



GOVERNMENT OF KARNATAKA
DEPARTMENT OF TECHNICAL EDUCATION
Board of Technical Examinations, Bengaluru

Course Title	: COMMUNICATION SKILLS IN ENGLISH	Course Code	: 15CP01E
Semester	: I / II	Course Group	: Core
Teaching Scheme (L:T:P)	: 4:0:0 (in hours)	Credits	: 4 Credits
Type of course	: Theory	Total Contact Hours	: 52
CIE	: 25 Marks	SEE	: 100 Marks

Pre-requisites:

- Basic Knowledge of Grammar
- Listening, Speaking, Reading and Writing Skills as acquired in Secondary Education

Course Objectives:

The students shall be able to:

- Learn to apply the basic grammar in day to day communication in English
- Comprehend the given ideas in a passage and be able to effectively express the same in written form
- Enrich their vocabulary through reading
- Face oral examinations and interviews
- Express their ideas creatively through (spoken/written) exercises

Course Delivery:

The Course will be delivered through lectures, class room interactions, exercises and case studies as detailed below:

Sl. No.	Description	Teaching contact hours
1.	Text	24
2.	Grammar	18
3.	Descriptive writing	5
4.	Comprehension	5
Total		52

Text book: Communication Skills in English for Polytechnics – by ORIENT BLACKSWAN publishers – published by NITTTR Chennai

Course Content:

UNIT I: CAREER PLANNING

(09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Spelling; Grammar- Parts of Speech; Newspaper Reading and Comprehension; Descriptive Writing – Describing Objects; Listening/ Speaking Exercise – Self Introduction.

UNIT-II: THE GREAT INDIAN PSYCHOTHERAPY

(09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Prefixes and Suffixes; Grammar – Articles and Prepositions; Descriptive Writing – Describing People; Listening/ Speaking Exercises – Listening to speeches and writing gist of it in one's own words.

UNIT III: GLOBAL WARMING

(08Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Synonyms and Antonyms; Grammar – Auxiliaries, Question Tags and Short-form Answers; Descriptive Writing – Describing Places; Listening/ Speaking Exercises – Narrating one's own experiences of different situations in their day- to-day life.

UNIT IV: RENDEZVOUS WITH A WOMAN CORPORATE GIANT

(09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Homonyms, Homophones, Homographs; Grammar – Subject-Verb Agreement; Descriptive Writing – Describing Processes; Listening/ Speaking Exercises – A short presentation on a given topic ;Paraphrasing of Proverbs; Different kinds of Interviews.

UNIT V: A UNIQUE PATIENT

(09 Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Compound words; Grammar –Tenses; Descriptive Writing – Describing Events (Eg: College Day, National Festivals, Etc.); Comprehension of a paragraph; Quiz – Questions on health and hygiene.

UNIT VI: A FARMER'S WIFE

(08 Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Formation of plurals; Grammar – Active and Passive Voices; Descriptive Writing – Describing one's goal and its attainment; Developing hints into a paragraph; Comprehension of an unseen passage.

Reference Books:

1. **HIGH SCHOOL ENGLISH GRAMMAR AND COMPOSITION** BY WREN AND MARTIN (S.CHAND & CO.)
2. **THE KING'S GRAMMAR** BY SANJAY KUMAR SINHA (S.CHAND & CO.)
3. **STRENGTHEN YOUR WRITING** BY V.R. NARAYANA SWAMY (ORIENT BLACKSWAN)
4. **ESSENTIAL ENGLISH** BY E. SURESH KUMAR et.al (ORIENT BLACKSWAN)
5. **ENGLISH GRAMMAR & COMPOSITION AND EFFECTIVE BUSINESS COMMUNICATION** BY M.A.PINK AND THOMAS S.E. (S.CHAND & CO.)
6. **WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS** BY CHETAN BHAGAT (RUPA PUBLICATION, NEW DELHI)
7. **CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL** BY JACK CANFIELD et.al (WESTLAND LIMITED PUBLISHERS)
8. **SOFT SKILLS** BY K. ALEX(S.CHAND AND COMPANY)
9. **"REFLECTIONS": I PUC ENGLISH COURSE BOOK**, PUBLISHED BY DEPT.OF PRE-UNIVERSITY EDUCATION, GOVT OF KARNATAKA
10. **A PRACTICAL COURSE FOR WRITING SKILLS IN ENGLISH** BY J.K.GANGAL. (PHI PUBLICATIONS)
11. **ENGLISH LANGUAGE LABORATORIES – A COMPREHENSIVE MANUAL** BY NIRA KONAR (PHI LEARNING)

Course outcomes:

On successful completion of the course, the student will be able to:

1. Read their text, and respond to basic comprehension questions
2. Enhance the students' English grammar skills by using the following grammatical components in written and verbal communication
 - Parts of speech
 - Auxiliaries
 - Articles
 - Tenses
 - Active and Passive voice
 - Prepositions
 - Question Tags and Short form answers
 - Prefixes and Suffixes
 - Subject-Verb Agreement
 - Homonyms/Homophones/ Synonyms /Antonyms
3. Communicate an idea in series logically connected sentences by describing an event such as objects, people, places, processes, expanding proverbs and also conducting activity such as group discussion, presentation, reporting and documentation
4. Comprehend the given passage and able to answer the linked questions

Mapping Course Outcomes with Program Outcomes:

CO –PO Mapping

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Read their text, and respond to basic comprehension questions	5, 6, 7,9	R/U	24	30	25	-	55
CO2	Enhance the student English grammar skills by using the following grammatical components in written and verbal communication <ul style="list-style-type: none"> • Parts of speech • Auxiliaries • Articles • Tenses • Active and Passive voice • Prepositions • Question Tags and Short form answers • Prefixes and Suffixes • Subject-Verb Agreement • Homonyms/Homophones/ Synonyms /Antonyms 	9	U/A	18	-	16	25	41
CO3	Communicate an idea in series logically connected sentences by describing an event such as objects, people, places, processes, expanding proverbs and also conducting activities such as group discussion, presentation, reporting and documentation	7,8,9,10	U/A	7	-	-	15	15
CO4	Comprehend the given passage and able to answer the linked questions	8,9,10	U/A	3	-	10	-	10
		Total Hours of instruction		52	Total marks			121

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
COMMUNICATION SKILLS IN ENGLISH	-	-	-	-	3	3	3	1	3	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Question Paper Blue Print:

Course: COMMUNICATION SKILLS IN ENGLISH

Course code: 15CP 01E

Sl. No.	Content	Knowledge	Comprehension	Application	Total
1.	TEXT				55
a	Lesson	30	25		
2.	GRAMMAR				41
a	Parts of speech			4	4
b	Auxiliaries: Primary and Modals			3	3
c	Articles			3	3
d	Identification of tenses			4	4
e	Active and Passive voice			4	4
f	Prepositions	4			4
g	Question tags			3	3
h	Short form answers			2	2
i	Prefixes and Suffixes	2			2
j	Homonyms/Homophones/	4			4
k	Synonyms and Antonyms	4			4
l	Agreement of the Verb with its Subject	4			4
3.	DESCRIPTION WRITING				15
a	Descriptive writing – Describing objects, people and places, Process and Events			15	
4.	COMPRHENSION				10
a	Comprehension of an unseen passage		10		
	Total	48	35	38	121

Question Paper Pattern:

Sl. No.	Source	Question	Type	Marks
1.	Textual Units	Answer any twelve of the following questions in one or two sentences each	15 questions to be asked from 6 Textual Units	$12 \times 2 = 24$
2.	Textual Units	Write short notes on any three of the following	5 questions to be asked from 6 Textual Units	$3 \times 5 = 15$
3.	Grammar	Identify the parts of speech of the underlined words	4 sentences are to be given and word to be identified is underlined	$4 \times 1 = 4$
4.	Grammar	Fill in the blanks using suitable Auxiliaries	3 sentences are to be given.	$3 \times 1 = 3$
5.	Grammar	Fill in the blanks using suitable Articles	3 sentences are to be given	$3 \times 1 = 3$
6.	Grammar	Identification of Tenses	4 sentences are to be given	$4 \times 1 = 4$
7.	Grammar	<u>Active and Passive Voice:</u> Change the voice of the verb in the following sentences	4 sentences are to be given for changing the voice of the verb	$4 \times 1 = 4$
8.	Grammar	<u>Prepositions:</u> Fill in the blanks with appropriate prepositions	4 sentences are to be given	$4 \times 1 = 4$
9.	Grammar	<u>Question Tags:</u> Add question tags	3 sentences are to be given	$3 \times 1 = 3$
10.	Grammar	<u>Short form answers:</u> Give short form answers	2 sentences are to be given	$2 \times 1 = 2$
11.	Grammar	<u>Prefixes and Suffixes:</u> Add Prefixes/Suffixes to the stem words	2 stem words are to be given	$2 \times 1 = 2$
12.	Grammar	<u>Homonyms, Homophones and Homographs:</u> Use the following words in your own sentences.	4 words are to be given	$4 \times 1 = 4$
13.	Grammar	<u>Synonyms / Antonyms:</u> Give the	2 words each are to be given	

		Synonyms/Antonyms for the following words		2 x 1= 2
14.	Grammar	<u>Agreement of the Verb with its Subject:</u> Fill in the blanks with verbs that agree with their subjects	4 sentences are to be given	4 x 1= 4
15.	Composition	<u>Descriptive Writing:</u> Describe objects, people, places and processes	3 questions are to be given	2 x 5 = 10
16.	Composition	<u>Comprehension of an unseen passage:</u> Read the following passage and answer the questions that follow	Questions to be set for 10 marks	10
	Total	-	-	100

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of marks fixed for each category. (As per model question paper)
2. The question paper pattern provided should be adhered to.
3. Care must be taken so that there is only one possible answer for all 'fill in the blanks' questions.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Three tests (average of three tests will be computed)	20	Blue Books	1 and 2
		Class room Assignments		Any one Activity(*)	05	Log of Activity	3
		TOTAL		25			
	SEE (Semester End Examination)	End Exam	Students	End Of the Course	100	Answer Scripts at BTE	1 to 4
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 3 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 4 Effectiveness of delivery of instructions and assessment

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit. Any decimals shall be rounded off to the next higher digit. **Eg: 15.1** should be rounded of to **16**.

* Class room Assignments: Evaluated for any ONE activity

Suggested list of Tutorial Exercises leading to the Development of Speaking Skills

1. Introducing oneself
2. Discussion about weather
3. Discussion about hobbies
4. Discussing holiday plans
5. Telephonic conversation
6. Talking about favorite sports, movie, TV shows etc.
7. Description about one's goal and its attainment.

8. Any other topic of your/students' choice.

MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY

RUBRICS FOR ACTIVITY(5 Marks)						
Dimension	Unsatisfactory	Developing	Satisfactory	Good	Exemplary	Student Score
	1	2	3	4	5	
Speaks on the given topic	Does not perform any duties assigned to them	Performs very few duties but unreliable	Performs very few duties	Performs nearly all duties	Performs all duties assigned	Ex: 4
Students' Enunciation	Does not enunciate clearly	Enunciation not up to the mark	Enunciation adequate	Enunciation above average	Enunciation extremely good	3
Presentation Skills	Poor presentation	Scope for improvement	Average presentation skills	Presentation effective	Excellent Presentation	2
Submission of Assignment	Does not collect any information relating to the topic	Collects very limited information	Collects some information	Collects much information	Collects a great deal of information	5
Average / Total marks = (4+3+2+5) /4 = 14/4= 3.5 = 4						4

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (course coordinator) for assessing the given activity.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1.	Remembering	42
2.	Understanding the course	25
3.	Applying the knowledge acquired from course	33

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/ Date and Time	Semester/ Year	Course / Course Code	Max. Marks		
Ex: I test/6 th week of sem. 10-11 a.m.	I/II SEM	COMMUNICATION SKILLS IN ENGLISH	20		
	Year: 2015-16	Course Code:15CP01E			
Name of Course Coordinator :			Units: 2 CO's: 2		
Question No.	QUESTIONS	MARKS	CL	CO	PO
I	<p>Answer any <u>five</u> of the following in one or two sentences each:</p> <ol style="list-style-type: none"> 1. What do you mean by career? 2. Define 'Career Planning'? 3. What should be the major focus of career planning? 4. What are the questions often asked by the young? 5. What are the three traits as identified by the author? 6. How have the content of our films changed? 7. What has startled global experts? 	5x 2 = 10	R/U	1	5,7,9
II	<p><u>Grammar:</u></p> <p>1. Identify the parts of speech of the underlined words:</p> <p>a. <u>All</u> spoke in his favour. b. Let us <u>even</u> the ground.</p> <p>2. Fill in the blanks with suitable articles:</p> <p>a. Charlie is ___ European. b. She is ___ untidy girl.</p> <p>3. Fill in the blanks with appropriate prepositions:</p> <p>a. Caesar was killed ___ Brutus ___ a dagger. b. We arrived ___ Belagavi ___ 6 o' clock.</p> <p>4. Add Suffix and Prefix to the following:</p> <p>_____ nation _____</p>	<p>2 x 1 = 2</p> <p>2 x 1 = 2</p> <p>4 x 1 = 4</p> <p>2 x 1 = 2</p>	U/A	2	9

Sources:

UNIT 1: CAREER PLANNING: SOFT SKILLS -BY DR. K. ALEX

UNIT 2: THE GREAT INDIAN PSYCHOTHERAPY: WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS - BY CHETAN BHAGAT

UNIT 3: GLOBAL WARMING: AN ESSAY BY DR. B.M.RAVINDRA, RETD. DY. DIR., DEPT. OF MINES AND GEOLOGY

UNIT 4: RENDEZVOUS WITH A WOMAN CORPORATE GIANT: ESSENTIAL ENGLISH BY E. SURESH KUMAR et.al.

UNIT 5: A UNIQUE PATIENT: CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL - BY JACK CANFIELD et.al.



Government of Karnataka
Department of Technical Education, Bengaluru

Course: **COMMUNICATION SKILLS IN ENGLISH**

Course code: 15CP 01E

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1.	Mrs. Geetha K.	Selection Grade Lecturer	GRICP, Bengaluru
2.	Mr. C.V. Inamdar	Selection Grade Lecturer	Govt. Polytechnic, Belagavi
3.	Mrs. Bharathi Naik	Selection Grade Lecturer	Women's Polytechnic, Mangaluru
4.	Mrs. Rajyashree Srikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
5.	Mrs. Sunitha M.N.	Selection Grade Lecturer	HMS Polytechnic, Tumakuru
6.	Mr. Deepak Dongre	Selection Grade Lecturer	Govt. Residential Women's Polytechnic, Shivamogga

Review committee

	Name	Designation	Institution
1.	Mrs. Rajyashree Srikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
2.	Mrs. Shailaja D.	Lecturer	Women's Polytechnic, Bengaluru

Model Question Paper:

Code: 15CP 01E

I / II Semester Diploma Examination
COMMUNICATION SKILLS IN ENGLISH
(Common to all Diploma programmes)

Time: 3 Hours]

[Max. Marks: 100

Note:

- (i) Answer all the questions as directed.
- (ii) Spelling and grammatical errors shall be penalized.
- (iii) Answers to Question No. I and II are based on the prescribed text.

I. Answer any TWELVE of the following in one or two sentences each:

2 x 12 = 24

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. What are the questions often asked by the young?
5. What are the three traits as identified by the author?
6. How have the content of our films changed?
7. What is Global Warming?
8. How does Global Warming occur?
9. What are the major causes for Global Warming?
10. What was the usual talk when the parents of the children met?
11. What ambition did Nooyi's mother have for her daughter?
12. Who is the sinner according to the poem?
13. Why did the farmer commit suicide?
14. Explain in your own words the reason for the farmer's visit to the clinic.
15. Describe how the doctor fixed the bull's tooth.

II. Write short notes on any THREE of the following:

5 x 3 = 15

1. How does career planning play a major role in making career choices?
2. How does our environment contribute to our numbness to injustice?
3. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?
4. Explain in your own words the reason for the farmer's visit to the clinic.
5. Why does the farmer's wife resolve to live?

III. GRAMMAR:

- 1. Identify the parts of speech of the underlined words:** **4 x 1 = 4**
- All spoke in his favour.
 - Let us even the ground.
 - I can shift for myself.
 - She lives in luxury.
- 2. Fill in the blanks with suitable auxiliaries:** **3 x 1 = 3**
- You _____ not use calculators in the exam hall.
 - _____ I come in sir?
 - _____ you lend me your scooter?
- 3. Fill in the blanks with suitable articles:** **3 x 1 = 3**
- Charlie is ___ European.
 - She is ___ untidy girl.
 - What is ___ matter?
- 4. Identify the tense of the verbs in the following sentences:** **4 x 1 = 4**
- I am writing a letter.
 - Sun rises in the east.
 - I have done my homework.
 - She has been learning western music.
- 5. Change the voice of the verb in the following sentences:** **4 x 1 = 4**
- Who did this?
 - The money was lost.
 - The cat is chasing the mouse.
 - He was made the king.
- 6. Fill in the blanks with appropriate prepositions:** **4 x 1 = 4**
- Caesar was killed ___ Brutus ___ a dagger.
 - We arrived ___ Belagavi ___ 6 o' clock.
- 7. Add suitable question tag:** **3 x 1 = 3**
- You were late this morning, _____?
 - I did not hurt you, _____?
 - Your father is a doctor, _____?
- 8. Give short form answers for the following:** **2 x 1 = 2**
- Does your father smoke? (Negative)
 - Have you read today's newspaper? (Affirmative)
- 9. Add Suffix and Prefix to the following:** **2 x 1 = 2**
- _____ nation _____
- 10. Frame sentences using each word to bring out the difference in meaning clearly:**

4 x 1 = 4

- a. (i) Sight (ii) Site
- b. (i) Present (ii) Present

11. Give Synonyms to the following words: **2 x 1=2**

- a. Teach
- b. Agree

12. Give Antonyms to the following words: **2 x 1 = 2**

- a. War
- b. Happy

13. Fill in the blanks with verbs to agree with their subjects: **4 x 1 = 4**

- a. Twenty kilometers _____not a long distance.
- b. Either you or I_____ mistake.
- c. Gold and Silver_____ precious metals
- d. The captain with his team _____arrived.

IV. COMPOSITION: (Answer any two in 80 -100 words each) **5 x 2 = 10**

1. Describe your favorite tourist place.
2. Describe the process of preparing tea.
3. Expand – Work is worship.

V. COMPREHENSION:

Read the following passage and answer the questions that follow:

She was all of one-and-a-half years old. Two nurses were holding her down while a third was trying to insert a syringe into a vein to get a blood sample. She was crying loudly, but I was crying even louder. We had no option. It was the fifth day and the fever had not broken; it was imperative that we run the test to rule out typhoid. They finally asked me to leave the room, not just because they were embarrassed at a grown-up crying, but because they thought it would be easier and quicker for the child if the mother was not in the room. They got her out within a few minutes. She jumped into my arms and gave a few more loud wails. Fresh tears streamed down my eyes as we made our way out of the wretched pathology lab. Her paediatrician was getting into the building just then. Between sobs I told him how my daughter had flung the syringe and the lab had to have three attendants on her to collect the sample. As I was talking, my voice broke. To my surprise, Dr. Patel handed me his briefcase and stethoscope, took my girl in his arms and went to the store just a few paces away. He bought her a Cadbury bar and my daughter's face lit up like a million bucks. Gone were the tears, the memory of the syringe, smell of antiseptic, cotton ... everything receded to the background as she unwrapped the big bar with her tiny fingers and dug into it with all her heart. I smiled as the angelic doctor handed me my princess.

Meanings of difficult words:

1. **Imperative:** absolutely essential
2. **Wretched:** miserable; unpleasant
3. **Pathology lab:** where the causes and effects of diseases are studied
4. **Receded:** moved back gradually
5. **Paediatrician:** children's doctor
6. **Flung:**(past tense of fling) an act of throwing violently
7. **Attendants:** one who attends

Questions:

- | | |
|---|---|
| 1. How old was the child? | 1 |
| 2. What did the nurses have to do to get a blood sample? | 2 |
| 3. Why was the mother asked to leave the room? | 2 |
| 4. Why does the mother called the pathology lab 'wretched'? | 2 |
| 5. How did Dr. Patel calm down the little girl? | 2 |
| 6. Suggest a suitable title for this passage. | 1 |

Model Question Bank:

Course Title : **COMMUNICATION SKILLS IN ENGLISH**

Course Code: **15CP01E**

I. ANSWER IN ONE OR TWO SENTENCES EACH:

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. List out the benefits of career planning?
5. Identify the guidelines for choosing a career?
6. What are the frequently asked questions about career fields?
7. How do connections help in searching for a suitable job?
8. What are the sample questions asked about a particular job title?
9. What is the role of a career counselor in charting out a career path?
10. List out the factors influencing career decisions?
11. What has startled global experts?
12. What are the questions often asked by the young?
13. What are the three traits as identified by the author?
14. How have the content of our films changed?
15. In what way have we been exposed to corruption from our childhood?

16. How can we contribute to India's progress?
17. What is global warming?
18. How does global warming occur?
19. What are the major causes for Global Warming?
20. What is the quantity of fossil fuel burnt each year?
21. How does the concentration of carbon dioxide in the air increase?
22. Define Greenhouse effect?
23. By burning forests around the world, how much carbon dioxide is added to the atmosphere?
24. What are the steps to be taken to save our environment?
25. What is the possible problem of global warming and its result?
26. What is the effect of global warming?
27. What was the usual talk when the parents of the children met?
28. What ambition did Nooyi's mother have for her daughter?
29. How did Nooyi's mother threaten Nooyi?
30. What good news did Indra Nooyi want to share with her mother?
31. What did Nooyi's mother say when she was told the good news?
32. What lesson did Nooyi learn from her mother?
33. Why does Nooyi's mother take full credit for Nooyi's success?
34. What does Indra Nooyi discover about the language of business in the U.S?
35. What does Indra Nooyi think about herself as a mother?
36. What is the secret of Indra Nooyi's success?
37. How does Indra Nooyi manage time?
38. What is Indra Nooyi's passion?
39. Describe the farmer who visited the dentist's clinic.
41. What was the curious act of the farmer?
42. What request did the farmer make?
43. Why did the doctor almost 'faint in shock'?
44. What did the farmer say when he came back to the clinic?
45. Who do 'you' and 'I' in the poem refer to?
46. Who is the sinner according to the poem?
47. Why did the farmer commit suicide?
48. Explain the meaning of the phrase 'you crossed over'.
49. What are the contrasts depicted by the writer between the farmer's wife and her husband?
50. What memories of her husband trouble her now?

II. ANSWER IN A PARAGRAPH OF NOT MORE THAN 100 WORDS EACH:

1. Write a short note on Guidelines for Choosing a Career.
2. How does career planning play a major role in making career choices?
3. Explain in your own words the first trait of our psyche.
4. How does our environment contribute to our numbness to injustice?
5. Describe the divisiveness that the author talks about.
6. What are the causes and effects of global warming?
7. How does deforestation affect our environment?

8. What information do you gather about Indra Nooyi after going through the interview with Nandan Nilekani?
9. How did Indra Nooyi's mother try to teach her the role of a woman in a family? Do you agree with her?
10. How do you think Indra Nooyi's mother and her husband contribute to her success?
11. What does Indra Nooyi mean when she says "I have to decide every moment in time whether I am going to be a mother or a wife or an executive"?
12. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?
13. Explain in your own words the reason for the farmer's visit to the clinic.
14. Describe how the doctor fixed the bull's tooth.
15. Describe the lament of the farmer's wife on her husband's death?

III. GRAMMAR:

1. Fill in the blanks with suitable articles:

- a. Dr. Sanjay is ___ dentist.
- b. My friend is ___ MLA.
- c. Have you ever visited ___ Himalayas?
- d. Please bring me ___ cup of coffee.
- e. He is ___ untidy boy.
- f. She is ___ backbone of her organization.
- g. He is ___ honour to his profession.
- h. Raghu is going to ___ mall.
- i. ___ world is ___ happy place.
- j. I met ___ European at ___ party in ___ friend's house.

2. Fill in the blanks with suitable prepositions:

- a. She works ___ a big shop ___ Jayanagar.
- b. There is a book ___ the floor. Put it ___ the table.
- c. I often see Mrs. Dixit ___ the station, waiting ___ her train.
- d. Mangalore is ___ the coast ___ the south ___ India.
- e. My daughter isn't ___ work today because she isn't feeling well.
- f. There were several people ___ the bus stop.
- g. Mr. and Mrs. Sharma were ___ the shop talking ___ the assistant.
- h. Yesterday we spent the day ___ the country.
- i. We had lunch ___ a pretty little village.
- j. When I was ___ the bus stop this morning; I saw two boys ___ the church roof.

3. Add appropriate prefixes to form new words:

- | | | | | |
|---------|------------|-------------|-------------|-------------|
| a. form | b. regular | c. literate | d. accurate | e. operate |
| f. pure | g. fix | h. technic | i. tone | j. national |

4. Add appropriate suffixes to form new words:

- a. rich b. love c. start d. beauty e. differ
f. use g. cheer h. attract i. save j. slow

5. Give the synonyms of the following:

- a. release b. arrive c. trap d. happiness. e. large
f. teach g. change h. confusion i. discover j. charge

6. Give the antonyms for the following:

- a. rise b. increase c. smiled. d. strict. e. sadness
f. full g. host h. success i. discover j. charge

7. Add the correct question tags to the following statements:

- a. It is cold, _____?
b. But it isn't as cold as yesterday, _____?
c. It was very cold yesterday, _____?
d. It hasn't been so cold for a long time, _____?
e. It is snowing in the north, _____?
f. It often snows there, _____?

8. Give short form answers for the following:

- a. Does Renu work hard? _____.
b. Can you swim? _____.
c. Are you angry with me? _____.
d. Do you like watching movies? _____.
e. Have you met our Prime Minister? _____.

9. Fill in the blanks with appropriate words from the brackets:

- a. His father-in-law owns a _____ farm. (dairy/diary)
b. Diabetics must take extra care of their _____. (feet/feet)
c. Rekha is a popular _____ of Bollywood. (hero/heroine)
d. The _____ country was prosperous during the _____ of Krishnadevaraya. (reign/reign/rain)
e. You should be _____ in the class. (quite/quiet)

10. Differentiate between the following pairs of words by using each of them in a sentence of your own:

- a. Wrong, rung b. Principal, principle c. Hair, hare
d. Gate, gait. e. Sea, see f. Fair, fare
g. Some, sum. h. Sell, cell i. Weather, whether
j. Birth, berth k. Vacation, vocation l. Bear, bare

11. Fill in the blanks with verbs to agree with their subjects:

- a. Every seat in the bus _____ taken.
- b. All the seats in this bus _____ reserved.
- c. One of my friends _____ visiting me this week end.
- d. Neither Gopal nor Deepak _____ come today.
- e. The Captain of Indian team as well as his players _____ staying here.
- f. Intelligence and hard work _____ required to get good marks.
- g. Mathematics _____ my favourite subject.
- h. _____ your father and mother at home?

12. Identify the tense of the verbs in the following in the sentences.

- a. He was listening to her attentively.
- b. Raghu denies stealing my purse.
- c. She has bought a flat near my house.
- d. Kiran fought bravely.
- e. The teachers are discussing the details of the annual day function.
- f. I am not trying to copy you.
- g. Sushma was cooking pasta.
- h. The students have been waiting eagerly for the results.
- i. Risheeba speaks Tamil very fluently.
- j. I have been waiting for her for over an hour.

13. Change the voice:

- | | |
|-------------------------------|--|
| a. Ramu was making a kite. | f. He was refused admission. |
| b. Close the door. | g. Do not insult the poor. |
| c. Cable wires have been cut. | h. Without effort nothing can be gained. |
| d. We prohibit smoking. | i. They made him captain. |
| e. Everyone loves him. | |
| e. My watch was lost. | |

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: ENGINEERING MATHEMATICS – I	Course Code : 15SC01M
Semester : I	Core / Elective : Core
Teaching Scheme in Hrs (L:T:P) : 4:0:0	Credits : 4 Credits
Type of course : Lecture + Assignments	Total Contact Hours : 52
CIE : 25 Marks	SEE : 100 Marks
Programmes: Common to all Engineering Diploma Programmes	

Pre-requisites:

Basics in Algebra, Trigonometry and Coordinate Geometry in Secondary Education.

