No.	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Instruction periods per week			Total Periods per semester	Credits	Continuous internal evaluation			Semester end examination			
			L	T	P			Mid sem. I	Mid sem. II	Internal evaluation	Max. Marks	Min. Marks	Total marks	Min. marks for passing including internal
1	HU-201	Advanced English	4	1	0	75	2.5	20	20	20	40	14	100	End Marks shall be ≥35% of Topper Marks and Subject Total Shall be ≥ D-Hybrid Grade Minimum
2	SC-202	Engineering Mathematics	4	1	0	75	2.5	20	20	20	40	14	100	
3	SC-203	Applied Physics	4	1	0	75	2.5	20	20	20	40	14	100	
4	SC-204	Applied Engineering Chemistry	4	1	0	75	2.5	20	20	20	40	14	100	
5	CS-205	Programming In C	4	1	0	75	2.5	20	20	20	40	14	100	
6	CE-206	Engineering Mechanics	4	1	0	75	2.5	20	20	20	40	14	100	
7	ME-207	Engineering Drawing - II	1	0	2	45	1.25	20	20	20	40	20	100	End Marks shall be ≥50% of Topper Marks and Subject Total Shall be ≥ D-Hybrid Grade Minimum
8	CE-208	Material Testing Lab	1	0	2	45	1.25	20	20	20	40	20	100	
9	SC-209	Applied Science Lab	1	0	2	45	1.25	20	20	20	40	20	100	
10	CS-210	Programming In C Lab	1	0	2	45	1.25	20	20	20	40	20	100	
Total			28	6	8	630	20	200	200	200	400	164	1000	

HU– 201- ADVANCED ENGLISH

Course Title	Advanced English	Course Code	HU-201
Semester	II	Course Group	Foundation
Teaching Scheme in Minutes (L:T)	3:2	Credits	2.5
Methodology	Communicative Language Teaching + Assignments	Total Contact Hours	75
CIE	60 Marks	SEE	40 Marks

Prerequisites: Basic knowledge of English Language

COURSE CONTENTS

MODULE 1: VOCABULARY THROUGH READING - II

Duration: 15 Periods (L 9 P 6)

a. Homonyms, Homophones and Homographs
b. Root-words and Affixes
c. Reading – III
   Passages on Innovation, Science and Technology, History, Biography, Travel Writing, Nature Writing, Journal, Story, Process, Cause and Effect, Problem Solution, Evaluation of ideas, Reasons and Conclusion, etc.
d. Reading – IV
   Passages on Innovation, Science and Technology, History, Biography, Travel Writing, Nature Writing, Journal, Story, Process, Cause and Effect, Problem Solution, Evaluation of ideas, Reasons and Conclusion, etc.

MODULE 2: SPEAKING- III

Duration: 10 Periods (L 6 P 4)

a. Making Requests
b. Offering Help and Suggestions
c. Expressing Obligations
d. Seeking and Giving Permissions

MODULE 3: GRAMMAR-III

Duration: 15 Periods (L 9 P 6)

a. Reported Speech
   Conversion from Direct to Indirect Speech but not vice versa
b. Error Analysis - I
   On nouns, articles, pronouns and verbs
c. Error Analysis - II
   Adjectives, adverbs and Prepositions
d. Error Analysis - III
   Questions, concord, redundancy and other kinds of errors

MODULE 4: SPEAKING – IV

Duration: 10 Periods (L 6 P 4)

a. Giving Directions
b. Giving Instructions
c. Talking about the Past
d. Describing Objects

MODULE 5: WRITING - II

Duration: 15 Periods (L 9 P 6)

a. Mechanics of Writing
   i. Spelling, punctuation marks, capitalization and special symbols
   ii. Different types of fonts, font size, bold, italics, underline, superscript, subscript, alignment, margins, etc.
b. Data Interpretation -I
   i. Understand the information and analyze the flow charts and stating the main idea.
   ii. Describe the process (events or chronological order) interpret flow chart.
   iii. Use connectives and sequence markers and write a meaningful paragraph.
c. Data Interpretation -II
   i. Understand the information in a tree diagram and analyze the data.
   ii. State the main idea and describe the process from key word.
   iii. Explain one branch completely and move to the branches down words and write horizontal direction.
   iv. Use linkers and sequence markers.
d. Data Interpretation –III
   i. Understand the data given in tables and pie charts.
   ii. Analyze and state the main idea of the tables and pie charts.
   iii. Identify the similarities, differences and mention figures.
   iv. Use linkers.

MODULE6: WRITING-III

Duration: 10 Periods – (L 6 P 4)

a. Writing a Resume
   i. Different formats of a resume
   ii. Analyze strengths and weaknesses.
b. Writing a Cover Letter
   i. Importance of cover letter
   ii. Format of cover letter
   iii. Sample cover letter
c. Note Making
   i. Understand the Benefits of Note Making.
   ii. Cue Method
   iii. Mind Mapping
d. Writing a Report
   i. Understand the concept of report writing and formats of various reports.
   ii. Report on an incident.
   iii. Report on an industrial visit.
   iv. Report on events.

COURSE OUTCOMES

CO	At the end of the course the students will be able to
CO 1	Learn vocabulary and use them in professional & social interactions and comprehend the passages.
CO 2	Make requests, offer help and suggestions, express obligations, seek and giving permissions.
CO 3	Learn English grammar to speak and write flawlessly.
CO 4	Give directions and instructions, talk about the past and describe objects.
CO 5	Learn the mechanics of writing to make the technical writing practical and meaningful and interpret the data given.
CO 6	Prepare resumes, prepare cover letters, make notes and draft reports.

CO-PO Matrix

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**Mapping POs**
CO 1	-	-	-	-	2	2	2	5, 6 and 7
CO 2	-	-	-	-	2	2	2	5, 6 and 7
CO 3	-	-	-	-	1	3	2	5, 6 and 7
CO 4	-	-	-	-	2	2	3	5, 6 and 7
CO 5	-	-	-	-	1	2	3	5, 6 and 7
CO 6	-	-	-	-	2	2	3	5, 6 and 7

CONTINUOUS INTERNAL EVALUATION (CIE)

Test	Modules	Marks	Pattern
Mid - I	1. Vocabulary Through Reading- II 2. Speaking - III	20	Part A: 4 short answer questions Part B: 2 short essay questions with internal choice Part C: 2 essay questions with internal Choice
Mid - II	1. Grammar - III 2. Speaking - IV	20	Part A: 4 short answer questions Part B: 2 short essay questions with internal choice Part C: 2 essay questions with internal Choice
Slip Test 1	1. Vocabulary Through Reading - II 2. Speaking - III	5	2 questions out of 3 questions
Slip Test 2	1. Grammar - III 2. Speaking - IV	5	2 questions out of 3 questions
Assignment	One assignment per one semester	5	Different group assignments of higher order questions that develop problem solving skills and critical thinking should be given
Seminars	One seminar per one semester	5	Oral presentations using audio –visual equipment, charts, etc.
	Total	**60**	

Legend:

Remembering: 1 mark Understanding: 3 marks Application: Five marks

Suggested Student Activities:

- Practice conversation / dialogue / speech and answer the questions.
- Seminars.
- Collect the resumes of the successful people.
- Narrate a story.
- Prepare chain stories.
- Vocabulary building games.
- Speak about incidents / events / memories / dreams / role model.
- Interviews of famous personalities.
- Collect the biographies of unsung heroes.
- Read for main ideas and specific details.
- Picture description.
- Collect the letters written by famous persons and analyze them.
- Describe a process.
- Give directions using maps.
- Collect user manuals and analyze the sets of instructions given.
- Collect the various types of reports and analyze the information.
- Collect the official information given in the forms of tables, tree diagrams and pie charts.

REFERENCES:

1. High School English Grammar & Composition by Wren & Martin
2. Practical English Grammar by A.J Thomson and A.V. Martinet
3. A Course in Phonetics and Spoken English by J. Sethi and P.V Dhamija
4. Word Power Made Easy by Norman Lewis.
5. Essential English Grammar by Raymond Murphy.
6. Spoken English-A Self Learning Guide to Conversation Practice by V. Sasi Kumar.

BOARD DIPLOMA EXAMINATION (C-24)

MID SEMESTER EXAMINATION -I

HU-201 ADVANCED ENGLISH

Time: One Hour **Total Marks: 20**

PART - A **1 X 4 = 4 Marks**

Instructions: a) Answer all the questions. b) Each question carries one mark.

1. Write the antonym of words using the root word, 'Micro'.
2. Read the following paragraph and answer the question that follows.

Nature is the best gift of God to all living beings on earth. Human beings depend on nature to survive, whereas trees and other living beings balance eco system in nature. Trees, flowers, animals, mountains, rivers, oceans, valleys, sky, forest etc., are parts of nature. Nature provides us air, water, food, light, health and many more to live. But man is misusing all these natural resources for his greediness.

a) What does nature provide us?

3. How do you request your teacher to repeat the lesson? Write in a sentence.
4. A pregnant lady is boarding a bus with heavy luggage. How do you offer her help?

PART – B **2 X 3 = 6 Marks**

Instructions: a) Answer the following questions. b) Each question carries three marks.

5. i) Use the following homonyms in your own sentences.

a. Right
b. Ring
c. Rise

(OR)

ii) Form antonyms for the given words using suitable prefixes.

a) Loyal
b) Legal
c) Necessary

6. a) Using the words of obligation, write any three precautions you have to take when a little baby is in your home.

(OR)

b) How do you seek permission from your teacher for attending a training programme? Write your discussion in the form of a dialogue.

PART – C **2 X 5 = 10 Marks**

Instructions: a) Answer the following questions. b) Each question carries five marks.

7. a) Read the following passage and answer the questions given below it**.**

Man used to fly in hot air balloons before the airplane was invented. The first hot air balloon was invented in 1780. Hot air, being lighter than the cold air, made the balloon rise. The first hot air balloon was designed by the Montgolfier Brothers. It took flight in 1783. Hydrogen is the lightest of all gases. It is lighter than air. So it gives a greater lift to the balloon than hot air. Thus, the hydrogen balloon was an improvement on the hot air balloon. Ballooning was a popular sport until the 1930s. Today balloons are used for forecasting the weather and in scientific research most balloons contain Helium which is heavier than Hydrogen but does not burn as easily as Hydrogen.

i. Who designed the hot air balloon?
ii. When was the hot air balloon invented?
iii. Why is hydrogen used in balloons?
iv. How are the balloons used for today?
v. What is the meaning of the word, forecast?

(OR)

b). Read the following passage and answer the questions given below it**.**

Malaria is one of the deadliest and most destructive of all diseases. Thousands of people die of it every year in India alone. In the middle ages, people realized that it was common in places where there was stagnant water or the places such as marshes and swamps. They thought the air was the cause of this disease and named it 'malaria' which means bad air. Not till nearly the end of the nineteen century, the great discovery was made that it was not the stagnant water nor was it the marshy air which spread malaria. The real culprit was the mosquito.

i. Name the disease considered to be deadly and destructive?
ii. What is the meaning of malaria according to people of middle ages?
iii. Where was malaria very common?
iv. Nearly how many people die of malaria in India every year?
v. Name the insect responsible for causing malaria?

8. a) How do you request your friend to clarify your doubts in mathematics. Write a dialogue.

(OR)

b) Your younger brother wants to apply for POLYCET. Give him any five suitable suggestions.

BOARD DIPLOMA EXAMINATION (C-24)

MID SEMESTER EXAMINATION -II

HU-201 ADVANCED ENGLISH

Time: One Hour **Total Marks: 20**

PART - A **1 X 4 = 4 Marks**

Instructions: a) Answer all the questions. b) Each question carries one mark.

1. She said, 'I am hungry'. (Change the sentence into reported speech)
2. Vijay along with friends go to temple. (Correct the sentence)
3. Give directions to your sister from your home to reach library in your town.
4. Describe your mobile using four adjectives.

PART-B **2 x 3 = 6 Marks**

Instructions: a) Answer all the questions. b) Each question carries three marks.

5. a)Change the following into indirect speech.
   i. She said to him, "Where are you going?"
   ii. He said to her, "I bought books yesterday."
   iii. Sunil said to me, "Will you bring your camera tomorrow?"

   (OR)

   b) Correct the following sentences.
   i. They discussed about politics.
   ii. We buy a car two days ago.
   iii.She is my older sister.

6. a) How did you celebrate your birthday recently?

   (OR)

   b) Describe your laptop or desktop computer in 50 words.

PART-C **2 X5 = 10 Marks**

Instructions: a) Answer all the questions. b) Each question carries five marks.

7. a)Change the following sentences into reported speech.
   i. She said," I saw a cute dog in the park."
   ii. He said, "Iam going out."
   iii. Vijay said, "It may rain now."
   iv. Chandu said, "Wewill go to school tomorrow."
   v. Madhuri said to Prasad, "When did you come?"

   (Or)

b)Correct the following sentences.

i) My birth day is on January.
ii) You must and should come here.
iii) This is the horse who won the race.
iv) I prefer coffee than tea.
v) I am having a car.

8. a) Write instructions for taking a bus pass.

   (Or)

b) Give suggestions to your friend on how to score good marks in POLYCET

BOARD DIPLOMA END EXAMINATION (C-24)

SEMESTER END EXAMINATION

HU-201 ADVANCED ENGLISH

Time: Two Hours **Total Marks: 40**

PART-A **1 X 8 = 8 Marks**

Instructions: a) Answer all the questions. b) Each question carries one mark.

1. Write the antonyms of the following words using the suitable prefixes.
   a) logical b) polite
2. Correct the following sentence.
   a) This is the best of the two books I have.
3. What salutations do you use in a cover letter?
4. Rewrite the following sentence using appropriate punctuation marks and capital letters.
   a) she told him that she had returned bhaskars book yesterday
5. Correct the spellings of the following words.
   a) shedule b) plander
6. Rewrite the following sentence using the appropriate punctuation marks and capital letters.
   vinod went to hyderabad on 2nd march 2024.
7. You are applying for the post of Assistant Engineer in BHEL. Write the educational qualifications in the resume.
8. What complimentary closure do you use in a cover letter?

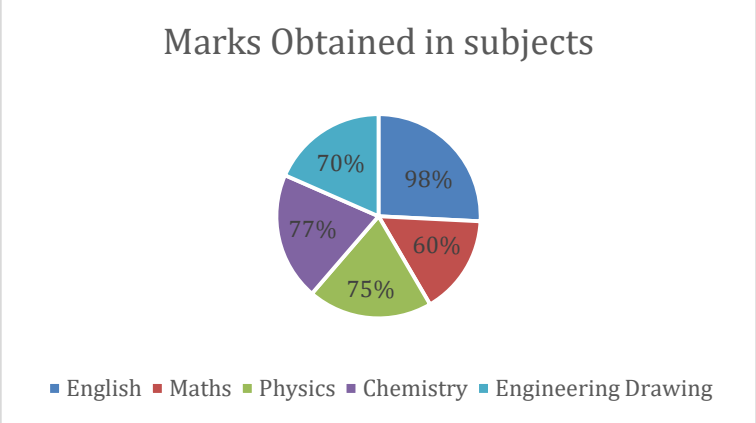
PART-B **3 X 4 = 12 Marks**

Instructions: a) Answer all the questions. b) Each question carries three marks.

9. a) Add affixes to the following words.
   i) Value
   ii) Create
   iii) Sense

(OR)

b) Write a short paragraph on the following Pie chart.



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10.a) Write about your favourite past incident.

(OR)

b) Write your three strengths and three limitations.

11.a) Read the following sentence and provide proper punctuation marks.

i) drajay studied his mbbs in gandhi medical college

(OR)

b) Write a paragraph interpreting the data given in the following table.

Year	Salary	Expenditure on housing and transport	Interests on Loan	Savings
2018	70k	30k	7k	33k
2029	75k	35k	10k	30k
2020	80k	40k	13k	37k
2021	90k	45k	13k	37k
2022	1L	50k	14k	46k
2023	1.5L	52k	14k	86k

12. a) V. Vijay completed his M.Tech. He wants to apply for the post of Executive Engineer in Pragathi Engineering Company. Prepare a resume for the same.

(OR)

b) Read the following paragraph and make notes.

Yuvraj Singh is one of the most phenomenal cricketers who have redefined winning over struggle. Since the year 2000, this Punjab boy is the reason for many victories of India. His personal life and his struggle with the dreaded disease cancer is an inspiration for all of us. He is also one of the players who is honored with Arjuna award and has been declared Man of the Tournament in the 2011 ICC Cricket World Cup. Yuvraj Singh made a comeback to India national cricket team (ODI squad) after a lengthy period earlier this year, and fared average. The cricketer, also known for entrepreneurial initiatives and his charity work, says cricket will always be a priority in his life but he also tries to inspire young people with his story. He made India proud by hitting six sixes off an over in 2007, and was part of the Indian cricket team when they won World Cup 2011. But the turning point came in his life when he battled cancer in 2012. Yuvraj found a new meaning to life after the hardship. “Earlier on in my career, it was more about cricket and now it is being more about inspiring people to come out of the adversity and create examples... Since my treatment, things have changed a lot for me.”

PART-C **4X 5 = 20 Marks**

Instructions: a) Answer all the questions. b) Each question carries five marks. .

13. a) Read the following paragraph and answer the questions:

Once, there lived two friends in a village. Their names were Bhaskar and Suresh. One day they set out on a journey and had to pass through a forest. As they were passing through the forest they saw a big bear coming towards them. They were frightened. Bhaskar at once climbed up a nearby tree to save his life. Suresh did not know how to climb up a tree. But he was wise and intelligent. He had heard that bears do not touch the dead. So he lay on the ground, held his breath and appeared to be dead. The bear came near him sniffed him, thinking him to be dead, it went away. When the bear had left Bhaskar came down from the tree and asked Suresh what the bear had whispered in his ear. Suresh said that the bear had advised him to beware of false friends.

1. Where were the friends going one day?
2. What is the antonym of the word, wise?
3. What did Bhaskar do when bear came towards them?
4. How can you say Suresh was wise and intelligent?
5. Did the Bear really whisper in Suresh's ear?

(OR)

b)Write a paragraph interpreting analyzing the information given in the following table.

Table Showing the Number of Students Admitted in Different Branches in Private Engineering Colleges in the Past Four Years.

Year	**ECE**	**EEE**	**Mechanical**	**Civil**	**CSE**
2023	54065	36255	21600	34000	13436
2022	49008	36255	20900	29000	22687
2021	45032	36255	20600	14500	32008
2020	38060	36254	20300	14500	38065

14.a) Change the following into indirect speech.

i. He said." I have eaten a banana."
ii. She said," I will go to Chennai tomorrow."
iii. Hari said, "I can speak French."
iv. Karunakar said to Vani, "I have completed my homework."
v. Doctor said to Mani, "Are you a Professor?"

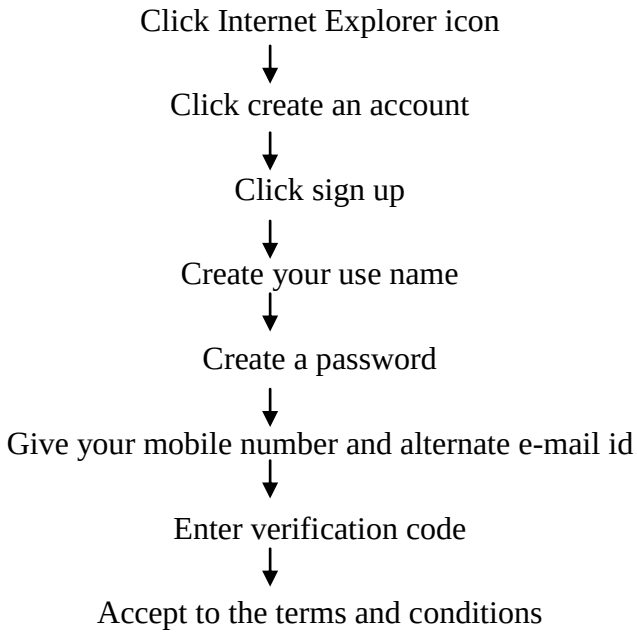
(OR)

b) Write a report on the industry you visited recently.

15. a) Rewrite the following sentences using proper punctuation marks and capital letters.

i. when you are coming.
ii. i love Flowers?
iii. this is my cousins book.
iv. “all that glittersis not gold.
v. What a melodious song?

b)Observe the following flow chart and write a paragraph describing the steps involved in creating an e-mail.



16. a) Write a cover letter applying for the post of Work Supervisor at Bharath Electronics Private Limited.

(OR)

b) Write a report to the Principal on how you have conducted the Seminar on Robotics.

SC-202 - ENGINEERING MATHEMATICS

Course Title	Engineering Mathematics	Course Code	SC-202
Semester	II	Course Group	Foundation
Teaching Scheme in Periods (L : T : P)	4:1:0	Credits	2.5
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites:
This course requires the basic knowledge of Algebra, Trigonometry in Mathematics at Secondary school level and Basic Engineering Mathematics at Diploma 1st Semester level

Course Outcomes (COs):
At the end of the course, the student will have the ability to:

CO 1	Solve simple problems in straight lines and circle using various formulae
CO 2	Solve the simple problems in conic section by using its properties
CO 3	Evaluate the Limits of Algebraic, Rational and Trigonometric functions.
CO 4	Determine the Derivatives of various Functions
CO 5	Determine the Derivatives of various functions by using various Differentiation Methods
CO 6	Solve some problems in Geometrical applications of derivatives and Maxima and Minima

Course Contents:

Unit – I Straight lines and Circles: Duration: 12 Periods (L: 10– T:2)

Straight lines: Slope of straight line - Various forms of straight line-Horizontal and Vertical lines, Point-Slope form, Two-Point form, Slope-Intercept form, Intercept form, Normal form and General equation of a Straight line- Angle between two Straight lines- Conditions for Parallelism and Perpendicularity of the Straight lines –Equations of parallel and Perpendicular Straight lines- Distance of a point from a line -Distance between two Parallel lines - Intersection of two non-parallel lines - Related problems.
Circles: Definition of Locus of a point and Circle and its equation - Equation of the Circle, given(i) Centre and Radius, (ii) Two ends of a Diameter (iii) Centre and a point on the Circumference (iv) Centre and Tangent and (v) Three non-collinear points - Related problems.

Unit – II Conic Sections: Duration: 13Periods (L: 10 – T:3)

Definitions of Conic Section, Focus, Eccentricity, Directrix, Axes and Latus rectum - **Parabola**: Standard equations of Parabolas have focus on one of the coordinate axes; vertex at origin and directrix is parallel to the other coordinate axis -**Ellipse**: Standard equations of Ellipses have centre at the origin and the major and minor axes are coordinate axes - **Hyperbola**: Standard equations of Hyperbola have centre at the origin and the transverse and conjugate axes are coordinate axes -Related properties and problems.

Unit-III Functions& Limits: **Duration: 12Periods (L: 10– T: 2)**

Definition of a function -Constants and Variables - Independent and Dependent Variables - Various types of functions: Constant function, Explicit and Implicit functions, Even and Odd functions, Hyperbolic functions, Modulus function and Function of a function with examples - Intervals and Neighbourhoods - Meaning of $x \to a$ - Definition of Limit of a function - Properties of Limits - Indeterminate forms- Standard Limits (without proof)- Evaluation of Limits of the form: $\lim_{x\to\infty} \frac{f(x)}{g(x)}$ using Algebraic techniques- Evaluation of limits of the form: $\lim_{x\to l} \frac{f(x)}{g(x)}$ using Direct Substitution, Factorization, Rationalization and Reduction to Standard forms.

Unit – IV Differential Calculus – I: **Duration: 13 Periods (L: 10 – T:3)**

Definition of Derivative of a function(First Principle of Derivatives) -Different notations - Derivatives of Standard Algebraic, Logarithmic, Exponential, Trigonometric, Hyperbolic and Inverse Trigonometric functions - Algebra of derivative of functions: Derivatives of Sum, Difference, Scalar Multiplication, Product, Quotient of functions-Derivative of function of a function(Chain rule)- Related problems.

Unit – V Differential Calculus – II: **Duration: 13Periods (L: 10 – T: 3)**

Logarithmic Differentiation -Derivative of Implicit functions - Differentiation of an Infinite Series - Derivative of Parametric functions- Differentiation of a function with respect to another function-Successive differentiation with emphasis on second order-Functions of several variables - Partial Differentiation - Euler's theorem for Homogeneous functions - Related problems.

Unit – VI Applications of Derivatives: **Duration: 12Periods (L: 10– T: 2)**

Geometrical Applications: Geometrical meaning of the Derivative -Slope of Tangent, Slope of Normal, Equations of Tangent and Normal to the curve at any point on the curve - Lengths of Tangent, Normal, Sub-tangent and Sub-normal to the curve at a point on the curve - Angle between two intersecting curves - Related problems.
Maxima & Minima: Increasing and decreasing functions - Extreme values and Extreme points - Conditions for Maxima and Minima of function of single variable -The maxima and minima of simple functions - Problems leading to engineering applications.

Reference Books:
1. The Elements of Co - Ordinate Geometry – by S.L. Loney.
2. Thomas Calculus, Pearson Publications.
3. NCERT Mathematics Text Books of Class XI, XII.
4. Intermediate Mathematics Text Book IB (Telugu Academy).
5. Differential Calculus -by Shanti Narayan and P. K. Mittal.

Suggested E-Learning references:
1. https://www.khanacademy.org/
2.https://www.desmos.com/
3. https://www.wolframalpha.com/
4.http://tutorial.math.lamar.edu/

Suggested Learning Outcomes:

At the end of the course, the student will have the ability to:

CO1: Solve simple problems in straight lines and circle using various formulae

1.1 Define slope of a straight line.
1.2 Classify various forms of a straight line:
(i) Horizontal and Vertical lines,
(ii) Point-slope form,
(iii) Two-point form,
(iv) Slope-intercept form,
(v) Intercept form,
(vi) Normal form and
(vii) General equation of a straight line.
1.3 Solve the problems on 1.2.
1.4 Find the acute angle between two straight lines.
1.5 Explain the conditions for parallelism and perpendicularity of straight lines.
1.6 Find the equation of parallel line which is passing through the given point.
1.7 Find the equation of perpendicular line which is passing through the given point.
1.8 Calculate the distance of a point from a line.
1.9 Evaluate the distance between two parallel lines.
1.10 Determine the point of intersection of two non-parallel lines.
1.11 Define locus of a point and circle.
1.12 Write the general equation of a circle with centre and radius.
1.13 Find the equation of a circle having its centre and radius.
1.14 Find the equation of a circle having two ends of a diameter.
1.15 Find the equation of a circle having its centre and a point on the circumference.
1.16 Find the equation of a circle having its centre and tangent.
1.17 Find the equation of a circle passing through three non-collinear points.
1.18 Solve the related problems from 1.12 to 1.17.

CO2: Solve the simple problems in conic section by using its properties

2.1 Define conic section.
2.2 Explain the terms focus, eccentricity, directrix, axes and latus- rectum of the conic.
2.3 Describe the properties of parabola in standard forms have focus on one of the coordinate axes; vertex at origin and directrix is parallel to the other coordinate axis.
2.4 Describe the properties of ellipses in standard forms have centre at the origin and the major and minor axes are coordinate axes.
2.5 Describe the properties of hyperbolas in standard forms have centre at the origin and the transverse and conjugate axes are coordinate axes.
2.6 Solve the problems related to 2.3, 2.4 and 2.5

CO3: Evaluate the Limits of Algebraic, Rational and Trigonometric functions.

3.1 Define function with example.
3.2. Explain constants, variables, independent and dependent variables.
3.3 Define various types of functions:
(i) Constant function,
(ii) Explicit and Implicit functions,
(iii) Even and Odd functions,
(iv) Hyperbolic functions,
(v) Modulus function and
(vi) Function of a function with examples.
3.4 Explain intervals and neighbourhoods.

3.5 Explain the meaning of $x \to a$.
3.6 Define Limit of a function.
3.7 Explain the Properties of Limits.
3.8 State indeterminate forms.
3.9 State the standard limits: $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to 0}\frac{tan\ x}{x}$, $\lim_{x\to 0}\frac{a^x-1}{x}$, $\lim_{x\to 0}\frac{e^x-1}{x}$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$, $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$.
3.10 Evaluate the Limits of the form $\lim_{x\to\infty}\frac{f(x)}{g(x)}$ using Algebraic techniques.
3.11 Evaluate limits of the form $\lim_{x\to l}\frac{f(x)}{g(x)}$ using
(i) Direct substitution,
(ii) Factorization,
(iii) Rationalization and
(iv) Reduction to standard forms.

CO4: Determine the Derivatives of various Functions

4.1 Define the concept of derivative of a function $y = f(x)$ as $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ (First Principle of Derivatives) and also provide standard notations to denote the derivative of a function.
4.2 Find the derivatives of simple elementary functions like k (constant), x^n, $\sqrt{x}$, Sin x, Cos x using the First Principle of Derivatives.
4.3 List the formulae for derivatives of standard algebraic, logarithmic, exponential, trigonometric, hyperbolic and inverse trigonometric functions.
4.4 Use the Algebra of derivatives of functions, i.e. derivative of sum, difference, scalar multiplication, product and quotient of functions to solve problems.
4.5 Find the derivatives using the method of Differentiation of a Function of a function (Chain rule).

CO5: Determine the Derivatives of various functions by using various Differentiation Methods

5.1 Apply the Properties of Logarithms for differentiating functions of the form: $[f(x)]^{g(x)}$.
5.2 Explain the procedure for finding derivatives of Implicit functions with examples.
5.3 Find the derivatives of Infinite series of the form: (i) $\sqrt{f(x)+\sqrt{f(x)+\sqrt{f(x)\ldots\infty}}}$ and (ii) $f(x)^{f(x)^{f(x)\cdots\infty}}$.
5.4 Explain the method of Parametric Differentiation with examples.
5.5 Explain the method of Differentiation of a function with respect to another function with examples.
5.6 Explain successive differentiation with examples and solve engineering problems related to second order.
5.7 Define functions of several variables and explain partial derivatives up to second order with examples.
5.8 Define homogeneous functions with examples.
5.9 State Euler's theorem for homogeneous functions.
5.10 Verify Euler's theorem for homogeneous functions.
5.11 Apply Euler's theorem to solve engineering problems involving partial derivatives.

CO6: Solve some problems in Geometrical applications of derivatives and Maxima and Minima

6.1 State the geometrical meaning of the derivative of a function as the slope of the tangent to the curve $y=f(x)$ at any point on the curve.
6.2 Use the concept of derivative to find the slope of normal at a point on the curve.
6.3 Determine the equations of tangent and normal to the curve $y=f(x)$ at any point on the curve.
6.4 Calculate the lengths of tangent, normal, sub-tangent and sub-normal at any point on the curve $y=f(x)$.
6.5 Apply the concept of derivatives for finding the angle between two intersecting curves with illustrative examples.
6.6 Define increasing and decreasing functions.
6.7 State the conditions for increasing and decreasing functions.
6.8 Use the conditions 6.7 to find points where the given function is increasing or decreasing.
6.9 Define Extreme Values (Maximum and minimum values) and Extreme points (Points of Maximum and minimum) of a function of single variable.
6.10 Explain conditions for maxima and minima.
6.11 Find the Maxima and minima of simple functions.
6.12 Apply maxima and minima to solve engineering problems.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2. Quiz.
3. Group discussion.
4. Group Tests.
5. Formulae Tests.
6. Surprise tests.
7. Seminars.
8. Home assignments.
9. Mathematics for preparing competitive exams. Solving old question papers on arithmetical ability.

CO / PO - MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapped POs
CO1	3	1					3	1,2,7
CO2	3	2					3	1,2,7
CO3	3	2	1				3	1,2,3,7
CO4	3	2	1				3	1,2,3,7
CO5	3	2	1				3	1,2,3,7
CO6	3	2	3				3	1,2,3,7

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS (C - 24)
SC-202
SEMESTER II, MID – I EXAM, MODEL PAPER
ENGINEERING MATHEMATICS

Duration: 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions. 04 × 01 = 04
2 Each question carries **ONE** mark.

1. Write the normal form of a straight line.
2. Find the equation of the point circle whose centre is (1,2).
3. Write the standard form an ellipse whose major axis is *x*- axis.
4. Find the equation of directrix of the parabola $y^2 = 36x$.

PART-B

Instructions: 1. Answer any **TWO** questions. 02 × 03 = 06
2. Each question carries **THREE** marks.

. 5(a) If the equation of a line is $3x - 4y + 10 = 0$, then find i) its slope ii) *x* & *y* intercepts.

OR

5(b) Find the equation of the circle passing through the points (2,3) and touches the line $x - 3y - 11 = 0$.

6(a) Find the equation of the parabola whose focus is $(5, 0)$ and directrix is $x + 5 = 0$.

OR

6(b) Find the equation of an ellipse whose end points of major axis are $(\pm 3, 0)$ and end points of minor axis are$(0, \pm 2)$.

PART C

Instructions: 1. Answer any **FOUR** questions. 02× 05 = 10
2. Each question carries **FIVE** marks.

7(a) Find the angle between straight lines $x + 3y - 1 = 0$ and $2x + 5y - 2 = 0$.

OR

7(b) Find the equation of the circle passing through the points (0, 0), (2, 0) and (0, 3).

8(a) Find the coordinates of foci, eccentricity and the length of latus rectum, equations of latera-recta and directrices of the ellipse $49y^2 - 16x^2 = 784$.

OR

8(b) Find the equation of the hyperbola whose centre is at (0,0) and passes the points (3,2) and (1,6).

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS (C - 24)
SC-202
SEMESTER II, MID – II EXAM, MODEL PAPER
ENGINEERING MATHEMATICS

Duration: 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions. 04 × 01 = 04
2 Each question carries **ONE** mark.

1. Find $\lim_{x\to 3}\left(\frac{x^3-3x^2}{x^2-5x+6}\right)$.
2. Find $\lim_{\theta\to 0}\left(\frac{\sin 2\theta}{\theta}\right)$.
3. Differentiate $\tan(3x-7)$ with respect to *x*.
4. If $y = x.e^x$, then find $\frac{dy}{dx}$.

PART-B

Instructions: 1. Answer any **TWO** questions. 02 × 03 = 06
2. Each question carries **THREE** marks.

5(a) Evaluate: $\lim_{x\to 5}\left(\frac{x^3-125}{x-5}\right)$.

OR

5(b) Evaluate: $\lim_{x\to\infty}\left(1+\frac{5}{x}\right)^x$.

6(a) Find the derivative of $\left(\frac{2x+3}{4x+5}\right)$ with respect to *x*.

OR

6(b) Differentiate $\sin^{-1}(3x-4x^3)$ with respect to *x*.

PART C

Instructions: 1. Answer any **FOUR** questions. 02 × 05 = 10
2. Each question carries **FIVE** marks.

7(a) Evaluate: $\lim_{n\to\infty}\frac{1^2+2^2+3^2+\ldots+n^2}{n^3}$.

OR

7(b) Evaluate: $\lim_{\theta\to 0}\left(\frac{\cos 3\theta-\cos 5\theta}{\cos 7\theta-\cos 9\theta}\right)$.

8(a) If $y=\sqrt{e^x+log(log(sin\,x))}$ then find $\frac{dy}{dx}$.

OR

8(b) Find the derivative of $\sin x$ with respect to *x* by using first principle of derivatives.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATIONS (C - 24)
SC-202
SEMESTER II, END SEMESTER EXAM, MODEL PAPER
ENGINEERING MATHEMATICS

Duration: 2:00 Hours **Max. Marks: 40**

PART-A

Instructions: 1. Answer **ALL** questions. 08 × 01 = 08
2 Each question carries **ONE** mark.

1. Find the slope of a straight line passing through the points $(-2, 3)$ and (4,8).
2. Find $\lim_{x\to 0} \frac{x^2+3x+2}{x^2+4x+3}$.
3. Find the second order derivative of $x^3 + 4x^2 + 2$ with respect to *x*.
4. Write the equation of a parabola whose focus is$(a,0)$ and the directrix is$x = -a$.
5. If $u(x, y) = x^2y$, then find $\frac{\partial y}{\partial x}$.
6. Find $(\frac{dy}{dx})$ if $xy = 2025$.
7. Find the slope of the curve $y = x^2 + 5x - 2025$ at (1, 2).
8. Write the conditions for a point to be a minimum point on the curve $y = f(x)$.

PART-B

Instructions: 1. Answer any **FOUR** questions. 04 × 03 = 12
2. Each question carries **THREE** marks.

9(a)If (1, 3) is an extremity of a diameter of the circle $3x^2 + 3y^2 + 6x - 12y - 2 = 0$, then find the other end point of the diameter.

OR

9(b)If $y = x^x$,then find $\frac{dy}{dx}$.

10(a)Evaluate: $\lim_{x\to 0} \frac{1-\cos x}{x^2}$.

OR

10 (b)Find the equation of tangent to the curve $y^2 = 8x$, at (2, 4).

11(a) Find $\frac{dy}{dx}$, if $x = \lambda t$ and $y = \frac{\lambda}{t}$.

OR

11(b)If $u = tan^{-1}\left(\frac{y}{x}\right)$, then prove that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$.

12(a)The sum of two numbers is 20. Find the numbers such that the sum of their squares is minimum.

OR

12 (b)Find the angle between the curves$y = x^2$ and$x^2 = y$.

PART C

Instructions: 1. Answer any **FOUR** questions 04 × 05 = 20
2. Each question carries **FIVE** marks

13(a) Find the centre, foci, vertices, eccentricity, length of latus-rectum and lengths of major and minor axes of the ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$

OR

13 (b)$Find\ \frac{dy}{dx}$, if$\sqrt{x}+\sqrt{y}=\sqrt{a}$

14 (a) Differentiate $\log\left(x+\sqrt{x^2+1}\right)$ with respect to x.

OR

14 (b) Show that $y^2=4(x+1)$ and $y^2=36(9-x)$ cut each other orthogonally.

15(a). $If\ y=(sin\ x)^{(sin\ x)^{(sin\ x)\ldots\ldots\infty}}$, then find $\frac{dy}{dx}$.

OR

15 (b) Find the derivative of log tan 2$x$with respect to cot 2x

16 (a).A right circular cylinder is inscribed in a sphere of radius R, show that the volume is maximum when its height is$\frac{2R}{3}$.

OR

16 (b)Find the lengths of tangent, normal, sub-tangents and sub-normal for the curve $2x^2+3xy-2y^2-8=0$ at (2, 3).