Course Objectives:

1. Apply the concept of matrices and determinants and their applications to solve the linear equation in engineering field.
2. Apply the vector algebra in solving the problems of statics and mechanics.
3. Analyse the civil engineering problems using concepts of probability.
4. Evaluate the advanced engineering mathematical problems using logarithms.
5. Apply and evaluate trigonometric concept in vector engineering field.
6. Create the basic concept of calculus.

Course Content:

Topic and Contents	Hours	Marks
LINEAR ALGEBRA		
UNIT-1: MATRICES AND DETERMINANTS	10	31
(a) Matrices: Basic concepts of matrices: Definition, types of matrices and mathematical operations on matrices (addition, subtraction and multiplication of matrices).	02	
(b) Determinant: Definition, problems on finding the determinant value of 2 nd and 3 rd order. Problems on finding unknown quantity in a 2 nd and 3 rd order determinants using expansion. Solving simultaneous linear equations using determinant method (Cramer's rule up to 3 rd order).	04	

<p>(c) Inverse and applications of matrices: Minors and Cofactors of elements of matrix. Adjoint and Inverse of matrices of order 2nd and 3rd order. Elementary row and column operations on matrices. Characteristic equation and characteristic roots (eigen values) of 2x2 matrix. Statement of Cayley-Hamilton theorem and its verification for 2x2 matrix. Solution of system of linear equations using Gauss Elimination method (for 3 unknowns only).</p>	04	
ALGEBRA		
UNITS-2: VECTORS	08	27
<p>Definition of vector. Representation of vector as a directed line segment. Magnitude of a vector. Types of vectors. Position vector. Expression of vector by means of position vectors. Addition and subtraction of vectors in terms of line segment. Vector in plane and vector in a space in terms of unit vector i, j and k respectively. Product of vectors. Scalar product and vector product of two vectors. Geometrical meaning of scalar and vector product. Applications of dot (scalar) and cross (vector) products. Projection of a vector on another vector. Area of parallelogram and area of triangle. Work done by force and moment of force.</p>		
UNITS-3: PROBABILITY AND LOGARITHMS	08	14
<p>(a) Probability: Introduction. Random experiments: outcomes and sample space. Event: Definition, occurrence of an event, types of events. Algebra of events- complementary event, the events A or B, A and B, A but not B, mutually exclusive events, exhaustive events, defining probability of an event. Addition rule of probability. Conditional probability: definition, properties of conditional probability, simple problems.</p> <p>(b) Logarithms: Definition of common and natural logarithms. Laws of logarithms (no proof). Simple problems on laws of logarithms.</p>	06	02

TRIGONOMETRY		
UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES.	16	47
(a)Recapitulation of angle measurement, trigonometric ratios and standard angles. Allied angles: Meaning of allied angle. Signs of trigonometric ratios. Trigonometric ratios of allied angles in terms of θ . Problems on allied angles.	02	
(b) Compound angles: Geometrical proof of $\sin(A+B)$ and $\cos(A+B)$ and hence deduce $\tan(A+B)$. Write the formulae for $\sin(A-B)$, $\cos(A-B)$ and $\tan(A-B)$, problems. Multiple and sub multiple angle formulae for $2A$ and $3A$. Simple problems. Transformation formulae. Expression for sum or difference of sine and cosine of angles into product form. Expression for product of sine and cosine of angles into sum or differences form.	06	
	08	
UNIT-5:COMPLEX NUMBERS	04	09
Meaning of imaginary number i and its value. Definition of complex number in the form of $a + ib$. Argand diagram of complex number $a + ib$ (Cartesian system). Equality of complex numbers. Conjugate of complex number. Algebra of complex numbers, modulus of complex number, principal value of argument of complex number, polar form: $Z = r(\cos\theta + i \sin\theta)$ and exponential form $Z = re^{i\theta}$ of complex number, where r is modulus and θ is principal value of argument of complex number.		
UNIT-6: INTRODUCTION TO CALCULUS	06	17
Limits: Constants and variables. Definition of function. Types of functions: Explicit and implicit function, odd and even functions(definition with example). Concept of $x \rightarrow a$.Definition of limit of a function. Indeterminate forms. Evaluation of limit of functions by factorization, rationalization. Algebraic limits. Statement of $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}$ where n is any rational number. Proof of $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$ where θ is in radian. Related problems. Standard limit (statement only) 1. $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \log_e a$, 2. $\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$ 3. $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = e$, 4. $\lim_{n \rightarrow 0} (1 + n)^{\frac{1}{n}} = e$ Simple problems on standard limits.		
TOTAL	52	145

Course outcomes:

On successful completion of the course, the student will be able to:

1. Find the product of matrices, value of determinants, and inverse of matrix and solve the simultaneous linear equation.
2. Find the product of vectors and their geometrical applications in finding moment of force, work done.
3. Determine probability of various types of events.
4. Solve the problems related to logarithms.
5. Solve the problems on trigonometric functions with angle of any magnitude.
6. Evaluate the limiting value of algebraic and trigonometric functions.

Mapping Course Outcomes with Program Outcomes:

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Find the product of matrices, value of determinants, and inverse of matrix and solve the simultaneous linear equation	1,2,3	R/U/A	10	9	10	12	31
CO2	Find the product of vectors and their geometrical applications in finding moment of force, work done	1,2,3	R/U/A	8	6	15	6	27
CO3	Determine probability of various types of events	1,2,	R/U/A	8	3	5	6	14
CO4	Evaluate the integrations of algebraic, trigonometric and exponential function	1,2,3,10	R/U/A	16	15	20	12	47
CO5	Solve the problems related to logarithms.	1,2	R/A	4	3	0	6	09
CO6	Evaluate the limiting value of algebraic and trigonometric functions	1,2,10	R/U/A	6	6	5	6	17
Total Hours of instruction				52	Total marks			145

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Engineering Mathematics-I	3	3	3	-	-	-	-	-	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
 If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
 If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
 If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
 If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference:

1. NCERT Mathematics Text books of class XI and XII.
2. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr.Ramaverma published by S.Chand & Co.Pvt.Ltd.
3. CBSE Class Xi & XII by Khattar&Khattar published PHI Learning Pvt. ltd.,
4. First and Second PUC mathematics Text Books of different authors.
5. www.freebookcentre.net/mathematics/introductory-mathematics-books.html

Course Assessment and Evaluation:

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

Method	What		To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSESSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests will be computed).	20	Blue books	1 to 6
		Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	5	Log of record	1 to 6
		Total		25			
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 6
INDIRECT ASSESSMENT	Student feedback		Students	Middle of the course	-NA-	Feedback forms	1 to 3, delivery of the course
	End of Course survey			End of course		Questionnaire	1 to 6, Effectiveness of delivery of instructions and assessment methods

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering	25
2	Understanding	40
3	Applying the knowledge acquired from the course	30
	Analysis and Evaluation	5

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks		
Ex: I test/6 th week of sem 10-11 Am	I/II SEM	ENGINEERING MATHEMATICS –I	20		
	Year:	Course code: 15SC01M			
Name of Course coordinator :			Units: __ CO's: ____		
Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Model Question Paper:

Code: 15SC01M

I Semester Diploma Examination

ENGINEERING MATHEMATICS –I
(Common to All Engineering Diploma Programmes)

Time: 3 Hours.] [Max marks: 100

Note:

- (i) Answer any **Ten** questions from **section-A**, any **Eight** questions from **section-B** and any **Five** questions from **section-C**.
- (ii) Each question carries **3** marks in **section-A**.
- (iii) Each question carries **5** marks in **section-B**.
- (iv) Each question carries **6** marks in **section-C**.

SECTION – A

1. Find the product of $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ -1 \\ 5 \end{bmatrix}$
2. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 1 \\ 0 & -3 \end{bmatrix}$ find $\text{adj}(AB)$.
3. If $A + B = \begin{bmatrix} 3 & -7 \\ 0 & 2 \end{bmatrix}$, $A - B = \begin{bmatrix} 1 & 5 \\ 4 & -6 \end{bmatrix}$ find A .
4. If $\vec{a} = i + 2j - 3k$, $\vec{b} = 3i - 5j + 2k$. Find the magnitude of $2\vec{a} + 3\vec{b}$.
5. If $\vec{A} = (3, -4)$, $\vec{B} = (-5, 6)$ find position vector of A and B and also find $|\overline{AB}|$
6. Three coins are tossed simultaneously. List the sample space for event.
7. If $\sin \theta = -\frac{8}{17}$ and $\pi < \theta < \frac{3\pi}{2}$ find the value of $4\tan\theta + 3\sec\theta$.
8. Find the value of $\sin 75^\circ$ using standard angles.
9. Show that $\frac{\text{cosec}(180-A)\cos(-A)}{\sec(180+A)\cos(90+A)} = \cot^2 A$
10. Prove that $\sin(A + B) \sin(A - B) = \sin^2 A - \sin^2 B$.
11. Prove that $\frac{\sin 3A}{\sin A} - \frac{\cos 3A}{\cos A} = 2$.
12. Express the product $(1 + i)(1 + 2i)$ in $a + ib$ form and hence find its modulus.
13. Evaluate : $\lim_{x \rightarrow 3} \left[\frac{x-1}{2x^2-7x+5} \right]$
14. Evaluate: $\lim_{x \rightarrow \infty} \left[\frac{3x^2+4x+7}{4x^2+7x-1} \right]$

SECTION – B

1. Find the value of x if $\begin{vmatrix} 1 & x & 0 \\ 2 & -1 & 3 \\ -2 & 1 & 4 \end{vmatrix} = 0$.

2. Find the characteristic equation and its roots of a square matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$
3. Find the *sine* of the angle between the vectors $2i - j + 3k$ and $i - 2j + 2k$.
4. If vector $\vec{a} = i + j + 2k$, $\vec{b} = 2i - j + k$ show that $\vec{a} + \vec{b}$ perpendicular $\vec{a} - \vec{b}$.
5. Find the projection of $\vec{a} = 2i + j - k$ on $\vec{b} = 2i - 3j + 4k$.
6. Prove that $\frac{1}{\log_a abc} + \frac{1}{\log_b abc} + \frac{1}{\log_c abc} = 1$
7. Find the numerical value of $\sin\left(\frac{\pi}{3}\right) \cdot \cos\left(-\frac{\pi}{3}\right) - \cos\left(\frac{\pi}{4}\right) \cdot \sin\left(-\frac{3\pi}{4}\right)$
8. Prove that $\sin(A + B) = \sin A \cos B + \cos A \sin B$ geometrically
9. If $A + B + C = \frac{\pi}{2}$, prove that $\tan A \tan B + \tan B \tan C + \tan C \tan A = 1$.
10. Show that $\frac{\sin 56^\circ - \sin 44^\circ}{\cos 56^\circ + \cos 44^\circ} = \cot 82^\circ$
11. Evaluate: $\lim_{x \rightarrow 0} \left[\frac{\sqrt{1+x+x^2}-1}{x} \right]$

SECTION – C

1. Solve for x, y & z using determinant method
 $x + y = 0$, $y + z = 1$ & $z + x = 3$.
2. Solve the equation $x + y + z = 6$, $2x - 3y + z = 1$ & $x + 3y - 2z = 7$ using Gauss elimination method.
3. A force $\vec{F} = 2i + j + k$ is acting at the point $(-3, 2, 1)$. Find the magnitude of the moment of force \vec{F} about the point $(2, 1, 2)$.
4. A die is thrown twice and the sum of the numbers appearing is absorbed to be. What is the conditional probability that the number 5 has appeared at least once?
5. Prove that $\frac{\cos\left(\frac{5\pi}{2} - \theta\right)}{\sin(4\pi + \theta)} + \frac{\tan(-\theta)}{\cot(\pi - \theta)} = \sec^2 \theta$
6. Prove that $\cos 80^\circ \cos 60^\circ \cos 40^\circ \cos 20^\circ = \frac{1}{16}$
7. Find the modulus and argument of the complex number $z = -\sqrt{3} + i$ and hence represent in argand diagram.
8. Prove that $\lim_{\theta \rightarrow 0} \left(\frac{\sin \theta}{\theta} \right) = 1$ where θ is in radian.

Question Paper Blue Print:**Course: ENGINEERING MATHEMATICS – I****Course Code: 15SC01M**

UNIT NO	HOURS	Each questions to be set for 3 Marks Section - A	Each questions to be set for 5 Marks Section - B	Each questions to be set for 6 Marks Section- C	Weightage of Marks	
1	a	2	2	-	-	31
	b	4	-	1	1	
	c	4	1	1	1	
2	8	2	3	1	27	
3	a	6	1	-	1	14
	b	2	-	1	-	
4	a	8	1	1	1	47
	b	8	4	3	1	
5	4	1	-	1	9	
6	6	2	1	1	17	
TOTAL	52	14	11	08	145	
Questions to be answered		10	08	05	100	

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weigh age of model fixed for each unit.
2. The question paper pattern provided should be adhered to
Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks
Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.
Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.
3. Questions should not be set from the recapitulation topics.
4. Questions should not be set from the recapitulation topics.

UNIT-1: MATRICES AND DETERMINANTS

3 MARK QUESTIONS

1. If $A = \begin{bmatrix} 3 & -9 \\ -4 & 7 \end{bmatrix}$, find $A + A'$.
2. If $A = \begin{bmatrix} 2 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & -2 \\ 3 & 1 \\ 2 & 4 \end{bmatrix}$, find AB matrix.
3. If matrix $A = \begin{bmatrix} 2 & -1 & 3 \\ 5 & 1 & 0 \\ 1 & 0 & x \end{bmatrix}$ is a singular matrix, then find the value of x .
4. Find the adjoint of the matrix $A = \begin{bmatrix} 4 & -5 \\ 3 & -2 \end{bmatrix}$.
5. If $A = \begin{bmatrix} 3 & -1 \\ 0 & -2 \end{bmatrix}$ find the characteristic equation.

5 MARK QUESTIONS

1. Solve the equations $x + y = 3$, $2x + 3y = 8$ by Cramer's rule.
2. Solve for x , if $\begin{vmatrix} 1 & 5 & 7 \\ 2 & x & 14 \\ 3 & 1 & 2 \end{vmatrix} = 0$
3. Verify Cayley-Hamilton theorem if $A = \begin{bmatrix} 1 & 3 \\ 2 & -4 \end{bmatrix}$.
4. Verify $A(\text{Adj}A) = |A|.I$. if $A = \begin{bmatrix} 5 & -2 \\ 3 & 1 \end{bmatrix}$.
5. Find the adjoint of the matrix $A = \begin{bmatrix} 3 & -1 & 2 \\ 2 & -3 & 1 \\ 0 & 4 & 2 \end{bmatrix}$

6 MARK QUESTIONS

1. Solve for x & y from the equations $4x + y = 7$, $3y + 4z = 5$, $5x + 3z = 2$ by Cramer's rule.
2. Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$
3. Prove that $\text{adj}(AB) = (\text{adj}B)(\text{adj}A)$ if $A = \begin{bmatrix} -1 & 0 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$

- Find the characteristic roots of a matrix $\begin{bmatrix} 1 & -1 \\ -6 & -2 \end{bmatrix}$.
- Solve the equations by Gauss elimination method $3x - y + z = 0$, $x + 2y - 2z = 3$, $3x + z = 4$.

UNIT-2: VECTORS

3 MARK QUESTIONS

- Find the magnitude of vector $2i + 3j - 6k$
- If $\vec{a} = i + 2j - 3k$, $\vec{b} = 3i - 5j + 2k$ find magnitude of $3\vec{a} - 2\vec{b}$
- Show that $\cos \theta i - \sin \theta j$ is unit vector
- Show that the vectors $2i + 5j - 6k$, and $7i + 2j + 4k$ orthogonal vectors.
- If $\vec{a} = 5i + 2j - 4k$, and $\vec{b} = 2i - 5j + 3k$ find $\vec{a} \times \vec{b}$.

5 MARK QUESTIONS

- Find cosine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.
- Find the projection of \vec{b} on \vec{a} if $\vec{a} = 5i + 2j - 4k$ and $\vec{b} = 2i - 5j + 6k$.
- If $\vec{a} = 3i + 2j - 4k$ and $\vec{b} = i - 2j + 5k$ are two sides of a triangle, find its area.
- Simplify $(\vec{a} + \vec{b}) \cdot (\vec{a} - \vec{b})$ and $(\vec{a} + \vec{b}) \times (\vec{a} - \vec{b})$.
- Find the magnitude of moment of force $4i - 2j + 5k$ about $(2,5,-7)$ acting at $(4,7,0)$

6 MARK QUESTIONS

- If $A=(2,5,7)$, $B=(3,9,4)$ and $C=(-2,5,7)$ are three vertices of parallelogram find its area.
- If a force $4i + 6j + 2k$ acting on a body displaces it from $(2,7,-8)$ to $(3,9,4)$. Find the work done by the force.
- Find the sine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.
- Find the unit vector in the direction perpendicular to both vector $2i - 5j + k$ and $5i + j + 7k$.
- Show that the points whose position vectors are $i - 3j - 5k$, $2i - j + k$ and $3i - 4j - 4k$ form a right angled triangle.

UNIT-3: PROBABILITY AND LOGARITHMS

3 MARK QUESTIONS

- Define equally likely events, Independent event, and mutually exclusive event.
- Define probability of an event.
- A coin is tossed twice. What is the probability that at least one head occurs.
- A die is thrown once, what is the probability an odd number appears.
- If E and F are events such that $P(E)=0.6$, $P(F)=0.3$ and $P(E \cap F)= 0.2$. Find $P(E/F)$.

5 MARK QUESTIONS

1. Prove that $\frac{1}{1+\log_c ab} + \frac{1}{1+\log_a bc} + \frac{1}{1+\log_b ca} = 1$
2. If $x = \log_c ab, y = \log_b bc, z = \log_a ca$,
Prove that $xyz = x + y + z + 2$
3. If $x = \log_{2a} a, y = \log_{3a} 2a, z = \log_{4a} 3a$, prove that $xyz + 1 = 2yz$
4. If $a^2 + b^2 = 7ab$, prove that $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$
5. Solve for x given that $(\log_2 x)^2 + (\log_2 x) - 20 = 0$

6 MARK QUESTIONS

1. An integer is chosen at random from the numbers ranging from 1 to 50. What is the probability that the integer chosen is a multiple of 3 or 10?
2. Two unbiased dice are thrown once. Find the probability of getting the sum of the numbers obtained on the two dice is neither a multiple of 2 nor a multiple of 4.
3. One card is drawn from a well shuffled pack of 52 cards. If E is the event "the card drawn is a king or an ace" and F is the event "the card drawn is an ace or a jack" then find the conditional probability of the event E, when the event F has already occurred.
4. A pair of dice is thrown once. If the two numbers appearing on them are different, find the probability that the sum of the numbers is 6.
5. A family has two children. What is the probability that both the children are boys given that (i) the youngest is a boy. (ii) at least one is a boy?

UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES

ALLIED ANGLES

3 MARKS QUESTIONS

1. Find the value of $\operatorname{cosec}(-1110^\circ)$
2. Find the value of $\frac{\operatorname{cosec}(180^\circ - A)\cos A}{\sec(180^\circ + A)\cos(90^\circ + A)}$
3. 3.If $\sin \theta = \frac{1}{2}$ and $\frac{\pi}{2} < \theta < \pi$, find $\cos \theta$
4. 4. If $A+B+C = 180^\circ$ Prove that $\cot\left(\frac{A+B}{2}\right) = \tan C/2$
5. 5.find the value of $\tan\left(\frac{7\pi}{3}\right)$

5 MARKS QUESTIONS

1. Prove that $\frac{\sin(180^\circ - A)\cos(360^\circ - A)\tan(180^\circ + A)}{\cos(270^\circ + A)\sin(90^\circ + A)\cot(270^\circ - A)} = 1$
2. If $\sec x = 13/5$ and $270^\circ < x < 360^\circ$, Find the value of $\frac{3 \sin x - 2 \cos x}{9 \cos x + 4 \sin x}$
3. Find the value of $\cos 570^\circ \sin 510^\circ - \sin 330^\circ \cos 390^\circ$
4. Evaluate $\frac{\sin(-\alpha)}{\sin(90^\circ + \alpha)} - \frac{\cos(-\alpha)}{\cos(90^\circ - \alpha)} - \frac{\sec(90^\circ - \alpha)}{\cos(180^\circ + \alpha)}$
5. Show that $\tan 225^\circ \cot 405^\circ + \tan 765^\circ \cot 675^\circ + \operatorname{cosec} 135^\circ \sec 315^\circ = 0$

6 MARK QUESTIONS

1. Evaluate $\tan 315^\circ \cot 405^\circ + \tan 765^\circ \cot 675^\circ + \operatorname{cosec} 135^\circ \sec 315^\circ$
2. Find x if $\frac{x \sin^2 300^\circ \sec^2 240^\circ}{\cos 225^\circ \operatorname{cosec}^2 240^\circ} = \cot^2 315^\circ \tan^2 300^\circ$
3. If $\sin \theta = \frac{-1}{4}$ and $\pi < \theta < \frac{3\pi}{2}$, find the value of $\frac{\cos \theta + \tan \theta}{\cot \theta + \sec \theta}$
4. Evaluate $\frac{\sin(2\pi - A)}{\sin(\pi - A)} - \frac{\tan\left(\frac{\pi}{2} + A\right)}{\cot(2\pi + A)} + \frac{\operatorname{cosec}(-A)}{\sec\left(\frac{\pi}{2} + A\right)}$
5. Show that $\tan^2(315^\circ) \cot(-405^\circ) + \cot(495^\circ) \tan(-585^\circ) = 0$

COMPOUND ANGLES

3 MARKS QUESTIONS

1. Find the value of $\sin 15^\circ$
2. Show that $\tan(45^\circ + \theta) = \frac{1 + \tan \theta}{1 - \tan \theta}$
3. Prove that $\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C \cos A} = 0$
4. Using $\tan(A+B)$, prove that $\cot(A+B) = \frac{\cot A \cot B - 1}{\cot A + \cot B}$
5. Prove that $\frac{\sin 2A}{\sin A} - \frac{\cos 2A}{\cos A} = \sin A$

5 MARKS QUESTIONS

1. Prove that $\cos(A-B) \cos(A+B) = \cos^2 A - \sin^2 B$
2. Show that $\sin\left(A + \frac{\pi}{4}\right) + \cos\left(A + \frac{\pi}{4}\right) = \sqrt{2} \cos A$
3. If $\sin A = \frac{1}{\sqrt{10}}$, $\sin B = \frac{1}{\sqrt{5}}$ prove that $A + B = 45^\circ$
4. Prove that $\tan 3\theta - \tan 2\theta - \tan \theta = \tan \theta \tan 2\theta \tan 3\theta$
5. If $A+B = \frac{\pi}{4}$, prove that $(1 + \tan A)(1 + \tan B) = 2$

TRANSFORMATION FORMULAE

3 MARKS QUESTIONS

- 1 P.T $\frac{\cos A + \cos B}{\sin A + \sin B} = \cot\left(\frac{A+B}{2}\right)$
- 2 P.T $\frac{\sin 68^\circ + \sin 52^\circ}{\cos 68^\circ + \cos 52^\circ} = \sqrt{3}$
- 3 Show that $\cos 40^\circ - \cos 50^\circ = \sqrt{2} \sin 5^\circ$
- 4 Show that $\sin 47^\circ + \cos 77^\circ = \cos 17^\circ$
- 5 Show that $\cos 80^\circ + \cos 40^\circ - \cos 20^\circ = 0$

MARKS QUESTIONS

- 1 P.T $\frac{\sin \theta + \sin 3\theta + \sin 5\theta}{\cos \theta + \cos 3\theta + \cos 5\theta} = \tan 3\theta$
- 2 In any triangle ABC prove that $\tan A + \tan B + \tan C = \tan A \tan B \tan C$
- 3 Show that $\frac{\sin 9^\circ + \cos 9^\circ}{\cos 9^\circ - \sin 9^\circ} = \tan 54^\circ$
- 4 Prove that $\cos 55^\circ + \cos 65^\circ + \cos 175^\circ = 0$
- 5 Prove that $\sin 20^\circ \times \sin 40^\circ \times \sin 80^\circ = \frac{\sqrt{3}}{8}$

MARKS QUESTIONS

- 1 Prove that $\cos 20^\circ \times \cos 40^\circ \times \cos 80^\circ \times \cos 60^\circ = 1/16$
- 2 In any triangle ABC prove that $\sin A + \sin B + \sin C = 4 \cos(A/2) \cos(B/2) \cos(C/2)$
 $\frac{\cos x + \cos 2x - \cos 3x - \cos 4x}{\sin x + \sin 2x + \sin 3x + \sin 4x} = \tan x$
- 3 Show that $\frac{\cos x + \cos 2x - \cos 3x - \cos 4x}{\sin x + \sin 2x + \sin 3x + \sin 4x} = \tan x$
- 4 If $A+B+C = 180^\circ$ prove that $\cos^2 A + \cos^2 B + \cos^2 C = 1 - 2 \cos A \cos B \cos C$

5. If $A+B+C = 180^\circ$ prove that $\sin 2A - \sin 2B + \sin 2C = 4 \cos A \cos C \sin B$

UNIT-5: COMPLEX NUMBERS

3 MARK QUESTIONS

1. Evaluate i^{-999}
2. Find the complex conjugate of $(1 + 2i)(3i - 4)$
3. Express $(3 + 4i)^{-1}$ in the form $a+ib$
4. Find the real part and imaginary part of $\frac{1}{\sqrt{2} + i}$
5. If $x + iy = \cos \theta + i \sin \theta$ show that $x + \frac{1}{x} = 2 \cos \theta$

5 MARK QUESTIONS

1. Evaluate $\left(i^{19} + \left(\frac{1}{i}\right)^{25}\right)^2$
2. Find the modulus and amplitude of $(1 - i\sqrt{3})$
3. Express in $a + ib$ form: $\frac{(2+3i)}{(1+3i)(2+i)}$
4. Express the complex number $1 + i$ in the polar form.
5. Find the amplitude of $\sqrt{3} + i$ and represent in Argand diagram.

UNIT-6: INTRODUCTION TO CALCULUS

3 MARK QUESTIONS

1. Evaluate: $\lim_{x \rightarrow -3} \frac{x^2 - 9}{x + 3}$
2. Evaluate: $\lim_{\theta \rightarrow 0} \left(\frac{\tan m\theta}{\sin n\theta}\right)$
3. Evaluate: $\lim_{n \rightarrow \infty} \left(\frac{n+1}{n}\right)^n$.
4. Evaluate: $\lim_{x \rightarrow \infty} \left(\frac{3x^2 - 2x + 1}{2x^2 + 5x - 1}\right)$
5. Evaluate: $\lim_{x \rightarrow 0} \left(\frac{1 - \cos 2x}{x^2}\right)$

5 MARK QUESTIONS

1. Evaluate: $\lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 - 1}$.
2. Evaluate: $\lim_{x \rightarrow 0} \left(\frac{\sqrt{a+x} - \sqrt{a-x}}{3x}\right)$
3. Evaluate: $\lim_{x \rightarrow 1} \left(\frac{x^m - 1}{x^n - 1}\right)$

4. Evaluate: $\lim_{\theta \rightarrow 0} \left(\frac{1 - \cos \theta + \tan^2 \theta}{\theta \sin \theta} \right)$

5. Evaluate: $\lim_{x \rightarrow 0} \left(\frac{e^{ax} - e^{bx}}{x} \right)$.

6 MARK QUESTIONS

1. Prove that $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$, if θ is in "radian".

2. Evaluate: $\lim_{x \rightarrow 0} \left(\frac{\sin \pi x}{x-1} \right)$

3. Evaluate: $\lim_{n \rightarrow \infty} \left(\frac{(5-n^2)(n-2)}{(2n-3)(n+3)(5-n)} \right)$.

4. Evaluate: $\lim_{x \rightarrow 1} \frac{x^2 - 5x + 4}{x^2 - 12x + 11}$.

5. Evaluate: $\lim_{x \rightarrow 2} \left(\frac{x^2 - 4}{\sqrt{x+2} - \sqrt{3x-2}} \right)$





Government of Karnataka
Department of Technical Education, Bengaluru

Course: ENGINEERING MATHEMATICS - I

Course code: 15SC01M


Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Dr. D.S. Prakash	Asst. Director (LRDC)	DTE, Bengaluru
2	Dr.MokaShekhu, ,	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
3	Sri.Sathyanaraya Dixit,	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru
4	Sri. Guruprasad V	Lecturer (Selection Grade /Science)	APS Polytechnic, Somanahalli
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Curriculum Review committee

	Name	Designation	Institution
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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: MATERIALS OF CONSTRUCTION		
	Scheme (L:T:P) : 4:0:0	Total Contact Hours: 52	Course Code: 15CE11T
	Type of Course: Lectures, Self Study & Quiz	Credit : 04	Core/ Elective: Core
CIE- 25 Marks		SEE- 100 Marks	

Prerequisites: Knowledge of basic Science in Secondary Education.