SC-203 - APPLIED PHYSICS

Course Title:	Applied Physics	Course Code :	SC-203
Semester:	II Semester	Course Group :	Foundation
Teaching Scheme in Periods(L:T:P):	4:1:0	Credits :	2.5
Type of Course :	Lecture+ Tutorials	Total Contact Periods :	75 Periods
CIE :	60 Marks	SEE :	40 Marks

Pre requisites

This course requires the basic knowledge of Science and Mathematics

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Explain the motion characteristics displacement, velocity, acceleration of Simple Harmonic Motion and apply the formulation to obtain time period of simple pendulum.
CO2	Classify wave motions and apply mathematical formulations to echo, Doppler effect and identify causes, effects and minimizing method of noise pollution.
CO3	Explain basic concepts of electricity and extend Kirchhoff's laws to construct Meter bridge to determine unknown resistance.
CO4	Identify magnetic materials and apply laws of electromagnetic induction to construct transformer.
CO5	Utilize the laws and principles of Photoelectric effect, LASER and optical fibers to build Photocell and Ruby LASER.
CO6	Apply the properties of semiconductors and volt-ampere characteristics of P-N junction diode to construct half wave and full wave rectifiers and Light Emitting Diode.

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	**3**	**-**	**-**		**-**	**-**	**2**	1,7
CO2	**3**	**-**	**-**	**1**	**-**	**-**	**2**	1,4,7
CO3	**3**	**1**	**-**	**1**	**-**	**-**	**2**	1,2,4,7
CO4	**3**	**1**	**-**	**1**	**-**	**-**	**2**	1,2,4,7
CO5	**3**		**-**	**1**	**-**	**-**	**2**	1,4,7
CO6	**3**		**-**	**1**	**1**	**-**	**2**	1,4,5,7

Course content:

Unit 1 Simple Harmonic Motion

Duration: 12 periods (L: 10 – T: 2)

Periodic motion and Simple Harmonic Motion (SHM) – examples of SHM, conditions of SHM, time period, frequency, amplitude and phase of a particle in SHM-definitions, expressions for Displacement, Velocity, Acceleration, Time period and Frequency of a particle executing in SHM – derivations- numerical problems, Ideal simple pendulum-definition, expression for time period of simple pendulum-derivation- numerical problems, laws of simple pendulum, second's pendulum-length of second's pendulum.

Unit 2 Waves and Acoustics

Duration: 13 periods (L:10 – T:3)

Wave-definition-characteristics, longitudinal and transverse waves –explanation- examples –Audible range, infrasonic and ultrasonic waves, expression relating wave velocity, frequency and wavelength-derivation- numerical problems, , phenomenon of beats - applications - numerical problems, echo – explanation- time of echo from a distant obstacle-derivation- numerical problems-applications of echo, Doppler Effect in sound-formula for Doppler shift- numerical problems, applications of Doppler Effect, SONAR, Reverberation, reverberation time and Sabine's formula, acoustics of good auditorium, free and forced vibrations, and resonance – definition-examples, noise pollution- causes, effects and methods to minimize noise pollution.

Unit 3 Electricity

Duration: 12 periods (L: 10 – T: 2)

Electric current and potential difference-summarize, Ohm's law-explanation-numerical problems, specific resistance-explanation-numerical problems, conductivity and conductance-definitions, combination of resistors in electric circuit –formula for series and parallel combination-related numerical problems, Heating effect of electric current –applications- heat produced and electric power consumed in a current carrying wire -derivations, electric power- numerical problems, Kirchhoff's laws in electricity –explanation- numerical problems, Wheatstone's bridge –explanation, condition for balancing of Wheatstone's bridge –derivation-numerical problems, Meter Bridge-explanation-numerical problems.

Unit 4 Electromagnetism

Duration: 13 periods (L: 10 – T: 3)

Magnetic pole, pole strength, magnetic length of a bar magnet. Magnetic field, magnetic lines of force and magnetic induction, properties of magnetic lines of force, uniform and non uniform magnetic fields, magnetic flux, magnetization, magnetic intensity, magnetic permeability and magnetic susceptibility- simple numerical problems, types of magnetic materials. Coulomb's inverse square law of magnetism-explanation-numerical problems, expression for moment of couple on a bar magnet placed in a uniform magnetic field- derivation- numerical problems, expression for magnetic induction field strength at a point on the axial line of a bar magnet –derivation- numerical problems, Faraday's laws of electromagnetic induction, Lenz's law-explanation, self induction and mutual induction, construction of transformer-types of transformers-numerical problems.

Unit 5 Modern Physics

Duration: 13 periods (L: 10 – T: 3)

Electromagnetic spectrum-regions, Photo electric effect-explanation-Einstein's photo electric equation, work function and threshold frequency, laws of photo electric effect, working of photocell, applications of photocell, LASER-definition, concept of energy levels, Spontaneous emission, Stimulated emission, population inversion and optical pumping, characteristics of LASER, Ruby LASER, applications of LASER, critical angle and total internal reflection of light, principle and working of Optical fiber, types of optical fiber (Step index and Graded index), applications of optical fiber, Nanosclae and properties of nanomaterials - applications.

Unit 6 Semiconductor Physics

Duration: 12 periods (L: 10 – T: 2)

Valence band, Conduction band and Forbidden energy gap in solids-explanation, Conductors, Insulators and Semiconductors on the basis of energy band diagram, Fermi level, Intrinsic semiconductors-explanation-examples, concept of hole and doping in semiconductors, Extrinsic semiconductors-explanation, PN Junction Diode-explanation, Forward bias and Reverse bias of PN diode , Volt-Ampere (V-I) characteristics of PN Diode, applications of PN Diode, half wave rectifier and full wave rectifier, working principle of Light Emitting Diode (LED).

Reference Books

1. Principles of Physics by N. Subrahmanyam and Brijlal, S. Chand & Co, New Delhi, edition, 1982
2. Engineering Physics by R.K. Gaur, S.L. Gupta, Dhanpatrai Publications, New Delhi.
3. Intermediate Physics, Telugu Academy, TS, Hyderabad.
4. Fundamentals of Physics by Halliday and Resnick.
5. Physics Part-I & II, NCERT

E-learning resources:

Hyper Physics website: http://hyperphysics.phy-astr.gsu.edu/

Learning Outcome:

Upon completion of this course the student will be able to

CO1: Explain the motion characteristics displacement, velocity, acceleration of Simple Harmonic Motion and apply the formulation to obtain time period of simple pendulum.

1.1 Explain periodic motion and Simple Harmonic Motion (SHM).
1.2 List the examples of SHM.
1.3 List the conditions of Simple Harmonic Motion.
1.4 Define the terms time period, frequency, amplitude and phase of a particle in SHM.
1.5 Develop the expressions for Displacement, Velocity, Acceleration, Time period and Frequency of a particle executing in SHM and solve numerical problems.
1.6 Define Ideal simple pendulum and develop the expression for time period of simple pendulum and solve numerical problems.
1.7 Develop the laws of simple pendulum.
1.8 Define second's pendulum and determine its length on the Earth.

CO2: Classify wave motions and apply mathematical formulations to echo, Doppler effect and identify causes, effects and minimizing method of noise pollution.

2.1 Define wave and outline the characteristics of wave (frequency, wavelength, amplitude and time period).
2.2 Explain longitudinal and transverse waves with examples and distinguish them.
2.3 Explain audible range, infrasonic waves and ultrasonic waves.
2.4 Develop the expression relating wave velocity, frequency and wavelength($v = n\lambda$) and solve numerical problems.
2.5 Explain the phenomenon of beats with legible diagram, list the applications of beats and solve numerical problems.
2.6 Explain echo and develop the formula for time of echo from a distant obstacle and solve numerical problems.
2.7 List the applications of echo.
2.8 Explain Doppler Effect in sound (no derivation, formulae only)- (i) source moves toward stationary observer (ii) source moves away from stationary observer (iii) observer moves

toward stationary source (iv) observer moves away from stationary source and solve simple numerical problems.

2.9 List the applications of Doppler Effect.
2.10 Explain SONAR.
2.11 Explain Reverberation, reverberation time and outline Sabine's formula.
2.12 Identify the requirements for acoustically good auditorium.
2.13 Explain free vibrations, forced vibrations and resonance with examples.
2.14 Explain noise pollution and identify the causes, effects and methods to minimize noise pollution.

CO3: Explain basic concepts of electricity and extend Kirchhoff's laws to construct Meter bridge to determine unknown resistance.

3.1 Summarize the concept of electric current and potential difference.
3.2 Explain Ohm's law and solve numerical problems.
3.3 Explain specific resistance ($\rho = \frac{RA}{l}$) and solve related numerical problems.
3.4 Define conductivity and conductance.
3.5 Explain combination of resistors in electric circuit and develop formulae for equivalent resistance in series and parallel connection and solve related numerical problems.
3.6 Explain Heating effect of electric current and list the applications of it. Develop formulae for heat produced ($H = I^2Rt$) and electric power consumed ($P=VI$) in a current carrying wire and solve numerical problems.
3.7 Explain Kirchhoff's laws in electricity and solve numerical problems.
3.8 Construct Wheatstone bridge and develop balancing condition of it starting from Kirchhoff's laws in electricity and solve numerical problems.
3.9 Construct Meter Bridge for determination of unknown resistance and solve numerical problems.

CO4: Identify magnetic materials and apply laws of electromagnetic induction to construct transformer.

4.1 Explain magnetic pole, pole strength and magnetic length of a bar magnet.
4.2 Explain magnetic field, magnetic lines of force and magnetic induction.
4.3 List the properties of magnetic lines of force.
4.4 Explain uniform and non uniform magnetic fields.
4.5 Define magnetic flux.
4.6 Explain magnetization, magnetic intensity, magnetic permeability and magnetic susceptibility and solve simple numerical problems.
4.7 Explain types of magnetic materials (dia, para and ferro magnetic materials) based on magnetic properties.
4.8 Explain Coulomb's inverse square law of magnetism and solve numerical problems.
4.9 Develop expression for moment of couple on a bar magnet placed in a uniform magnetic field ($C = MB\ Sin\theta$) and solve numerical problems.
4.10 Develop expression for magnetic induction field strength at a point on the axial line of a bar magnet [$B = \frac{\mu_0}{4\pi}\frac{2M}{d^3}$]and solve numerical problems for short bar magnet.
4.11 Explain Faraday's laws of electromagnetic induction.
4.12 Explain Lenz's law.
4.13 Explain Self induction and Mutual induction.
4.14 Explain construction and working of transformer using the principles of electromagnetic induction with legible diagram.
4.15 Construct a transformer to Step up and Step down input voltage with legible sketch.

CO5: Utilize the laws and principles of Photoelectric effect, LASER and optical fibers to build Photocell and Ruby LASER.

5.1 Outline the regions of electromagnetic spectrum.
5.2 Explain Photo electric effect.
5.3 Outline Einstein's photo electric equation; explain work function and threshold frequency and solve numerical problems.
5.4 Develop laws of photo electric effect.
5.5 Explain construction and working of photocell.
5.6 Identify applications of photocell.
5.7 Explain LASER and concept of energy levels (Ground state, excited state and Meta stable state).
5.8 Explain Spontaneous emission, Stimulated emission, population inversion and optical pumping.
5.9 List the characteristics of LASER.
5.10 Explain construction and working of Ruby LASER.
5.11 Identify applications of LASER.
5.12 Explain critical angle and total internal reflection of light.
5.13 Make use of optical properties to explain working of Optical fiber.
5.14 Construct Step index and Graded index optical fibers.
5.15 Identify applications of optical fiber.
5.16 Explain Nanoscale and identify properties at nano scale.
5.17 Classify Nanomaterials (zero, one, two and three dimensional).
5.18 Identify applications of nano materials.

CO6: Apply the properties of semiconductors and volt-ampere characteristics of P-N junction diode to construct half wave and full wave rectifiers and Light Emitting Diode.

6.1 Outline the concept of Valence band, Conduction band and Forbidden energy gap in solids.
6.2 Explain Conductors, Insulators and Semiconductors on the basis of energy band diagram.
6.3 Explain the concept of Fermi level.
6.4 Explain Intrinsic semiconductors with examples.
6.5 Explain the concept of hole and doping in semiconductors.
6.6 Explain Extrinsic semiconductors and identify differences between P-type and N-type semiconductors.
6.7 Explain PN Junction Diode.
6.8 Explain Forward bias and Reverse bias PN junction diode.
6.9 Summarize Volt-Ampere (V-I) characteristics of PN Diode.
6.10 Identify the applications of PN Diode.
6.11 Construct half wave and full wave rectifiers by making use of the characteristics of PN Diode.
6.12 Draw a labeled diagram and explain working of Light Emitting Diode (LED).

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

DIPLOMA EXAMINATION (C 24)
SEMESTER II
MID-I EXAM
SC 203 Applied Physics
Model Question paper

Duration: 1hour **Max. Marks: 20**

PART-A 4 X 1 = 4

Instructions: 1. Answer **ALL** questions.
2. Each question carries **ONE** mark.

1. Define periodic motion.
2. Define second's pendulum.
3. Name one example each for longitudinal and transverse waves.
4. Define reverberation.

PART-B 2 X 3= 6

Instructions: 1. Answer **ALL** questions.
2. Each question carries **THREE** marks.

5 (a) List the conditions for SHM.

(OR)

(b) The acceleration of a particle in S.H.M. is 0.09 ms^{-2} when its displacement is 0.25 m. Find the period of oscillation.

6 (a) The frequency of sound is 110 Hz and wavelength is 3 m. Calculate the velocity of the wave.

(OR)

(b) Draw a neat labeled sketch of formation of beats.

PART-C 2 X 5=10

Instructions: 1. Answer **ALL** questions.
2. Each question carries **FIVE** marks.

7 (a) Develop the formula for acceleration of a particle executing SHM and analyze for maximum and minimum accelerations.

(OR)

(b) Develop the expression for time period of a simple pendulum.

8 (a) Explain echo and apply principle of echo to find the distance of an obstacle from the observer.

(OR)

(b) List five methods to minimize noise pollution.

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATION (C 24)
SEMESTER II
MID-II EXAM
SC 203 Applied Physics
Model Question paper

Duration: 1hour **Max.Marks: 20**

PART-A 4 X 1 = 4

Instructions: 1. Answer **ALL** questions.
2.Each question carries **ONE** mark.

1. Define conductance.
2. What is the principle involved in Meter Bridge?
3. Define magnetic field.
4. Define magnetic permeability.

PART-B 2 X 3= 6

Instructions: 1. Answer **ALL** questions.
2. Each question carries **THREE** marks.

5 (a) An electric fan has a resistance of 100ohms. It is plugged into potential difference of 220 V. How much current passes through the fan?

(OR)

(b) Explain specific resistance of a conductor.

6 (a) Two magnetic poles of strengths 40 A-m and 30 A-m are separated by a distance of 0.2 m in air. Calculate the force between them.

(OR)

(b) Draw labeled diagrams of step up and step down transformers and identify various components.

PART-C 2 X 5=10

Instructions: 1. Answer **ALL** questions.
2. Each question carries **FIVE** marks.

7 (a) Explain heating effect of current and develop the formula for heat produced in a current carrying wire.

(OR)

(b) Develop an expression for balancing condition of Wheatstone bridge with legible sketch.

8(a) Develop expression for moment of couple on a bar magnet placed in a uniform magnetic field.

(OR)

(b) Classify magnetic materials based on their magnetic properties.

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STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATION (C 24)
SEMESTER II
SEMESTER END EXAM
SC –203 Applied Physics
Model Question paper

Duration: 2 hours **Max.Marks: 40**

PART-A 8 X 1= 8

Instructions: 1. Answer **ALL** questions.
2.Each question carries **ONE** mark

1. What is the formula for maximum acceleration of a particle in S.H.M?
2. Define magnetic field.
3. Define critical angle.
4. What is audible range of human beings?
5. What is photo electric effect?
6. Define population inversion in LASER.
7. What is forbidden gap?
8. Define intrinsic semiconductors.

PART-B 4 X 3 = 12

Instructions: 1. Answer **ALL** questions.
2. Each question carries **THREE** marks.

9(a) The Simple Harmonic oscillations executed by a particle of mass 0.5 kg are represented by the equation $y = 2\,Sin\left(10t + \frac{\pi}{4}\right)$. Find (a) velocity when the displacement is 1 unit and (b) maximum acceleration.

(OR)

(b) List the applications of optical fibre.

10(a) Explain Coulomb's inverse square law of magnetism.

(OR)

(b)Explain the concept of Fermi level.

11(a)The work function of a photoelectric material is 3.3 eV. Calculate threshold frequency? Given Planck's constant h = 6.6 x 10^{-34} joule-sec, velocity of light c = 3 x 10^{8} ms^{-1} and 1 eV= 1.6 x 10^{-19} joule.

(OR)

(b) Draw and label the diagram showing various regions of Electromagnetic spectrum in the order of increasing wavelength.

12(a)Explain valance band, conduction band and forbidden energy gap in solids.

(OR)

(b) Explain P-type and N-type semiconductors.

PART-C 4 X 5 = 20

Instructions: 1. Answer **ALL** questions.
2. Each question carries **FIVE** marks.

13(a) Two tuning forks when sounded together give 5 beats per second. The frequency of the first fork is 480 Hz. When a piece of wax is attached to the second fork, the beats are reduced to 4. Find the frequency of the other tuning fork.

(OR)

(b) Develop laws of photoelectric effect.

14(a) Explain construction and working of transformer using the principles of electromagnetic induction with legible diagram.

(OR)

(b) Explain forward bias and reverse bias PN diode.

15(a) Identify the differences between step index and graded index optical fibers.

(OR)

(b) Identify applications of nano materials.

16(a) Construct full wave rectifier.

(OR)

(b)Draw a labeled diagram and explain working of Light Emitting Diode (LED).

SC - 204 - APPLIED ENGINEERING CHEMISTRY

Course Title	Applied Engineering Chemistry	Course Code	SC-204
Semester	II	Course Group	Foundation
Teaching Scheme in Periods (L:T:P)	4:1:0	Credits	2.5
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60Marks	SEE	40Marks

Prerequisite: Basic knowledge of Chemistry in Secondary Education.

Course Objective: After studying this course the student will be able to understand and appreciate the role of chemistry and environmental studies in different spheres of industries.

Course Outcome: On successful completion of the course, the students will have ability to attain below Course Outcomes (CO):

CO1	Explain the formation and functioning of Galvanic Cells, Batteries and Fuel Cells and apply the knowledge to identify and compare the materials best suited for construction of Batteries and Fuel Cells.
CO2	Explain the different metallurgical processes and apply the knowledge in the extraction of metals and in making alloys for industrial needs.
CO3	Explain the various corrosion processes, protection methods and apply the knowledge to reduce the corrosion in domestic and industrial areas.
CO4	Explain the different methods of preparation and characteristics of organic polymers and apply the knowledge to select suitable polymer for domestic and industrial use.
CO5	Identify the importance of Gaseous fuels, Lubricants, engineering materials and their uses for domestic and industrial applications.
CO6	Explain the causes, effects and controlling methods of air pollution, water pollution and soil pollution and apply relevant methods to solve domestic and industrial problems.

CO-PO Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	-	-	-	-	-	2
CO2	3	-	-	-	1	-	2
CO3	3	-	-	-	-	-	2
CO4	3	1	-	-	1	-	2
CO5	3	1	-	-	1	-	2
CO6	3	-	-	-	3	-	3

COURSE CONTENTS

UNIT – I: ELECTROCHEMICAL CELL– BATTERIES: L10 + T3 Periods

Galvanic cell–Standard electrode potential–Reference electrodes–Electro chemical series–EMF of cell– Batteries-Types of batteries–Leclanche cell, Lead storage battery – H_2-O_2 Fuel cells.

UNIT -II: MTALLURGY: L10 + T2 Periods

Characteristics of metals- Distinguish between metals and non metals - Mineral, Ore, Gangue, Flux, Slag - Concentration of ore, Methods of extraction of crude metal - Roasting, Calcination, Smelting, Extraction of Al, and Fe – Alloys-Purpose of making alloys – Composition and uses of Brass, Nichrome and Duralumin.

UNIT –III: CORROSION: L10 + T2 Periods

Corrosion-Factors influencing the rate of corrosion–Dry and wet theories of corrosion–Composition cell, Stress cell and Concentration cell-Rusting of iron and its mechanism-Prevention of corrosion–Protective coatings-Cathodic protection-Paints– Constituents of paint–Functions of constituents of paint.

UNIT–IV: POLYMERS: L10 + T3 Periods

Polymers - Polymerization - Types of polymerization – Addition polymerization, Condensation polymerization - Plastics - Types of plastics - Advantages of plastics over traditional materials - Disadvantages of using plastics- Preparation and uses of the following plastics: 1. Polythene 2.PVC 3.Urea formaldehyde 4. Bakelite - Compounding of plastics – Natural rubber – Vulcanization of natural rubber - Elastomers – Preparation and uses of Buna-s, Neoprene rubber - Biodegradable polymers-preparation and uses.

UNIT–V: INDUSTRIAL FUELS AND MATERIALS L10 + T3 Periods

Definition and classification of fuels- Characteristics of good fuel-composition, calorific value, and uses of gaseous fuels- a) CNG b) LPG c) Bio gas – Lubricants– Classification and functions of lubricants – Engineering material -Glass-Properties- Manufacturing of glass-melting, Forming and shaping-Annealing -Finishing, Chemical components -uses of soft glass, hard glass, flint glass and laminated glass.

UNIT –VI: ENVIRONMENTAL POLLUTION AND CONTROL L10 + T2 Periods

Air pollution-Introduction, Classification of air pollutants based on origin and states of matter, Causes, effects, and controlling methods - Water pollution – Causes, effects, controlling methods– Soil pollution – Causes, General effects,-Controlling methods –Carbon credit and carbon trading

Reference Books:

1. Engineering chemistry–Jain &Jain –Dhanpat Rai Publishing Company.
2. A Text book of Engineering Chemistry–S.S. Dara – S. Chand Publications.
3. Environmental Studies –A.K. De.
4. Environmental Studies, R. Rajagopalan,2nd Edition,2011, Oxford University Press
5. Intermediate Chemistry I and II–Telugu Academy TS
6. Engineering chemistry– Prasanta Rath, B. Ramadevi, Ch. Venkataramana Reddy & Subhendu Chakroborty–CENGAGE

E- Learning links:

https://iupac.org/**https://www.khanacademy.org/www.nptel.ac.in**

Specific Learning Outcomes:

Upon completion of the course, the student will have ability to:

CO1: Explain the formation and functioning of Galvanic Cells, Batteries and Fuel Cells and apply the knowledge to identify and compare the materials best suited for construction of Batteries and Fuel Cells.

1.1. Define galvanic cell
1.2. Explain the construction and working of Daniel cell
1.3. Explain the differences between electrolytic cell and galvanic cell
1.4. Explain Electrode potential, Oxidation potential, reduction potential and standard electrode potential.
1.5. Define Reference electrode give examples.
1.6. Explain the construction and working of standard hydrogen electrode (SHE).
1.7. Explain the construction and working of calomel electrode
1.8. Define electrochemical series and explain its significance.
1.9. Define and explain EMF of cell and solve the numerical problems
1.10. Define battery and explain the types of batteries-Primary and secondary battery with examples
1.11. Explain the construction, working and applications of Dry cell (Leclanche cell) and Lead storage battery
1.12. Explain the construction, working and advantages of Hydrogen-Oxygen fuel cell

CO2: Explain the different metallurgical processes and apply the knowledge in the extraction of metals and in making alloys for industrial needs.

2.1 Identify the characteristics of metals.
2.2 Explain the differences between metals and non-metals
2.3 Define and explain the terms 1.Mineral 2.Ore 3.Gangue, 4.Fluxand 5.Slag -with examples
2.4 Explain the minerals and ores of Iron, and Aluminium.
2.5 Froth floatation and Electromagnetic separation methods for the concentration of ore
2.6 Explain the metallurgical processes -Roasting, Calcination, Smelting.
2.7 Extraction of Al from Bauxite (Flow chart)
2.8 Extraction of Fe from Hematite (flow chart)
2.9 Define an alloy and explain the purpose of making of alloys
2.10 Explain the composition and uses of following alloys i) Brass ii) Nichrome iii) Duralumin

CO3: Explain the various corrosion processes, protection methods and apply the knowledge to reduce the corrosion in domestic and industrial areas.

3.1 Define corrosion
3.2 Explain the factors influencing the rate of corrosion based on i) Nature of metal ii) Nature of environment of metal.
3.3 Explain the Electrochemical theory of corrosion.
3.4 Explain the formation of a) Composition cell b) Stress cell c) Concentration cell
3.5 Define rust and explain the mechanism of rusting of iron with chemical reactions.
3.6 Explain the following methods of prevention of corrosion:
  a). Protective coatings i) Metallic coatings (Anodic coating and cathodic coating) ii) Inorganic coatings iii) Organic coatings
  b). Cathodic protection i) Sacrificial anode method ii) Impressed voltage method.
3.7 Define the term paint.
3.8 Explain the characteristics of a good paint.
3.9 List the constituents of paint (pigment, vehicle or drying oil, thinner, drier, filler and plasticizers) and explain the functions of constituents of paint.

CO4: Explain the different methods of preparation and characteristics of organic polymers and apply the knowledge to select suitable polymer for domestic and industrial use.

4.1 Define polymerization
4.2 Explain the types of polymerization (Addition polymerization and Condensation polymerization) with examples.
4.3 Define the term plastic
4.4 Identify the characteristics of plastics.
4.5 Summarize the advantages of plastics over traditional materials
4.6 Explain the impact of plastics on environment.
4.7 Explain the types of plastics with examples.
4.8 Identify the differences between thermo plastics and thermosetting plastics
4.9 Explain the methods of preparation and uses of the following plastics: 1. Polythene, 2.Polyvinylchloride, 3.Urea formaldehyde resin 4. Bakelite (Only flow chart for Bakelite i.e. without chemical equations).
4.10 Define the term natural rubber
4.11 Explain the processing of natural rubber from latex.
4.12 Explain the structural formula of natural rubber
4.13 Explain the characteristics of natural rubber
4.14 Explain the process of vulcanization of natural rubber with chemical reactions.
4.15 Interpret the characteristics of vulcanized rubber
4.16 Define the term elastomer
4.17 Explain the preparation and uses of the following synthetic rubbers a) Buna-S b) Neoprene rubber.
4.18 Define a biodegradable polymer and explain a method of preparation and uses of biodegradable polymer-polylactic acid and polycaprolactone.

CO5: Identify the importance of Gaseous fuels, Lubricants, engineering materials and their uses for domestic and industrial applications.

5.1 Define fuel.
5.2 Classify the fuels based on their physical state with examples.
5.3 Classify the fuels based on occurrence-primary and secondary fuels with examples.
5.4 Define calorific value
5.5 Calculate the oxygen required for combustion of methane and ethane gases
5.6 Explain the characteristics of a good fuel
5.7 Explain the advantages of gaseous fuels
5.8 Explain the chemical composition, calorific value and uses of a) CNG b) LPG c) Bio gas
5.9 Define lubricant.
5.10 Classify the lubricants based on physical state.
5.11 Explain the functions of lubricants.
5.12 Explain General characteristics of Glass.
5.13 Explain a method of manufacture of Glass -melting, Forming and shaping-Annealing - Finishing,
5.14 Explain the components and uses of the following commercial Glasses 1. Soft glass, 2. Hard glass, 3. flint glass, 4. Laminated glass.

CO6: Explain the causes, effects and controlling methods of air pollution, water pollution and soil pollution and apply relevant methods to solve domestic and industrial problems.

6.1 Define air pollution

6.2 Classify the air pollutants-based on origin and states of matter
6.3 Explain the causes of air pollution
6. 4 Explain the effects of air pollution on human beings, plants and animals
6.5 Explain the Greenhouse effect- its consequences and control methods
6.6 Explain the Acid rain-its consequences and control methods
6.7 Explain the controlling methods of air pollution
6.8 Define water pollution
6.9 Explain the causes of water pollution
6.10 Explain the effects of water pollution on living and non-living things
6.11 Utilize the available methods to control water pollution.
6.12 Define soil pollution.
6.13 Explain the causes of soil pollution.
6.14 Explain the general effects of soil pollution.
6.15 Explain the methods of control of soil pollution.
6.16 Understand the concept of Carbon Credits and Carbon Trading (Elementary level only)
6.17 Understand the advantages and disadvantages of carbon trading

BOARD OF DIPLOMA EXAMINATIONS (C24)
SEMESTER EXAMINATION
MIDSEM– I

SC-204- ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES

Time: 1Hour **Max.Marks:20**

PART–A

Instructions: Answer **all** questions. Each question carries **one** mark 4X 1=4 marks

1. Define Galvanic cell.
2. What is standard electrode potential?
3. Define an ore.
4. Define Roasting.

PART–B

Instructions: Answer the **following** questions. Each question carries **three** marks

2x 3=6 Marks

5. a. Explain any three differences between Electrolytic cell and Galvanic cell

   (OR)

   b. Explain the types of batteries with examples.
6. a. Explain Magnetic separation method of concentration of Ore.

   (OR)

   b. Explain the purpose of making alloy (any six).

PART–C

Instructions: Answer the **following** questions. Each question carries **five** marks.

2x 5=10 marks

7. a. Explain the construction and working of Leclanche cell.

   (OR)

   b. Define and explain EMF. Find the EMF of Cell Zn /Zn^{2+} (1M)|| Cu^{2+} (1M)|Cu Given E^{o}ofZn^{2+}|Zn = - 0.76V and E^{o} of Cu^{2+}|Cu =0.34V

8. a. Select a systematic process of extraction Fe from Hematite (Flow chart only).

   (OR)

   b. Show the Chemical composition and explain the uses of following alloys a) Brass and b) Nichrome

BOARD OF DIPLOMA EXAMINATIONS (C24)
SEMESTER EXAMINATION
MIDSEM–II

SC-204-ENGINEERINGCHEMISTRYANDENVIRONMENTALSTUDIES

Time: 1Hour **Max.Marks:20**

PART–A

Instructions: Answer **all** questions. Each question carries **one** mark 4X 1=4 marks

1. Define Corrosion.
2. What is a Paint?
3. Define polymerization
4. What is the chemical name of natural rubber?

PART–B

Instructions: Answer the **following** questions. Each question carries **three** marks

2x 3=6 Marks

5. a. Select any six characteristics of a good paint.

(OR)

b. Explain Sacrificial anode method of prevention of corrosion.

6. a. Write any three advantages of plastics over traditional materials.

(OR)

b. Write any three differences between thermo plastic and thermosetting plastic.

PART–C

Instructions: Answer the **following** questions. Each question carries **five** marks.

2x 5=10 marks

7. a. Explain any five factors influencing the rate of corrosion of metal.

(OR)

b. Explain any five constituents of a paint with their functions

8. a. What is vulcanization of rubber and explain with chemical equations.

(OR)

b. Explain preparation and uses of following plastics 1. Polyethene 2. PVC (polyvinyl chloride)

BOARD OF DIPLOMA EXAMINATIONS (C24)
SEMESTER END EXAMINATION

SC-204- ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES

Time: 2Hour **Max. Marks: 40**

PART–A

Instructions: Answer **all** questions. Each question carries **one** mark 8X 1=8 marks

1. What is electrochemical series?
2. What is the composition of Rust?
3. Define a Fuel
4. Define gangue.
5. Define a Lubricant
6. What is the composition of potash lime Glass?
7. Define air pollution.
8. Define water pollution.

PART–B 4x3=12 marks

Instructions: Answer the **following** questions. Each question carries **three** marks

9. a. Choose any six characteristics of Metals.

(OR)

b. Classify the Lubricants based on physical state. Give examples.

10. a. Identify any six advantages of plastics over traditional material.

(OR)

b. Explain any three methods of control of soil pollution.

11. a. Explain the classification of fuels based on physical state. Give examples.

(OR)

b. Explain the general characteristics of Glass (any six).

12. a. Explain the causes and effects of Greenhouse effect.

(OR)

b. Explain the effects of water pollution on Living things.

PART–C 4X5= 20 marks

Instructions: Answer the **following** questions. Each question carries **three** marks

13. a. Explain the construction and working of Hydrogen-Oxygen Fuel cell.

(OR)

b. Explain a method of manufacture of Glass with labelled diagram.

14. a. Identify any five differences between Thermoplastics and Thermosetting plastics

(OR)

b. Explain the controlling methods of water pollution.

15. a. Explain the chemical composition and uses of LPG and CNG fuels

(OR)

b. Explain the components and uses following Glasses

1. Lead glass.2.Soda lime glass3.Laminated Glass

16. a. Explain any five causes of Air pollution

(OR)

b. Explain any five methods of control of Water pollution

CS-205- PROGRAMMING IN 'C'

Course Title:	Programming in C	Course Code	CS-205
Semester	II	Course Group	CORE
Teaching Scheme in Periods (L:T:P)	4:1:0	Credits	2.5
Methodology	Lecture + Tutorials	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

Basic knowledge Of Mathematics, Logical, Reasoning and IT skills

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Develop Algorithms and Draw Flowchart for given problems.
CO2	Use Data types and classify Operators.
CO3	Develop Programs Using Decision Making Branching and looping statements.
CO4	Create Arrays, know the usage of strings.
CO5	Analyze and implement Modular Programming using Functions
CO6	Develop programs Using structures and Unions

Course Content and Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>I</td><td>Programming Methodology and Introduction to C Language</td><td>10</td><td rowspan="6">Q4</td><td colspan="2" rowspan="3">Q1</td><td rowspan="3">Q9(a)</td><td rowspan="3">Q13(a)</td></tr>
<tr><td>II</td><td>Understand Constants, Variables and Data types in C and Understand Operators and Expressions in C</td><td>10</td></tr>
<tr><td>III</td><td>Decision making and Looping statements</td><td>14</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td><td>Arrays and Strings</td><td>14</td></tr>
<tr><td>V</td><td>User Defined functions</td><td>13</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),Q11(a), Q11(b)</td><td>Q13(b),Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Structures and Unions</td><td>14</td><td>Q7,Q8</td><td>Q10(b),Q12(a), Q12(b)</td><td>Q14(b),Q16(a), Q16(b)</td></tr>
<tr><td></td><td>Total</td><td>75</td><td colspan="2">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

1. Programming Methodology and Introduction to C Language

Duration: 10 periods(L:8 – T:2)

Steps involved in problem solving -Define Algorithm- Characteristics of algorithm- Steps involved in algorithm development - Algorithms for simple problems - Define flowchart – Symbols used in flowchart - Flowcharts for simple problems - Differentiate algorithm and flowchart – Define Program - Differentiate between algorithm and program - Define High level language and low level language- Define Compiler, Assembler, Linker and Loader - Define source code, assembly code, object code, machine code -importance of C language –- structure of C program – different stages in converting the C program source code into an executable code - steps in executing the C program.

2. Understand Constants, Variables and Data Types in C and Understand Operators and Expressions in C

Duration:10 Periods(L:7 – T:3)

Character set - C Tokens - Keywords and Identifiers- Constants and Variables - data types and Classification- declaration of a variable - Assigning values to variables - Define operator –Classify operators - List and explain various arithmetic operators with examples -Illustrate the concept of relational operators - List logical operators - various assignment operators – Increment and decrement operators - List bitwise operators - Conditional operator - various special operators - precedence and associatively of operators - Define expression - Evaluation of Arithmetic expressions - Evaluation of Logical expressions - Evaluation of Relational expressions - type conversion techniques – Know Preprocessor directives – Know Header Files - Reading and writing characters - formatted input and output.

3. Decision making and Looping statements

Duration: 14 Periods(L:12 – T:2)

Decision making in C programming - simple if statement – if-else statement – nested if statement - else-if ladder –Switch statement - Classification of various loop statements- while loop – do-while loop - for loop - break and continue statements - nesting of loops- Comparisons of different loop statements.

4. Arrays and Strings

Duration: 14 Periods(L:11 – T:3)

Arrays – definition, types, declaration and initialization of One Dimensional -Array - Accessing the elements in the Array - 'accessing array out of bounds' problem - Reordering an array in ascending order – average of elements in an array – largest element in an array - Declaration and initialization of two Dimensional Arrays - sample programs on matrix addition and matrix multiplication, transpose- Strings – Definition, Declaration and initialization of String variables - Reading of strings from terminal - writing strings to screen - String handling functions with sample programs

5. User defined functions

Duration: 13 Periods(L:10 – T:3)

Function – Definition - Need for user defined functions - Advantages of functions - elements of function - Return values and their types - function prototype - function call - function definition – Scope, visibility and lifetime of variables in functions- storage classes- Functions with no arguments and no return values - functions with arguments with no return values - functions with arguments with return values - functions with no arguments with return values - Recursion - sample programs on recursion - passing arrays to functions

6. Structures and Unions

Duration: 14 Periods(L:12 – T:2)

Structures and Unions Structure- Definition - Creating a structure - Declaring structure variables - Accessing the structure members - Concept of structure assignment - Find size of a structure - Nested structure - Structure as function arguments –structures vs. arrays – Array of structures - Structure containing arrays- array of structures containing arrays - Union and illustrate usage of a union – difference between Structures and Union.

Text Books

1.LetUsC	--	YeshwanthKanetkarBPBPublications
2.Programmingin ANSIC	--	E.Balaguruswamy TataMcGrawHill
3.ProgrammingwithC	--	GottfriedSchaum'outline
4.CThecomplete Reference	--	SchildtTataMcGraw Hill

Reference Books

1. The C Programming Language- Brian W. Kernighan,Dennis M.Ritchie- Pre Publicationntice Hall
2. Programming in C 3rd Edition-Sams Publishing- Steven G. Kochan- Sams Publishing
3. Expert C Programming: Deep Secrets-Peter Van Der Linden- Pearson Publications
4. C Programming: A Modern Approach. K.N. King- Norton Publications
5. Learn to Program with C- Noel Kalicharan- APress Publications

Suggested e-Learning Links

1. https://www.w3schools.com/c/c_intro.php?external_link=true
2. https://www.geeksforgeeks.org/c-programming-language/
3. https://www.programiz.com/c-programming
4. https://www.javatpoint.com/c-programming-language-tutorial
5. https://www.freecodecamp.org/news/the-c-programming-handbook-for-beginners/
6. https://www.tutorialspoint.com/cprogramming/index.htm
7. https://www.codecademy.com/catalog/language/c
8. https://www.codechef.com/learn/course/c
9. https://archive.nptel.ac.in/courses/106/104/106104128/
10. https://www.youtube.com/watch?v=3QiItmIWmOM
11. https://www.digimat.in/nptel/courses/video/106105171/L01.html
12. https://www.digimat.in/nptel/courses/video/106105171/L07.html

Suggested Learning Outcomes

For achieving the Course outcomes, the following learning outcomes must be achieved

CO1: Develop Algorithms and Draw Flowchart for given problems.