Course Objectives:

1. Understand properties of various materials.
2. Select suitable materials for appropriate engineering applications.

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

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Identify the types, origin, properties, manufacturing, qualities, uses of building element (Stones, Bricks & blocks) as per IS code requirements.	R/U	1,2,3,4,5,7	21
CO2	Comprehend about timber and able to select different market forms for appropriate field application.	R/U	1,5	10
CO3	Explain about composition, functions, manufacturing, tests, types, uses and storage of cement as per IS codes.	R/U	1,2,3,4,5	8
CO4	Summarize about paints, varnishes & distemper and recognize its good qualities	R/U	1,5	4
CO5	Compare the types, properties, uses and market forms of ferrous, nonferrous metals and their alloys.	R/U	1,2,5	9
Total sessions				52

Legend- R; Remember U: Understand

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments a practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
MATERIALS OF CONSTRUCTION	3	3	3	3	3	-	3	-	-	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT

UNIT I-STONES

Classification of rocks, Quarrying of stones by wedging & blasting, Tests on stone (Acid test, Attrition, crushing, impact & water absorption), Characteristics of a good building stone, Deterioration & Preservation of stones

UNIT II-BRICKS

Composition of good brick earth & harmful ingredients, Manufacture of bricks, Burning of bricks by clamps-intermittent (down draught) and continuous kiln (Hoffman's), Classification of bricks as per I S, Test on bricks (Field tests, Crushing strength, absorption, shape & size, efflorescence test), Requirements of good bricks, Substitutes for bricks – Cement concrete blocks (solid), Production process of solid blocks. Fire clay/Refractory bricks, Calcium Silicate Bricks (properties and uses).

UNIT-III-TIMBER

Classification of timber based on mode of growth, Cross- section of an exogenous tree, Properties of good timber, Defects in timber, Preservation of Timber, Seasoning of Timber, Conversion of timber and Market forms(types and uses).

UNIT-IV-CEMENT

Composition of ordinary Portland cement, Functions of ingredient of cement, Manufacture of OPC (Mixing of raw materials by dry process, Burning & Grinding), Storage of cement, Field tests on cement, Types of cement and its uses.

UNIT-V-PAINTS, VARNISH & DISTEMPER

Objects, characteristics & Ingredients of paints, varnishes & distemper

UNIT-VI-FERROUS, NONFERROUS AND ALLOY

FERROUS METALS: Properties & uses of Cast iron, Wrought iron, Mild steel Tor steel, TMT, High tensile steel, Market forms of structural steel
NONFERROUS METALS:- Properties & uses of Copper, Aluminum, Zinc and Tin
ALLOY: - Types, properties & uses - aluminum alloy, copper alloy & steel alloy

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TEXT BOOKS

1. Engineering Materials by SC Rangwala
2. Building Materials by S SBhavikatti

REFERENCES

1. Engineering Materials by GJ Kulkarni
2. Engineering Materials by Sushil Kumar
3. Engineering Materials by Duggal
4. Engineering Materials by Gurucharan Singh
5. Materials of construction by TTTI Publication (Oxford university madras)
6. Building Materials by- P.C.Varghese (Prentice Hall)
7. Materials of construction -I byH.S.Vishwanath- Sapna Publications
8. Civil Engineering handbook byKhanna

Course content and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE		Marks weightage	weightage (%)	A*	B*
			Cognitive Levels					
			R	U				
1	STONES	10	50%	50%	28	19	2	2
			14	14				
2	BRICKS	11	50%	50%	31	21	2	2
			15	15				
3	TIMBER	10	65.0%	35.0%	28	19	1	2
			18	10				
4	CEMENT	8	65.0%	35.0%	22	15	1	2
			15	8				
5	PAINTS, VARNISH & DISTEMPER	4	50.00%	50.00%	11	8	2	-
			6	6				
6	FERROUS, NONFERROUS AND ALLOY	9	65.00%	35.00%	25	17	1	2
			16	9				
Total		52	57.5%	42.5%	145	100	9	10
			83.79	61.21				

Legend- R: Remember U: Understand

A*-SEE questions to be set for (05 marks) in Part – A

B*- SEE questions to be set for (10 marks) in Part – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	100

Course Delivery: The course will be delivered through lectures and Power point presentations/ Videos

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment civil	CIE*	IA	Students	Three IA tests(Average of three tests will be computed)	Test 1	Blue books	CO1
					Test 2		CO2, CO3
					Test 3		CO4, CO5
	Written Quiz (MCQ)	05		Quiz Sheets	1,2,3,4,5		
SEE*	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5	
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5 Effectiveness of Delivery of instructions & Assessment Methods

***CIE – Continuous Internal Evaluation *SEE – Semester End Examination**

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

MODEL OF RUBRICS / CRITERIA FOR ASSESSING STUDENT ACTIVITY (Course Coordinator)

Dimension	Scale					Students score (Group of five students)				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	1	2	3	4	5
1	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	3				
2	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2				
3	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	5				
4	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students Grand Average/Total						14/4 =3.5 ≈4				

• MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY

RUBRICS FOR ACTIVITY(5 Marks)						
Dimension	Unsatisfactory	Developing	Satisfactory	Good	Exemplary	Student Score
	1	2	3	4	5	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	Ex: 4
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	5
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	2
Average / Total marks=(4+5+3+2)/4=14/4=3.5=4						

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (Course Coordinator) for assessing the given activity.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks			
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM		20			
	Year:					
Name of Course coordinator : CO's: _____			Units: __			
Question no	Question	MARKS	CL	CO	PO	
1						
2						
3						
4						

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QP FOR CIE (TESTS)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks					
Ex: I test/6 th weak of sem 10-11 Am	III SEM	Materials Of Construction	20					
	Year: 2015-16	Course code:15ME3011						
Name of Course coordinator : Note: Answer all questions			Units:1,2 Co: 1,2					
Questions	M	CL	CO	PO				
1	Discuss the geological classification of rocks?				5	R	1	1,2
2	Explain acid test & attrition test conducted on stone? OR Explain acid test & attrition test conducted on stone?				5	U	1	1,2
3	List the harmful ingredients of good brick earth?				5	R	1	1,2
4	Explain the IS test conducted on bricks OR Explain burning of bricks in clamp with a neat sketch?				5	U	1	1,2

MODEL QUESTION PAPER

Code: **15CE11T**

I- Semester Diploma Examination **MATERIALS OF CONSTRUCTION**

Time: **3 Hours**]

[Max Marks: **100**

Note: Answer any SIX from Part A and any SEVEN from Part B

PART-A

6x5=30 marks

1. What are the characteristics of good stone?
2. Write short notes on preservation of stones?
3. Explain the burning of bricks in a clamp with a neat sketch?
4. Give comparison between burning bricks in a kiln & clamp?
5. Explain the Cross- section of an exogenous tree with a neat sketch?
6. List market forms of timber?
7. List the functions of ingredient of cement?
8. Briefly explain the field tests conducted on cement?
9. Write the properties of cast iron?

PART-B

7x10=70 marks

10. Explain the process of quarrying by wedging?
11. Briefly explain the physical & chemical classification of rocks?
12. Explain the Crushing strength test & absorption test conducted on brick?
13. Explain burning of bricks in Hoffman's kiln with a neat sketch?
14. Explain classification of timber based on mode of growth?
15. Explain the defects in timber due to natural forces?
16. Explain the burning process of ordinary Portland cement?
17. What are the characteristics of paints & varnish?
18. a) List the properties & uses of TMT bars?
b) List the properties & uses of Zinc?
19. Explain the alloy of copper & aluminium?

MODEL QUESTION BANK

Diploma in civil Engineering

1st Semester

Course title: Materials of Construction, Course Code:15CE11T

CO1 : Know the origin, types, properties, manufacturing, qualities, uses of building element (Stones, Bricks & blocks) as per IS code requirements.

REMEMBER LEVEL QUESTIONS

1. List the classification of stones?
2. List the characteristics of good stone?
3. Describe preservation of stones
4. List the useful & harmful ingredients of good brick earth
5. List the properties of good building bricks
6. State any five different Substitutes for bricks

UNDERSTANDING LEVEL QUESTIONS

1. Discuss the geological classification of rocks?
2. Explain the physical & chemical classification of rocks
3. Explain the method of quarrying by blasting?
4. Explain the process of quarrying by wedging?
5. Describe the deterioration of stones?
6. Explain acid test & attrition test conducted on stone?
7. Explain crushing strength & water absorption test conducted on stones?
8. Explain the process of manufacture of bricks
9. Explain the burning of bricks in a clamp with a neat sketch?
10. Explain burning of bricks in intermittent down draught kiln with neat sketch
11. Explain burning of bricks in Hoffman's kiln with a neat sketch?
12. Explain with a neat sketch any method of burning bricks in continuous kiln?
13. Distinguish burning bricks in a kiln & clamp?
14. Explain the classification of bricks?
15. Explain the field test conducted on bricks?
16. Describe cement concrete blocks?
17. Explain production process of cement concrete blocks?
18. Explain the Crushing strength test & absorption test conducted on brick
19. Explain shape & size test & efflorescence test conducted on brick

CO 2 : Comprehend about timber and able to select different market forms for appropriate field application..

REMEMBER LEVEL QUESTIONS

1. State the classification of timber based on mode of growth
2. List the properties of good timber
3. Describe the preservation of Timber
4. List the market forms of timber

UNDERSTANDING LEVEL QUESTIONS

1. Explain the Cross- section of an exogenous tree with a neat sketch
2. Explain the defects in timber due to natural forces
3. Explain the defects in timber due to Fungi
4. Discuss the defects in timber due to Seasoning
5. Explain the defects in timber due to conversion
6. Explain the defects in timber due to Insects
7. Explain the importance of Seasoning of Timber
8. Illustrate the conversion of timber

CO 3 : Know about composition, functions, manufacturing, tests, types, uses and storage of cement as per IS codes

REMEMBER LEVEL QUESTIONS

1. List the functions of ingredient of cement
2. List the varieties of cement
3. List the precautions to be taken in storing of cement
4. List field tests conducted on cement.

UNDERSTANDING LEVEL QUESTIONS

7. Explain the composition of ordinary Portland cement
8. With flow diagram explain Dry process of mixing the raw materials for manufacture of ordinary Portland cement
9. With a neat sketch explain burning of cement in Rotary kiln.
10. Explain the grinding process of cement?

CO 4 : Know about paints, varnishes & distemper and recognize its good qualities

REMEMBER LEVEL QUESTIONS

1. State the objects of paints
2. List the characteristics of good paint
3. State the objects of varnish
4. List the characteristics of varnish
5. State the objects of distemper

6. List the characteristics of distemper

UNDERSTANDING LEVEL QUESTIONS

1. Explain the ingredients of paint?
2. Explain the ingredients of varnish?
3. Explain the ingredients of distemper?

CO 5 : Understand types, properties, uses and market forms of ferrous, nonferrous metals and their alloys

REMEMBER LEVEL QUESTIONS


1. List the types of cast iron
2. List the types of wrought iron
3. List the types of mild steel
4. State properties & uses of cast iron
5. List the properties & uses of wrought iron
6. List the properties & uses of mild steel
7. State the properties & uses of Tor steel
8. Tabulate the properties & uses of Tiscon steel
9. List the properties & uses of Tor steel & Tiscon steel
10. State the properties & uses of deformed bars
11. List the properties & uses of copper
12. List the properties & uses of zinc
13. State the types of aluminium alloy
14. List the types of steel alloy
15. List the properties & uses of steel alloy

UNDERSTANDING LEVEL QUESTIONS

1. Discuss the properties & uses of TMT bars?
1. Discuss the properties & uses of High tensile steel?
2. Describe the properties & uses of aluminium?
3. Discuss the properties & uses of tin?
4. Explain the types of copper alloy?
5. Explain the properties & uses of aluminium alloy?
6. Explain the properties & uses of copper alloy?



Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: ENGINEERING DRAWING-I		
	Credits (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15CE12D
	Type of Course: Tutorials and Drafting	Credit : 03	Core/ Elective: Core
CIE- 25 Marks		SEE- 100 Marks	

(Common to all Civil Engineering (GL) / Civil Engineering (Draughtsman)/ Civil Engineering (Environmental)/ Civil Engineering (Public Health Engineering)/ Civil Engineering (Water Technology and Health Sciences) Programme)

Prerequisites: Basic Geometry in Secondary Education and zeal to learn the course.

Course Objectives:

1. The course is aimed at developing Basic Drawing skills.
2. Develop Skills in Preparation of Basic Drawings.
3. Skills in Reading and Interpretation of Engineering Drawings.

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

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Acquire Knowledge to use the drawing instruments effectively and able to dimension the given figures and print letters	R/U/Ap	1,2,3,4,9	15
CO2	Appreciate the usage of engineering curves in solving civil engineering drafting problems and develop attitude of lifelong learning.	R/U/Ap	1,2,3,4,9	15
CO3	Develop a scale for any map and able to read it	R/U/Ap	1,2,3,4 5,6,8,9	6
CO4	Discover the concept of projection and acquire visualization skills related to projections of points, Lines and Planes.	R/U/Ap/ Ay	1,2,3,4 5,6,8,9,10	42
Total sessions				78

Legend- R: Remember U: Understand Ap: Application Ay: Analysis

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
ENGINEERING DRAWING-I	3	3	3	3	3	-	-	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENTS

UNITS	CONTENT	HOURS
1	INTRODUCTION TO ENGINEERING DRAWING AND LETTERING PRACTICE Drawing Instruments Standard Sizes of Drawing sheets-Layout of drawing sheets Types of lines and their applications Different types of lettering as per I.S.I; uppercase letters of vertical and slanting type as per I.S.I Numerical figures of vertical and slanting type as per I.S.I.	09
2	DIMENSIONING PRACTICE Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning, Methods of arrangements of Dimensioning Dimensioning of common features like diameters, radii, arcs and chords. Dimensioning of simple civil Engineering Objects.	06
3	GEOMETRICAL CONSTRUCTIONS AND CONIC SECTIONS Drawing of tangents to circles and arcs, Drawing a common tangent of given arcs to circles of equal or unequal radii. Inscribing a circle in a regular polygon -Inscribing circles touching each side of a regular polygon and its two adjacent circles. Inscribing circles touching two sides of polygon and two other circles - graded exercises. Division of a line into equal number of parts Introduction to conic sections-Types of conic section	15

	Construction of ellipse by Intersecting lines method (Rectangular and parallelogram methods) and Concentric circles method Construction of parabola by rectangle method, parallelogram method and tangential method.	
4	SCALES Construction of plain and diagonal scales and marking distances on scales constructed - exercises	06
5	ORTHOGRAPHIC PROJECTION AND PROJECTION OF POINTS Introduction to orthographic projection-Principal planes of projection-Four Quadrants- Concept of First angle & Third angle projection methods-Projection of points in all the four quadrant system.	12
6	PROJECTION OF LINES AND PLANES SURFACES (Only first angle projection) Projection of lines – Line Parallel to both HP and VP, Line parallel to one plane and Perpendicular to other-Line parallel to one plane and Inclined to the other, Line inclined to both HP and VP. Projection of plane Surfaces -Construction of polygons Plane surface parallel to one plane and Perpendicular to other two – Plane surface Perpendicular to one plane and inclined to the other- Plane surface inclined to both HP and VP	30

Total Hours= 78 Hours

Note: Grade exercises Plan in each unit should be as per table provided below.

Course Delivery: The course will be delivered through lectures with classroom practices and Power point presentations/ Video.

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE*	IA	Students	Graded Exercises (Average of marks allotted to each graded exercise)	25	Drawing Sheets	1,2,3,4
	SEE*	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE				Marks weightage	weightage (%)	A*	B*
			Cognitive Levels							
			R	U	Ap	Ay				
1	Introduction to Engineering drawing and lettering practice	9	15%	45%	40.00%	0.00%	18	12	1	
			3	8	7	0				
2	Dimensioning practice	6	20%	60%	20.00%	0.00%	11	8	1	
			2	7	2	0				
3	Geometrical constructions and conic sections	15	25.00%	55.00%	20.00%	0.00%	29	19	3	
			7	16	6	0				
4	Scales	6	20.00%	40.00%	40.00%	0.00%	12	8		1
			2	5	5	0				
5	Orthographic projection and projection of points	12	15.00%	30.00%	30.00%	20.00%	22	15	1	1
			3	7	7	5				
6	Projection of lines and plane surfaces	30	15.00%	35.00%	30.00%	20.00%	58	38		4
			9	20	17	12				
Total		78	18.30%	44.20%	25.70%	5.70%	150	100	6	6

Legend- R; Remember U: Understand Ap: Application Ay: Analysis

A*-SEE QUESTIONS TO BE SET FOR (10 MARKS) in PART – A

B*- SEE QUESTIONS TO BE SET FOR (15MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	63
2	Applying the knowledge acquired from the course	26
3	Analysis	11

Graded Exercise Plan

UNIT NO	NAME OF THE UNIT	SHEETS	TITLE OF THE DRAWING	MINIMUM NO OF EXERCISE
I	INTRODUCTION TO ENGINEERING DRAWING AND LETTERING PRACTICE	1	Use of drawing instruments	06
		3	Lettering	10
II	DIMENSIONING PRACTICE	3	Dimensioning	15
III	GEOMETRICAL CONSTRUCTIONS AND CONIC SECTIONS	2	Arc and line tangents	12
		2	Inscribing circles in polygon	10
		2	Ellipse and parabola	10

IV	SCALES	3	Plain and Diagonal scales	15
V	ORTHOGRAPHIC PROJECTION AND PROJECTION OF POINTS	2	Projection of Points	10
VI	PROJECTION OF LINES AND PLANE SURFACES	3	Projection of Lines	20
		3	Projection of Planes	20
TOTAL		24		128



TEXT BOOK

1. K.R.Gopalakrishna "Fundamentals of Drawing" Subhas Publications, 2010.
2. K.R.Gopalakrishna "Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, "A text book of Engineering Drawing", S.Chand Publishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. Dhananjay A.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGrawHill Publishing Company Limited, 2008.
6. Basant Agarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings

Model Question Paper

Code:15CE12D

I semester Diploma Examination ENGINEERING DRAWING-I

Time: 4 Hours][Max. Marks: 100

Note: Answer any **UR** questions from **Section-A& B**

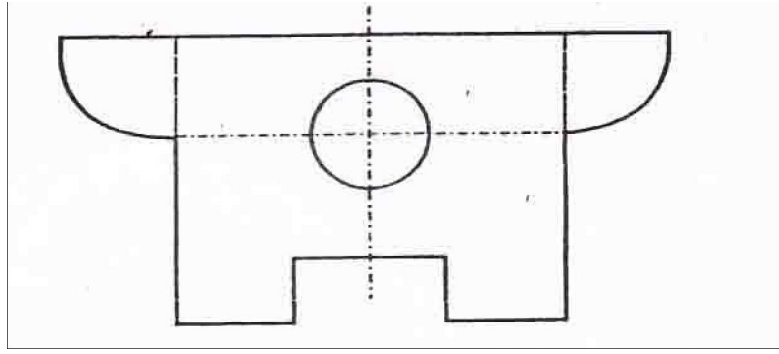
SECTION –A

1. Print the following Statement in single stroke vertical capital letters of height 22mm.
(10 Marks)

ANNUAL SPORTS MEET 2015

2. Draw the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method
(10 Marks)





3. Draw an arc of radius 90mm tangential internally to a circle of radius 30mm and externally to another circle of radius 15 mm the center of the two circles are 80mm apart. (10 Marks)
4. Inscribe 6 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles. (10 Marks)
5. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000. (10 marks)
6. A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point. (10 Marks)

(Turn over)

SECTION –B

7. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method. (15Marks)
8. The distance between Bangalore and Chennai is 352km. On a map, it is represented by a length 70.4mm. What is the R.F. on which the map has been drawn? Draw a diagonal scale of this R.F. to read up to one km and long enough to measure 800km. Mark on the scale the distances 549km and 207km. (15 Marks)
9. A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views. (15Marks)
10. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three

principal views of the line.

(15Marks)

11. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.

(15Marks)

12. A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.

(15Marks)

Model Question Bank

1ST Semester Diploma in Civil Engineering

Course: **ENGINEERING DRAWING-I** Code: **15CE12D**

UNIT-I

10 Marks Questions

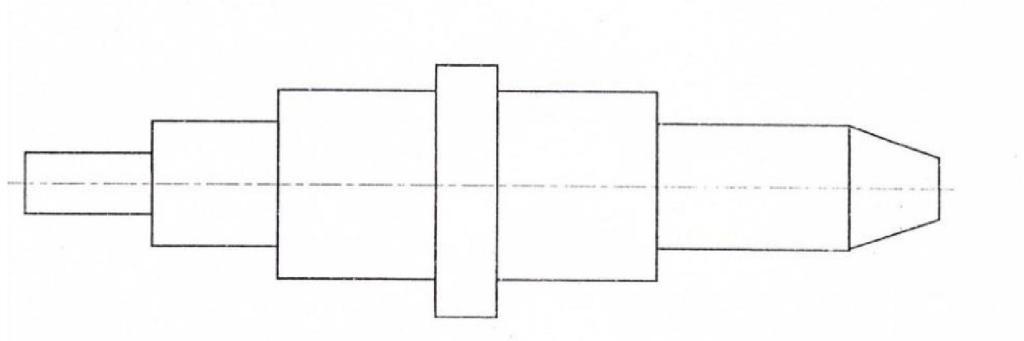
1. Print the following title to a height of 20mm single stroke vertical capital letters.
2. Print the following Statement in single stroke vertical capital letters of height 22mm.
3. Print the following statement in single stroke inclined capital case letters of height 18mm.
4. Print the following statement in single stroke inclined capital letters of height 16 mm
5. Print the following Statement in single stroke vertical capital letters of height 22mm.
6. (a) List the standard sizes of drawing sheets.
(b) Mention the types of lines and their applications.
7. (a) Illustrate the elements of dimensioning with the help of a sketch.
b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.
- 8 (a) Mention the uses of the following drawing instruments.
i) T-square ii) Set square iii) Bow compass iv) Clinograph v) Mini-drafter
b) Mention the uses of the following drawing instruments.
i) French curves ii) Protractor iii) Clips iv) Erasing Shield v) Drafting machine
9. Mention the types of lines and their applications



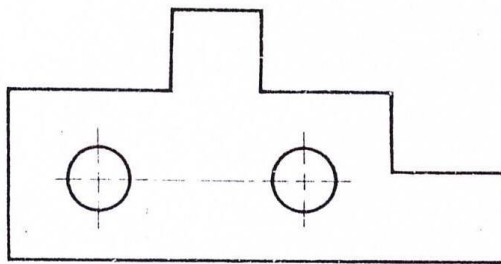
UNIT-II

(10 Marks questions)

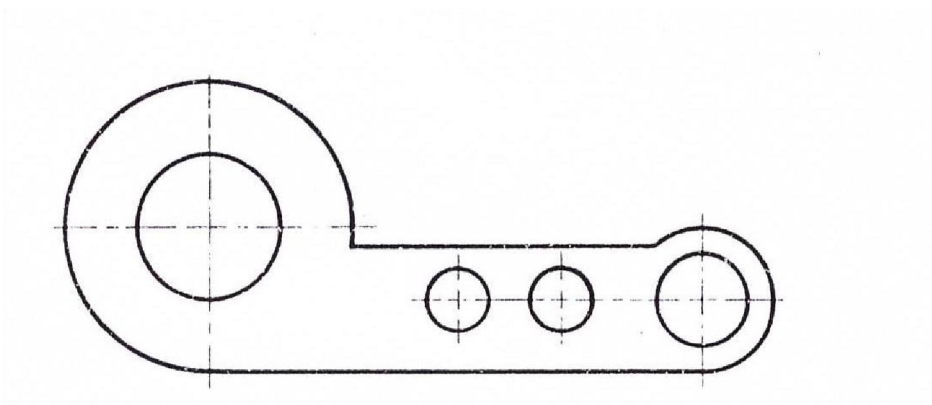
10. Copy the given sketch to 1:1 scale and dimension adopting aligned system with parallel Dimensioning method.



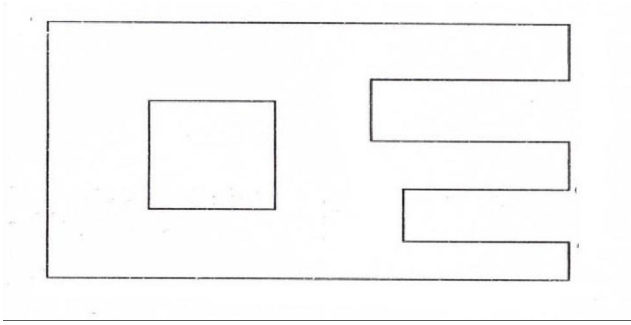
11. Copy the given sketch to 1:1 scale and dimension adopting aligned system with progressive dimensioning method.



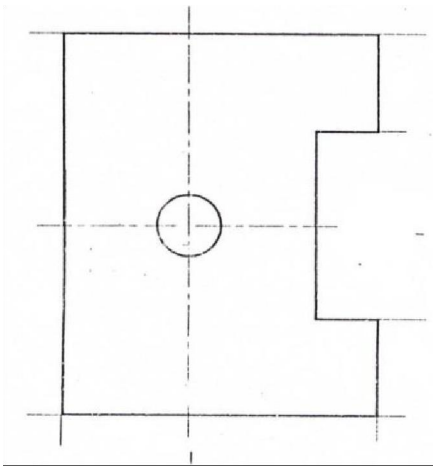
12. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with chain dimensioning method.



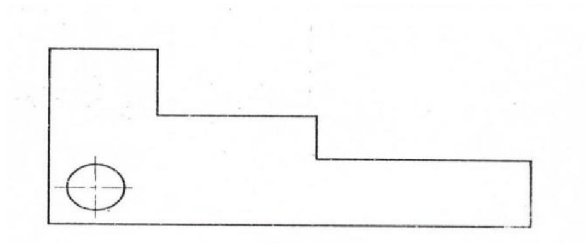
13. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with combined dimensioning method.



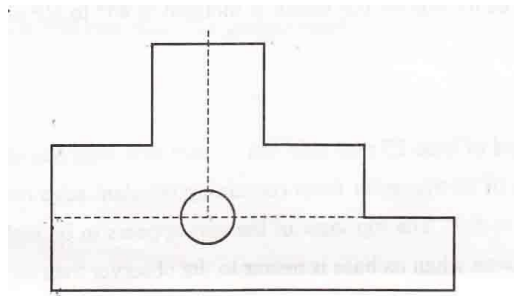
14. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with parallel dimensioning method.