1.1 State different steps involved in problem solving
1.2 Define algorithm and know its characteristics
1.3 State the steps involved in algorithm development
1.4 Develop algorithms for simple problems.
1.5 Define flowchart and know symbols used in drawing flowcharts
1.6 Draw flowchart for simple problems.
1.7 Differentiate algorithm and flowchart
1.8 Define program and differentiate between program and algorithm
1.9 Define High level language and low level language
1.10 Define Compiler, Assembler, Linker and Loader
1.11 Define source code, assembly code, object code, machine code.
1.12 State the importance of C language
1.13 Explain the structure of C program
1.14 List and Explain different stages in converting the C program source code to executable code.
1.15 Explain the steps involved in executing the C program.

CO2: Use Data types and classify Operators.

2.1 Describe Character set, C Tokens-Keywords, Variables, Identifiers, Constants and Variables.
2.2 Define Data type.
2.3 Classify Primary data types and explain with examples
2.3 Write the syntax to declare and assigning values to variables.
2.4 Define operator.
2.5 Classify and explain operators with examples
2.6 Describe operator precedence and associativity of operators.
2.7 Define expression.
2.8 Describe evaluation of Arithmetic, Relational and logical expressions.
2.9 Illustrate type conversion (implicit and explicit) techniques.
2.10 Define and List Pre-processor directives
2.11 Discuss #include and #define Pre-processor directives.
2.12 Define Header file and discuss stdio.h, conio.h, math.h, string.h Header files.
2.13 Illustrate getchar(), putchar(), scanf(), printf() with programs.

CO3: Develop Programs Using Decision Making Branching and looping statements.

3.1 Discuss decision making in programming
3.2 Explain decision making statements- if, if-else, nested if-else, else-if ladder - with syntax and programs.
3.3 Explain decision making statement- switch statement - with syntax and programs.
3.4 Define looping and list loop statements.
3.5 Discuss the iterative statements – while, do- while, for statement- with syntax and programs.
3.6 Discuss break and continue statements.
3.7 Compare and Contrast break and continue statements.
3.8 Define Nested loops.
3.9 Develop programs using Nested loops.
3.10 Compare different loop statements.

CO4: Create Arrays, know the usage of strings.

4.1 Define an Array.
4.2 List different types of Arrays.
4.3 Declare and initialize One Dimensional Array with example program.
4.4 Develop a program to read, access and display the elements of a one dimensional array
4.5 Develop a program to sort the elements in ascending or descending order using one-dimensional Array.
4.6 Develop a c program to count the even and odd numbers for a given array of n elements.
4.7 Declare and initialize two Dimensional Arrays with example program.
4.8 Illustrate the concept of two dimensional arrays with the following programs
   a. Matrix addition, subtraction
   b. Matrix multiplication
   c. Transpose of a matrix and check whether the given matrix is symmetric or not.
4.9 Define String
4.10 Declare and initialize a String variable.
4.11 Outline the different ways of reading and writing strings using scanf(), getchar(), gets(), printf(), putchar(), puts() functions.

4.12 Create a program to concatenate, copy, and finding out the length of a string without using string handling functions.
4.13 Explain about various String handling functions with sample programs.
4.14 Develop C programs using different string handling functions.

CO5: Analyze and implement Modular Programming using Functions

5.1 Define function,
5.2 Discuss the need of functions.
5.3 List out the advantages of functions.
5.4 Identify the elements of function.
5.5 Define and discuss function prototype, function call, and function definition with syntax and program.
5.6 Discuss the scope, visibility and lifetime of variables in functions.
5.7 Classify different storage classes.
5.8 Illustrate functions with no arguments and no return values with syntax and example programs.
5.9 Illustrate functions with no arguments and with return values with syntax and example programs.
5.10 Illustrate functions with arguments and with no return values with syntax and example programs.
5.11 Illustrate functions with arguments and with return values with syntax and example programs.
5.12 Illustrate passing arrays to functions as arguments with example programs.
5.13 Define recursion.
5.14 Develop the following programs using recursion
a. Factorial of a number.
b. compute x^n (hint : x raised to the power n).
c. Fibonacci series.

CO6: Develop programs Using structures and Unions

6.1 Define structure
6.2 State the uses of structures.
6.3 Declaration and initialization of a structure template and structure variables.
6.4 Explain accessing structure members using (.) dot operator.
6.5 Develop a C program to create, initialize a structure and access its data members.
6.6 Syntax to know the size of a structure.
6.7 Discuss nested structure concept.
6.8 Illustrate the concept of nested structure with a program.
6.9 Know the differences between Structures and Arrays.
6.10 Illustrate array of structures, structures containing arrays, array of structures containing arrays.
6.11 Illustrate array of structures using sample C program.
6.12 Illustrate structure as function arguments and returning of structure variables as function values.
6.13 Define Union.
6.14 State the usage of unions.
6.15 Declaration and initialization of a union.
6.16 Explain accessing of union members using (.) dot operator.
6.17 Know the differences between Structure and Unions.

Suggested Student Activities

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 5-10 students.

1. Each group should do any one of the following type of activity or any other similar activity related to the course with prior approval from the course coordinator and programme coordinator concerned.
2. Each group should conduct different activity and no repetition should occur.
3. Explore and analyse topics to improve the level of creativity and analytical skill by taking Quiz/ tests/ assignments. Documents have to be maintained as a record.
4. Create a power point presentation on the topic relevant to course or advanced topic as an extension to the course to improve the communication skills. Documents have to be maintained as a record.
5. Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report
6. Coding competitions

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	
CO1	2	1	1			1	1	1,2,3,6,7
CO2	2					1	2	1,6,7
CO3	2	1	2	1	1	2	2	1,2.3.4,5,6,7
CO4	2	2	2	1	1	1	2	1,2,3,4,5,6,7
CO5	2	2	2	1	3	2	2	1,2,3,4,5,6,7
CO6	2	1	1			1	2	1,2,3,6,7

State Board of Technical Education and Training, Telangana
Model Question paper
PROGRAMMING IN CII-SEMESTER
Mid Semester-I Examination

Course Code: CS-205 **Duration:1 hour**
Course Name: Programming in C **Max. Marks: 20 Marks**

PART-A

Answer **all** questions- Each Question carries **ONE** mark **4x1 = 4 Marks**

1. List any two differences between algorithm and flowchart.
2. Define Low level language
3. List various types of constants.
4. Define an expression

PART-B

Answer **two** questions- Each Question carries **THREE** marks **2x3 = 6 Marks**

5.a) List out any 6 symbols used in Flowchart.
(OR)
b) Write any three differences between high level language and low level language
6.a) Write the syntax to declare variable in C? Give examples.
(OR)
b) Evaluate an expression (2+5)*(10-4)%10.

PART-C

Answer **two** questions- Each Question carries **FIVE** marks **2x5 = 10 Marks**

7a) Draw a flowchart to find factorial of given number N.
(OR)
b) Explain the stages to execute a C-Program
8a) Explain different data types in C with examples.
(OR)
b) Elaborate any three categories of operators in C.

State Board of Technical Education and Training, Telangana
Model Question paper
PROGRAMMING IN C II-SEMESTER
Mid Semester-II Examination

Course Code: CS-205 **Duration:1 hour**
Course Name: PROGRAMMING IN C **Max.Marks: 20 Marks**

PART-A

Answer **all** questions- Each Question carries **ONE** mark **4x1 = 4 Marks**

1. Write the syntax of if statement.
2. Give the syntax of while statement in C.
3. Define an array.
4. Give the syntax for declaring and initializing of one dimensional array.

PART-B

Answer **two** questions- Each Question carries **THREE** marks **2x3 = 6 Marks**

5a) Explain switch statement with syntax.

(OR)

5b) Write any three differences between while and do-while statements.

6a) Write a C program to find largest number in array.

(OR)

6b) Explain any three String handling functions.

PART-C

Answer **two** questions- Each Question carries **FIVE** marks **2x5 = 10 Marks**

7a) Explain do-while statement with syntax and sample program

(OR)

7b)Write a C program whether a given number is Armstrong or not using while loop

8. a Write a C program to multiply two matrices.

(OR)

8.bWrite a C program to check whether given string is palindrome or not.

State Board of Technical Education and Training, Telangana
Model Question paper
PROGRAMMING IN C II-SEMESTER
Semester End Examination

Course Code: CS-205 **Duration:2 hour**
Course Name: Programming in C **Max.Marks:40 Marks**

PART-A

Answer **all** questions- Each Question carries **ONE** mark **8x1 = 8 Marks**

1.List any two differences between algorithm and program.
2. Give the syntax of simple if statement in C.
3.List any two advantages of functions.
4. Give the syntax for declaring and initializing of one dimensional array.
5. Define function.
6. Define recursion.
7.Write any two uses of structures.
8. Define Union?

PART-B

Answer **Four** questions- Each Question carries **THREE** marks **4x3 = 12 Marks**

9. a) Write any three characteristics of algorithm.

(OR)

9. b) Write any three advantages of functions.
10. a) Write any three differences between break and continue statements.

(OR)

10. b) Write any three differences between structure and union statements.
11. a) Explain elements of function in C.

(OR)

11. b) Write any three differences between local variable and global variable statements.

12. a) Explain how to access structure members.

(OR)

b. Compare structure and arrays.

PART-C

Answer **four** questions- Each Question carries **FIVE** marks **4x5 = 20 Marks**

13. a) Explain the structure of a C-Program.

(OR)

13. b) Write a C program to compute the transpose of given matrix.
14. a) Write a C program to sort the elements of a one-dimensional array.

(OR)

14. b) Write a C program to access the elements of a union.
15. a) Write a C program to illustrate functions with arguments and without return values.

(OR)

15. b) Write a C program to find the factorial of a number using recursion.
16. a) Write a C program to implement nested structures.

(OR)

b) Write a C program to implement array of structures.

CE-206: ENGINEERING MECHANICS

Course Title	Engineering Mechanics	Course Code	CE-206
Semester	II Semester	Course Group	Core
Teaching Scheme in Periods(L:T:P)	60:15:0	Credits	2.5
Methodology	Lecture + Tutorials	Total Contact Periods	75 Periods
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of Fundamentals of Engineering Physics and Engineering Mathematics

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Calculate the Resultant of force system and explain the concepts of Equilibrium
CO2	Discuss Moments of Forces, Types of Beams, loads and Supports
CO3	Illustrate the concept of centre of gravity and centroids for various shapes and its calculation
CO4	Calculate Moment of Inertia of standard and Built-up sections.
CO5	Explain Simple stresses and strains and its effect on simple sections
CO6	Interpret mechanical properties of materials and Explain Composite sections

Course Content and Blue Print of Marks for SEE

<table>
<tr><th rowspan="2">Unit No</th><th rowspan="2">Unit Name</th><th rowspan="2">Periods</th><th colspan="4">Questions to be set for SEE</th></tr>
<tr><th colspan="2">R</th><th>U</th><th>A</th></tr>
<tr><td>I</td><td>Principles of Mechanics and Force system</td><td>15</td><td rowspan="6">Q4</td><td rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td><td>Beams and Supports</td><td>10</td></tr>
<tr><td>III</td><td>Centroid</td><td>12</td><td rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td><td>Moment of Inertia</td><td>13</td></tr>
<tr><td>V</td><td>Simple Stresses and Strains</td><td>12</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),Q11(a), Q11(b)</td><td>Q13(b),Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Composite sections and Mechanical properties</td><td>13</td><td>Q7,Q8</td><td>Q10(b),Q12(a), Q12(b)</td><td>Q14(b),Q16(a), Q16(b)</td></tr>
<tr><td colspan="2">Total</td><td>60</td><td colspan="2">8</td><td>8</td><td>8</td></tr>
</table>

Course Contents

UNIT - 1: Principles of Mechanics and Force system

Duration: 15 Periods (L: 12 – T:3)

Mechanics – Engineering Mechanics – Applications and branches of Engineering Mechanics – Statics, Dynamics, Kinetics and Kinematics — S.I and M.K.S units of physical quantities used in Civil Engineering-Definition of force — systems of forces – co-planar forces - Resultant of forces at a point – Parallelogram Law and Triangle Law of forces — Polygon law of forces – Resolution of forces - Parallel forces – like and unlike forces

Lami's theorem – Moment of force –couple- Conditions of equilibrium of a rigid body subjected to a number of co-planar forces.

UNIT - 2: Beams and Supports

Duration: 10 Periods (L: 8 – T:2)

Types of supports –Simple support, fixed support, hinged support, roller support

Types of beams –simply supported beams, cantilever, fixed beams, overhanging beams, continuous beams and propped cantilevers.

Types of loading - vertical point load, uniformly distributed load, uniformly varying loads, Calculation of Reactions

UNIT - 3: Centroid

Duration: 12 Periods (L: 10 – T:2)

Definitions – Centroid, Centre of gravity – Differentiation between Centroid and Centre of gravity, Position of Centroid of standard figures like rectangle, triangle, circle, semi-circle, parallelogram and trapezium - Determination of location of Centroid of standard steel sections – T, L, I, Channel section, Z section and unsymmetrical I section - built up sections and plane figures having hollow portion.

UNIT - 4: Moment of Inertia

Duration: 13 Periods(L: 10 – T:3)

Definition of Moment of Inertia (Mass moment of inertia and Area moment of inertia) - Perpendicular and parallel axes theorems - Moment of Inertia of standard sections like rectangle, triangle, circle and hallow circular sections - Moment of Inertia of standard steel sections – T, L, I, Channel section, Z sections and unsymmetrical I section and Unsymmetrical Channel sections using parallel axis theorem - Moment of Inertia and radius of gyration of built-up sections - Polar Moment of Inertia of solid and hollow circular sections using Perpendicular axis theorem

UNIT - 5: Simple Stresses and Strains

Duration: 12 Periods(L: 10 – T:2)

Stress and strain – type of stresses and strains - Stress strain curves for ductile materials (like mild steel)–Hooke's law – Young's modulus – deformation under axial load - shear stress and Shear Strain – Modulus of rigidity - Longitudinal and lateral strain – Poisson's ratio, Bulk Modulus – relationship between elastic constants (proof not required, only problems). Stress due to gradually applied load, sudden loads and impact loads

UNIT - 6: Composite sections and Mechanical properties

Duration: 13 Periods (L:10 – T:3)

Composite sections – effect of axial loads - Temperature stresses and strains – hoop stress – Temperature stresses in composite sections - Mechanical properties of materials, Resilience, Strain Energy, Proof resilience and Modulus of Resilience

Reference Books

1. Engineering Mechanics – S Timoshenko (Tata Mc Graw Hill)
2. Engineering Mechanics Statics and Dynamics – Ferdinand L.Singer
3. Engineering Mechanics – N.H. Dubey (Tata Mc Graw Hill)
4. Engineering Mechanics – R.S.Khurmi
5. Engineering Mechanics – P.K. AbdulLatheef
6. Engineering Mechanics& Statics – Dayaratnam
7. Engineering Mechanics – N. Srinivasulu
8. Engineering Mechanics – S.S. Bavikatti
9. Engineering Mechanics – A.K. Tayal

Suggested E-learning references

1.www.elearning.com/survey

2. http://nptel.ac.in

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1: Calculate the Resultant of force system and explain the concepts of Equilibrium

1.1 Define Mechanics and Engineering Mechanics
1.2 State the applications of Engineering Mechanics
1.3 State the branches of Engineering Mechanics
1.4 Define the terms 1. Statics 2. Dynamics 3. Kinetics 4. Kinematics
1.5 State S.I and M.K.S units of physical quantities used in Civil Engineering
1.7 Define the following terms
   a) Force
   b) Resultant
1.8 Distinguish between
   a) Co-planar and Non co-planar forces
   b) Concurrent and Non Concurrent forces
   c) Collinear and Non Collinear forces
   d) Parallel and non-parallel forces
   e) Like and unlike parallel forces
1.9 Compute the resultant of two co-planar forces acting at a point by
   a) Law of parallelogram of forces
   b) Triangle law of forces
1.10 Solve problems on computation of the resultant of a system of coplanar concurrent forces by
   a) Law of polygon of forces
   b) Resolution of forces
1.11 Determine resultant of co-planar concurrent forces by analytical methods.

1.12 Define the following a) Moment b) Equilibrium of forces c) Euilibrant and d) Moment of a couple
1.13 State Lami's Theorem, Solve simple problems using Lami's Theorem
1.14 Solve problems on computation of the resultant of a system of coplanar parallel forces
1.15 Define couple and Explain the properties of a couple
1.16 State the conditions of equilibrium of rigid body subjected to a number of co-planar forces

CO2: Discuss Moments of Forces, Types of Beams, loads and Supports

2.1 List and describe various types of supports (Simple support, fixed support, hinged support, roller support)
2.2 List and sketch various types of beams(simply supported beams, cantilever, fixed beams, overhanging beams, continuous beams and propped cantilever beams)
2.3 List various types of loading (point load, uniformly distributed load, uniformly varying load
2.4 To determine support reactions for cantilever, simply supported and overhanging beams with vertical point loads and uniformly distributed loads

CO3: Illustrate the concept of centre of gravity and centroids for various shapes and its calculation

3.1 Define Centroid and Centre of gravity.
3.2 Distinguish between Centroid and Centre of gravity.
3.3 State the need for finding the Centroid and Centre of gravity for various engineering applications.
3.4 Determine the position of Centroid of standard sections-T, L, I, Channel section, Z section, unsymmetrical I section, unsymmetrical channel sections.
3.5 Determine the position of Centroid of built up sections consisting of RSJs, flange plates and Plane figures having hollow portions.

CO4: Calculate Moment of Inertia of standard and Built-up sections.

4.1 Define Moment of Inertia (MI), Mass moment of inertia, Polar Moment of Inertia, Radius of gyration.
4.2 State the necessity of finding Moment of Inertia for various engineering applications.
4.3 Determine Moment of Inertia and Radius of gyration for regular geometrical sections like T, L, I, Channel section, Z section, unsymmetrical I section, unsymmetrical channel section.
4.4 State 1. Parallel axes theorem 2. Perpendicular axes theorem.
4.5 Determine MI of standard sections by applying Parallel axes theorem.
4.6 Determine MI of built-up sections by applying Parallel axes theorem.
4.7 Calculate least radius of gyration of standard sections and built-up sections.
4.8 Determine the polar M.I for solid and hollow circular section applying Perpendicular axes theorem.

CO5: Explain Simple stresses and strains and its effect on simple sections

5.1 Define the following terms
   a) Stress
   b) Strain
   c) Modulus of Elasticity
   d) Longitudinal Strain
   e) Lateral Strain
   f) Poisson's ratio
   g) Modulus of rigidity
   h) Bulk Modulus

5.2 Distinguish between different kinds of stresses and strains.

5.3 Draw the stress-strain curve for ductile materials (Mild steel) and explain the salient points in the curve.

5.4 State Hooke's law and limit of proportionality.

5.5 Solve problems on relationship between simple stress and simple strain under axial loading on uniform bars and stepped bars.

5.6 State the relationship among the elastic constants.

5.7 Solve problems on relationship between elastic constants.

5.8 Stress due to gradually applied load, suddenly applied load and impact loads.

CO6: Interpret mechanical properties of materials and Explain Composite sections

6.1 Calculate stresses in simple and composite members under axial loading.

6.2 Explain and calculate temperature stress, strain, hoop stress, temperature stresses in composite sections.

6.3 Explain the mechanical properties of materials

6.4 Elasticity, plasticity, ductility, brittleness, malleability, stiffness, hardness, toughness, creep, fatigue – examples of materials which exhibit the above properties.