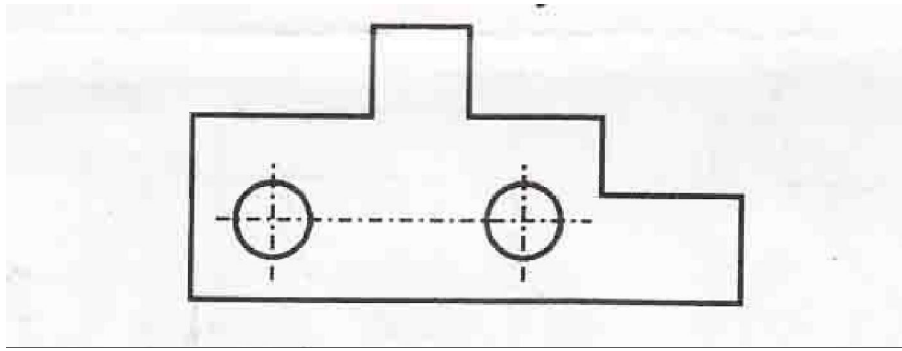
15. Copy the given sketch to 1:1 scale and dimension adopting aligned system with chain dimensioning method.



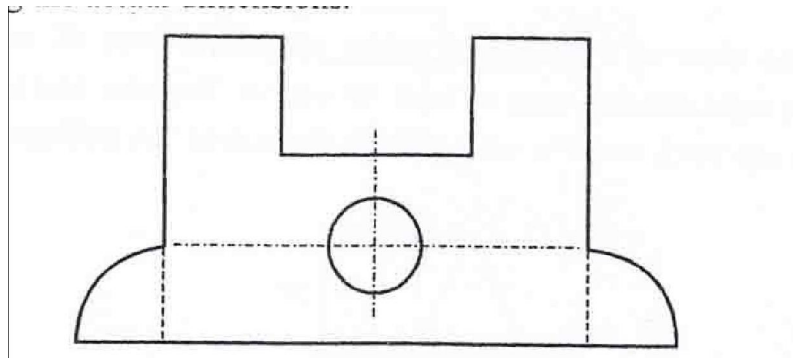
16. Copy the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method



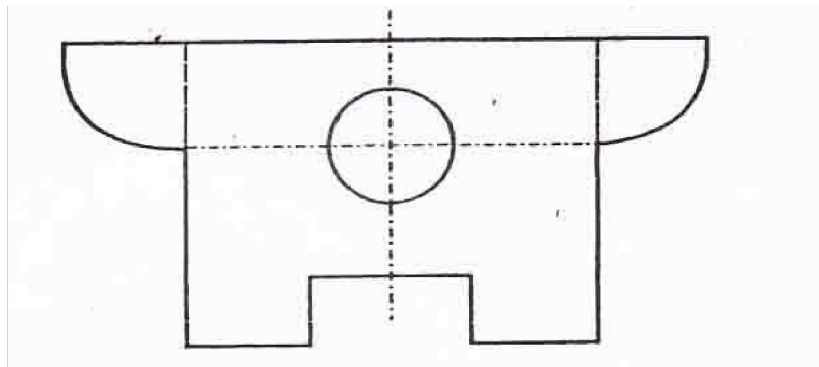
17. Copy the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



18. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



19. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



UNIT-III

(10 MARKS)

20. Draw an arc of radius 50mm tangential external to two circles of radii 30mm and 20mm and having their centers 90mm apart.
21. Draw an arc of radius 80mm tangential internally to two circles of radii 35mm and 25mm and having their centers 100mm apart.
22. Draw a common external tangent to two circles of radius 40mm and 20mm whose centers are 90 mm apart.

23. Draw an arc of radius 90mm tangential internally to a circle of radius 30mm and externally to another circle of radius 15 mm the center of the two circles are 80mm apart.
24. Draw a common external tangent to two circles of equal radii 30mm and having their centers 80mm apart.
25. Draw a common internal tangent to two circles of diameters 60mm and 40mm having their centers 100mm apart.
26. Inscribe 5 equal circles in a regular Pentagon of side 60mm so as to touch each side and two adjacent circles.
27. Inscribe 6 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles.
28. Inscribe 5 equal circles in a regular Pentagon of side 50 mm so as to touch two sides and two adjacent circles.
29. Inscribe 6 equal circles in a regular Hexagon of side 50 mm so as to touch two side and two adjacent circles.
30. Inscribe 3 equal circles in a regular Hexagon of side 60 mm so as to touch two side and two adjacent circles.
31. Inscribe 3 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles.

UNIT-III

(15 marks Questions)

32. Inscribe an ellipse in a rectangle of side 150mm and 120mm.
33. A parallelogram has sides 130 mm and 90mm at an included angle of 65° . Inscribe an ellipse in the parallelogram. Find the major axes and minor axes of the ellipse.
34. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method.
35. Inscribe parabola in a rectangle of side 120mm and 80mm.
36. Inscribe parabola in a parallelogram of side 100mm and 70mm and having included angle 55° .
37. A shot is discharged from the ground level at an inclination of 55° to the ground which is assumed to be horizontal. The shot returns to the ground at a point 75m distance from the point of discharge. Trace the path of the shot. Take scale 1:1000.
38. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000.

39. Construct a diagonal scale of $RF = \frac{1}{20,000}$ to show kilometers and decimals of kilometer. Mark on the scale a distance of 2.37 kilometer and 3.42 kilometer.
40. On building plan a line 10cm long represents a distance of 5m. Construct a diagonal scale for the plan to read up to 6m. Show, meters, decimeters and centimeters indicate on the scale the length 4.54m and 5.37m.
41. The distance between Bangalore and Chennai is 352km. On a map, it is represented by a length 70.4mm. What is the R.F. on which the map has been drawn? Draw a diagonal scale of this R.F. to read up to one km and long enough to measure 800km. Mark on the scale the distances 549km and 207km.
42. Construct a plain scale to show kilometer and hectometer when $R.F = 1:40000$ and long enough to measure 6 km. Mark on the scale 3.2km and 4.3 km on the scale.
43. Construct a plain scale to read centimeter and decimeter and long enough to measure 6 decimetre. $RF=1/4$. Show on it a distance of 4.9 decimetre.

UNIT-IV

(10 marks Questions)

44. A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point.
45. A point P is 30 mm above HP, 50 mm behind VP and 45 mm in front of left PP. Draw the three principal views of the point
46. Draw the three principal views of a point P lying 40 mm behind VP, 60 mm below HP and 30 mm behind the right PP.
47. Draw the three principal views of a point P lying 60 mm below HP, 50 mm in front of VP and 45 mm in front of the left PP.

UNIT-V

(15 Marks questions)

48. Draw the three principal views of a line 90 mm long placed parallel to VP and perpendicular to HP. The line is 60mm in front of VP and 50mm in front of right PP. The lower end of the line is 40mm above HP.
49. Draw the three principal views of a line 90 mm long when it is placed parallel to both HP & VP. One of the ends of the line is 60 mm above HP, 30 mm in front of VP and 40mm in front of the right PP.

50. A line AB 95 mm long is inclined at 40° to HP and parallel to VP. The line is 90 mm in front of VP. The lower end A is 35 mm above HP, 110 mm in front of the right PP and is away from it than the higher end. Draw the three principal views of the line.
51. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three principal views of the line.
52. Draw the projections of a line AB, 80 mm long inclined at 30° to HP and parallel to VP. The line is 40 mm in front of VP. The lower end A is 20 mm above HP.
53. The length of a line is 100 mm long and is inclined at 45° to VP and parallel to HP. The line is 15 mm above HP and one end of the line is 10 mm in front of VP. Draw the projections of the line and measure top and front views.
54. A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.
55. A line AB measuring 70 mm has its end A 15 mm in front of VP and 20 mm above HP. The other end B is 60 mm in front of VP and 50 mm above HP. Draw the projections of the line with HP & VP.
56. A line PQ has its end P 15 mm above HP and mm in front of VP. The end Q is 55 mm above HP and the line is inclined at 30° to HP. The distance between the end projectors of the line when measured parallel to the line of intersection of HP & VP is 50 mm. Draw the projections of the line and find its inclinations with VP.
57. The distance between the end projectors passing through the end points of a line AB is 40 mm. The end A is 20 mm above HP and 15 mm in front of VP. The line AB appears as 65 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP & VP.

UNIT-VI


(15 marks Questions)

58. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.
59. An equilateral triangular lamina of sides 40mm is resting with one of its corners on HP, The surface of the lamina is inclined at 50° to HP and the side opposite to the corner on which the lamina rests is inclined at 40° to VP. Draw the projections of the lamina.

60. A square lamina of 40mm side rests with one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the square lamina in this position.
61. A square lamina of 40mm sides rests with one of its corner on HP. The diagonal passing through this corner is inclined at 45° to VP and Lamina appears to be inclined at 35° to HP. Draw its projections.
62. A square lamina of side 40mm rests with one of its corner on HP. The diagonal passing through this corner is inclined at 55° to HP and 30° to VP. Draw its projections.
63. A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.
64. A hexagonal lamina of side 30mm is resting with one of its corner on HP so that the diagonal passing through that corner is inclined at an angle of 45° and appears to be inclined at 30° to VP. Draw the top and front views of the lamina.
65. A square lamina of ABCD of 40mm side rests on the corner C such that diagonal AC appears as at 35° to the VP in the top view. The two sides BC and CD containing the corner C make equal inclinations with the HP. The surface of the lamina makes 40° with HP. Draw its top and front views.
66. A pentagonal plane lamina of edges 30mm is resting on HP with one of its corner touching it such that plane surface makes an angle of 50° with HP. The two of the base edges containing the corner on which the lamina rests make equal inclinations with HP. If the edge opposite to this corner makes an angle of 40° with the VP, draw the top and front views of the plane lamina in this position.
67. A hexagonal lamina of 40mm sides rests on HP on one of its sides. The side which is on HP is perpendicular to VP and the surface of the lamina is inclined to HP at 45° . The lamina is then rotated through 90° such that the side on HP is parallel to the VP, while the surface is still inclined to HP at 45° . Draw the front view and the top view of the lamina in its final position.
68. A circular lamina of 65mm diameter rests on HP such that the surface of the lamina is inclined at 40° to HP. The diameter through the point on which the lamina rests on HP appears to be inclined at 50° to the VP in the top view. Obtain its projections.



Government of Karnataka
Department of Technical Education
Bengaluru

	Course Title: Basic Computer Skills Lab		
	Scheme (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15CE13P
	Type of Course: Tutorial and Practical's	Credit : 03	Core/ Elective: Core
CIE- 25 Marks		SEE- 50 Marks	

Pre-requisite

Knowledge of English comprehension.

Course Objectives

Will learn and understand the Basics of Computers and apply the application tools like word processor, spread sheet and presentation.

Course Outcome

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

Course Outcome		Experiment linked	CL	Linked PO	Teaching Hrs
CO1	Understand and identify the models, components of a computer along with its connections, operating system concepts along with internet operation	1-7	U	1,2,3,4,8,10	15
CO2	Demonstrate skills using word processor	8-13	A	1,2,3,4,8,9,10	24
CO3	Demonstrate skills using spreadsheet presentation	14-18	A	1,2,3,4,8,9,10	24
CO4	Demonstrate skills using presentation	19-21	A	1,2,3,4,8,9,10	15
			Total sessions		78

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Basic Computer Skills Lab	3	3	3	3	-	-	-	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

LIST OF GRADED EXERCISES

Tutorials and Practice

Unit – I

Computer hardware and software

1. Identify and understand the models of Computers, Identify and understand front panel switches and back panel connections of a Computer system, Identify and understand the physical components of a Computer.
2. Conduct computer system connection and understand the booting process.
3. Study and Practice of Basic DOS Commands.
4. Familiarization of GUI based Operating System Environment.
5. Practice creating Icons and Folders, Creating/Opening of file, Editing and saving the document, Copy, Cut and Paste operations, built-in utilities of OS like – Text Editors, Paint, Calculator, etc.
6. Practice browsing of different sites using Search Engine.
7. Practice Creating E-Mail accounts, Sending, Receiving of E-Mails.

Unit –II

Word Processing

8. Create a Business Letter and Personal Letter.
9. Create a Company Letter head.
10. Create a Simple Newsletter with minimum three columns. Insert a Clip Art in the Newsletter.
11. Create a Resume for a Job Application.
12. Create the Cover Page of a Project Report (use Word Art, insert Picture Image).
13. Prepare the class time table of your class.

Spreadsheet

14. Create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
15. You have a monthly income of Rs.11000. Your monthly expenditures are: Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month).
16. Create a worksheet containing the Pay details (containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF, PT, Insurance, Gross and Net salary) of the Employees using Formulas.
17. Create a Simple Bar Chart to highlight the sales of a company for three different periods.
18. Create a Pie Chart for a sample data and give legends.

Presentation

19. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
20. Create a presentation about a Book containing Title, Author, Publisher and Contents.
21. Create an automated (with timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

Mini-Project [CIE- 05 Marks]

Prepare a mini project of a minimum of 5 pages of report, using the above concepts of Unit-I and/or Unit-II

References

1. Computer Fundamentals Concepts, Systems, Application, D.P.Nagapal, S.Chand Publication, RP-2014, ISBN: 81-219-2388-3
2. <http://www.tutorialsforopenoffice.org/>
3. <http://www.libreoffice.org/get-help/documentation/>

Software Tools

Any open source tool or equivalent proprietary tools

Course Delivery

The course will be delivered through tutorials of two hours and four hours of hands on practice per week.

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
DIRECT ASSESSMENT	CIE (Continuous Internal Evaluation)	IA Tests	Students	Two Tests (Average of two tests will be computed)	10	Blue books	1,2,3,4
				Record Writing (Average marks of each exercise to be computed)	10	Record Book	1,2,3,4
				Mini Project	05	Report	1,2,3,4
	TOTAL	25					
SEE (Semester End Examination)	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,4	
INDIRECT ASSESSMENT	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	10
2	Understanding	20
3	Application	70

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
TOTAL						13/4=3.25=4

**All student activities should be done in a group of 4-5 students with a team leader.*

Scheme of Evaluation for End Exam

SN	Scheme	Max. Marks
1	Testing Skills/ Abilities from Unit - I	10
2	Writing steps on any one from Unit -II	10
3	Execution	10
4	Presentation of Result	10
5	Viva voce	10
Total		50
Note:		
<ol style="list-style-type: none"> 1. Candidate shall submit Lab Record for the Semester End Examination. 2. Student shall be allowed to execute directly even if he / she is unable to write the procedure 3. In case of change in experiment or no write up, marks will not be awarded for writing procedure/steps. 		

Resource Requirements for Basic Computer Skills Lab

(For an Intake of 60 Students [3 Batches])

Hardware requirement

Sl. No.	Equipment	Quantity
1	PC systems (latest configurations with speakers)	20
2	Laser Printers	03
3	Networking (Structured) with CAT 6e / Wireless 24 Port switches / Wireless Router I/O Boxes for networking (as required)	03
4	Broad Band Connection	01

Software Requirement:

Linux, Libre Office/Open Office/Kingsoft Office/ any equivalent software.

Note: Student: Computer ratio in the Lab should be strictly **1:1** for a batch of twenty Students.

Note: *One Question from Unit-I and Unit-II*

UNIT-I

1. Identify Physical components of a Computer System.
2. Demonstrate Internal and External DOS Commands and differentiate between them.
3. Create and Rename the file using DOS Commands.
4. Create a directory and copy a file inside the directory using DOS Commands.
5. Demonstrate the basic formatting features in Text Editors.
6. Create two file in a folder and place the shortcut of these files on the desktop.
7. Demonstrate how search engine may be used in browsing Internet.
8. Create an E-mail account
9. Create and Send an E-mail with a picture attachment.
10. Demonstrate how documents can be downloaded using Internet.


UNIT-II

11. Using Word Processor Application create a Business Letter.
12. Using Word Processor Application create a Personal Letter.
13. Using Word Processor Application create a letter head for company.
14. Using Word Processor Application create a Simple Newsletter with minimum of three columns. Insert a Clip art in the newsletter.
15. Using Word Processor Application create a Resume for a Job application.
16. Using Word Processor Application create the cover page of a Project Report (use Word Art, insert Picture Image).
17. Prepare the class time table for your class using Word Processor Application.
18. Using Spreadsheet Application, create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
19. You have a monthly income of Rs.11000. Your monthly expenditures are Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month). Use Spreadsheet Application.

20. Using Spreadsheet Application, create a worksheet containing the pay details (containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF, PT, Insurance, Gross and Net salary) of the employees using formulas.
21. Using Spreadsheet Application, create a Simple Bar Chart to highlight the sales of a company for three different periods.
22. Using Spreadsheet Application, create a Pie Chart for a sample data and give legends.
23. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
24. Create a presentation about a book containing Title, Author, Publisher and Contents.
25. Create an automated (timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: MATERIALS OF CONSTRUCTION LAB		
	Credits (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15CE14P
	Type of Course: Practical, Demo& Assignments	Credit : 03	Core/ Elective: Core
CIE- 25 Marks		SEE- 50 Marks	

Pre-requisites: Basic knowledge of science in secondary education.

Course Objectives: Identification & understanding the properties & uses of various building materials.

Course Outcomes:

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

Course Outcome		Experiments Linked	CL	Linked PO	Teaching Hrs
CO1	Demonstrate the important properties and uses of various solid building materials.	1	R/U	1,2,5,6,8,9,10	18
CO2	Apply knowledge of building materials to provide predictive capability to optimize building performance & to minimize building failure.	2,3,4,5	R/U	1,2,5,6,8,9,10	24
CO3	Explain the important properties and uses of various types of Timber.	6	R/U	1,2,5,6,8,9,10	06
CO4	Illustrate the various types of plastic, glass and preservative materials used in the construction.	7,8	R/U	1,2,5,6,8,9,10	12
CO5	Recognize the need & to engage in independent lifelong learning in identifying miscellaneous materials.	9	R/U	1,2,5,6,8,9,10	09
CO6	Apply the properties of materials in societal & environmental context & demonstrate knowledge for sustainable development.	10	R/U/Ap/C	1,2,5,6,8,9,10	09
Total sessions					78

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Materials of construction lab	3	3	3	-	3	3	-	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

EXPERIMENT 1 : BUILDING UNITS

i) Stones

Identification & understanding the properties & uses of the following stones: Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.

Identification	Geological Classification	Properties	Uses

ii) Bricks

Identification & understanding the properties & uses of the following bricks:

Ground moulded, Table moulded, Machine moulded (Wire cut), Soil stabilized blocks, Concrete blocks (solid-hollow), Fly ash bricks, Fire bricks, Light weight blocks (clay hollow blocks & autoclave aerated concrete blocks)

Specimen tabular column

Identification	Standard size	Properties	Uses

EXPERIMENT 2 : FLOORING MATERIAL

Identification & understanding the properties & uses of the following flooring materials Granolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring

Identification	Properties	Uses

EXPERIMENT 3 : BINDING MATERIAL

Identification & understanding the properties & uses of the following binding materials Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.

Specimen tabular column

Identification	Properties	Uses

EXPERIMENT 4 : CLADDING & ROOFING MATERIALS

Identification & understanding the properties & uses of the following Cladding material- Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding.

Roofing Material- Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.

Identification	Properties	Uses

EXPERIMENT 5: FINISHING, DECORATIVE & FALSE CEILING MATERIAL

Identification & understanding the properties & uses of the following: Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt.

Identification	Properties	Uses

EXPERIMENT 6 : TIMBER

Identification & understanding the properties & uses of the following timber Teak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo.

Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets

Identification	Properties	Uses

EXPERIMENT 7 : PLASTICS & GLASS

Identification & uses of the following material

Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fibre glass, Float glass, Toughened glass.

Plastics- Thermosetting plastic articles, Polycarbonate.

Identification	Uses

EXPERIMENT 8 : COATING MATERIAL

Identification & understanding the uses of the following paints, primers, varnishes & distemper

Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints, Interior paints

Varnish-French polish, Metallic paint (grills & all purpose)

Distemper- Water based & weather proof exterior emulsion.

Identification	Uses

EXPERIMENT 9 : MISCELLANEOUS MATERIALS

Identification & uses of the following material

Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids.

Identification	Uses

EXPERIMENT 10 : MINI PROJECT

Each Student should collect at least five different building materials & prepare the report.

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score				
	(Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1 , Developing 2 , Satisfactory 3 , Good 4 , Exemplary 5				
1.Organisation	3				
2.Fulfill team's roles & duties	4				
3.Conclusion	5				
4.Convensions	5				
Total	17				
Average=(Total /4)	17/4=4.25=5				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course coordinator (faculty).

Course Delivery: The course will be delivered through Tutorials and Demonstration of materials.

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes	
Direct Assessment	CIE*	IA	Students	Two IA Tests (average of two tests will be computed)	Test 1	10	Blue books (Test Papers)	1,2,3
					Test2			4,5,6
				Record writing (average of marks allotted for each experiment)	10	Lab Record	1,2,3,4,5,6	
				Mini project	05	Report	1,2,3,4,5,6	
	Total	25						
	SEE*	End Exam		End of the course	50	Answer scripts at BTE	CO1 to CO6	
Indirect Assessment	Student Feedback on course		Students	Middle of the course	---	Feedback forms	CO1,CO2, CO3 Delivery of course	
	End of Course Survey			End of the course	---	Questionnaires	CO1 to CO6 Effectiveness of Delivery of instructions & Assessment Methods	

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. (Any decimals shall be rounded off to next higher digit).

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	60
2	Applying the knowledge acquired from the course	25
3	Analysis	10
4	Synthesis (Creating new knowledge)	3
5	Evaluation	2



TEXT BOOKS&REFERENCEBOOKS

1. Materials by SC Rangwala
2. Engineering Building materials by S SBhavikatti
3. Engineering Materials by GJ Kulkarni
4. Engineering Materials by Sushil Kumar
5. Market brochures

E-Links

1. www.constructionmaterials.com/
2. [en.wikipedia.org/wiki/Building material](http://en.wikipedia.org/wiki/Building_material)
3. en.wikipedia.org/wiki/List_of_building_materials
4. www.exponent.com
5. <http://www.tce.co.in/>
6. www.prakruthibuilding.com
7. <http://www.aboutcivil.org>

SCHEME OF VALUATION

Course: **MATERIALS OF CONSTRUCTION LAB** Course Code: **15CE14P**

Sl. no.	Performance	Max. Marks
1	Identify & list the properties & uses of given 7 material Identification-1 mark Properties-2 marks Uses-2 marks	35
2	Viva-Voce	10
3	Mini-project report and graded exercise	5
	TOTAL	50

List of equipment and materials

Sl No	Description	Nos
Furniture		
1	Display table 4'X8'	8
2	Stools/ Chairs	40
3	Display Racks	10
4	Metal Trays	10
Specimens		
6	<u>STONES</u> Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.	Each 5Nos
7	<u>BRICKS</u> Ground moulded, Table moulded, Machine moulded (Wire cut), Soil stabilized blocks, Concrete blocks (solid-hallow), Fly ash bricks, Fire bricks, Light weight blocks (clay hallow blocks & autoclave aerated concrete blocks)	Each 5Nos
8	<u>FLOORING MATERIAL</u> Granolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring	Each 5Nos
9	<u>BINDING MATERIAL</u> Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.	Each 5Nos
10	<u>CLADDING MATERIAL</u> Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding. <u>ROOFING MATERIAL</u> - Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non-asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.	Each 5Nos
11	<u>FINISHING, DECORATIVE & FALSE CEILING MATERIAL</u> Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt	Each 5Nos
12	<u>TIMBER</u> Teak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo. Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets	Each 5Nos
13	<u>PLASTICS & GLASS</u> Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fiber glass, Float glass, Toughened glass. Plastics- Thermosetting plastic articles, Polycarbonate.	Each 5Nos

Sl No	Description	Nos
14	<p><u>COATING MATERIAL</u> (Paint samples to be displayed on panels of size 30cm X 30cm) Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints, Interior paints Varnish-French polish, Metallic paint (grills & all purpose) Distemper- Water based & weather proof exterior emulsion.</p>	15X2=30 panel
15	<p><u>MISCELLANEOUS MATERIALS</u> Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids</p>	Each 5Nos

Note: Minimum Floor area required for establishing Material-testing Lab is 60 Sqm.



Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: ENGINEERING MATHEMATICS – II	Course Code : 15SC02M
Semester : II	Course Group : Core
Teaching Scheme (L:T:P) : 4:0:0(in hours)	Credits : 4 Credits
Type of course : Lecture + Assignments	Total Contact Hours : 52
CIE : 25 Marks	SEE : 100 Marks
Programmes: Common to all Engineering Diploma Programmes	

Pre-requisites:

Engineering Mathematics-I, in First Semester Diploma curriculum.

Course Objectives:

1. Apply the concept of straight line and conic section in engineering field.
2. Determine derivatives of functions involving two variables.
3. Apply the concepts of differentiation in physics and engineering courses.
4. Evaluate the integrals of functions of two variables.
5. Apply the concepts of definite integrals and its application over a region.
6. Solve the ODE of first degree, first order in engineering field.

Course Contents:

Topic and Contents	Hours	Marks
Unit-1: COORDINATE GEOMETRY	08hr	23
<p>a. Straight lines: Different forms of equations of straight lines: $y = mx + c,$ $y - y_1 = m(x - x_1),$ $y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1}\right)(x - x_1).$ General equation of a line $ax + by + c = 0$ (graphical representation and statements) and problems on above equations. Equation of lines through a point and parallel or perpendicular to a given line. Problems.</p> <p>b. Conic Section: Definition of conic section. Definition of axis, vertex, eccentricity, focus and length of latus rectum. Geometrical representation of parabola, ellipse and hyperbola: Equations of parabola $y^2 = 4ax,$</p>	04 hr	
	04hr	

<p>Equation of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and</p> <p>Equation of hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (without proof of above 3 equations). Equations of parabola, ellipse and hyperbola with respect to x-axis as axis of conic.</p> <p>Finding axes, vertices, eccentricity, foci and length of latus rectum of conics. Problems on finding the above said equations with direct substitution.</p>		
UNIT – 2: DIFFERENTIAL CALCULUS	15hr	39
<p>Differentiation.</p> <p>Definition of increment and increment ratio. Definition of derivative of a function.</p> <p>Derivatives of functions of x^n, $\sin x$, $\cos x$ and $\tan x$ with respect to 'x' from first principle method. List of standard derivatives of $\operatorname{cosec} x$, $\sec x$, $\cot x$, $\log_e x$, a^x, e^x.....etc.</p> <p>Rules of differentiation: Sum, product, quotient rule and problems on rules. Derivatives of function of a function (Chain rule) and problems. Inverse trigonometric functions and their derivatives.</p> <p>Derivative of Hyperbolic functions, Implicit functions, Parametric functions and problems.</p> <p>Logarithmic differentiation of functions of the type u^v, where u and v are functions of x. Problems.</p> <p>Successive differentiation up to second order and problems on all the above types of functions.</p>		
UNIT – 3: APPLICATIONS OF DIFFERENTIATION.	07hr	17
<p>Geometrical meaning of derivative. Derivative as slope. Equations of tangent and normal to the curve $y = f(x)$ at a given point- (statement only). Derivative as a rate measure i.e. to find the rate of change of displacement, velocity, radius, area, volume using differentiation. Definition of increasing and decreasing function. Maxima and minima of a function.</p>		
UNIT-4: INTEGRAL CALCULUS.	12hr	30
<p>Definition of Integration. List of standard integrals. Rules of integration (only statement)</p> <p>1. $\int kf(x)dx = k \int f(x)dx$. 2. $\int \{f(x) \pm g(x)\}dx = \int f(x)dx \pm \int g(x)dx$</p> <p>problems. Integration by substitution method. Problems.</p> <p>Standard integrals of the type</p>		

$1. \int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + c$ $2. \int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + c.$ $3. \int \frac{dx}{x\sqrt{x^2 - a^2}} = \frac{1}{a} \sec^{-1}\left(\frac{x}{a}\right) + c$ <p style="text-align: center;">(1 to 3 with proof)</p> $4. \int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \log\left(\frac{x-a}{x+a}\right) + c \quad \text{if } x > a > 0.$ $5. \int \frac{dx}{a^2 - x^2} = \frac{1}{2a} \log\left(\frac{a+x}{a-x}\right) + c \quad \text{if } a > x > 0. \quad (4 \& 5 \text{ without proof})$ <p>and problems on above results Integration by parts of the type $\int x^n e^x dx$, $\int x \sin x dx$, $\int x \cos x dx$, $\int x \log x dx$, $\int \log x dx$, $\int \tan^{-1} x dx$, $\int x \sin^2 x dx$, $\int x \cos^2 x dx$ where $n=1, 2$. Rule of integration by parts. Problems</p>		
UNIT – 5: DEFINITE INTEGRALS AND ITS APPLICATIONS	05 hr	22
Definition of Definite integral. Problems on all types of integration methods. Area, volume, centres of gravity and moment of inertia by integration method. Simple problems.		
UNIT – 6: DIFFERENTIAL EQUATIONS.	05 hr	14
Definition, example, order and degree of differential equation with examples. Formation of differential equation by eliminating arbitrary constants up to second order. Solution of O. D. E of first degree and first order by variable separable method. Linear differential equations and its solution using integrating factor.		
Total	52	145

Course Delivery:

The Course will be delivered through lectures, class room interaction, exercises, assignments and self-study cases.

Course outcome:

On successful completion of the course, the student will be able to:

1. Formulate the equation of straight lines and conic sections in different forms.
2. Determine the derivatives of different types of functions.
3. Evaluate the successive derivative of functions and its application in tangent, normal, rate measure, maxima and minima.
4. Evaluate the integrations of algebraic, trigonometric and exponential function.
5. Calculate the area under the curve, volume by revolution, centre of gravity and radius of gyration using definite integration.
6. Form and solve ordinary differential equations by variable separable method and linear differential equations.

Mapping Course Outcomes with Program Outcomes:

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Formulate the equation of straight lines and conic sections in different forms.	1,2,3,10	R/U/A	08	6	5	12	23
CO2	Determine the derivatives of different types of functions.	1,2,3,10	R/U/A	15	12	15	12	39
CO3	Evaluate the successive derivative of functions and its application in tangent, normal, rate measure, maxima and minima.	1,2,3,10	R/U/A	07	6	5	6	17
CO4	Evaluate the integrations of algebraic, trigonometric and exponential function	1,2,3,10	R/U/A	12	9	15	6	30
CO5	Calculate the area under the curve, volume by revolution, centre of gravity and radius of gyration using definite integration	1,2,3,10	R/U/A	05	6	10	6	22
CO6	Form and solve ordinary differential equations by variable separable method and linear differential equations.	1,2,3,10	R/U/A	05	3	5	6	14
		Total Hours of instruction		52	Total marks			145

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Engineering Maths-II	3	3	3	-	-	-	-	-	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
 If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
 If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
 If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
 If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference Books:

1. NCERT Mathematics Text books of class XI and XII.
2. Higher Engineering Mathematics by B.S Grewal, Khanna publishers, New Delhi.
3. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr. Ramaverma published by S.Chand & Co.Pvt. ltd.
4. CBSE Class Xi & XII by Khattar & Khattar published PHI Learning Pvt. ltd.,
5. First and Second PUC mathematics Text Books of different authors.
6. E-books:www.mathebook.net
7. www.freebookcentre.net/mathematics/ introductory-mathematics -books.html

Course Assessment and Evaluation:

Method	What		To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSESSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests to be computed).	20	Blue books	1 to 6
		Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	5	Log of record	1 to 6
	Total			25			
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 6
INDIRECT ASSESSMENT	Student feedback		Student	Middle of the course	-NA-	Feedback forms	1 to 3, delivery of the course
	End of Course survey			End of course		Questionnaire	1 to 6, Effectiveness of delivery of instructions and assessment methods

*CIE – Continuous Internal Evaluation *SEE – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering	31
2	Understanding	41
3	Applying the knowledge acquired from the course	25
	Analysis Evaluation	3

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks		
Ex: I test/6 th week of sem 10-11 Am	I/II SEM	ENGINEERING MATHEMATICS –II	20		
	Year:	Course code: 15SC02M			
Name of Course coordinator :			Units: __ CO's: ____		
Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

II Semester Diploma Examination
ENGINEERING MATHEMATICS –II
(For All Engineering Diploma Programmes)

Time: 3 Hours][Max. Marks: 100

NOTE: i) Answer any 10 questions from section A, 8 questions from section B and 5 questions from section-C

ii) Each question carries 3 marks in section A.

ii) Each question carries 5 marks in section B.

iii) Each question carries 6 marks in section C.

SECTION-A

1. Find the equation of the line passing through the point (2,-3) with slope 1/3.
2. Find the equation of parabola with vertex (2,0) and focus (5,0)
3. Differentiate: $(3x + 8)^7$ with respect to x.
4. If $y = \cos^{-1} x$ show that $\frac{dy}{dx} = \frac{-1}{\sqrt{1-x^2}}$.
5. If $y = x^x$, find $\frac{dy}{dx}$.
6. If $y = \frac{1+\sin x}{1-\sin x}$ find $\frac{dy}{dx}$.
7. Find the equation to the tangent to the curve $2x^3 + 5y - 4 = 0$ at (-2,4).
8. The volume of the sphere is increasing at the rate of 6cc/sec. Find the rate of change of radius when the radius is 3 cm.
9. Integrate: $(2x + 1)(x + 5)$ with respect to x
10. Evaluate: $\int \tan^2 x dx$
11. Evaluate: $\int \frac{\cos x}{1+\sin x} dx$
12. Evaluate: $\int_0^{\pi/4} (\sec^2 x + 1) dx$.
13. Find area bounded by the line $x + 2y = 0$, x-axis, and ordinates $x = 0$, and $x = 4$ by integration.
14. Form differential equation for curve $y^2 = 4ax$

SECTION – B

1. Find the equation of line passing through the point (2,5) and (-3,2).
2. Differentiate $\sqrt{x} + \log x + \sin^{-1} x + e^{\tan x} - a^x$ with respect to x.
3. Differentiate $\tan x$ with respect to x using first principal method.
4. If $y = \sinh 3x \cosh 2x$ then find $\frac{dy}{dx}$.
5. If $S = t^3 - t^2 + 9t + 8$, where S is distance travelled by particle in t seconds. Find the velocity and acceleration at $t = 2$ sec.
6. Integrate: $\frac{1}{x} - \tan x + e^{-3x} + \frac{1}{1+x^2} + 5$ with respect to x.
7. Evaluate: $\int \frac{(1+\log x)^2}{x} dx$
8. Evaluate: $\int x \sin x dx$

9. Evaluate: $\int_0^{\pi/2} \cos 5x \cos 3x \, dx$
10. Evaluate: $\int_0^{\pi/2} \cos^3 x \, dx$
11. Solve the differential equation $\sin^2 y \, dx - \cos^2 x \, dy = 0$

SECTION – C

1. Find the equation of median through B in a triangle with vertices A(-1, 3), B(-3, 5) and C(7, -9)
2. Find the equation of hyperbola, given that vertices are $(\pm 7, 0)$ and eccentricity, $e=4/3$
3. If $x^y = a^x$, show that $\frac{dy}{dx} = \frac{x \log_e a - y}{x \log_e x}$.
4. If $y = e^{\tan^{-1} x}$ then show that $(1 + x^2) \frac{d^2 y}{dx^2} + (2x - 1) \frac{dy}{dx} = 0$.
5. Find the maximum and minimum values of the function $f(x) = 2x^3 - 21x^2 + 36x - 20$.
6. Evaluate: $\int \tan^{-1} x \, dx$
7. Find the volume of solid generated by revolving the curve $y = \sqrt{x^2 + 5x}$ between $x=1$ & $x=2$.
8. Solve the differential equation $x \frac{dy}{dx} - 2y = 2x$

Question Paper Blue Print:Course: **ENGINEERING MATHEMATICS – II** Course Code: **15SC02M**

UNIT NO		HOURS	Each questions to be set for 3 Marks Section - A	Each questions to be set for 5 Marks Section - B	Each questions to be set for 6 Marks Section- C	Weightage of Marks
1	a	4	01	01	01	23
	b	4	01	--	01	
2		15	04	03	02	39
3		07	02	01	01	17
4		12	03	03	01	30
5		05	02	02	01	22
6		05	01	01	01	14
TOTAL		52	14	11	08	145
Questions to be answered			10	08	05	100

Guidelines to Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weight age of model fixed for each unit.
2. The question paper pattern provided should be adhered to
Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks.
Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.
Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.
3. Questions should not be set from the recapitulation topics.

Model Question Bank:

Course Title: **ENGINEERING MATHEMATICS – II**

Course Code: **15SC02M**

UNIT-1: STRAIGHT LINES AND CONIC SECTION:

3 MARK QUESTIONS

1. Find the equation of the straight line passing through (2,3) and having slope 5.
2. Find the slope and x-intercept and y-intercepts of the line $2x + 3y - 11 = 0$.
3. Find the vertex and focus of the parabola $(y - 2)^2 = 8x$.
4. Show that the lines $3x-2y+2=0$, $2x+3y+7=0$ are perpendicular.
5. Find the eccentricity of the ellipse $\frac{x^2}{64} + \frac{y^2}{9} = 1$

5 MARK QUESTIONS

1. Find the equation to the line passing through the point (6,-4) and perpendicular to the line $7x-6y+3=0$.
2. Find the equation to the line passing through the point (2,3) parallel to the line joining the points (-8,-6) & (2,-4).
3. Find the equation of straight line inclined at 135° to the x-axis having y-intercept $\frac{2}{3}$.
4. Find the equation of straight line joining the points (2,3) & (-4,6).
5. Find the equation of the line passes through (-3,-2) which is perpendicular to x-axis.

6 MARK QUESTIONS

1. Find the equation to the median of the triangle through the vertex A with vertices A(-1,3), B(-3,5) & C(7,-9).
2. The vertices of a quadrilateral taken in order are A(1,2), B(2,1), C(3,4) & D(-1,-2). Find the equation to the diagonal BD.

- Obtain the equation of the hyperbola in the form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, whose eccentricity is 8 and distance between the foci is 12.
- Find the equation of the ellipse with length of major axis is 8 and minor axis is 3.
- Find the equation to the line passing through point (3,-2) and perpendicular to the line joining points (5,2) & (7,-6).

UNIT-2: DIFFERENTIATION:

3 MARK QUESTIONS

- Find $\frac{dy}{dx}$, if $y = 2x^2 - 3x + 1$.
- Differentiate $x \tan x$ with respect to x .
- Find $\frac{dy}{dx}$, if $x^2 + y^2 = 25$
- Find $\frac{dy}{dx}$ if $x = ct, y = \frac{c}{t}$,
- If $y = 4ax$, find $\frac{d^2y}{dx^2}$.

5 MARK QUESTIONS:

- Differentiate the function x^n by method of first principle.
- Find $\frac{dy}{dx}$ if $y = 6x^3 - 3 \cos x + 4 \cot x + 2e^{-x} - \frac{5}{x}$.
- Find $\frac{dy}{dx}$ if $y = \frac{\cos x + \sin x}{\cos x - \sin x}$
- Find $\frac{dy}{dx}$ if $y = (\cos x)^{\sin x}$
- If $y = \tan^{-1} x$, prove that $(1 + x^2)y_2 + 2xy_1 = 0$

6 MARK QUESTIONS:

- Find $\frac{dy}{dx}$ if $y = \frac{x \log x}{1 + \sin x}$
- Find $\frac{dy}{dx}$ if $x = a \cos^3 \theta, y = a \sin^3 \theta$ at $\theta = \frac{\pi}{4}$.
- Find $\frac{dy}{dx}$ if $y = x^{x^{x^{x^{\dots}}}}$.
- If $y = \tan^{-1} \left(\frac{1+x}{1-x} \right)$, find $\frac{dy}{dx}$.
- If $y = e^{m \sin^{-1} x}$, prove that $(1 - x^2)y_2 - xy_1 - m^2y = 0$

UNIT-3 APPLICATIONS OF DIFFERENTIATION

3 MARK QUESTIONS

1. Find the slope of the tangent to the curve $x^2 + 2y^2 = 9$ at a point (1, 2) on it.
2. Find the slope of the normal to the curve $y = 2 - 3x + x^2$ at (1, 0).
3. The law of motion of a moving particle is $S = 5t^2 + 6t + 3$ where 'S' is the distance in metres and 't' time in seconds. Find the velocity when $t=2$.
4. Find the rate of change of area of a circle with respect to its radius.
5. Show that the curve $2x^3 - y = 0$ is increasing at the point (1, 2).

5 MARK QUESTIONS

1. For a moving body vertically upwards, the equation of motion is given by $S = 98t - 4.9t^2$. When does the velocity vanish?
2. Find the equation to the tangent to the curve $y = 2x^2 - 3x - 1$ at (1,-2).
3. A circular patch of oil spreads on water and increases its area at the rate of 2 sq.cm/min. find the rate of change of radius when radius is 4 cm.
4. The volume of the spherical ball is increasing at the rate of 36π cc/sec. Find the rate at which the radius is increasing. When the radius of the ball is 2cm.
5. Find the max value of the function $y = x^3 - 3x + 4$.

6 MARK QUESTIONS

1. Find the max & min values of the function $y = x^5 - 5x^4 + 5x^3 - 1$.
2. Find the equation of normal to the curve $y = x^2 + 2x + 1$ at (1,1).
3. If S is the equation of motion where $S = t^3 - 2t^2$ find its acceleration when velocity is 0.
4. The volume of sphere is increasing at 3c.c per second. Find the rate of increase of the radius, when the radius is 2cm.
5. Water is flowing into a right circular cylindrical tank of radius 50 cms at the rate of 500π cc/min. Find how fast is the level of water going up.

UNIT-4: INTEGRATION

3 MARK QUESTIONS

1. Evaluate: $\int (x^2 + x + 1) dx$.
2. Evaluate: $\int \cot^2 x dx$
3. Evaluate: $\int e^{5x+8} dx$
4. Evaluate: $\int \frac{1}{2x+5} dx$
5. Evaluate: $\int \sin^5 x \cos x dx$

5 MARK QUESTIONS

1. Evaluate $\int \left(x^4 - \frac{1}{x} + \operatorname{cosec}^2 x - e^{-2x} + \cos x \right) dx$.
2. Evaluate: $\int \cos^3 x \, dx$
3. Evaluate: $\int \sin 6x \cos 2x \, dx$
4. Evaluate: $\int \log x \, dx$
5. Evaluate: $\int \frac{(\tan^{-1} x)^3}{1+x^2} dx$

6 MARK QUESTIONS

1. Evaluate: $\int (\tan x + \cot x)^2 dx$.
2. Evaluate: $\int (x+1)(x-2)(x-3) dx$
3. Evaluate: $\int x^2 \cos x \, dx$
4. Prove that $\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1} \left(\frac{x}{a} \right) + c$
5. Evaluate: $\int \frac{1}{9\sin^2 x + 4\cos^2 x} dx$

UNIT-5: DEFINITE INTEGRATION AND ITS APPLICATION.

3 MARK QUESTIONS

1. Evaluate: $\int_2^3 (2x + 1) dx$.
2. Evaluate: $\int_0^{\pi/4} \sec^2 x \, dx$.
3. Evaluate: $\int_0^2 e^x \, dx$
4. Evaluate: $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$.
5. Evaluate: $\int_0^{\pi/2} \cos x \, dx$.

5 MARK QUESTIONS

1. Evaluate: $\int_0^{\pi/2} \sin 3x \cos x \, dx$.
2. Evaluate: $\int_0^{\pi} \frac{\cos x}{1+\sin^2 x} dx$.
3. Evaluate: $\int_0^1 x(x-1)(x-2) dx$.
4. Find the area bounded by the curve $y = x^2 + 1$ the x-axis and ordinates $x = 1, x = 3$.
5. Find the volume of the solid generated by the revolving of the curve $y^2 = x^2 + 5x$ between the ordinates $x=1, x=2$ about x-axis.

6 MARK QUESTIONS

1. Evaluate: $\int_0^1 \frac{\cos(\tan^{-1} x)}{1+x^2} dx$.
2. Find the area between the curves $y = x^2 + 5$ and $y = 2x^2 + 1$.
3. Find the volume of ellipsoid generated by revolving $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ between the ordinates $x = \pm a$ about x-axis.
4. Find the centre of gravity of a solid hemisphere.
5. Determine the moment of inertia of a uniform rod of length $2l$, Cross-sectional area “a” about an axis perpendicular to the rod and passing through the mid-point of the rod.

UNIT-6: INTEGRATION

3 MARK QUESTIONS

1. Write the order and degree of the differential equation $\left(\frac{dy}{dx}\right)^8 + 3\frac{d^2y}{dx^2} - ye^x = 0$.
2. Form the differential equation by eliminating arbitrary constants in $y = m e^{2x}$.
3. Solve $x dx + y dy = 0$.
4. Solve $\frac{dy}{1+y^2} = \frac{dx}{1+x^2}$.
5. Solve $e^x dx + dy = 0$.

5 MARK QUESTIONS

1. Form the differential equation by eliminating arbitrary constants A and B in $y = Ae^x + Be^{-x}$.
2. Form the differential equation by eliminating arbitrary constants in $y = a \cos mx + b \sin mx$.
3. Solve $(1 + y)dx + (1 + x)dy = 0$.
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + y \tan x = \cos x$

6 MARK QUESTIONS

1. Solve $x(1 + y^2)dx + y(1 + x^2)dy = 0$.
2. Solve $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0$.
3. Solve $x \frac{dy}{dx} + y = x^3$
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + 2y \cot x + \sin 2x = 0$



Government of Karnataka
Department of Technical Education, Bengaluru

Course: ENGINEERING MATHEMATICS - II

Course code: 15SC02M

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Dr. D.S. Prakash	Asst. Director (LRDC)	DTE, Bengaluru
2	Dr.MokaShekhu	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
3	Sri.Sathyanaraya Dixit	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru
4	Sri. Guruprasad V	Lecturer (Selection Grade /Science)	APS Polytechnic, Somanahalli
5	Dr.RajasekharHeera	Lecturer/Science,	Government Polytechnic, Gulbarga.

Curriculum Review committee

	Name	Designation	Institution
1	Dr.MokaShekhu	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
2	Sri.Sathyanaraya Dixit	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title	: APPLIED SCIENCE	Course Code	: 15SC03S
Semester	: I / II	Course Group	: Core
Teaching Scheme in Hrs (L:T:P)	: 4:0:0	Credits	: 4 Credits
Type of course	: Lecture & Assignments	Total Contact Hours	: 52
CIE	: 25 Marks	SEE	: 100 Marks
Programme: Common to all Engineering Diploma Programmes			

Prerequisite:

Dynamics, Heat, Sound, Matter, recent trends in Physics, Basic chemistry in Secondary Education.

Course Objective:

1. Learn concepts of Units, Laws of vectors, parallel forces, moment of force, couple.
2. Learn the fundamentals of properties and behavior of the materials
3. Learn the concepts of heat and thermodynamics.
4. Enhance theoretical and practical principles with applications of sound wave.
5. Understand different types of communication systems.
6. Develop awareness about corrosion, materials, and energy sources in engineering field.

Course Content:

UNIT I:MECHANICS

(08 Hrs)

Units and Measurements: Definition of unit, types of unit (fundamental and derived)

SI units: Definition, Basic and supplementary units, advantages.

Measuring Instruments: Vernier calipers, principle and least count, diagram of vernier calipers with labeling the parts. Screw gauge (pitch, ZE, ZC), principle and least count, diagram of screw gauge with labeling the parts, simple problems.

Scalars and Vectors: Definition of scalar and vector with examples, representation of a vector, definition of resultant, equilibrium and equilibrant. Laws of vectors: Statement of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Deriving an expression for magnitude and direction of resultant of two vectors acting at a point. Resolution of vectors, mentioning rectangular component of resolution of vector.

Experimental verification of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Simple problems on laws of vectors

Parallel forces. Types of parallel forces, Moment of force: definition, S.I unit, types and examples. Couple: definition with examples. Moment of a couple. Conditions of equilibrium of coplanar parallel forces, applications. Experimental verification of Conditions of equilibrium of coplanar parallel forces using moment bar and simple problems.

UNIT-2: PROPERTIES OF SOLIDS AND LIQUIDS:

(10 Hrs)

Properties of solids: Definitions of deforming force, elasticity and plasticity, examples for elasticity and plasticity, definition of stress and its types with examples and its S.I unit, definition of strain and its types with examples, elastic limit, Hooke's law, stress - strain graph with explanation. Modulus of elasticity and its types, derivation of an expression for Young's modulus of a material. Definition of Compressibility and factor of safety. Simple problems on stress, strain and Young's modulus.

Properties of liquids: Definition of thrust and pressure with S.I units. Derivation of expression for pressure at a point inside the liquid at rest, simple problems.

Energy of liquid in motion: Kinetic, Potential energies and Pressure energy in moving liquid. Bernoulli's theorem: statement and expression (No derivation). Cohesive and adhesive forces, angle of contact.

Surface Tension: Definition of surface tension and its S.I unit, factors affecting surface tension, applications of surface tension, capillarity and its applications.

Viscosity: Types of flow of liquid, definition of stream line flow and turbulent flow, definition of viscosity, expression for coefficient of viscosity, experimental determination of coefficient of viscosity of water, effect of temperature on viscosity. List of applications of viscosity. Simple problems.

UNIT III: HEAT AND PROPERTIES OF GASES.

(07Hrs)

Concept of heat & temperature: Definitions of heat and temperature with S.I units, definition of Specific heat of substance with S I unit, equation for specific heat of a substance (no derivation).

Transmission of heat: Definitions of conduction, convection and radiation with examples, definition of thermal conductivity, derivation of co-efficient of thermal conductivity(K) and its S.I unit. Applications of conduction, convection and radiation, simple problems on K.

Gas laws: Statement of Boyle's law, Charle's law, Gay-Lussac's law, derive the relation between them ($PV=nRT$), definition of C_p and C_v , relation between them (Mayer's equation no derivation), simple problems on Boyle's law and Charle's law.

Thermodynamics: Definition of thermodynamics, Laws of thermo dynamics: Zeroth law, 1st law and 2nd law (only statement), types of thermodynamics process: isothermal process, adiabatic process.

UNIT IV: WAVE MOTION

(10Hrs)

Simple Harmonic Motion: Definition of periodic motion with example, definition of Simple Harmonic Motion, representation of S.H.M with respect to particle in circular motion, derivation of displacement of a particle executing S.H.M. Definitions of period, frequency, amplitude, in case of vibrating particle.

Wave: Definition of wave, wave period(T), wave frequency (n or f), wave amplitude (a), wave length(λ) and wave velocity (v) in case of wave motion. Derive the relation between v , n and λ . simple problems.

Types of waves: Mechanical and Non mechanical waves with examples. Definition of longitudinal and transverse waves, differences.

Propagation of sound waves in air: Newton's formula for the velocity of sound in air and Laplace's correction to it, various factors affecting velocity of sound in air. Simple problems.

Vibrations: Free vibrations, Forced vibration, Damped vibrations and Un-damped vibrations with examples. Resonance with examples. Laws of transverse vibrations of stretched string, derivation of equation for fundamental frequency of vibrations of stretched string. Simple problems.

Experiment to determine the unknown frequency of a given tuning fork by absolute and comparison methods using sonometer.

Stationary waves: Formation of stationary waves and their characteristics. Experimental determination of velocity of sound in air by using resonance air column apparatus.

Beats: Formation of Beats, definition of beat frequency, its applications.

UNIT V: MODERN PHYSICS

(07Hrs)

Electromagnetic waves: Definition, generation of electromagnetic waves and their properties.

Electromagnetic spectrum: Definition, classification and its applications.

Lasers: Principle and listing the types of Laser, properties of Laser, applications.

Nano-Technology: Definition of Nano-Technology, advantages and dis-advantages of nano-Technology.

Advance Communication Systems: Basic elements of communication systems with block diagram, List commonly used terms in electronic communication systems.

Satellite communication: Introduction, advantages and disadvantages,

Optical fiber: principle and applications.

UNIT VI: INDUSTRIAL CHEMISTRY

(10 Hrs)

Electrolysis: Definition of electrolyte, types of electrolytes with examples, definition of electrolysis. Arrhenius theory of electrolytic dissociation. Mechanism of Electrolysis. Faradays laws of Electrolysis: state and explain.

Corrosion: Definition, necessary conditions for corrosion, electrochemical theory of corrosion, list the preventive methods of corrosion.

Batteries: Basic concept, classification and applications of batteries.

Fuel cells: Definition, mentioning the types and advantages.

Metallurgy: Definitions of minerals, ore, flux, slag, alloys. Purpose of making alloys, composition and uses of alloys.

Polymers: Definition and classification of polymers, methods of polymerization and applications.

Composite materials: Definition, types, advantages and dis-advantages of composite materials.

Solutions: Definition of solute, solvent, solutions. Saturated and unsaturated solutions, concentration of solutions: normal, molar and molal solutions, simple problems on concentration of solution.

pH Value: Hydrogen ion concentration and concept of pH, definition of pH of solution, pH scale, applications of pH in different fields.

Course Delivery:

The Course will be delivered through lectures, class room interaction and exercises.

Course Outcome:

On successful completion of the course the student will be able to:

1. Determine the dimensions of objects using measuring instruments and analyze vector in mechanics.
2. Create knowledge of properties of matter applicable to engineering.
3. Apply the concepts of thermal properties of matter and gas laws related to engineering.
4. Analyse the different concepts of waves and vibration in the field of engineering.
5. Analyse the recent trends in physics related to engineering.
6. Apply the basic concepts of chemistry in the field of engineering.

Mapping Course Outcomes with Program Outcomes:

CO –PO mapping

	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Determine the dimensions of objects using measuring instruments and analyze vector in mechanics	1,2,3,4,9	R/U/A	08	8	10	6	24
CO2	Create knowledge of properties of matter applicable to engineering.	1,2	R/U/A	10	6	15	6	27
CO3	Apply the concepts of thermal properties of matter and gas laws related to engineering	1,2,3,9	R/U/A	07	4	10	6	20
CO4	Apply the different concepts of waves and vibration in the field of engineering.	1,2,3,9	R/U/A	10	4	10	18	32
CO5	Apply the recent trends in physics related to engineering.	1,2,6	R/U/A	07	4	10	6	20
CO6	Apply the basic concepts of chemistry in the field of engineering.	1,2,6	R/U/A	10	4	20	6	30
		Total Hours of instruction		52	Total marks			153

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Applied Science	3	3	3	1	-	2	-	-	2	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO. If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3. If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2. If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1. If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference Books:

1. Principle of physics for class XI and XII by V.K.Mehata and Rohit Mehta, as per Karnataka state PUC syllabus S.Chand and Company, New Delhi
2. Engineering chemistry for Diploma by Ranjan Kumar Mahapatra (PHI Learning Pvt. Ltd., New Delhi)
3. Basic Physics by Kongbam Chandramani Singh (PHI Learning Pvt. Ltd., New Delhi)
4. Principle of physics by P.V.Naik (PHI Learning Pvt. Ltd. New Delhi)

Website:

1. www.rsc.org/Education/Teachers/resources/Inspirational/.../4.3.1.pdf
2. [www.nanogloss.com/nanotechnology/advantages and disadvantages](http://www.nanogloss.com/nanotechnology/advantages%20and%20disadvantages)
3. [www.freebookcentre.net/physics/ introductory-physics-books.html](http://www.freebookcentre.net/physics/introductory-physics-books.html)

e-books:

1. Introduction to physics – II, Robert P Johnson.
2. Lecture notes physics university of Rochester.
3. Text book of Physics poynting J.H Thomson sir J.J.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Three tests (average of three tests will be computed)	20	Blue Books	1 to 6
		Class room Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	05	Log of Activity	1 and 6
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	Students	End Of the Course	100	Answer Scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 3 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 6 Effectiveness of delivery of instructions and assessment

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks			
Ex: I test/6 th week of sem 10-11 Am	I/II SEM	APPLIED SCIENCE	20			
	Year:	Course code:15SC03S				
Name of Course coordinator :			Units:___ CO's:_____			
Question no	Question		MARKS	CL	CO	PO
1						
2						
3						
4						

Note: Internal Choice may be given for each CO at the same cognitive level (CL).