6.5 Define the following
   a) Resilience
   b) Strain Energy
   c) Proof resilience
   d) Modulus of Resilience

Suggested Student Activities

1. Prepare a program in MS Excel to find centre of gravity; I_{xx} and I_{yy} of I, L,T and channel sections.
2. Prepare a report on calculation of tensile stress induced in the rope made with any material
3. Demonstrate the stresses developed in composite sections using AUTO CAD

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3	2	1	-	1	1	2	1,2,3,5.6.7
CO2	3	-	1	-	1	1	2	1,3,5,6,7
CO3	3	2	1	-	1	1	2	1,2,3,5,6,7
CO4	3	2	2	-	1	1	2	1,2,3,5,6,7
CO5	3	3	1	-	1	1	2	1,2,3,5,6,7
C06	3	-	1	-	1	1	2	1,3,5,6,7

State Board of Technical Education and Training, Telangana
Model Question paper
DCE III Semester
Mid Semester-I Examination

Course Code: CE-206 **Duration: 1 Hour**
Course Name: Engineering Mechanics **Max.Marks: 20 Marks**

PART-A

Answer **all** questions, Each Question carries *one* mark **4x1 = 4 Marks**

1) Define Resultant.
2) State "Triangle law of forces".
3) Draw the sketch of a) Simply supported beam b) Fixed beam
4) List types of supports.

PART-B

Answer **two** questions. Each question carries *three* marks **2x 3 = 6 Marks**

5) a) Write any three applications of Engineering Mechanics

(OR)

b)Two forces of magnitude 60N and 80N act at a point at an angle of 50^o. Find the magnitude and direction of resultant force? 80 N force acts Horizontally.

6) a) Draw the sketch of a Simply supported beam of 5m length with a central point load of 20kN and udl of 15kN/m over the right half portion.

(OR)

b) Draw the neat sketches free body diagrams of any six types beams.

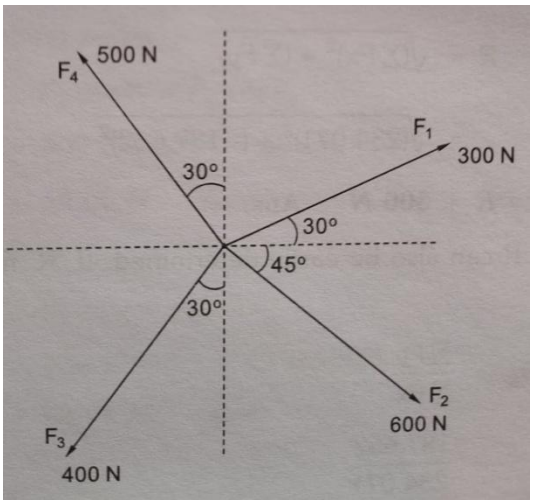
PART-C

Answer **two** questions. Each question carries *five* marks **2x5 = 10Marks**

7) a) Four forces of 100N, 200N 300N and 400N are acting at a point in the East, North-East, North-West and South-West directions respectively. Find the resultant and its direction.

(OR)

b) A point is acted upon by a system of four coplanar forces as shown if fig below. Determine the magnitude and direction of the resultant of the force system.



8) a) A cantilever 4m length is subjected to two point loads of 20kN and 30kN at 2m and 3m from the free end. It also carries a udl of 15kN/m over a length of 2 m from free end. Draw a neat sketch of the beam and Calculate Support reactions of the beam.

(OR)

b) Draw the neat sketch and Determine the support reactions of a beam of 9m length simply supported at the right end and at 6m from the right end. It carries a udl of 15kN/m over a length of 6m from right end and a concentrated load of 10kN at 1m from left end.

State Board of Technical Education and Training, Telangana
Model Question paper
DCE III Semester
Mid Semester-II Examination

Course Code: CE-206 **Duration: 1 Hour**
Course Name: Engineering Mechanics **Max.Marks: 20 Marks**

PART-A

Answer **all** questions, Each Question carries one mark. **4x1 = 4 Marks**

1) Define Centroid.
2) Give the position of centroid of a semi-circular section
3) Define Moment of Inertia
4) State perpendicular axis theorem.

PART-B

Answer **two** questions. Each question carries *three* marks **2x 3 = 6 Marks**

5) a) Find the Centroid of an inverted T-section with flange 80mm x 15mm and web 120mm x 12 mm.

(OR)

b) Differentiate between the Centroid and Centre of gravity

6) a) The moment of inertia of rectangular section beam about x-x and y-y axes passing through the centroid are 250 x 10^6 mm^4 and 40 x10^6 mm^4 respectively. Calculate the size of the section.

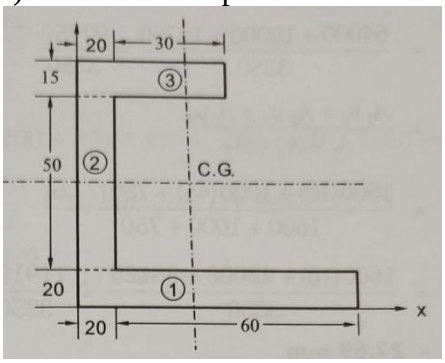
(OR)

b) Find the radius of gyration of hollow circular plate of 100 mm inner diameter and 140 mm outer diameter.

PART-C

Answer **two** questions. Each question carries *five* marks **2x5 = 10Marks**

7) a) Determine the position of centroid for the given figure shown below.



(OR)

b) Find the position of centroid of one side vertical trapezoidal dam section of top width 2m, base width 8m and height 9m from vertical face.

8(a) Find the moment of inertia of an angle section 100 mm x 100 mm x 20mm about its horizontal and vertical centroidal axes.

(OR)

b) Find the moment of inertia about horizontal and vertical axes passing through centroid for a "T" section, whose size of flange is 250mm x 50 mm and size of web is 200 mm x 50 mm.

State Board of Technical Education and Training, Telangana
Model Question paper
DCE III Semester
Semester End Examination

Course Code: CE-206 **Duration: 2 Hours**
Course Name: Engineering Mechanics **Maximum .Marks: 40 Marks**

PART-A

Answer **all** questions. Each question carries **one** mark. **8x1 = 8 Marks**

1) State the classification of Engineering Mechanics
2) Define "Radius of gyration"
3) State "Hooke's law"
4) State "Triangle law of forces".
5) Define "Stress"
6) Define "Resilence"
7) List the Elastic Constants.
8) Define the term "Creep"

PART-B

Answer **four** questions. Each question carries **three** marks. **4x3= 12 Marks**

9)
   a) State any three characteristics of couple.
   (OR)
   b) A steel bar 5 meters long and 50 mm in diameter is stretched by 5.0mm by a load of 120kN in pulling it axially. Determine the modulus of elasticity of the bar.

10)
   a) The M.I of a triangle about its base is 1526.5×10^4 mm^4, width of base is 120mm. Find the height of the triangle
   (OR)
   b) Define i) Ductility ii) stiffness

11)
   a) Define the terms
      i. Linear strain
      ii. Lateral strain
   (OR)
   b) A material has Young's modulus of 2.1×10^5 N/mm^2 and Poisson's ratio of 0.3. Calculate the modulus of rigidity and bulk modulus

12)
   a) Define i) Toughness ii) Malleability
   (OR)
   b) Define i) Fatigue ii) Brittleness

PART-C

Answer **four** questions. Each question carries **five** marks **4x 5=20 Marks**

13)

a) A telephone pole has five wires radiating from the top of the pole, producing the following concurrent pulls.
   i) 260 N due West
   ii) 180 N due East
   iii) 170 N at 30^o East of North
   iv) 240 N due North West
   v) 200N due South West
   Find the resultant pull in magnitude and direction.

(OR)

b) A tensile test is carried out on a steel bar of 12 mm diameter over a gauge length of 60mm. The bar yields at a load 25 kN, reaches a maximum load of 47 kN and breaks at 37 kN. The diameter of ruptured neck is 9.5mm and final gauge length is 74mm. Determine
   (a) Yield strength
   (b) Ultimate strength
   (c) Percentage reduction in area and
   (d) percentage elongation.

14)

a) Find the moment of inertia about centroidal axis parallel to XX direction of the built up I-section.
   Top plate: 220mm x 20mm
   Top flange : 140 mm x 40 mm
   Web : 160 mm x 20mm
   Bottom flange: 220mm x 40 mm

(OR)

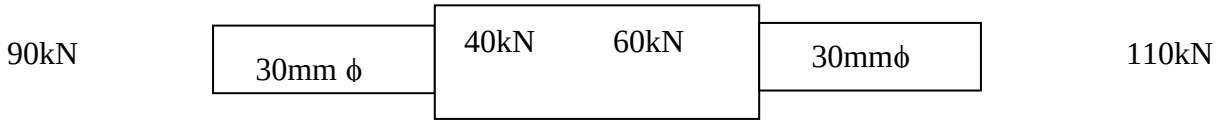
b) An R.C. C column has square cross-section 400mm x 400mm. If it is reinforced with four steel bars each of 25 mm diameter. The column carries an axial compressive load of 630 kN. Determine stress in each material. Modular ratio is 13.

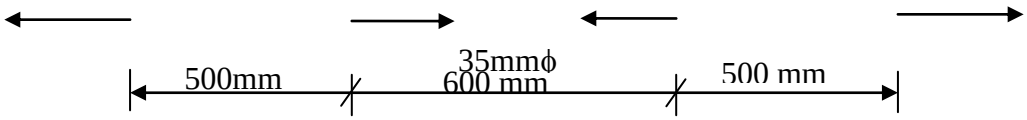
15)

a) A cylindrical bar is 25mm dia of 1.2m long. During a tensile test it is found that the linear strain is 4 times the lateral strain. Calculate the shear and bulk modulus if the bar is elongated 0.06mm under axial tensile load of 50kN.

(OR)

b) A steel bar 1.6 long is acted upon by forces as shown in fig. below. Find the elongation of the bar. Given E=200GPa.





16)

a) Following are the details of a composite member formed by enclosing a copper rod in a steel tube:

Dia. of copper rod = 36mm

Internal dia. of steel tube = 40mm

External dia. of steel tube = 50mm

E for steel = 200 GPa, E for copper = 110 GPa, α for steel 12 x 10^{-6} per ^{0}C; $\alpha$for copper =16 x 10^{-6} Per ^{0}C. Calculate the stress developed in each material if the combination is heated through 30°C.

(OR)

b) A copper rod 80mm in diameter is co-axially enclosed in a copper tube of internal dia. 90mm and external dia. 110mm, both of same length 480mm. The combination carries total axial thrust F. If the stress in the copper rod is 12 MPa compressive, find (a) The stress in the tube (b) The value of F

ME - 207 - ENGINEERING DRAWING – II

(This Course is Common to all programs of Diploma in Level offered by the State Board of Technical Education, Hyderabad, Telangana State)

Course Title	Engineering Drawing -II	Course Code	ME-207
Semester	II	Course Group	Practical
Teaching Scheme inPeriods (L:T:P)	1:0:2	Credits	1.25
Methodology	Teaching + Practice	Total Contact Periods:	45
CIE	60 Marks	SEE	40 Marks

Pre-requisites: Knowledge of Basic Engineering Drawing pictorial intelligence to learn this course.

COURSE OUTCOMES (CO)

Upon successful completion of the course, the students will be able to

Course Outcome		Cognizant Level	Linked Program Objectives (PO)
CO1	Draw the specified projections of solids for the given 3D representation of the regular solids	**R / U / A**	**1, 2, 3, 4, 7**
CO2	Create sectional views using cutting-plane lines and appropriate section lining.	**R / U / A**	**1, 2, 3, 4, 7**
CO3	Practice drawing auxiliary views of engineering components, ensuring accuracy and alignment with other views.	**R / U / A**	**1, 2, 3, 4, 7**
CO4	Create detailed engineering drawings that include isometric views to provide a comprehensive understanding of component geometry.	**R / U / A**	**1, 2, 3, 4, 7**
CO5	Identify different types of surfaces and their corresponding development methods, such as cylindrical, conical, and spherical surfaces.	**R / U / A**	**1, 2, 3, 4, 6,7**
CO6	Appraise the drawing principles and appreciateits applications in engineering field.	**R / U / A**	**1, 2, 3, 4, 7**

BLUEPRINT OF MARKS FOR SEE

Unit No	Name of the Unit	Periods	Questions to be set for SEE		
			R	U	A
			PART-A (2M Questions)		PART-B (6 M Questions)
1	Projection of Solids	08	Q1		Q9(a)
2	Sectional Views	08	Q2		Q9(b)
3	Auxiliary views	06	Q3		Q10(a)
4	Pictorial drawing	09	Q4		Q10(b)
5	Development of surfaces	14	Q5, Q6, Q7, Q8		Q11(a), Q11(b), Q12(a), Q12(b)
Total Periods / Total Questions		**45**	**8**		**4**

[R: Remembering, U: Understanding – 2 Marks] [A: Application – 6 Marks]

Note: Question Paper consists PART – A and PART-B, Total Marks: 40, Time: 2 Hours

PART – A consists of 8 and student have to answer ALL questions, each question carries 2 marks (8x2 = 16)

PART – B consists of 4 questions and student have to answer ALL questions, each question carries 6 marks (4x6=24)

COURSE CONTENT

1.0 Projection of solids (08 periods)

Projection of regular solids

a) Axis perpendicular to one of the planes
b) Axis parallel to VP and inclined to HP and vice versa.

2.0 Sectional views (08 periods)

Need for drawing sectional views – what is a sectional view - Location of cutting plane – Purpose of cutting plane line – Selection of cutting plane to give maximum information (vertical and offset planes) - Hatching – Section of regular solids inclined to one plane and parallel to other plane

3.0 Auxiliary views (06 periods)

Need for drawing auxiliary views -Explanation of the basic principles of drawing an auxiliary views - explanation of reference plane and auxiliary plane -Partial auxiliary view.

4.0 Pictorial Drawings **(09 periods)**

Brief description of different types of pictorial drawing viz., Isometric, oblique, and perspective and their use - Isometric drawings: Isoaxis, angle between them, meaningof visual distortion in dimensions - Need for an isometric scale, difference between Isometric scale and ordinary scale difference between Isometric view and Isometric projection - Isometric and non-Isometric lines -Isometric drawing of common features like rectangles, circular shapes, non-isometric lines - Use of box and offset methods.

5.0 Development of Surfaces **(14 periods)**

Need for preparing development of surface with reference to sheet metal work - Concept of true length of a line with reference to its orthographic projection when the line is (i) parallel to the plane of projection (ii) inclined to one principal and parallel to the other -Development of simple solids like cubes, prisms, cylinders, cones, pyramid (sketches only) -Types of development: Parallel line and radial line development -Procedure of drawing development, drawings of trays, funnels, elbow pipes and rectangular ducts.

REFERENCE BOOKS

1. Engineering Drawing by Kapil dev – (Asian Publisher)
2. Engineering Drawing by Basant Agarwal&C.M Agarwal - (McGraw-hill)
3. Engineering Drawing by N.D.Bhatt. (Charotar Publishing House Pvt. Ltd.)
4. A Textbook on Engineering Drawing by P. Kannaiah, K. L. Narayana, K. Venkata Reddy
5. Engineering drawing + AutoCAD by Venugopal, K, New Delhi : New Age International

ONLINE RESOURCES

1. https://nptel.ac.in/courses
2. https://nptel.ac.in/courses/124107159
3. www.slideshare.net/shameem.mist/engineering-drawing
4. https://www.powershow.com/viewfl/76303aOWI5M/Engineering_Drawing_powerpoint_ppt_presentation
5. https://www.powershow.com/view0/91a2bfN2Q2N/Basic_engineering_drawing_solved_question_powerpoint_ppt_presentati on

SPECIFIC LEARNING OUTCOMES

CO1: Draw the specified projections of solids for the given 3D representation of the regular solids

1.1. Draw the projections of solids to axis of solids parallel to one plane.

1.2. Draw the projections of solids to axis of solid inclined to other plane.

CO2: Create sectional views using cutting-plane lines and appropriate section lining.

2.1 Explain the need to draw sectional views.
2.2 Select the section plane for a given component to reveal maximum information.
2.3 Explain the positions of section plane with reference planes
2.4 Differentiate between true shape and apparent shape of section
2.5 Draw sectional views and true sections of regular solids discussed in 6.0
2.6 Apply principles of hatching.

CO3: Practice drawing auxiliary views of engineering components, ensuring accuracy and alignment with other views.

3.1 State the need of Auxiliary views for a given engineering drawing.
3.2 Draw the auxiliary views of a given engineering component
3.3 Differentiate between auxiliary view and apparent view

CO4: Create detailed engineering drawings that include isometric views to provide a comprehensive understanding of component geometry.

4.1 State the need of pictorial drawings.
4.2 Differentiate between isometric scale and true scale.
4.3 Prepare Isometric views for the given orthographic drawings.

CO5: Identify different types of surfaces and their corresponding development methods, such as cylindrical, conical, and spherical surfaces.

5.1 State the need for preparing development drawing.
5.2 Prepare development of simple engineering objects (cubes, prisms, cylinders, cones, pyramid) using parallel line and radial line method.
5.3 Prepare development of surface of engineering components like trays, funnel, 90^0 elbow & rectangular duct.

COURSE-PO ATTAINMENT MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	-	-	3
CO2	3	3	3	2	-	-	3
CO3	3	3	3	2	-	-	3
CO4	3	2	3	3	-	-	3
CO5	3	2	2	2	-	-	3
CO6	3	2	2	2	-	-	3

BOARD DIPLOMA EXAMINATION, (C-24) DME – II SEMESTER
MID SEM - I EXAMINATION
ENGINEERING DRAWING - II

Time: 1 Hours] **[Total Marks: 20**

PART-A

4x2=8

Instructions : 1. Answer **ALL** questions.
2. Each question carries **TWO** marks.

1. Draw the projections of a triangular prism of base side 35 mm, resting on H.P. on its base such that one of its base side is perpendicular to V.P.
2. Draw the projections of a cone of base diameter 40 mm and height 60 mm resting on H.P. on its base.
3. A cube of base side 30 mm resting on its base on H.P. such that one of its base side is making an angle of 30^0 to V.P. A sectional plane parallel to H.P passes through the axis at a distance of 20 mm from the base. Draw the sectional top view of the truncated cube.
4. Draw the sectional top view of the square pyramid of base side 30 mm and height 60 mm is resting on HP on its base with one of its base side is parallel to V.P. when it is cut by a horizontal section plane at a distance of 30 mm from the apex.

PART-B 2x6=12

Instructions : 1. Answer any **ALL** questions.
2. Each question carries **SIX** marks.

5. (a). Draw the projections of a pentagonal pyramid, base 30 mm edge and axis 50 mm long, having its base on the H.P. and an edge of the base parallel to the V.P. Also draw its side view.

(Or)

5. (b). A tetrahedron of 50 mm long edges is resting on the H.P. on one of its faces, with an edge of that face parallel to the V.P. Draw its projections.

6. (a) A cube of 35 mm long edges is resting on the H.P. on one of its faces with a vertical face inclined at 30° to the V.P. It is cut by a section plane parallel to the V.P. and 9 mm away from the axis and further away from the V.P. Draw its sectional front view and the top view.

(Or)

6. b) A cylinder of 40 mm diameter, 60 mm height and having its axis vertical, is cut by a section plane, perpendicular to the V.P., inclined at 45° to the H.P. and intersecting the axis 32 mm above the base. Draw its front view, sectional top view and true shape.