Question Paper Blue Print:

Course Title : **APPLIED SCIENCE** Course Code : **15SC03S**

Name and Unit No.	Allotted Hours	Questions to be set for (2marks)	Questions to be set for (5marks)	Questions to be set for (6marks)
		PART - A	PART - B	PART - C
Mechanics I	08	04	02	01
Properties of Solids and Liquids II	10	03	03	01
Heat and properties of gases III	07	02	02	01
Wave motion IV	10	02	02	03
Modern Physics V	07	02	02	01
Industrial chemistry VI	10	02	04	01
Total	52	15	15	8

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of model fixed for each unit.
2. The question paper pattern provided should be adhered to
Part – A: 10 questions to be answered out of 15 questions each carrying 02 marks
Part – B: 10 questions to be answered out of 15 questions each carrying 05 marks.
Part – C: 05 questions to be answered out of 08 questions each carrying 06 marks.

Model Question Paper:

Code:15SC03S

I Semester Diploma Examination
APPLIED SCIENCE
(Common for All Engineering Programmes)

Time: 3 Hours][Max Marks: 100

- Note:** i) Answer any 10 questions from section A, each carry 02marks.
ii) Answer any 10 questions from section B, each carry 05 marks.
iii) Answer any 05 questions from section C, each carry 06 marks.

SECTION – A

1. Define Unit.
2. Differentiate scalars and vectors.
3. Define Resultant of forces.
4. Define moment of couple.
5. Define plasticity.
6. Define compressibility.
7. Define viscosity of liquid.
8. Define specific heat of substance.
9. Define thermodynamics.
10. Define time period.
11. Define beats.
12. Define Electro-magnetic waves.
13. Define Nano-Technology.
14. Define electrolyte.
15. Define composite materials.

PART-B

1. Draw a neat diagram of Vernier calipers and label its parts.
2. Write the condition for equilibrium of coplanar parallel forces with an example.
3. Explain stress-strain graph.
4. Define K.E of liquid in motion. State Bernoulli's theorem.
5. Define capillarity? Write any three application of surface tension.
6. State 1st law of thermodynamics. Explain isothermal & adiabatic process.
7. State the three gas laws.(Boyle's law, Charle's law & Gay-Lussac law)

8. Explain mechanical & non-mechanical waves with examples.
9. Distinguish between longitudinal & transverse waves.
10. Write any three advantages and two disadvantages of F.M.
11. Write the principle of laser. List its properties.
12. Explain the mechanism of electrolysis of HCL.
13. Write the basic concepts of batteries. Mention any three applications of batteries.
14. Distinguish between minerals and ore. Write any three applications of pH.
15. Define composite materials. Write the advantages of composite materials.

PART-C

1. Derive an expression for magnitude and direction of resultant of two forces acting at a Point.
2. Describe an experiment to determine coefficient of viscosity of water by Poiseuille's method.
3. 1.25cc volume of a gas at 15°C & 755mm of mercury pressure. Calculate volume at NTP.
4. Derive an expression for fundamental frequency of transverse vibrations of stretched string.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer by comparison method.
6. Calculate the velocity of sound in air at 25°C & 75cm of mercury pressure, if the density of air at 0°C & 76cm of mercury pressure is 1.29kgm^{-3} . (given $\gamma=1.41$ for air).
7. Write the basic elements of communication system with block diagram.
8. Explain any two methods of polymerization.

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Model Question Bank:

Course Title : **APPLIED SCIENCE**

Course Code : **15SC03S**

UNIT – I : MECHANICS

PART – A (02MARKS QUESTIONS)

1. Define unit of a physical quantity.
2. Define fundamental and derived units.
3. List supplementary units in S.I systems.
4. Define S.I units give two eg of S.I, basic units.
5. Define least count of measuring instrument.
6. Write the principle of Vernier calipers and screw gauge.
7. Define least count of Vernier calipers?
8. Define pitch of a screw.
9. Define ZE and ZC in screw gauge.
10. Define scalar quantity & give its examples.
11. Define vector quantity & give its examples.
12. Write the relation between resultant and equilibrant.
13. State law of parallelogram of vectors.
14. State Converse law of triangle of forces.
15. State Lami's theorem.
16. Define moment of force.
17. Write the two rectangular component of a vector.
18. Write how moment of force is measured.
19. Discuss why the handles of the doors and windows are fixed at the end.
20. Define couple.
21. Define is moment of couple.
22. Write how you measure moment of couple.
23. Define equilibrium.
24. Write the conditions of equilibrium when number of co-planar parallel forces acting on a body.
25. Define like & unlike parallel forces.

PART – B (05 MARKS QUESTIONS)

1. Mention seven basic units and two supplementary units of SI system.
2. Draw a neat diagram of Vernier calipers and label its parts.
3. Draw a neat diagram of Screw Gauge and label its parts.
4. Explain parallel forces with their types.

5. List two types of moment of force. Write any three applications of couple.
6. Write the advantages of S.I system.
7. Mention the difference between scalars and vectors.
8. State Converse law of triangle of forces; write the line diagram & equation of Converse law of triangle of forces.
9. State Lami's theorem, write the line diagram & equation of lami's theorem
10. Define moment of force, write the equation to measure moment of force & give its examples.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for magnitude and direction of resultant of two forces acting at a point.
2. Derive an expression for horizontal and vertical components of force acting at an angle θ with horizontal.
3. Write the conditions for equilibrium of coplanar parallel forces acting on a rigid body with equations & diagram.
4. Describe an experiment to verify law of parallelogram of forces.
5. Describe an experiment to verify Converse law of triangle of forces.
6. Describe an experiment to verify Lami's theorem.
7. Describe an experiment to verify the conditions of equilibrium of co-planar parallel forces using moment bar.
8. A main scale is divided into 0.5 mm the length of vernier attached to it is 12mm and is divided into 25 equal parts. Calculate the value of 1 vsd and L.C of vernier.
9. In Vernier calipers, main scale is divided into 1mm; 9 division of main scale is divided into 10 equal parts on Vernier scale. In a setting zero of Vernier scale lies between 4.8cm and 4.9cm, and 7th division of vernier coincide with the main scale division. What is the total reading?
10. A screw gauge has a pitch of 0.5mm and 50 divisions on head scale. The reading when jaws touch is +5div. When gripping a wire the reading is 3 turns and 17 div. What is the diameter of the wire?
11. The resultant of two equal forces acting at a right angle to each other is 1414N. Find the magnitude of each force.
12. Two forces of 5kg wt. and 10kg wt. acts at right angles to one another. Find the magnitude and direction of the resultant forces.
13. Two unlike parallel forces equal to 20N and 12N acts at two points A and B on a rigid body. Find the magnitude and direction of their resultant and the point where it acts if $AB=0.8m$
14. Two like parallel forces equal to 80N and 100N act on a body at two points A and B. If $AB=0.6m$, find the magnitude and the point where their resultant acts.
15. Three forces P, Q and 100 N acting on a body in equilibrium. If the angles opposite to P and Q are 120° and 150° respectively. Find the magnitude of P and Q.

UNIT II: PROPERTIES SOLIDS & LIQUIDS

PART – A (02MARKS QUESTIONS)

1. Define plasticity.
2. Define elasticity.
3. Define deforming force.
4. Define restoring force.
5. Define stress.
6. Write the types of stress.
7. Define strain.
8. Write the type of strain.
9. Define elastic limit.
10. State Hooke's law.
11. Define Young's modulus.
12. Define Bulk modulus.
13. Define Rigidity modulus.
14. Define compressibility? Write its S.I unit.
15. Write S.I units of stress and strain.
16. Define pressure of liquid.
17. Write equation for the pressure at a point inside the liquid at rest.
18. State Bernoulli's theorem.
19. Define cohesive force.
20. Define Adhesive force.
21. Write reason why glue stick to paper?
22. Define angle of a contact.
23. Name the type of angle of a contact formed for water and glass, water and mercury.
24. Define surface tension.
25. List the factors affecting surface tension.
26. Define capillarity.
27. Write any four applications of capillarity.
28. List the applications of surface Tension.
29. Write the equation used to determine surface tension of water by capillary raise method.
30. Define viscous force.
31. Give two examples of viscous liquid.
32. Define co-efficient of viscosity. Write its S.I unit.
33. List the factors affecting viscosity of liquid.
34. Write the effect on viscosity of gas if temperature is increased.
35. Write any four applications of viscosity.
36. List the types of flow of liquid.

PART – B (05 MARKS QUESTIONS)

1. Explain elasticity with an example.
2. Define elasticity and list three types of moduli of elasticity.
3. Define strain. Write the types of strain. Give e.g. for each type of strain.
4. Define stress. Write the types of stress. Give e.g. for each type of stress.
5. Define elastic limit. State Hooke's law? Write its mathematical form .
6. Explain stress-strain graph.
7. Define compressibility and factor of safety. Write the SI unit of stress.
8. Define thrust and pressure, write their SI units.
9. Define K.E and P.E of liquid. State the Bernoulli's theorem.
10. Define cohesive and adhesive force with an example.
11. Define pressure energy and angle of contact.
12. Define two types of flow of liquid with an example.
13. Define angle of a contact. What type of angle of contact is formed for water and glass, water and mercury? List the factors affecting surface tension.
14. Define capillarity. Write any four applications of capillarity.
15. Write the difference between stream line flow and turbulent flow of liquids.
16. Define viscosity and write the effect of temperature on viscosity of liquid & gas.
17. Define stress and explain the types of stress.
18. Define strain and explain the types of strain.
19. State Hooke's law? List any three applications of viscosity.
20. Define surface tension. Mention any three factors affecting surface tension.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for young's modulus of elasticity.
2. Derive an expression for pressure at any point inside the liquid at rest.
3. Derive an expression for co-efficient of viscosity of liquid.
4. Describe an experiment to determine the surface tension of water by capillary rise method.
5. Describe an experiment to determine coefficient of viscosity of water by Poiseuille's method.
6. A uniform wire of length 0.5m and diameter 0.0006m when stretched by a mass of 5kg extends by 0.0004m. Calculate Young's modulus of wire.
7. A wire of length 1m is fixed at one end and a mass of 1kg is hung from free end, the area of cross section of the wire is $2.5 \times 10^{-6} \text{ m}^2$ and the Young's modulus of the material of the wire is $2 \times 10^{11} \text{ Nm}^{-2}$. Calculate stress, strain and extension of the wire.
8. A spring 60cm long is stretched by 2cm by the application of a load 200g. What will be the length when the load of 500g is applied (given $g = 980 \text{ cm/s}^2$).

9. A rectangular tank is 3m long, 2m wide and 1.5m in height, it contains water to a depth of 1m, the density of water is 1000kg/m^3 . Calculate the pressure at the bottom of the tank.
10. Calculate the pressure at the bottom of a swimming pool 10m wide if the water is 3m deep, the density of water is 1000kg/m^3 .
11. A square plate of 6cm side moves parallel to another plate with a velocity of 10cm/s, both the plates being immersed in water ($\eta = 0.01\text{poise}$). If the distance between the plates 0.5mm. Calculate the viscous force.
12. In a certain experiment on the flow of water through a capillary tube, the following data were obtained. Volume of water coming out per minute = 15cc; pressure head of water = 30cm
Length of tube = 25cm; radius of tube = 0.05cm; calculate coefficient of viscosity of water ($g=980\text{cm/s}^2$, density = 1gm/cc)
13. A castor oil of viscosity 98.6NS/m^2 fills the space between two horizontal plates 1cm apart. If the lower plate is stationary and upper plate is moving horizontally with a velocity of 3m/s. Find the tangential force per unit area.

UNIT-III: HEAT AND PROPERTIES OF GASES.

PART – A (02MARKS QUESTIONS)

1. Define heat & write SI unit of heat.
2. Define temperature & write SI unit of temperature.
3. Define specific heat of substance & write its SI unit.
4. Define conduction of heat.
5. Define convection of heat.
6. Define Radiation of heat.
7. Define Thermal conductivity.
8. Define specific heat of a gas at constant volume.
9. Define specific heat of a gas at constant pressure.
10. State Boyle's law.
11. State Charle's law.
12. State Gay-Lussac's law
13. Define isothermal process.
14. Define adiabatic process.
15. Define thermodynamics.
16. State zeroth law of thermodynamics.
17. State Ist law of Thermodynamics.
18. State IInd law of Thermodynamics
19. Write Mayer's equation.

PART – B (05 MARKS QUESTIONS)

1. Write any five differences between heat & temperature.

2. Define heat, temperature & specific heat of Substance. Write Mayer's equation for gas.
3. Define conduction, convection, radiation and thermal conductivity.
4. Write any five applications of conduction.
5. Write any five applications of convection.
6. Write any five applications of radiation.
7. Define C_p & C_v , write the relation between them.
8. Define conduction, write applications of conduction.
9. Define convection, write applications of convection.
10. Define radiation, write applications of radiation..
11. State 1st law of thermodynamics, explain isothermal & adiabatic process.
12. Derive an expression for coefficient of thermal conductivity (K).
13. Compare the three modes of transfer of heat.
14. State the three gas laws. (Boyle's law, Charle's law & Gay-Lussac's law).
15. State zeroth law, 1st law & 2nd law of thermodynamics.

PART – C (06 MARKS QUESTIONS)

1. With usual notations prove that $pV = nRT$
2. Define thermal conductivity. Derive an equation for co-efficient of thermal conductivity (K).
3. Define specific heat of a substance. Derive an equation for specific heat of substance.
4. Describe an experiment to verify Boyle's law.
5. The volume of a gas at 27°C at 2 atmospheric pressure is 2 liters.
If the pressure is double & absolute temperature is reduced to half.
What will be the new volume of gas?
6. A sealed glass bulb contains air at 30°C at normal pressure. The bulb is immersed in an oil bath & heated gradually. Find the temperature in degree centigrade at which the bulb bursts if it can withstand a maximum pressure of 3.5 atm.
7. The volume of certain mass of a gas at STP is $2 \times 10^{-4} \text{ m}^3$. Find its volume at 27 °C at pressure $2.2 \times 10^5 \text{ Pa}$.
8. The volume of a gas at 15°C is 1.25 cc & 755 mm of mercury pressure. Calculate volume at NTP.
9. How much heat is required to raise the temperature of 5 kg of copper from 27°C to its melting point of 1063°C? Given that specific heat of copper is 400 J/kg°C.
10. A hot iron ball of mass 0.2 kg is dropped into 0.5 g of water at 10°C. The resulting temperature is 30°C. Calculate the temperature of the hot ball. Specific heat of iron = 336 J/kg°C and specific heat of water = 4200 J/kg°C.
11. A silver rod 0.15 m long has cross-sectional area of 0.0003 m^2 . If one end is maintained at 10°C and other end at 75°C. How much heat will flow through the rod in 5 minutes? Given that co-efficient of thermal conductivity of silver = 406 J/ms°C.

UNIT-IV: WAVE MOTION

PART – A (02MARKS QUESTIONS)

1. Define frequency and amplitude of a vibrating particle.
2. Write the relation between frequency and time period.
3. Define periodic motion with example.
4. Define S.H.M with example.
5. Write the equation for displacement of the particle in S.H.M.
6. Define wave motion.
7. Define wave period, wave frequency.
8. Write the relation between wave velocity, wavelength & wave frequency
9. Define non mechanical wave. Give an example.
10. Define mechanical wave. Write two types of Mechanical wave
11. Define transverse wave & give an example.
12. Define longitudinal wave & give an example.
13. Write any two differences between transverse wave and longitudinal wave.
14. Write two characteristics of transverse wave.
15. Write two characteristics of longitudinal wave.
16. Write Newton's equation for velocity of sound in a medium and name the terms involved in the equation.
17. Write the Newton's Laplace equation for velocity of sound in air
18. Write the effect of pressure on velocity of sound in air.
19. Write the effect of temp on velocity of sound in air.
20. Write the equation for velocity of sound in air at 0°C.
21. Write the effect of humidity on velocity of sound in air.
22. Define free and forced vibration.
23. Define natural frequency.
24. Define resonance.
25. Give any two practical examples of resonance.
26. Define how stationary waves are produced?
27. Write any two characteristics of stationary waves.
28. Define nodes and antinodes.
29. Write the difference between stationary waves and progressive waves.
30. Write the fundamental note in vibration of stretched string.
31. Write the formula for the fundamental frequency of vibration of stretched string.
32. State the law of tension as applied to the vibration of stretched string.
33. State the law of length as applied to the vibration of stretched string.
34. State the law of mass per unit length as applied to the vibration of stretched string.
35. Define beats.
36. Define beat frequency.
37. Write any two applications of beats.

38. Write how beat frequency can be calculated?

PART-A (05 MARKS QUESTIONS)

1. Define period, frequency & amplitude of vibrating particle.
2. Explain mechanical & non mechanical waves with examples.
3. Define longitudinal waves & transverse waves.
4. Define beat and beat frequency.
5. Obtain the relation between v , n and λ .
6. Define periodic motion & SHM with example in each.
7. Derive an expression for displacement of a particle executing SHM.
8. Define wave period, wave frequency, wave amplitude, wave length and wave velocity.
9. Distinguish between longitudinal & transverse waves.
10. Explain propagation of sound waves in air with practical example.
11. Describe Newton's formula for velocity of sound in air.
12. Explain Newton's formula for velocity of sound in air and hence Laplace correction to it.
13. Explain various factors affecting velocity of sound in air.
14. What is stationary wave? Mention the characteristics of stationary waves.
15. Why the soldiers are asked to break steps while marching across bridges.

PART- C (06 MARKS QUESTIONS)

1. Derive an expression for displacement of a particle executing SHM
2. Derive an expression for velocity of wave in terms of its frequency and wavelength.
3. Derive an expression for fundamental frequency of vibrations of stretched string.
4. Describe an experiment to determine the velocity of sound in air at room temperature by resonance air column method.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer by comparison method.
6. Describe an experiment to determine frequency of Turing fork by absolute method using sonometer.
7. A wave of frequency 600MHZ travels at a speed of 3×10^8 m/s. Calculate its wavelength & calculate the frequency of same type of wave whose wavelength is 40m.
8. If the frequency of tuning fork is 500Hz & velocity of sound is 300m/s. Find how far sound travels while the fork completes 25 vibrations.
9. Calculate the velocity of sound in air at 25°C & 75cm of mercury pressure, if the density of air at 0°C & 76cm of mercury pressure is 1.29kgm^{-3} . (Given $\gamma=1.41$ for air).
10. Calculate the speed of sound at -50°C & at $+100^\circ\text{C}$, given speed of sound at 0°C is 332 m/s.
11. The density of air at NTP is 1.293kgm^{-3} & $\gamma=1.402$. Calculate the frequency of a tuning fork which emits sound of wavelength 0.75m at 26°C .
12. A string of length 2m is stretched by a force of 3200N. If the frequency of vibration is

- 100Hz. Find the mass of the string.
13. A string has length of 0.3m & weight 2×10^{-3} kg. What must be the tension in the string so that when vibrating string transversely, it has a fundamental frequency 320 Hz?
 14. A Sonometer wire of 0.5m long vibrates in two segments & is stretched by a force of 5kg wt. Calculate the frequency of the note emitted. ($g=9.8\text{m/s}^2$ linear density of the wire= 0.018kg/m).
 15. The frequency of Sonometer wire is doubled when the tension is increased by 12kg wt. Find the original tension.

UNIT V: MODERN PHYSICS

PART – A (02MARKS QUESTIONS)

1. Define electromagnetic waves.
2. State two characteristics of electromagnetic waves.
3. Write how electromagnetic waves are produced?
4. Define electromagnetic spectrum.
5. Write any two uses of electromagnetic spectrum.
6. Write the principle of LASER.
7. List any two types of LASER.
8. Write any two principle of LASER.
9. Write any two applications of LASER.
10. Define nanotechnology.
11. Write two advantages of nanotechnology.
12. Write two disadvantages of nanotechnology.
13. Write what do you mean by communication?
14. Write the basic elements of communication system.
15. List any two commonly used terms in electronic communication system.
16. Write two advantages of communication satellite.
17. Write two disadvantages of communication satellite.
18. Define optical fiber.
19. Write the principle of optical fiber.
20. Write two advantages of optical fiber.

PART-B (05 MARKS QUESTIONS)

1. Describe the generation of electromagnetic waves.
2. Write any five properties of electromagnetic waves.
3. Explain how electromagnetic spectrum is classified?
4. Write any five applications of electromagnetic spectrum.
5. Explain the principle of LASER. List the properties of LASER.
6. Write any five advantages of LASER.
7. Write five advantages of nanotechnology.
8. Write advantages and disadvantages of nanotechnology.

9. Write the block diagram of communication system.
10. List any five commonly used terms in electronic communication system..
11. Write five advantages of satellite communication.
12. Write any five disadvantages of satellite communication.
13. Write any five advantages of optical fiber.
14. Explain satellite communication. List any two disadvantages of satellite communication system.

PART- C (06 MARKS QUESTIONS)

1. Define electromagnetic waves. Write four properties of electromagnetic waves.
2. Define electromagnetic spectrum. Explain how electromagnetic spectrum is classified.
3. Write the applications of electromagnetic spectrum.
4. List six applications of LASER.
5. Write six advantages of nanotechnology.
6. Write what you mean by communication system. Write the block diagram of communication system..
7. Define satellite communication system. Write four advantages of satellite communication system.
8. Write the principle of optical fiber. Write four applications of optical fiber.

UNIT VI INDUSTRIAL CHEMISTRY

PART – A (02MARKS QUESTIONS)

1. Define electrolysis.
2. Define electrolyte.
3. Write any four examples of electrolyte.
4. Define strong and weak electrolyte.
5. Write any two postulates of Arrhenius theory of electrolytic dissociation.
6. State Faradays Ist law of electrolysis.
7. State Faradays IInd law of electrolysis.
8. Define corrosion.
9. List any two preventive methods of corrosion.
10. Define batteries.
11. Write any two applications of batteries.
12. Define fuel cells.
13. Write any two types of fuel cells.
14. Write any two advantages of fuel cells.
15. Define minerals.
16. Define ore.
17. Define flux.
18. Define slag.
19. Define an alloy.
20. Write any two uses of alloys.

21. Define polymers.
22. Define polymerization.
23. Write any two applications of polymers.
24. List the methods of polymerization.
25. Define composite materials.
26. Write any two types of composite materials.
27. Write two advantages of composite materials.
28. Write two disadvantages of composite materials.
29. Define solute.
30. Define solvent.
31. Define solution.
32. Define saturated solution.
33. Define unsaturated solution.
34. Define concentration of a solution.
35. Define normal solution.
36. Define molar solution.
37. Define molal solution.
38. Define pH of a solution.
39. Write any two applications of pH.
40. Write hydrogen ion concentration in case of neutral solution.

PART-B (05 MARKS QUESTIONS)

1. Explain the mechanism of electrolysis of HCl.
2. Define corrosion. Write the necessary condition of corrosion.
3. Write any five postulates of Arrhenius theory of electrolytic dissociation.
4. State 1st and 2nd Faraday's laws of electrolysis.
5. Write any five preventive methods of corrosion.
6. Write the classification of batteries. Write two applications of batteries.
7. Write two types of fuel cells. List any three advantages of fuel cells.
8. Define alloys. Write the purpose of making alloys.
9. Write the classification of polymers. Write any three applications of polymers.
10. Define composite material. Write any two advantages of composite materials.
11. Calculate the concentration of solution when 110g of copper sulphate is dissolved in 550g of a solvent.
12. Define pH of a solution. Explain acid, base, and neutral solution on the basis of pH value.

PART- C (06 MARKS QUESTIONS)

1. State and explain Faraday's laws of electrolysis?
2. Explain the mechanism of electrolysis of HCl.
3. Define corrosion. Write the necessary condition for corrosion.
4. Write any six preventive methods of corrosion.
5. Explain the electrochemical theory of corrosion.

6. Mention what is battery? Write the applications of batteries.
7. Define fuel cells. Mention the types of fuel cells.
8. Write the advantages of fuel cells.
9. Define minerals, ore, flux, slag and alloys?
10. Write the composition steel. List three uses of alloys.
11. Explain any two methods of polymerization.
12. Write the applications of polymers.
13. Write the advantages and disadvantages of composite materials.
14. Define molar and normal solution. What is concentration of a solution?
15. Write any six applications of pH.

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Government of Karnataka
Department of Technical Education, Bengaluru

Course: APPLIED SCIENCE
Course code: 15SC03S

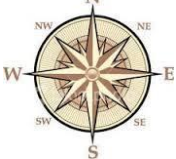
Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Mr. R B Pawar	Principal	Govt. Polytechnic, Bijapur
2	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
3	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
4	Dr. HanumanthaNayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: SURVEYING - I		
	Credits (L:T:P) : 4:0:0	Total Contact Hours: 52	Course Code: 15CE21T
	Type of Course: Lectures, Self Study & Quiz	Credit : 04	Core/ Elective: Core
CIE- 25 Marks		SEE- 100 Marks	

Prerequisites: Knowledge of Basic Science and Mathematics in Secondary Education.

Course Objective:

1. To provide knowledge of basic Principles of surveying.
2. To develop the techniques of taking measurements and plotting the details.
3. Interpretation of data collected analyze and evaluate for the purpose of design, estimation

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

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Interpret the basics in surveying and chain surveying.	<i>R/U/Ap</i>	1,2,3,4,8.	10
CO2	Explain the principles of compass surveying and its applications.	<i>R/U/Ap</i>	1,2,3,4,5,8.	10
CO3	Illustrate the basics in levelling, types of levelling instruments and methods of levelling	<i>R/U/Ap</i>	1,2,3,4,8.	10
CO4	Discover the types of levelling, errors and its applications.	<i>U/Ap</i>	1,2,3, 5,7,8,10	10
C05	Explain the concept of contour, its uses and methods of contouring.	<i>R/U</i>	1,2,3,5.	05
C06	Compute area and volume of irregular figures.	<i>U/Ap</i>	1,2,3.	07
C07	Perform suggested activity related to surveying, exploring in groups and able to present it.	<i>U/Ap/Ay/C</i>	1 to 10	*
			Total sessions	52

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
SURVEYING-I	3	3	3	3	3	1	3	2	1	2

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Contents

UNIT	COURSE CONTENTS	HOURS
1	INTRODUCTION Definition and objectives of surveying, primary divisions, classifications, and principle.	10
	CHAIN SURVEYING Purpose, Accessories, Principles of chain surveying, Different operations, Ranging, Cross staff survey simple problems, Plotting the chain survey, adopting suitable conventions, Errors & corrections in chain surveying, (without numerical problems)	
2	COMPASS SURVEYING Introduction and purpose, Bearing & its type, Problems on bearings, Compass and its type, Dip and declination, Simple problems, Local attraction, Open and closed traverse, checks, Errors	10
3	LEVELLING – Terms used in leveling, types of levels, Bench marks, Temporary adjustments of level Concept of B.S, I.S, F.S, C.P, H.I and remarks, Simple leveling and differential leveling Reduction of levels i) Plane of collimation method ii) Rise and fall methods Problems on reduction of levels.	10

4	LEVELLING – APPLICATION Different types of leveling - fly leveling, check leveling, profile leveling, cross sectioning, Plotting of longitudinal and cross section, Errors in leveling and precautions, Setting grade stakes and setting out grades for sewers and problems on it.	10
5	CONTOURING Concepts of contour and terms used in contouring, characteristics of contour, uses of contours, Methods of contouring, Interpolation by arithmetical method, calculation of capacity of the reservoir.	05
6	AREAS & VOLUMES Computation of Area of Irregular figures using Trapezoidal & Simpson's rule - problems. Volumes of Irregular solids- using Trapezoidal & Prismoidal Rule - Problems on Embankment & Cutting	07
7	CASE STUDY	

Course Delivery: The course will be delivered through lectures and Power point presentations/ Video



SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill and lifelong learning, communication, modern tool usage.