ME-207

BOARD DIPLOMA EXAMINATION, (C-21)
DME – II SEMESTER
MID SEM- II EXAMINATION
ENGINEERING DRAWING - II

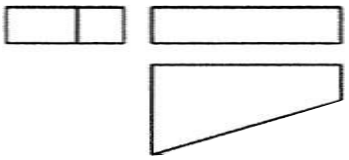
Time: 1 Hours] [Total Marks: 20

PART-A

4x2=8

Instructions : 1. Answer **ALL** questions.
2. Each question carries **TWO** marks.

1. What is the need for an auxiliary view?
2. A cube of side 30 mm placed on HP and sectioned diagonally, draw the auxiliary view of the inclined surface.
3. Draw the isometric view of a block whose orthographic projections are given below assume proper dimensions.



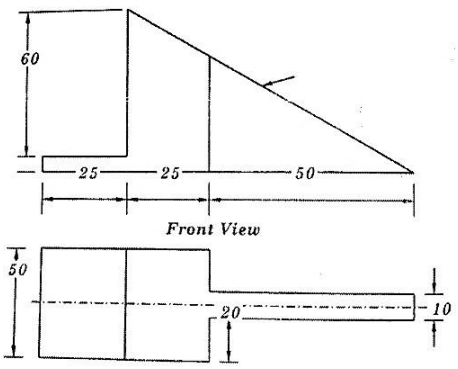
4. Draw the isometric view of a hexagonal plane of base side 30 mm when one of its side is parallel to H.P, when it is horizontal.

PART-B

2x6=12

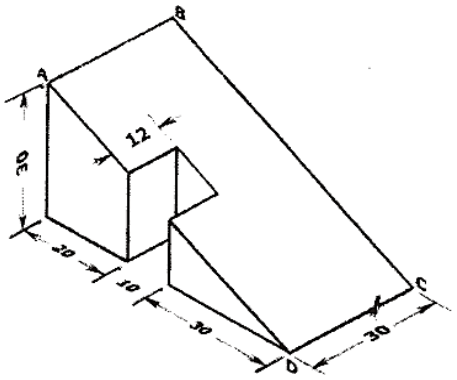
Instructions : 1. Answer any **ALL** questions.
2. Each question carries **SIX** marks.

5. (a) Draw the auxiliary view of a component given below.

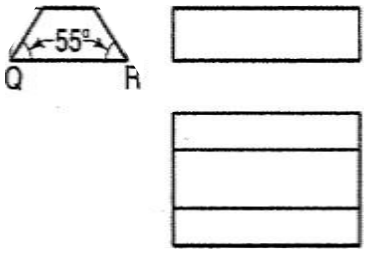


(Or)

5. (b) Draw the auxiliary view of the slopping surface of the cast iron block as shown in the figure.

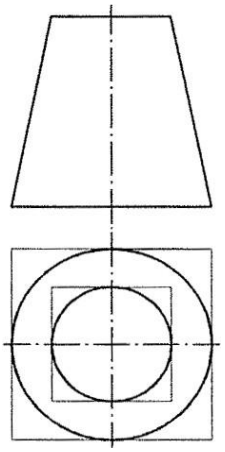


6. (a) Draw the isometric view of the block whose orthographic projections are given below by assuming proper dimensions.



(Or)

6. (b) Draw the isometric drawing of the frustum of a cone shown in figure with proper dimensions.



ME-207

MODEL PAPER SEE

BOARD DIPLOMA EXAMINATION, (C–21)

DME-II SEMESTER END EXAMINATION

ENGINEERING DRAWING - II

Time: 2hours] [Total Marks:40

Important Note: Wherever any question has choice, marks will be allotted only to first attempted question. **No marks will be allotted for extra questions answered.**

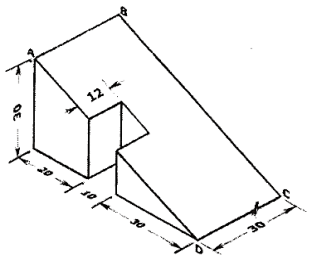
PART-A

Instructions : 1. Answer **ALL** questions. 8x2=16

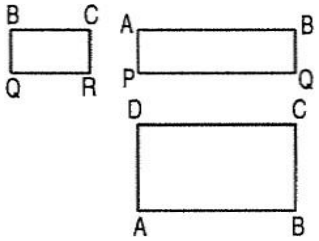
2. Each question carries **TWO** marks.

3. All the dimensions are in mm.

1. Draw the projections of the cone with 30 mm height and 10 mm base circle radius, resting on H.P. on its base.
2. A cylinder with base radius 20 mm and height 60 mm resting on the ground, a 30^0 inclined section plane perpendicular to V.P. cuts the cylinder axis at mid-point. Draw the sectional top view of the cylinder.
3. Draw the auxiliary view of sloping surface of the object whose isometric view is given below.



4. Draw the isometric view of a block whose orthographic views are given below by assume proper dimensions.



5. Develop the lateral surface of a cube of side length 30 mm.
6. Develop the lateral surface of a triangular pyramid of base side 25 mm and height 50 mm.
7. Develop the lateral surface of a cylinder of base diameter 60 mm.
8. Develop the lateral surface of a hexagonal prism of base side 25 mm and 60 mm height.

PART-B **4x6=24**

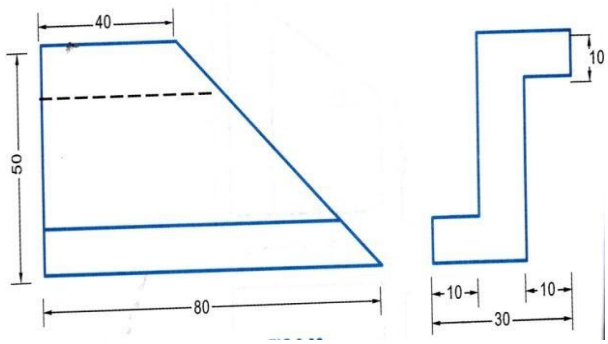
Instructions : 1. Answer any **ALL** questions.
2. Each question carries **SIX** marks.
3. All the dimensions are in mm.

9. a) Draw the projection of a cone of base diameter 50 mm and height 80 mm when itsaxis is making an angle of 45^0 to H.P and parallel to the V.P.

(Or)

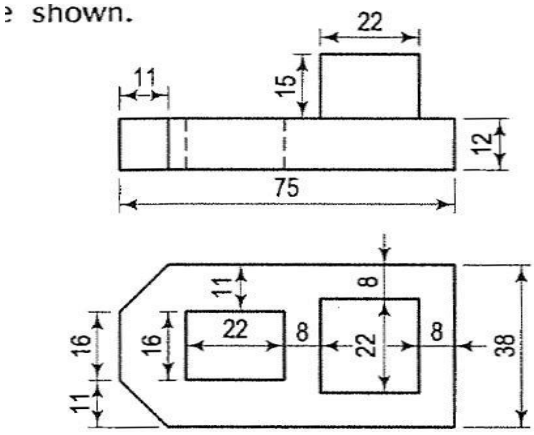
9. b) A triangular prism, base 30 mm side and axis 50 mm long, is lying on the H.P. on one of its rectangular faces with its axis inclined at 30° to the V.P. It is cut by a horizontal section plane, at a distance of 12 mm above the ground. Draw its frontview and sectional top view.

10. a) Draw the auxiliary view of sloping surface of an object shown in figure.

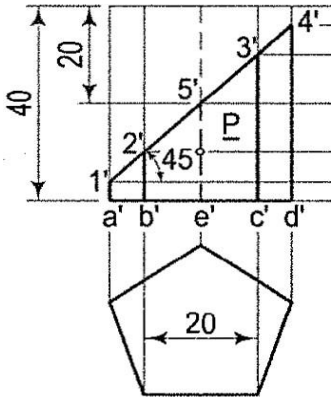


(Or)

10. b) Draw the isometric view of the block, whose orthographic views are shown in figure.

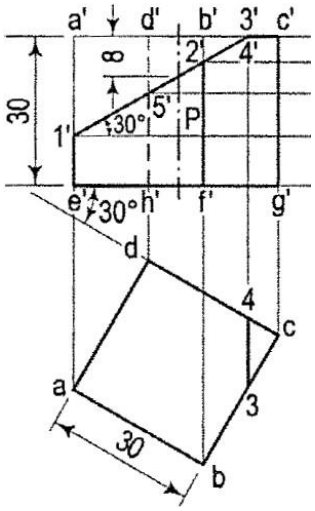


11. a) Develop the lateral surface of the truncated pentagonal prism as shown in figure.

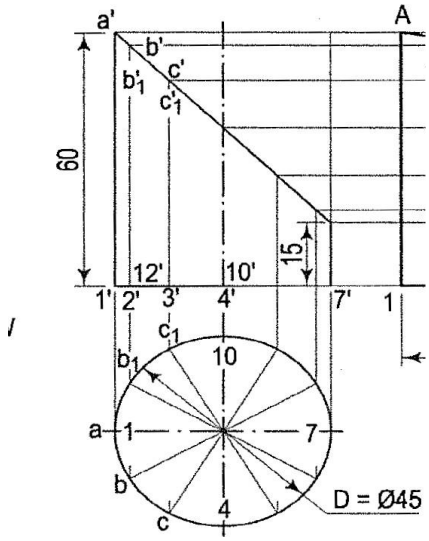


(Or)

11. b) Draw the development of a truncated cube shown in below figure.

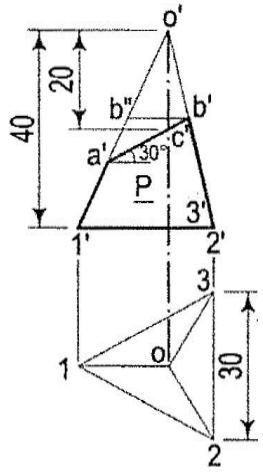


12. a) Develop of bottom portion of the truncated cylinder.



(Or)

12. b) Develop the portion 'P' in the below figure.



CE – 208 - MATERIAL TESTING LAB

Course Title:	Material Testing Lab	Course Code :	CE-208
Semester:	II Semester	Course Group :	Practical
Teaching Scheme in Periods(L:T:P):	15:0:30	Credits :	1.25
Methodology:	Lecture+ Practical	Total Contact Periods :	45
CIE:	60 Marks	SEE :	40 Marks

Course outcomes

This course requires the knowledge of Construction Materials

Course Outcomes

Upon the completion of the course, the student shall be able to

CO1	Select suitable sample of material and Use standard equipment like UTM, Hardness testing machine etc for conducting different tests based on BIS
CO2	Test Bricks and metals to check their suitability for construction works as per IS specification
CO3	Check suitability of Ordinary Portland cement for a particular work as per standards by conducting Fineness test and Normal consistency test
CO4	Find the suitability of Ordinary Portland cement for a particular work by conducting Initial and final setting times of cement and Compressive strength of cement.
CO5	Select suitable sample of Fine aggregate based on tests for use in mortar and concrete
CO6	Identify suitable sample of Course aggregate based on tests for use in mortar and concrete

Course Content

Unit No	Unit Name	Periods
1	Tests on Bricks and metals	15
2	Tests on Cement	15
3	Tests on Aggregates	15
	Total	45

Course Contents

UNIT 1: Tests on Bricks and metals

Duration: 15Periods(L:5-P:10)

a) Water absorption
b) Crushing strength
c) Tension Test
d) Hardness Test
e) Izod/Charpy Test
f) Deflection Test

UNIT 2: Tests on Cement

Duration: 15 Periods(L:5-P:10)

a) Fineness test
b) Normal consistency test
c) Initial and final setting times of cement.
d) Compressive strength of cement.

UNIT 3: Tests on Aggregates

Duration:15Periods(L:5-P:10)

a) Specific Gravity and Water absorption of Fine and Coarse aggregate
b) Bulking of Sand,
c) Bulk Density and Percentage of voids in Fine and Coarse aggregate
d) Sieve analysis of fine and Coarse aggregate

KEY Competencies to be achieved by the student

S. No	Experiment Title	Key Competencies
1	Water Absorption on bricks	Taking weight of dry bricks and wet bricks
2	Crushing strength test on bricks	1.Preparation of 1:1 cement mortar and application of cement mortar over top and bottom faces of brick
		2.Application of load gradually at the rate 14 N/mm^2 per minute till failure occurs
		3.Recording the load at FAILURE
3	Tension test on mild steel rod	1.Marking of gauge length on the MS Rod
		2.Fixing the specimen correctly in between jaws
		3.Application of load at required rate carefully
		4. Measuring the load at failure accurately
4	Brinell/Rockwell Hardness test	1.Placing of specimen at exact position
		2.Application and release of load at required rate
5	Izod/Charpy test on mild steel/brass	1.Preparation of standard specimen and fixing the specimen in the right position of anvil

		2.Recording down the reading by observing the appropriate scale
6	Deflection test on beams(central point load)	1.Measuring the dimensions of specimen accurately
		2.Application of load at exact point of application
		3.Measurement of deflection accurately
7	Fineness test on cement	1.Taking weight of cement sample and its residue
8	Normal consistency test on cement	1.Measurement of required percentage of water to cement accurately
		2.Preparation of sample in the mould
		3.Noting down the plunger penetration on vicat's scale
9	Setting times of cement	1.Measurement of required percentage of water to cement accurately
		2.Preparation of sample.
		3.Noting down the needle penetration on Vicat's scale
		4.Recording time at required needle penetration
10	Compressive strength test on cement	1.Taking weights of different grades of standard sand and cement accurately
		2.Addition of required percentage of water to cement accurately
		3.Application of load at required rate and recording of load at failure accurately
11	Specific Gravity and Water absorption of fine and coarse aggregate	Take weights accurately, record the observations and calculate accurately
12	Bulking of sand	1.Measuring the volume of sand and water accurately
		2.Addition of water to sand in accurate increments
		3.Measuring the increase in volume of sand
13	Bulk Density and Percentage of voids in coarse and fine aggregates	1.Taking the weight of cylindrical measure accurately
		2.Calculating the bulk density of coarse/ fine aggregates both in loose and compacted states
		3.Taking the weight of coarse/ fine aggregate and containers
14	Sieve analysis of coarse and fine aggregate	1.Correct arrangement of sieves used for the sieve analysis of fine or coarse aggregate
		2.Weighing the residue in each sieve accurately

Reference Books

1. Laboratory manual on Testing of Engineering Materials by HemantSood,New Age International Publishers,New Delhi
2. Building and Construction materials Testing and Quality Control by M.L.Gambhir and NehaJamwal,McgrawHill,India
3. Material Testing Laboratory manual by C.B.Kukreja, Kishore.K and Ravi Chawla,StandardPublishers Distributors

Suggested E-learning references

1. http://nptel.ac.in
2. https://docslide.us/documents/som-bmt-lab-manual-final.html
3. http://www.nitttrchd.ac.in/sitenew1/nctel/civil.php

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

CO1 - Select suitable sample of material and Use standard equipment like UTM, Hardness testing machine etc for conducting different tests based on BIS

CO2 - Test Bricks and metals to check their suitability for construction works as per IS specification

2.1 State the significance of water absorption test on bricks
2.2 State the standards on water absorption of bricks used for various construction works
2.3 Explain the procedure for conducting water absorption test on bricks
2.4 Perform water absorption test on bricks
2.5 State the significance of crushing strength test on bricks
2.6 State the standards on crushing strength of bricks used for various construction works
2.7 Explain the procedure for conducting crushing strength test on bricks
2.8 Determine crushing strength of bricks by testing
2.9 Compare observations of crushing tests conducted on different types of bricks like clay bricks, fly ash bricks, concrete blocks
2.10 State the properties of mild steel used as reinforcement in concrete
2.11 State various tests conducted on mild steel by using UTM
2.12 Explain the tension test on Mild steel specimen
2.13 Conduct tension test on mild steel using UTM
2.14 Interpret the behaviour of the steel with increasing load
2.15 Draw inferences from tests on different grades of steel
2.16 State the significance of hardness of metals
2.17 Explain the hardness test by Brinell/ Rockwell testing machine
2.18 Calculate BHN and Rockwell's hardness on given steel samples
2.19 State of effect of impact loading over structures made of different metals
2.20 Explain method of Izod/Charpy impact test on Mild steel specimen

2.21 Calculate Impact load on Mild steel specimens by sing Izod/Charpy Testing machine

2.22 Use apparatus required for conducting deflection tests on beams under central point load

2.23 Find the Young's modulus by conducting deflection test on steel and wooden beams at different positions of loading

CO3 - Check suitability of Ordinary Portland cement for a particular work as per standards by conducting Fineness test and Normal consistency test

CO4 - Find the suitability of Ordinary Portland cement for a particular work by conducting Initial and final setting times of cement and Compressive strength of cement.

4.1 State the significance of workability and Compression tests in field.

4.2 State the method of preparing sample and the number of samples required for given work

4.3 Use apparatus required for conducting fineness test on cement

4.4 State the standards on fineness of cement

4.5 Explain the procedure for conducting the fineness test on cement

4.6 Conduct the fineness test on cement and record the observation

4.7 State the significance of normal consistency of cement

4.8 Use apparatus required for conducting normal consistency test on cement sample

4.9 Explain the procedure for conducting normal consistency test on cement sample

4.10 Find the normal consistency ofgiven cement sample

4.11 Draw the inference from the observations of normal consistency of fresh cement and old cement samples of same and different grades

4.12 State the significance of setting times on construction activity

4.13 State the standards on initial and final settings times of various types of cement

4.14 Use apparatus required for conducting initial and final setting times of given cement sample

4.15 Explain the procedure for conducting initial and final setting times of given cement sample

4.16 Find the initial setting time of given cement sample

4.17 Draw the inference from the observations of initial setting times of fresh and old cement samples of same and different grades

4.18 State the significance of compressive strength of cement used for various civil engineering works

4.19 State various grades of cement available in the market based on compressive strength of the cement

4.20 State the standards on compressive strengths of different types of cements used in construction

4.21 Use apparatus required for conducting compressive strength test on given cement sample

4.22 Explain the procedure for conducting compressive strength test on given cement sample
4.23 Find the compressive strength of given cement sample
4.24 Draw the inference by comparing the observations of compressive strength test on fresh and old cement samples

CO5 - Select suitable sample of Fine aggregate based on tests for use in mortar and concrete

CO6 - Identify suitable sample of Course aggregate based on tests for use in mortar and concrete

6.1 Calculate the fineness modulus of given sample of aggregate
6.2 State the significance of specific gravity and water absorption of fine and coarse aggregate used for construction
6.3 State the range of specific gravity values for various naturally available fine and coarse aggregate
6.4 State standards on water absorption of sand
6.5 Use apparatus required for conducting Specific gravity and water absorption test on given aggregate sample
6.6 Explain the procedure for conducting specific gravity and water absorption test on given aggregate sample
6.7 Find specific gravity and water absorption test on given aggregate sample
6.8 Explain the effect of bulking of sand on quantities of material and quality mortar and concrete
6.9 State the significance of bulking of sand on strength and durability properties of mortar and concrete
6.10 Use apparatus required for conducting bulking of sand test on given sand sample
6.11 Explain the procedure for conducting bulking of sand test on given sand sample
6.12 Draw the inferences from the observations of bulking of sand tests conducted on fine, medium and coarse sands
6.13 Explain the field method of adjustment for bulking of fine aggregate
6.14 Use apparatus required for conducting test to determine bulk density of coarse and fine aggregate
6.15 Find the bulk density of given sample of coarse and fine aggregate
6.16 Explain the effect of voids in coarse and fine aggregates on strength and durability properties of mortar and concrete
6.17 Use apparatus required for conducting tests to find percentage of voids present in aggregate
6.18 Find the percentage of voids present in given sample of aggregate
6.19 State the significance sieve analysis of fine and coarse aggregates on properties of concrete
6.20 State the grading limits of fine aggregate as per IS: 383-1970
6.21 Use apparatus required for conducting sieve analysis of fine aggregate

Suggested Student Activities

1. Collect the information with proper justification for the fine aggregates used for different constructional activities such as foundation, plastering, concreting etc mentioning zonal classification.
2. Take the students for industrial visit for a nearby industry Select any two materials used for various mechanical engineering applications. Compare their mechanical properties
3. Presentation on Strain gauges, strain indicators, extensometer.
4. Collecting different samples of materials from market and testing in lab
5. Collecting Specifications of various materials and correlate with standards.
6. Collecting and study of various IS codes regarding testing of materials
7. Field tests on various building materials such as cement, sand, brick etc as per codes.
8. Tech fest/Srujana
9. Paper/Poster presentation
10. Quiz
11. Group discussion
12. Surprise Test

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	1	2		2		2	2	1,2,4,6,7
CO2	2	2		2		2	2	1,2,4,6,7
CO3	2	2		2		2	2	1,2,4,6,7
CO4	2	2		2		2	2	1,2,4,6,7

State Board of Technical Education and Training, Telangana
Mid Sem-I Model Question paper
DCE II semester

Course Code: CE-208 **Duration:1 hour**
Course Name: Material Testing Lab **Max.Marks:20 Marks**

Instructions to the Candidate: 1 x 20 =20 Marks

(i)Pick and Answer any One of the following Questions from the given list.
(ii) Check the suitability of the given construction material by drawing suitable inference

1) Calculate the water absorption of given sample of bricks
2) Calculate the crushing strength of given sample of bricks
3) Determine the various parameters of stress strain curve for the given mild steel specimen.
4) Determine the Brinell's harness number for the given metal sample
5) Determine the Rockwell's hardness number for the given metal sample
6) Find the Izod impact value for the given metal specimen
7) Find the Charpy impact value for the given metal specimen
8) Determine the Young's modulus of the given material by conducting deflection test under central point load

State Board of Technical Education and Training, Telangana
Mid Sem-II Model Question paper
DCE II semester

Course Code:CE-208 **Duration:1 hour**
Course Name: Material Testing Lab **Max.Marks:20 Marks**

Instructions to the Candidate: 1 x 20 =20 Marks

(i)Pick and Answer any One of the following Questions from the given list.
(ii) Check the suitability of the given construction material by drawing suitable inference

1) Calculate the fineness of given sample of cement
2) Determine the Standard consistency of given sample of cement
3) Determine the initial setting time of cement
4) Calculate the compressive strength of given cement mortar cubes

State Board of Technical Education and Training,Telangana
Semester End Examination
Model Question paper
DCE II Semester

Course Code:CE-208 **Duration:2 hours**
Course Name: Material Testing Lab **Max.Marks:40 Marks**

Instructions to the Candidate: 1 x 40 =40 Marks

(i)Pick and Answer any One of the following Questions from the given list
(ii) Check the suitability of the given construction material by drawing suitable inference

1) Calculate the water absorption of given sample of bricks
2) Calculate the crushing strength of given sample of bricks
3) Determine the various parameters of stress strain curve for the given mild steel specimen.
4) Determine the Brinell's harness number for the given metal sample
5) Determine the Rockwell's hardness number for the given metal sample
6) Find the Izod impact value for the given metal specimen
7) Find the Charpy impact value for the given metal specimen
8) Determine the Young's modulus of the given material by conducting deflection test under central point
9) Calculate the fineness of given sample of cement
10) Determine the Standard consistency of given sample of cement
11) Determine the initial setting time of cement
12) Calculate the compressive strength of given cement mortar cubes
13) Calculate the Specific gravity and water absorption of given sample of aggregate
14) Determine the percentage of bulking in given sample of sand by field method
15) Calculate the Bulk density and percentage of voids in given sample of aggregate
16) Calculate the fineness modulus of given sample of aggregate

SC-209 - APPLIED SCIENCE LAB

Course Title	Applied Science Lab	Course Code	SC-209
Semester	II Semester	Course Group	Practical
Teaching Scheme in Periods (L:T:P)	15:0:30	Credits	1.25
Type of course	Lecture + Practical	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

SC-209 (A) Physics Lab

Pre requisites:

This course requires the basic knowledge of Science and Mathematics.

Course Outcomes

Upon completion of the course, the student shall be able to

CO1	Determine the value of acceleration due to gravity using simple pendulum and verify with L-T^2 graph.
CO2	Determine the velocity of sound in air at room temperature and calculate velocity of sound at 0^0 C.
CO3	Draw magnetic lines of force, locate neutral points and calculate magnetic moment of a bar magnet.
CO4	Determine the specific resistance of given wire using meter bridge.
CO5	Determine the refractive index of a solid using travelling microscope
CO6	Develop V-I characteristics of Photocell (Demonstration only)

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	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	3					1	1	1,6,7
CO2	3					1	1	1,6,7
CO3	3					1	3	1,6,7
CO4	3					1	3	1,6,7
CO5	3					1	3	1,6,7

Learning outcomes

On successful completion of the course, the student will have ability to:

1. Determine the value of acceleration due to gravity using simple pendulum and verify with L-T^2 graph.
2. Determine the velocity of sound in air at room temperature and calculate velocity of sound at 00 C.
3. Draw magnetic lines of force, locate neutral points and calculate magnetic moment of a bar magnet. Determine the specific resistance of given wire using meter bridge.
4. Determine the refractive index of a solid using travelling microscope.
5. V-I characteristics of Photocell (Demonstration only)

Course Delivery:

The course will be delivered through lectures, class room interaction, group discussions, graded exercises, demonstration and practice.

Tutorial: 1 Period/Experiment:

1. Introduction to Physics practical and its importance, safety precautions in maintenance of equipment in the laboratory.
2. Maintenance of apparatus and equipment.
3. Follow of Do's and Don'ts.
4. Maintenance of data in manual and record book.
5. Write the procedure of the experiment before the commencement of each experiment.
6. Strictly following of instructions given from time to time by the lecturer-in-charge.
7. Demonstration of each experiment by the lecturer in charge.

Conduction of experiments: 2 periods/Experiment.

Student must perform experiment individually under the supervision of the lecturer-in charge.

EXAMINATION & EXPERIMENTS		
S.NO	**EXAMINATION**	**EXPERIMENTS**
1	MIDSEM-I	EXPERIMENT NO 1 & 2
2	MIDSEM-II	EXPERIMENT NO 3 & 4
3	SEMESTER END EXAMINATION	EXPERIMENT NO 1,2,3,4 and 5

Scheme of Valuation of SEE		
S. No	**Particulars**	**Marks**
1.	Objective/Aim	01
2.	Apparatus/Equipment	02
3.	Observations	02
4.	Principle including formula	02
5.	Experiment (Tabular form, readings, etc)	05
6.	Calculation and Result	05
7.	Viva Voce	03
	Total	**20**

References:

1. Intermediate Physics lab manual – Telugu Academy
2. Laboratory manual for class XI and XII – NCERT

SC-209 (B) Chemistry Lab

Prerequisite: Knowledge of basic concepts of Chemistry of Secondary Education

Course Objectives: To provide practical knowledge about the basics of volumetric analysis of chemical compounds

Course Outcomes: On successful completion of the course, the student will have ability to attain the following COs

Course Outcome	
CO1	Determine the molarity of potassium permanganate solution.
CO2	Estimate the amount of the Mohr's salt in the given solution.
CO3	Determine of acidic impurities present in water samples.
CO4	Determine of alkaline impurities present in water samples.
CO5	Estimate the amount of the chlorides in the water sample.

CO-PO Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	**3**	**-**	**-**	**-**	**-**	**1**	**1**
CO2	**3**	**-**	**-**	**-**	**-**	**1**	**1**
CO3	**3**	**-**	**-**	**-**	**2**	**1**	**1**
CO4	**3**	**-**	**-**		**2**	**1**	**1**
CO5	**3**	**-**	**-**	**-**	**2**	**1**	**1**

Course Delivery: The course will be delivered through lectures, classroom interaction, group discussion, demonstration and practical.

Conduction of experiments: Lecture 1 period + Experiment 2 periods.

Student must conduct experiment individually under the supervision of the staff-in-charge.

Lecture and Demonstration: 1 Period

1. Introduction of chemistry practical and its importance, safety precautions in maintenance of cleanliness and orderliness of chemicals in the laboratory.
2. Maintenance of apparatus and equipment.
3. Follow of Do's and Don'ts.
4. Maintenance of data in record book.
5. Write the procedure of the experiment before the commencement of each experiment.
6. Strict following of instructions given from time to time by the staff-in-charge.
7. Demonstration of each experiment by the staff in-charge.

Course content

Volumetric Analysis: (22.5 Periods) Volumetric Analysis by Titrimetric Method:-
Volumetric Analysis -Titration – Standard solutions - Concentration of solutions - Indicators– Self indicator- Acid base indicators- Selection of indicators-End point of titration - Neutralization.

List of experiments:

1. Determination of molarity of $KMnO_4$ by using standard oxalic acid solution
2. Estimation of Mohr's salt by using standard KMnO4 solution.
3. Determination of acidity of water sample by using standard NaOH solution.
4. Determination of alkalinity of water sample by using standard H2SO4 solution.
5. Estimation of chloride content present in water sample by using standard AgNO3 solution.

Specific Learning Outcomes

Upon completion of the course, the student will have ability to

1. Determine the molarity of $KMnO_4$ by using 0.1 M oxalic acid solution
2. Estimate Mohr's salt by using 0.05M potassium permanganate solution.
3. Determine the partial and total acidity of water sample by using 0.02N NaOH solution.
4. Determine the partial and total alkalinity of water sample by using 0.02N H2SO4 solution.
5. Estimate the chloride content present in water sample by using 0.0141N AgNO3 solution.

Reference Books:

1. Vogel's In organic Qualitative and Quantitative Analysis.
2. Practical chemistry by O.P. Pande & others.
3. Qualitative and quantitative analysis by Alex.

EXAMINATION & EXPERIMENTS		
S.NO	**EXAMINATION**	**EXPERIMENTS**
1	MIDSEM-I	Experiment No 1 & 2
2	MIDSEM-II	Experiment No 3 & 4
3	SEMESTER END EXAMINATION	Experiment No 1, 2, 3, 4 and 5

Scheme of Valuation for SEE		
Sl.No.	**Particulars**	**Marks**
1	Identification of apparatus/equipment/chemical compounds/tools/etc.	2
2	Writing Principle and Procedure	5
3	Experiment and Observations	6
4	Calculation and Results	4
5	Viva-voce	3
Total		20

BOARD DIPLOMA EXAMINATION, (C-24)
SECOND SEMESTER EXAMINATION
MIDSEM – I
SC-209: APPLIED SCIENCE LAB

TIME: 1 Hour **TOTAL MARKS: 20**

Instructions: (1) Answer both PART-A AND PART-B on **separate** answer sheets.
(2) Each question carries **TEN** marks.

PART-A (PHYSICS LAB)

Perform ONE experiment allotted by the examiner. 1 x 10 = 10

1. Determine the value of acceleration due to gravity using L-T^2graph.
2. Determine the value of acceleration due to gravity using simple pendulum.
3. Determine the velocity of sound in air at room temperature.
4. Determine the velocity of sound in air at room temperature and calculate velocity of sound at 0^0 C.

PART-B (CHEMISTRY LAB)

Perform ONE experiment allotted by the examiner. 1 x 10 = 10

1. Determine the molarity of KMnO4 solution by using 0.1M oxalic acid.
2. EstimatetheamountofMohr'ssaltpresentinthegiven500mlofsolution by using 0.02M Potassium permanganate solution
3. Estimate the amount of Mohr's salt present in the given 750 ml of solution by using 0.02M Potassium permanganate solution.

BOARD DIPLOMA EXAMINATION, (C-24)
SECOND SEMESTER EXAMINATION
MIDSEM – II
SC-209: APPLIED SCIENCE LAB

TIME: 1 Hour **TOTAL MARKS: 20**

Instructions: (1) Answer both PART-A AND PART-B on **separate** answer sheets.
(2) Each question carries **TEN** marks.

PART-A (PHYSICS LAB)

Perform ONE experiment allotted by the examiner. 1 x 10 = 10

1. Draw magnetic lines of force and calculate magnetic moment of a bar magnet.
2. Draw magnetic lines of force and locate neutral points of a bar magnet.
3. Determine the specific resistance of given wire using meter bridge.
4. Determine the resistance of given wire using meter bridge.

PART-B (CHEMISTRY LAB)

Perform ONE experiment allotted by the examiner. 1 x 10 = 10

1. Determine the partial acidity of water sample by using 0.02N NaOH solution.
2. Determine the total acidity of water sample by using 0.02N NaOH solution
3. Determine the partial alkalinity of water sample by using 0.02N H_2SO_4 solution.
4. Determine the total alkalinity of water sample by using 0.02NH_2SO_4 solution

BOARD DIPLOMA EXAMINATION, (C-24)
SECOND SEMESTER END EXAMINATION
SC-209 - APPLIED SCIENCE LAB

Time: 2 Hours] [Total Marks: 40

Instructions: (1) Answer both PART-A AND PART-B on **separate** answer sheets.

(2) Each question carries **TWENTY** marks.

PART-A (PHYSICS LAB)

Perform ONE experiment allotted by the examiner. 1 x 20 = 20

1. Determine the value of acceleration due to gravity using L-T^2graph.
2. Determine the value of acceleration due to gravity using simple pendulum.
3. Determine the velocity of sound in air at room temperature.
4. Determine the velocity of sound in air at room temperature and calculate velocity of sound at 0^0 C.
5. Draw magnetic lines of force and calculate magnetic moment of a bar magnet.
6. Draw magnetic lines of force and locate neutral points of a bar magnet.
7. Determine the specific resistance of given wire using meter bridge.
8. Determine the resistance of given wire using meter bridge.
9. Determine the refractive index of a solid using travelling microscope.

PART-B (CHEMISTRY LAB)

Perform ONE experiment allotted by the examiner. 1 x 20 = 20

1. Determine the molarity of $KMnO_4$ solution by using 0.1M oxalic acid.
2. Estimate the amount of Mohr's salt present in the given one litre of solution by using 0.02M $KMnO_4$ solution.
3. Determine the partial acidity of water sample by using 0.02NNaOH solution.
4. Determine the total acidity of water sample by using 0.02NNaOH solution
5. Determine the partial alkalinity of water sample by using $0.02NH_2SO_4$ solution.
6. Determine the total alkalinity of water sample by using 0.02N H_2SO_4 solution
7. Estimate the chloride content present in water sample by using 0.0141N $AgNO_3$ solution

CS- 210 – PROGRAMMING IN 'C' LAB

Course Title	Programming in C Lab	Course Code	CS-210
Semester	II Semester	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.25
Methodology	Lecture + Practical	Total Contact Hours:	45
CIE	60Marks	SEE	40Marks

Prerequisites

Basic knowledge of Mathematics, Logical, Reasoning and IT skills.

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Hours/ Periods	Marks for SEE			Marks weightage	%Weightage
			Coding	Execution	Viva		
1	Programming in C Lab	45	20	10	10	40	100
	Total	45	40			40	100

Course Outcomes

On successful completion of the course, the students will be able to

CO'S	Description
CO1	Use the concepts of algorithm and flow chart for developing programs in C language.
CO2	Use variables, constants, data types, operators and Input / Output functions in programs
CO3	Apply decision making and looping concepts for developing programs in C language
CO4	Implement the concepts of arrays and structures for a given problem
CO5	Illustrate the use of functions in developing modular programming
CO6	Illustrate the usage of structures and unions.

Course Content

Unit Number	Unit Name	Periods
1	Programming Methodology and Introduction to C Language	**2**
2	Understand Constants, Variables and Data types in C and Understand Operators and Expressions in C	**4**
3	Decision making and Looping statements	**9**
4	Arrays and Strings	**10**
5	User Defined functions	**10**
6	Structure, union	**10**
	Total	**45**

Recommended Books

1.Let Us C	--	Yeshwanth Kanetkar BPB Publications
2.Programming in ANSIC	--	E.Balaguruswamy Tata McGrawHill
3.Programming with C	--	GottfriedSchaum'outline
4.C The complete Reference	--	Herbert SchildtTataMcGraw Hill

Suggested E-learning references

1. https://www.w3schools.com/c/c_intro.php?external_link=true
2. https://www.geeksforgeeks.org/c-programming-language/
3. https://www.programiz.com/c-programming
4. https://www.javatpoint.com/c-programming-language-tutorial
5. https://www.freecodecamp.org/news/the-c-programming-handbook-for-beginners/
6. https://www.tutorialspoint.com/cprogramming/index.htm
7. https://www.codecademy.com/catalog/language/c
8. https://www.codechef.com/learn/course/c
9. https://archive.nptel.ac.in/courses/106/104/106104128/
10. https://www.youtube.com/watch?v=3QiItmIWmOM
11. https://www.digimat.in/nptel/courses/video/106105171/L01.html
12. https://www.digimat.in/nptel/courses/video/106105171/L07.html

Suggested Learning Outcomes

Upon completion of the course, the student shall be able to

List of Exercises:

1. Write an algorithm to compute whether a given number is even or odd.
2. Write a algorithm to check whether a given year is leap year.
3. Draw a flowchart to identify whether the given number is a "BUZZ" number or not.
4. Write and execute a C program to compute number of months, number of remaining weeks and number of remaining days, given number of days. (**hint** : **Input**: 265 days **Output**: 8 months, 3 weeks,4days)
5. Write and execute a C program to compute Lateral surface area, Total surface area and volume of a cuboid given length, breadth and height.
6. Write and execute a C program to evaluate an expression using operator precedence and associativity rule.
   (hint: a+b/c*d –(e * (f-z)%k)
7. Write and execute a C program to display the following pattern using for loop given n rows
   (hint n=4).

```
1
1  2
1  2  3
1  2  3  4
```

8. Write and execute a C program to reverse a 4 digit number.
9. Write and execute a C program to print all the prime numbers from 2 to n.
10. Write and execute a C program to read two matrices to perform matrix addition.
11. Write and execute a C program to perform matrix multiplication.
12. a. Write and execute a C program to check whether the given string is palindrome or not.

b. Write and execute a C program to read a line of text and display the vowels and consonants.

13. Write and execute a C program to compute the following series using functions $1+ x+(x^2/2!) +(x^3/3!) +……+ (x^n/n!)$
14. Write and execute a C program to compute the sum of first n natural numbers using recursion.
15. Write and execute a C program on" TOWERS OF HANOI PROBLEM" using recursion.
16. Write and execute a C program to read two integers and compute sum, difference, product, quotient using "functions with arguments and with return values".
17. Consider and execute a structure with the following structure members

a. Student name b. PIN c.subject1 marks d. subject2 marks e. subject3 marks

Write and execute a Program to compute individual subject total, individual student marks total for n number of students.

18. Write and execute a c program to read, retrieve, and display the members of a union.

Suggested Student Activities

1. Slip test on C snippets
2. Lab Slip test to execute a random program beyond the given list of exercises

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	1	1	1			2	1	1,2,3,6,7
CO2	1						1	1,7
CO3	1	2	1	2	1	2	1	1,2,3,4,5,6,7
CO4	1	1	1	1	2	1	1	1,2,3,4,5,6,7
CO5	2	2	1	3	1	2	1	1,2,3,4,5,6,7
CO6	1	1	1			1	1	1,2,3,6,7