1. Prepare a spread sheet(Microsoft Excel) of Rise and fall method showing the calculation by using formula bar and present it
2. Prepare a spread sheet (Microsoft Excel) of Height of instrument method showing the calculation by using formula bar and present it
3. Compute the area of Nehru ground or any area/agriculture field by cross staff survey and present it
4. Compute the area of Nehru ground/ any area/agriculture field by Compass survey and present it
5. Chain triangulation
6. Find the volume of excavation of a drainage
7. Conduct a experiment to overcome obstacles in chaining and ranging.
8. Conduct a open traverse in chain surveying and represent the sign conventions in the field book.
9. Conduct a closed traverse in chain surveying and represent the sign conventions in the field book calculate area.
10. New Road survey
11. Survey conducted for Widening of existing road
12. Compute the capacity of reservoir/pond near by your locality
13. Sensitivity of bubble used in levelling

14. Two Peg Test
15. Three Wire Levelling
16. Permanent Adjustments of a Dumpy Level
17. Block levelling for sloped ground level and compute the volume of earth work excavation required to construct a building.
18. Layout Plan of Existing Campus
19. Contour Map of Existing Campus
20. Carryout reciprocal levelling and make a presentation
21. Presentation on Precise levelling, Digital levelling, Digital ground model, Data logger, Triangular grid model, Units of measurements used in survey from history
22. Select an irregular area/hillock conduct a block levelling and calculate the volume of earth and present it.
23. Explore and use surveying software's and present it.
24. Select an irregular area/hillock conduct a direct contouring and calculate the volume of earth and present it.

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows: (Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**)

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score				
	(Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1 , Developing 2 , Satisfactory 3 , Good 4 , Exemplary 5				
1.Literature	5				
2.Fulfill team's roles & duties	2				
3.Conclusion	3				
4.Conversions	4				
Total	14				
Average=(Total /4)	14/4=3.5=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Rubric Model- Example only:

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Conversions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE*	IA	Students	Three test (average of three tests)	Test 1	20	Blue books	1,2
					Test 2			3,4
					Test 3			5,6
				Suggested activity	05	Reports	1 2 3 4,5,6,7	
	SEE*	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5,6	
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3, Delivery of course	
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4,5,6,7 Effectiveness of Delivery of instructions & Assessment Methods	

*CIE – Continuous Internal Evaluation *SEE – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE			Marks weightage	weightage (%)	A*	B*
			Cognitive Levels						
			R	U	Ap				
1	Introduction and chain surveying	10	30%	30%	40%	28	19	1	2
			8	8	12				
2	Compass surveying	10	30%	30%	40%	28	19	1	2
			8	8	12				
3	Leveling	10	35%	30%	35%	28	19	2	2
			10	8	10				
4	Leveling application	10	18%	35%	47%	28	19	2	2
			5	10	13				
5	Contouring	7	33%	33%	34%	19	13	2	1
			6	6	7				
6	Areas and volumes	5	0%	65%	35%	14	10	1	1
			0	9	5				
Total		52	37	49	59	145	100	9	10

A*-SEE QUESTIONS TO BE SET FOR (05MARKS) in PART – A

B*- SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – B

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	61
2	Applying the knowledge acquired from the course	39

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks		
Ex: I test/6 th week of sem 10-11 Am	I/II SEM	SURVEYING-I	20		
	Year:	Course code:15CE21T			
Name of Course coordinator : CO's:_____			Units:___		
Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks	
Ex: I test/6 th week of sem 10-11 Am	II SEM	SURVEYING-I	20	
	Year: 2015-16	Course code:15CE21T		
Name of Course coordinator :				
Units:1, CO: 1,2.				
Note: Answer all questions				
Question	M	C L	C O	PO
1 Define surveying. State the objects of surveying.	4	R	1	1,2,3,4,8.
2 Explain the following terms : a) Base line b) Check line c) Tie line.	3	U	1	1,2,3,4,8.
3 What is meant by local attraction? How it is detected and eliminated?	5	R/ U	2	1,2,3,4,5,8.
4 Plot the following details of a field and calculate the area, all measurements being taken in metres. <div style="text-align: center; margin-left: 100px;"> B0 8 5C A4 15 18 3D 30E </div>	8	A	1	1,2,3,4,8.
			2	1,2,3,4,5,8.
OR.				
The following bearings were observed with compass. Calculate the interior angles.				
Line	Fore bearing	Back bearing		
AB	60° 30'	240° 30'		
BC	122° 0'	302° 0'		
CD	46° 0'	226° 0'		
DE	205° 30'	25° 30'		
EA	300° 0'	120° 0'		



TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Surveying and Levelling by T P konetkar& S V Kulkarni
3. Plane Surveying by Dr.Alak De
4. Surveying and Levelling by S SBhavikatti
5. Surveying by Duggal
6. Surveying by R Agor
7. Fundamentals of Surveying by S K Roy
8. Surveying and Levelling by N NBasak

E-links

1. www.elearning.com/survey
2. <http://nptel.ac.in/video.php?subjectId=105104101>
3. <http://media.sakshat.ac.in/NPTEL-IIT-Videos/>
4. http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
5. <http://nptel.iitk.ac.in/>

Model Question Paper

Code: **15CE21T**

Second Semester Diploma Examination

SURVEYING-I

Time: **3 hours]**

[Max. Marks: 100

- Note:** 1. Answer any **SIX** questions from **Section-I**, Each question carries **5** marks
2. Answer any **SEVEN** questions from **Section-II**, Each question carries **10** marks

SECTION- I

1. Define surveying. State the objects of surveying.
2. Draw a suitable convention signs of hill, chain line, stream, benchmark,.
3. Compare Prismatic compass with surveyors compass
4. At a place the bearing of sun is measured at local noon and found to be $175^{\circ} 15'$. What is the magnitude and direction of magnetic declination of the place?
5. Define the following terms
i) Level line ii) Parallax iii) change point
6. Explain the temporary adjustments of a Dumpy level
7. What are the uses of taking L/S & C/S?
8. What are the different sources of errors in levelling?
9. What is Contour interval? List the factors affecting it.

SECTION- II

1. a) What is Reconnaissance survey and state its importance?
b) Plot the following details of a field and calculate the area, all measurements being taken in metres.

	0	
	8	5
4	15	
	18	3
	30	

2. a) Differentiate between Check line and Tie line?

b) What is Reconnaissance survey and state its importance?

3. a) Compare WCB system and R.B. system.

b) Convert the following W.C.B to R.B

i) 10° ii) $45^{\circ} 15'$ iii) $135^{\circ} 45'$ iv) $315^{\circ} 15'$ v) $215^{\circ} 15'$

4. The following bearings were observed in running a closed traverse.

Line	Fore bearing	Back bearing
AB	$75^{\circ} 05'$	$254^{\circ} 20'$
BC	$115^{\circ} 20'$	$296^{\circ} 35'$
CD	$165^{\circ} 35'$	$345^{\circ} 35'$
DE	$224^{\circ} 50'$	$44^{\circ} 05'$
EA	$304^{\circ} 50'$	$125^{\circ} 05'$

At what station do you suspect local attraction? Determine the corrected bearings

5. a) The following consecutive readings were taken with a dumpy level: 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765. The first reading was taken with the staff held upon a BM of elevation 132.135. Enter the readings in level book form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points

b) Explain the method of block levelling.

6. a) Compare Rise & fall Method with Collimation method.

b) Calculate the reduce level by Rise and Fall method on a continuous sloping ground with four meter levelling staff at common interval of 30m.

0.855(onA),1.545,2.335,3.115,3.825,0.455,1.380,2.055,2.855,3.455,0.585,1.015, 1.850, 2.755,3.845 (on B);The reduced level of A was 380.500. Make the entries in a level book and apply usual checks.

7. In running Fly levels from a BM. Of RL. 384.705m the following readings were obtained :

BS: 3.215, 1.030, 1.295, 1.855

FS: 1.225, 3.290, 2.085

From the last position of the instrument, Six pegs at 25.00m intervals are to be set out on a uniformly falling gradient of 1 in 100, the first peg is to have RL of 384.500m. Work out the staff readings required for setting the top of the pegs on the given gradient.

8. Four sight rails are to be erected over points A,B,C and D 50m apart in a straight line. The invert level of sewer at d is 74.500m. The sewer is on a gradient of 1 in 200 rising from D to A. The RL of pegs on the surface of ground are 76.300, 75.500, 74.850, and 75.650 respectively from A to D. The height of sight rail at d is 1.5m. find the suitable height of the boning rod and height of the sight rail above the pegs at A, B, and C

9. a) Mention any three uses of contour.

b) The areas within the contour lines at the site of reservoir and face of the proposed dam are as follows.

Contour (m)	Area (m ²)
100	1000
103	128000
106	16600
109	18800
112	24400
115	30600
118	38400

If 100.00m is the bottom level and 118.00m is the maximum water level of the reservoir, calculate the capacity of reservoir using trapezoidal formula and Prismoidal formula.

10. A road of constant RL 120.00m runs from North to South. The GL along the centre line of the road are as follows:

Chainage	R.L.
0	117.50
30	116.25
60	115.95
90	116.65
120	117.20
150	117.85
180	115.70

Assuming no transverse slope, find the volume of earth work for a road of formation width 8.00m with side slopes 1.5 :1 by;

- i) Trapezoidal method ii) Prismoidal method

Model Question Bank

CO1: Able to understand the basics in surveying and chain surveying.

LEVEL: REMEMBER QUESTIONS

1. What are the principles of surveying
2. What is the Principles of chain surveying,
3. Draw a suitable convention signs of hill, chain line, stream, benchmark

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the principles of surveying.

LEVEL: APPLICATION QUESTIONS

1. Plot the following details of a field and calculate the area, all measurements being taken in metres.

	0	
	8	5
4	15	
	18	3
	30	

CO2: Understand the principles of compass surveying and its applications.

LEVEL: REMEMBER QUESTIONS

1. State any four instrumental and personnel errors in prismatic compass survey.
2. What are the sources of errors in compass survey and what precautions will you take to eliminate them.

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the temporary adjustments of Compass.
2. Explain prismatic compass with a neat sketch
3. Explain i) True Bearing and Magnetic bearing ii) Dip and Declination
4. Compare Prismatic compass with surveyors compass
5. Differentiate between i) fore bearing and back bearing ii) closed traverse and open traverse
6. What is meant by local attraction? How it is detected and eliminated?

LEVEL: APPLICATION QUESTIONS

1. Convert the following fore bearing to Back. Bearing
2. 125° 15' b) N30° E c) 360° d) S45° 45'W e) N 25° 45'E
3. Compare WCB system and R.B. systems
4. Convert the following W.C.B to R.B
 - a. 10° ii) 45° 15' iii) 135° 45' iv) 315° 15' v) 215° 15'
5. Convert the following RB to WCB
6. i) N 30° 15' W ii) N 45° 45' E iii) S 15° 15' W iv) S 25° 15' E
7. The following bearings were observed in running a closed traverse.

8. Line	9. Fore bearing	10. Back bearing
11. AB	12. 75° 05'	13. 254° 20'
14. BC	15. 115° 20'	16. 296° 35'
17. CD	18. 165° 35'	19. 345° 35'
20. DE	21. 224° 50'	22. 44° 05'
23. EA	24. 304° 50'	25. 125° 05'

- a. At what station do you suspect the local attraction? Determine the corrected bearings
8. The following bearings were observed with compass. Calculate the interior angles.

7. Line	8. Fore bearing	9. Back bearing
10. AB	11. $60^{\circ} 30'$	12. $240^{\circ} 30'$
13. BC	14. $122^{\circ} 0'$	15. $302^{\circ} 0'$
16. CD	17. $46^{\circ} 0'$	18. $226^{\circ} 0'$
19. DE	20. $205^{\circ} 30'$	21. $25^{\circ} 30'$
22. EA	23. $300^{\circ} 0'$	24. $120^{\circ} 0'$

9. At a place the bearing of sun is measured at local noon and found to be $175^{\circ} 15'$. What is the magnitude and direction of magnetic declination of the place?

10. In an old survey made when the declination was $4^{\circ}W$, the magnetic bearing of a given line was 210° . The declination in the same locality is now $10^{\circ}E$. What is the true and present magnetic bearing of the line?

CO3:. Able to understand the basics in levelling, types of levelling instruments and methods of levelling

LEVEL: REMEMBER QUESTIONS

1. Define the following terms used levelling i) Level surface ii) level line iii) datum
2. What are the different types of levelling staff?

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the temporary adjustments of a dumpy level?
2. Comparison of HI method & Rise & Fall method of computing the levels?
3. Explain the special methods of spirit levelling.

LEVEL: APPLICATION QUESTIONS

1. The following consecutive readings were taken with a dumpy level: 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765. The first reading was taken with the staff held upon a BM of elevation 132.135. Enter the readings in level book form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points.
2. Calculate the reduce level by Rise and Fall method on a continuous sloping ground with four meter levelling staff at common interval of 30m.
0.855(onA),1.545,2.335,3.115,3.825,0.455,1.380,2.055,2.855,3.455,0.585,1.015, 1.850, 2.755,3.845 (on B);The reduced level of A was 380.500. Make the entries in a level book and apply usual checks.

CO4:. Able to understand the types of levelling, errors and its applications.

LEVEL: REMEMBER QUESTIONS

What are the uses of taking L/S & C/S?

LEVEL: UNDERSTANDING QUESTIONS

1. What are the different sources of errors in levelling? How are they eliminated?

LEVEL: APPLICATION QUESTIONS

1. During the fly levelling operation the following observations were made :
Back sight: 0.650, 2.155, 1.405, 2.655, 2.435
Fore sight: 2.455, 1.305, 0.5555, 2.405

The first back sight was taken on a BM of RL 100.500m. From the last back sight it is required to set four pegs each at a distance of 30m on a falling gradient of 1 in 100. Calculate the RL of these four pegs. Apply the check.

2. Four sight rails are to be erected over points A, B, C and D 50m apart in a straight line. The invert level of sewer at d is 74.500m. The sewer is on a gradient of 1 in 200 rising from D to A. The RL of pegs on the surface of ground are 76.300, 75.500, 74.850, and 75.650 respectively from a to D. The height of sight rail at d is 1.5m. find the suitable height of the boning rod and height of the sight rail above the pegs at A, B, and C.

CO 5: Concept of contour, its uses and methods of contouring.

LEVEL: REMEMBER QUESTIONS

1. What is Contour? What are the uses of Contour maps?
2. What is Contour interval? List the factors affecting it.

LEVEL: UNDERSTANDING QUESTIONS

1. Explain the characteristics of contours with sketches
2. Mention the methods of locating Contours. Explain the method of locating contour by cross-sections
3. What is interpolation of contours? Explain arithmetical method of interpolating contours.

LEVEL: APPLICATION QUESTIONS

1. The areas within the contour lines at the site of reservoir and face of the proposed dam are as follows.

Contour (m)	Area (m ²)
100	1000
103	128000
106	16600
109	18800
112	24400
115	30600
118	38400

If 100.00m is the bottom level and 118.00m is the maximum water level of the reservoir, calculate the capacity of reservoir using trapezoidal formula and Prismoidal formula.

CO 6: Able to compute area and volume of irregular figures.

LEVEL: REMEMBER QUESTIONS

1. Write the formula to calculate the area of an irregular figure by
 - a. Trapezoidal Rule
 - b. Simpson’s Rule
2. Write the formula to calculate the volume of an irregular figure by
 - a. Trapezoidal Rule
 - b. Prismoidal Rule

LEVEL: UNDERSTANDING QUESTIONS

1. Differentiate between Trapezoidal Rule and Simpson’s Rule.

LEVEL: APPLICATION QUESTIONS

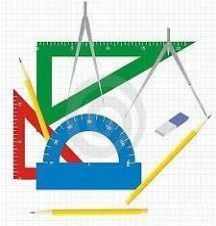
1. A road of constant RL 120.00m runs from North to South. The GL along the centre line of the road are as follows:

Chainage	R.L.
0	117.50
30	116.25
60	115.95
90	116.65
120	117.20
150	117.85
180	115.70

Assuming no transverse slope, find the volume of earth work for a road of formation width 8.00m with side slopes 1.5 :1 by;

- ii) Trapezoidal method
- iii) Prismoidal method.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: ENGINEERING DRAWING-II		
	Credits (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15CE22D
	Type of Course: Tutorial and Drafting	Credit :03	Core/ Elective: Core
CIE- 25 Marks		SEE- 100 Marks	

(*Common to all Civil Engineering /Civil (Draughtsman/Environmental/Public Health Engineering/Water Technology and Health Sciences Programme)***)**

Prerequisites: Student should know Engineering Drawing-I

Course Objectives

1. The course is aimed at developing Basic Drawing skills.
2. Develop Skills in Preparation of Engineering Drawings.
3. Develop Skills In Preparation of Engineering Drawings, their Reading and Interpretation

Course Outcomes

On successful completion of the course, the students should be able to:

Course Outcome		CL	Linked PO	Teaching Hrs
CO1	Draw Orthographic views of given Civil Engineering Objects.	R/U/Ap/Ay	1,2,3,4,5,8,9,10	15
CO2	Develop the ability to draw the isometric view from the orthographic views of a given Building Components and vice versa.	U/Ap/Ay	1,3,8,9	21
CO3	Develop the perspective views for simple Civil Engineering components	R/U/Ap/Ay	1,2,3,5,8,9	12
CO4	Build up the concept of developing cross sections for Building components.	R/U/Ap/Ay	1,2,3,5,8,9,10	09
CO5	Develop Plan and Elevation for single and two room Buildings for sustainable development as per codal provisions	R/U/Ap/Ay	1,2,3,4,5,6,7,8,9,10	21
Total sessions				78

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
ENGINEERING DRAWING-II	3	3	3	3	3	2	2	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Contents

UNITS	COURSE CONTENTS	HOURS
1	PROJECTION OF SOLIDS Introduction-Positioning of solids –Solid lying with base on HP- Solids lying with base or axis inclined to HP- Solids lying with one of the lateral faces on HP- Solids lying with one of their lateral edges on HP-Cylinder lying with its axis or base inclined to HP- Cone lying with its axis or base inclined to HP -Solid lying with their axis inclined to both HP and VP.	15
2	CONVERSION OF ISOMETRIC VIEWS INTO ORTHOGRAPHIC VIEWS Introduction –Guidelines for conversion of pictorial views into orthographic views-Illustrative problems.	06
3	ISOMETRIC VIEWS Principles of isometric Views Isometric views of simple solids – cube – prisms, pyramids, cylinder and cone . Conversion of orthographic views into isometric View Drawing of Isometric views of combination of solids , Civil Engineering components i.e. column footing, carpentry joints	15
4	PERSPECTIVE PROJECTIONS Technical terms used in perspective projection- one point Perspective projection and two point perspective projection for simple objects like Cube, Prism, Pyramids, combination of solids and simple civil engineering objects.	12
5	CROSS SECTION OF BUILDING COMPONENTS Conventional Representation of Civil Engineering materials. Cross section of Wall showing components of a Building from parapet to foundation through door, window, wardrobe, wall, steps & columns.	09
6	BUILDING DRAWING Draw Plan, Elevation and Section for Single ,Double Room Building and Three Room Building form the given line Diagram and Building details.	21
Total		78 Hrs

Note: Grade exercises Plan in each unit should be as per table provided below.

Course Delivery: The course will be delivered through lectures with classroom practices and Power point presentations/ Video.

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Graded Exercises (Average of marks allotted to each graded exercise)	25	Drawing Sheets	1,2,3,4,5
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 ,Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5Effectiveness of Delivery of instructions & Assessment Methods

Weightage of Marks and blue print of marks for SEE

Unit	Major Topics	Hours Allotted	Questions to be set for SEE						Marks weightage	weightage (%)	A*	B*	C*
			Cognitive Levels										
			R	U	Ap	Ay	C	E					
1	Projection of solids	15	15%	35%	30.00%	20.00%	0.00%	0.00%	26	18		2	
			4	10	7	5	0	0					
2	Conversion of pictorial views into orthographic views	6	0%	20%	40.00%	40.00%	0.00%	0.00%	12	8	1		
			0	2	5	5	0	0					
3	Isometric projections	15	0.00%	20.0%	40.00%	40.00%	0.00%	0.00%	27	19		2	
			0	5	11	11	0	0					
4	Perspective projections	9	10.00%	40.0%	40.00%	20.00%	0.00%	0.00%	19	12		1	
			2	7	7	3	0	0					
5	Cross section of building components	9	15.00%	30.00%	30.00%	20.00%	0.00%	0.00%	16	12	2		
			3	5	5	3	0	0					
6	Building drawing	24	15.00%	25.00%	40.00%	20.00%	0.00%	0.00%	40	31			1
			6	10	16	8	0	0					
Total		78						140	100	3	5	1	

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

A*-SEE QUESTIONS TO BE SET FOR (10MARKS) in PART – A(any 2 out of 3)

B*- SEE QUESTIONS TO BE SET FOR (15MARKS) in PART – B(any 2 out of 5)

C*- SEE QUESTIONS TO BE SET FOR (35MARKS) in PART – C(Compulsory)

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	38
2	Applying the knowledge acquired from the course	31
3	Analysis	23
4	Synthesis (Creating new knowledge)	0
5	Evaluation	0

GRADED EXERCISES

UNIT NO	NAME OF THE UNIT	SHEETS	TITLE OF THE DRAWING	MINIMUM NO OF EXERCISE
I	PROJECTION OF SOLIDS	5	Projection of solids	20
II	CONVERSION OF ISOMETRIC VIEWS INTO ORTHOGRAPHIC VIEWS	3	Isometric projections	15
III	ISOMETRIC PROJECTIONS	5	Isometric projections	20
IV	PERSPECTIVE PROJECTIONS	4	Perspective projections	16
V	CROSS SECTION OF BUILDING COMPONENTS	3	Cross section of building components	15
VI	BUILDING DRAWING	6	Building drawing	10
	TOTAL	26		96

TEXT BOOK

1. K.R.Gopalakrishna “Fundamentals of Drawing” Subhas Publications, 2010.
2. K.R.Gopalakrishna “Engineering Drawing” (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, “A text book of Engineering Drawing”, S.ChandPublishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, “Engineering Graphics”, Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, “Engineering Graphics”, New Age International Private Limited,2008.
4. M.B.Shah and B.C.Rana, “Engineering Drawing”, Pearson Education, 2005.
5. DhananjayA.Jolhe, “Engineering Drawing with an Introduction to AutoCAD”, Tata McGraw

Hill Publishing Company Limited, 2008.

6. Basant Agarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings

Model Question Paper

Code: **15CE22D**

II semester Diploma Examination **ENGINEERING DRAWING-II**

Time: 4 Hours][Max. Marks: 100

Note: Answer Any Three full questions from Part-A, Any 3 full Questions from Part B&Part C is compulsory.

Part –A(Any Two)

1. Draw the three principal views of the component as shown in the figure 1 10 marks

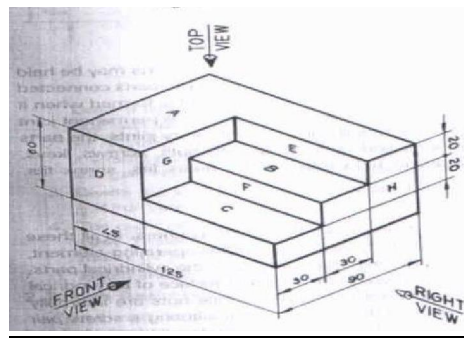


Fig-1

2. Draw the three principal views of the component as shown in the figure2

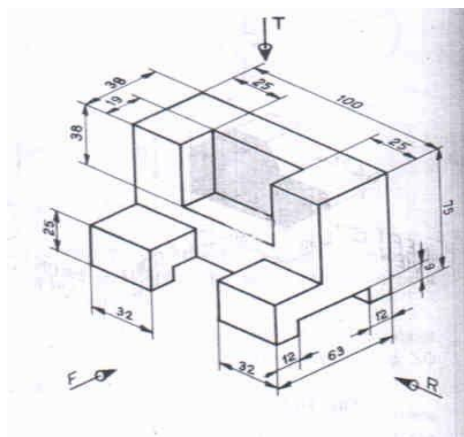


Fig.2

3. Show the conventional representation of Building materials in Section (IS: 962) 10 marks
(a) Brick Masonry (b) Stone Masonry (c) Steel works (d) Wood

PART-B(Any Three)

4. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30° to HP. The edge on which the prism rests is inclined at 60° to VP. Draw its projections.
15marks
5. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections of the solid in its final position.
15marks

6. Draw the isometric view of the following objects whose orthographic views are given Fig 3
15 marks

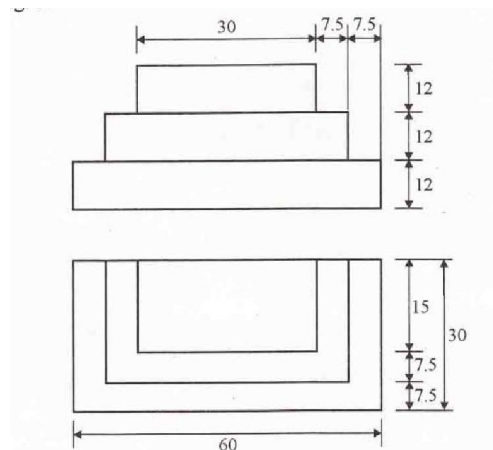


Fig-3

7. Draw the isometric view of the following objects whose orthographic views are given Fig 4

15marks

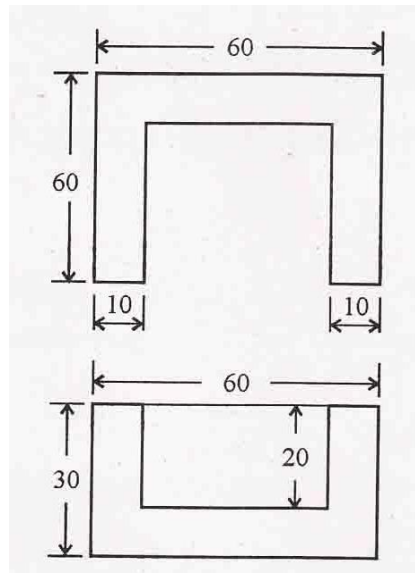


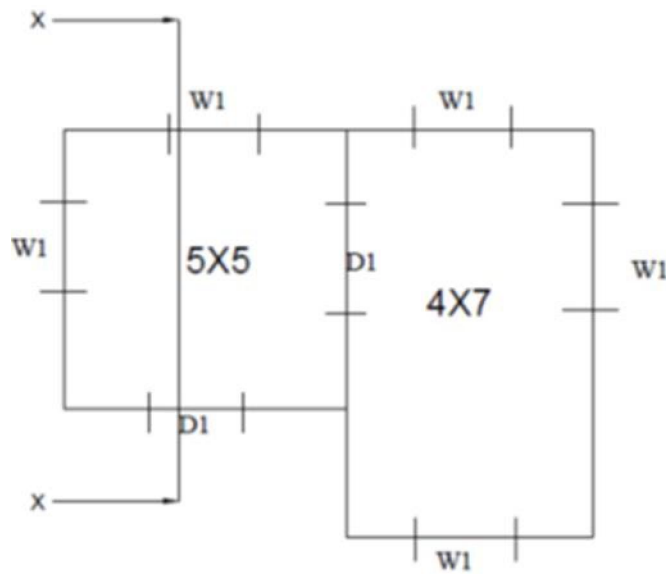
Fig-4

8. A Square based prism of 30mm side of base and height 50mm rests with its base on ground such that one of the rectangular faces is touching the picture plane. The station point lies on the center line of the object, 60mm aboveground and 50mm in front of the picture plane. Draw the perspective view of the square prism.
15 marks

PART- C(Compulsory)

9. The Line Diagram of a Two room building is shown in Fig 5. The Details and specification are as follows. 35 Marks

- (a) Level of Plinth above ground - 0.5m
- (b) Height of ceiling from the floor- 3m
- (c) Burnt Brick Masonry wall Thickness of wall 0.3m
- (d) Doors 1.0mX 2.1m
- (e) Windows 1.2mX1.2m
- (f) RCC Roof 0.15m thick
- (g) Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
- (h) Provide suitable Foundation of Size Stone Masonry



Draw to a scale of 1:50

- | | |
|---------------------------------------|----------|
| (i) Plan of the Building and | 15Marks |
| (ii) Front Elevation of the Building. | 10Marks |
| (iii) Section along xx | 10 Marks |

UNIT-I (15 Marks)

1. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its triangular face containing the slant edge on which it rests are equally inclined to HP. The axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.
2. Draw the projection of a pentagonal prism of base side 25mm and axis length 45mm resting on a corner such that the two base edges passing through it make equal inclination with HP and its base inclined at 60° to HP and the axis appears to be inclined at 30° to VP in the top view.
3. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30° to HP. The edge on which the prism rests is inclined at 60° to VP. Draw its projections.
4. A cone of base diameter 50mm and altitude 70mm is lying with one of its generators on HP and the axis appears to be inclined to VP at an angle of 40° in the top view. Draw its top and front views.
5. A Hexagonal prism of 30 mm side of base and axis 60mm long is placed with one of its base edges on HP such that the axis is inclined at 35° to HP and 45° to VP. Draw its projections.
6. A Pentagonal pyramid 25mm side of base and 50mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which rests make equal inclinations with HP. The axis is inclined at 50° to VP and 30° to HP. Draw the top and front views of the pyramid.
7. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° to HP and 30° to VP. Draw the top and front views of the cone.
8. Draw the top and front views of a right cylinder of base 50mm diameter and 70mm long when it lies on HP, such that its axis is inclined at 30° to HP and axis appears to be perpendicular to VP in the top view.
9. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.
10. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.
11. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the axis appears to be inclined at 45° to VP. Draw the projections when the base of the prism is nearer to the observer.

12. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.
13. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.
14. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.
15. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.
16. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is inclined at 30° and 45° to HP and VP respectively. Draw the top and front views.
17. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.
18. Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.
19. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.
20. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.
21. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.
22. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° and 30° with HP and VP respectively. Draw the top and front views of the cone.
23. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view.

UNIT-2(10 MARKS)

1. Draw the three principal views of the component as shown in the figure.

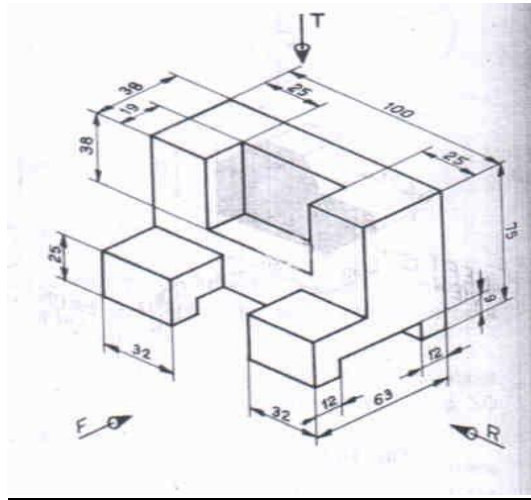


Fig-1

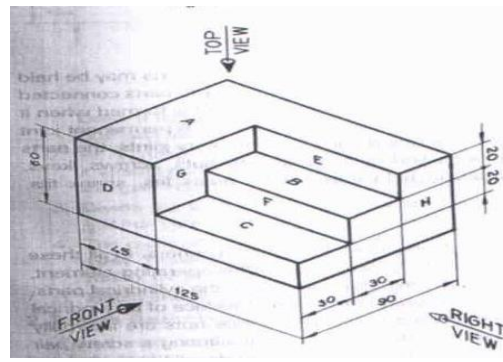


Fig-2

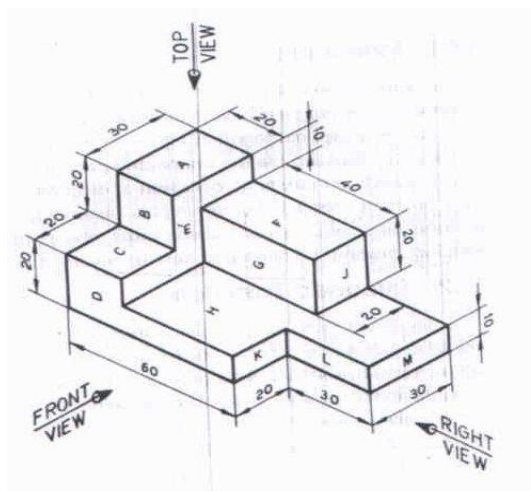


Fig-3

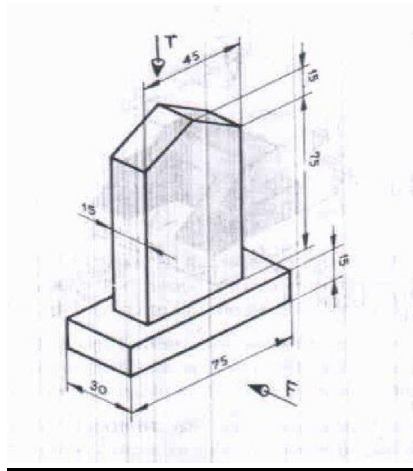


Fig-4

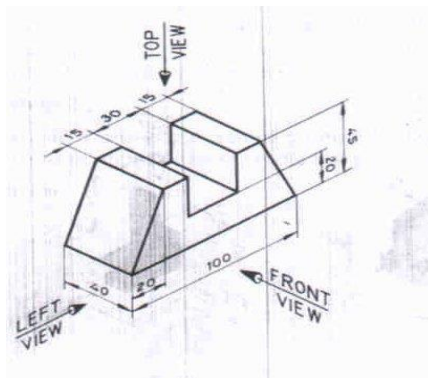


Fig-5

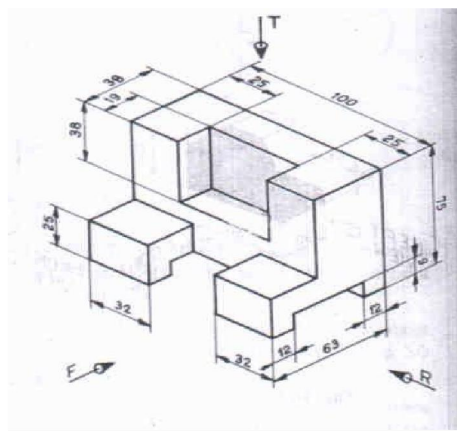
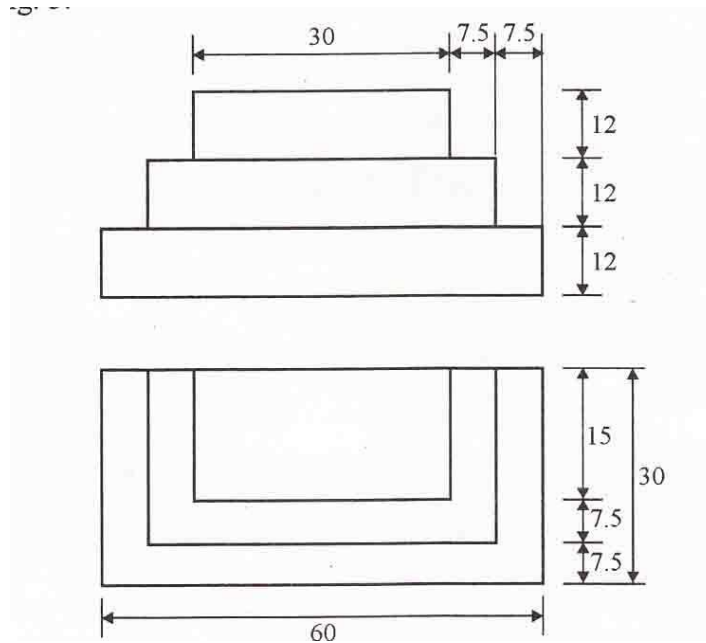


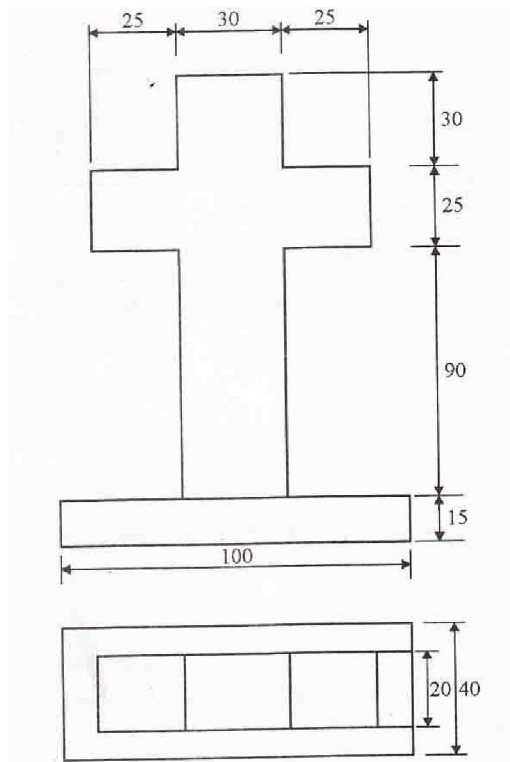
Fig-6

UNIT-3 (15 Marks)

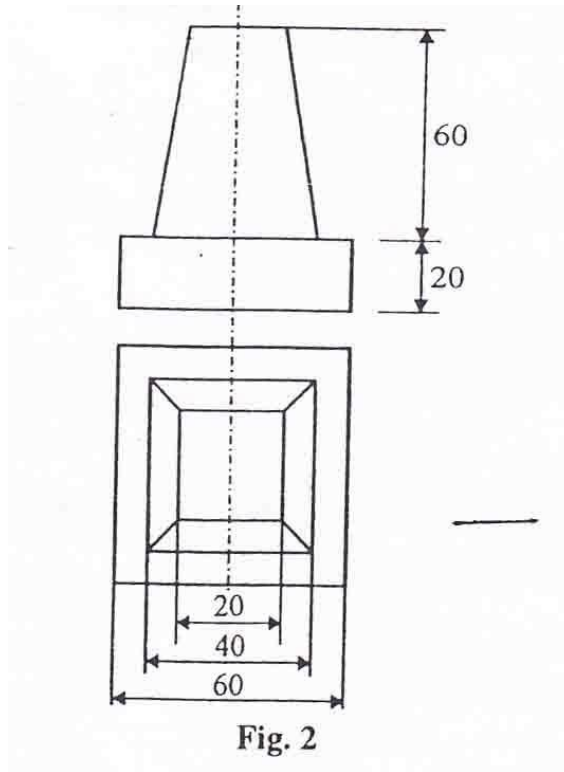
1. Draw the isometric view of the following objects whose orthographic views are given below:



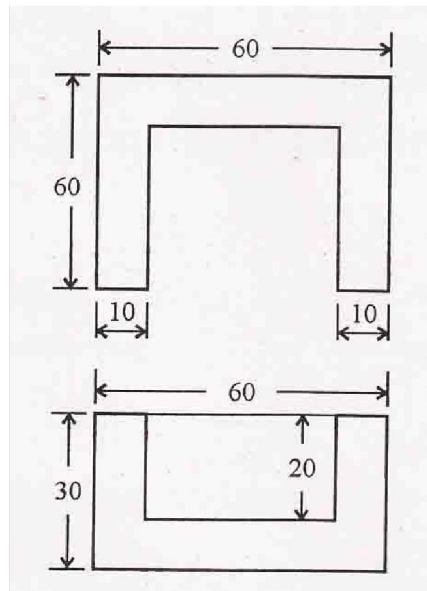
2. Draw the isometric view of the following objects whose orthographic views are given below:



3. Draw the isometric view of the following objects whose orthographic views are given below:



4. Draw the isometric view of the following objects whose orthographic views are given below:



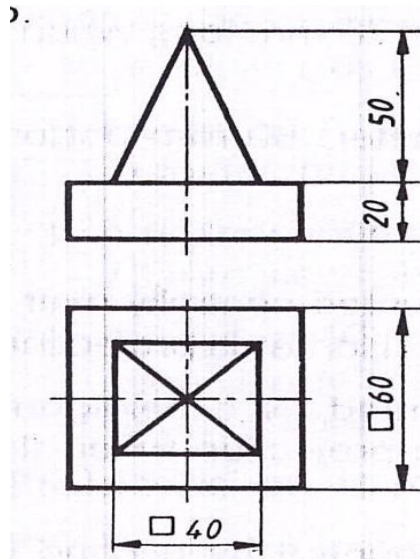


Fig-2

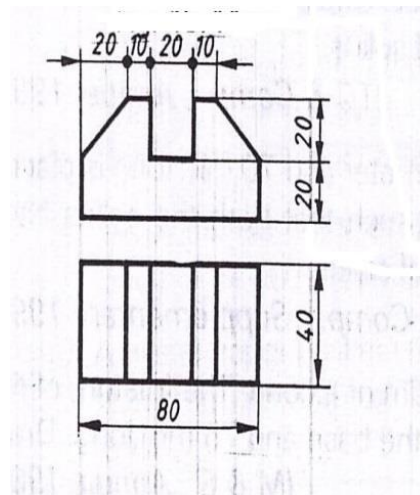


Fig-3

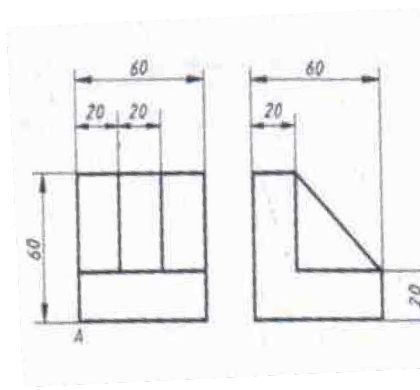


Fig-4

5. A Circular column of side 40mm and height 50mm is placed centrally on a square footing of side 100mm and thickness 25mm. Draw the Isometric projections of the combination
6. A Cube of side 50mm is resting coaxially over a circular slab of diameter 100mm and thickness 30mm. Draw the isometric view of the combination of the solid.

7. A cone having diameter of the base 60mm and height 70 mm is resting co- axially on the square slab of side 100mm and thickness 40mm. Draw the isometric view of the combination of the solid.
8. A cylinder of 50mm diameter and 50mm high is placed centrally on the rectangular footing of sides 75mm and 100mm and thickness 25mm. Draw the isometric projections of the arrangement.
9. A frustum of a cone 30mm top diameter and 60mm bottom diameter and 70mm long is placed vertically on a square block of 80mm side and 30mm thick such that both the solids have common axis. Draw the isometric of the combination of the solids.
10. A cylindrical slab 100mm diameter and 40mm thick is supporting a cube of 50mm edge. On the top of the cube rests a square pyramid of altitude 55mm and side of base 30mm such that the base edges of the pyramid are parallel to the edges of the top face. The axes of the solids are in the same straight line. Draw the isometric projection of the combination of the solids.
11. A square pyramid of base edge 50 mm and height 80 mm rests on the top of the cube of side 100 mm. Two sides of the base of the pyramid are parallel to the top edges of the cube. Draw the isometric view of the solid.
12. Three cubes of sides 60mm,40mm and 20mm are placed centrally one above the other. Draw the isometric projections of the combination.

UNIT-IV (15MARKS)

1. A Square based prism of 30mm side of base and height 50mm rests with its base and height 50mm rests with its base on ground such that one of the rectangular faces is touching the picture plane. The station point lies on the center line of the object, 60mm aboveground and 50mm in front of the picture plane. Draw the perspective view of the square prism.
2. A Cube of side 50mm side rests with its base on ground such that one of the square face is 20 mm behind the picture plane. The station point lies on the centerline of the object, 80mm above ground and 75mm in front of the picture plane.
3. A rectangular based pyramid of sides of base 30mm and 20mm, and height 35mm rests with its base edges in parallel to the picture plane and 30mm behind it. The station point is 50mm in front of the picture plane, 30mm to the left of the axis of the pyramid and 50mm above the ground. Draw the perspective view of the pyramid.
4. A model of steps has three steps of 15mm tread and rise 10mm. The steps measure 60mm widthwise. Draw the perspective view of the model when placed with its first step 25mm behind the picture plane and longer edge being parallel to it. The station point is 95mm from the picture plane, 60mm above ground and lies on the center line.
5. Draw one point parallel perspective view of the block shown below. The station point is located at 80mm to the right of the centre of the block and 100mm from the picture plane. The observers eyelevel is 60mm above the ground level.

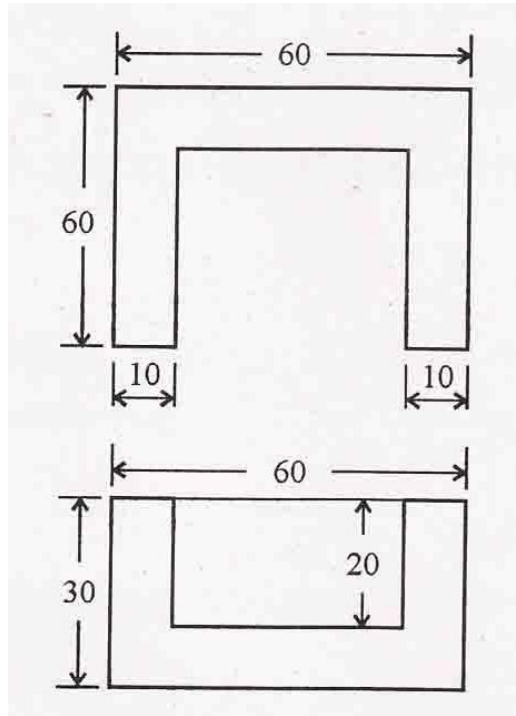


Fig-1

6. Draw the perspective view of a cube 25mm edge, resting on ground on one of its faces. It has one of its vertical edges in the picture plane and all its vertical faces are equally inclined to the picture plane. The station point is 55 mm in front of the picture plane. The station point is 55mm in front of the picture plane, 40mm above the ground and is in a central plane 9mm to the left of the centre of the cube.
7. A Square prism of 30mm side of base and height 40mm rests with its base on ground such that one of the rectangular faces is inclined at 30° to the picture plane. The nearest vertical edge touches the picture plane. The station point is 45mm in front of the picture plane, 65mm above ground and lies opposite to the nearest vertical edge that touches the picture plane. Draw the perspective view.
8. A cube of 45mm side of base rests on ground such that one of the square face is inclined at 25° to the picture plane. The nearest vertical edge touches the picture plane. The station point is 65mm in front of the picture plane, 85mm above ground and lies opposite to the nearest vertical edge that touches the picture plane. Draw the perspective view.
9. Draw one point perspective view of the block shown below. The station point is located at 80mm to the right of the centre of the block and 100mm from the picture plane. The observers eye level is 60mm above the ground level.

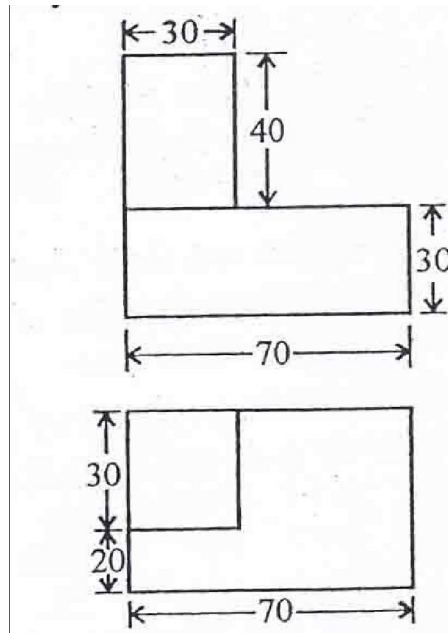


Fig-2

10. Draw the two point perspective view of the model shown in fig3 when its right touches picture plane and its longer side makes an angle of 30° with it. The station point is 100 mm in front of the picture plane and exactly opposite to the vertical edge touching the picture plane and the point of the sight is 120mm above the ground.

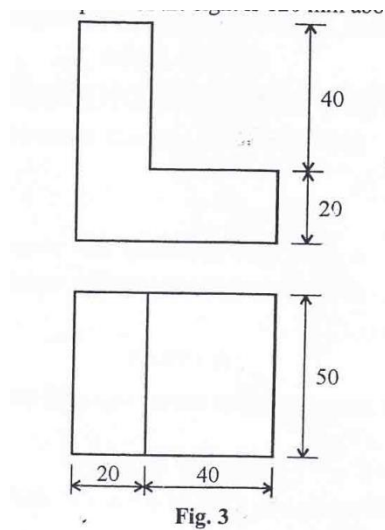


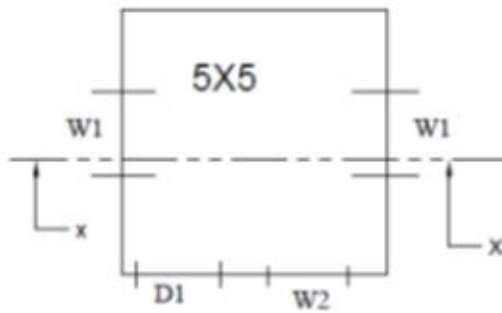
Fig. 3

UNIT-V (10 Marks)

1. Show the conventional representation of Building materials in Section (IS: 962)
2. Draw the cross section of wall from foundation to parapet for the given details.

UNIT-VI (35 Marks)

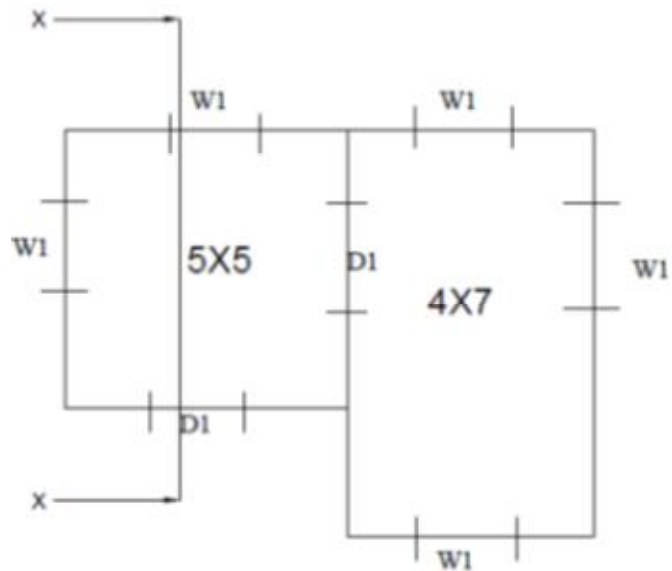
1. The Line Diagram of a Single room building is shown in Fig 1. The Details and specification are as follows.
- Level of Plinth above ground - 0.5m
 - Height of ceiling from the floor- 3m
 - Burnt Brick Masonry wall Thickness of wall-0.3m
 - Doors 1.0mX 2.1m
 - Windows 1.2mX1.2m
 - RCC Roof 0.15m thick
 - Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
 - Provide suitable Foundation of Size Stone Masonary



All Dimensions in Metre

Draw to a scale of 1:50

- Plan of the Building and
 - Front Elevation of the Building.
 - Section along xx
2. The Line Diagram of a two room building is shown in Fig 2. The Details and specification are as follows.
- Level of Plinth above ground - 0.5m
 - Height of ceiling from the floor- 3m
 - Burnt Brick Masonry wall Thickness of wall- 0.3m
 - Doors 1.0mX 2.1m
 - Windows 1.2mX1.2m
 - RCC Roof 0.15m thick
 - Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
 - Provide suitable Foundation of Size Stone Masonary



All Dimensions in metre.

Draw to a scale of 1:50

- (i) Plan of the Building and
- (ii) Front Elevation of the Building.
- (iii) Section along xx

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title	: APPLIED SCIENCE LAB	Course Code	: 15SC04P
Semester	: I / II	Course Group	: Core
Teaching Scheme in Hrs (L:T:P)	: 0:2:4	Credits	: 3 Credits
Type of course	: Tutorial & Practical	Total Contact Hours	: 78
CIE	: 25 Marks	SEE	: 50 Marks
Programme	: Common to all Engineering Diploma Programmes		

Prerequisite:

Applied Science theory in the current semester.

Course objective:

1. Learn to measure different dimensions of objects accurately using measuring instruments.
2. Enhance the vectorial concepts of concurrent forces.
3. Learn the concepts of properties of fluids.
4. Enhance the practical concept of resonance.

Experiments:

PART- A

1. Vernier Calipers:

- a) To determine the dimensions of given solid cylinder and hence calculate its volume.
- b) To determine the dimensions of given hollow cylinder and hence calculate its volume

Activity: To calculate the density of material of given solid/hollow cylinder knowing its volume and mass.

2. Screw Gauge:

- a) To determine the thickness of given metal and glass plate.
- b) To determine the diameter of given thin wire and hence to calculate its volume.
- c) To determine the diameter of given metallic sphere and hence to calculate its volume.

Activity: 1. To calculate volume of such half meter length wire.
2. To calculate volume of such number (50 or 75 etc) of spheres.

3. Laws of concurrent forces:

- a) Verify the law of parallelogram of forces.

b) Verify the converse law of triangle of forces.

c) Verify Lami's theorem.

Activity: To determine the weight of given body using law of parallelogram of forces.

4. Moment bar:

To verify the conditions of equilibrium of coplanar parallel forces acting on a body.

Activity: To determine the weight of given body using moment bar.

PART-B

5. Viscosity:

a) To determine the co-efficient of viscosity of water by poiseuille's method (for a given radius of capillary tube)

Activity: To plot a graph of ht versus V and to find ht/V from slope.

6. Sonometer:

a) To determine the frequency of given tuning fork by comparison method.

b) To determine the frequency of given tuning fork by absolute method.

Activity: 1. Plot a graph of 'n' versus 'l' from the graph, find the frequency unknown
Tuning fork

2. Plot a graph of \sqrt{T} versus 'l' from the slope of graph find \sqrt{T}/l

3. To calculate linear density 'm' by knowing \sqrt{T}/l and 'n'

7. Resonance:

a) To determine the velocity of sound in air at room temperature by using resonance air column apparatus. (for single resonating length)

Activity: 1. To calculate velocity of sound in air at 0°C .

2. To determine the unknown frequency of tuning fork.

8. Surface Tension:

a) To determine the Surface Tension of water by capillary rise method using Travelling Microscope. (radius of capillary tube is given)

Activity: Calculate radius of the capillary tube by knowing the surface tension of the liquid and height of liquid column in capillary tube.

9. Boyle's law:

a) To verify Boyle's law using Boyle's law apparatus.

Activity: 1. To plot a graph of pressure versus volume

2. To plot a graph of $1/\text{pressure}$ versus volume.

Course outcome:

On successful completion of the course, the student will be able to:

1. Measure the various dimensions of given objects using instruments.
2. Apply the vector concepts in engineering.
3. Apply the acquired knowledge of fluid dynamics in the field of engineering.
4. Apply the concepts of wave motion in engineering.

Mapping Course Outcomes with Program Outcomes:

CO –PO mapping

	Course Outcome	Experiment linked	PO Mapped	Cognitive Level	Lab Sessions
CO1	Measure the various dimensions of given objects using instruments.	1,2	1,2,3,4,9	U/A	24
CO2	Apply the vector concepts in engineering.	3,4	1,2,9	U	16
CO3	Apply the acquired knowledge of fluid dynamics in the field of engineering.	5,8,9	1,2,3,9	A	24
CO4	Apply the concepts of wave motion in engineering.	6,7	1,2,3,9	U	14
Total Hours of instruction					78

U-Understanding; A-Application;

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Applied Science lab	3	3	3	1	-	-	-	-	3	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Two IA tests for Practical (Average of Two Test marks will be computed)	10	Blue Books	1 to 4
		Record Writing		Record Writing (Average of Marks allotted for each expt.)	10	Record Book	1 to 4
		Class room Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	05	Log of Activity	1 to 4
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	Students	End of the Course	50	Answer Scripts at BTE	All the CO's
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 2 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire	1 to 4 Effectiveness of delivery of instructions and assessment	

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	35
2	Applying the knowledge acquired from the course	45
3	Analysis	05
4	Evaluation	05
5	Creating new knowledge	10

Reference Books:

1. Practical physics by pro. J.D.Belani and N.J.Belani. Published by Nebhandas Hiranand.
2. Practical physics by C.L. Arora. Published by S. Chand and company.
3. www.jac production.co.za

Model Question Bank:

Course: **APPLIED SCIENCE LAB** Course Code: **15SC04P**

PART- A

1. Determine the dimensions of given Solid Cylinder using Vernier Caliper and hence calculate its volume.
2. Determine the dimensions of given Hollow Cylinder using Vernier Caliper and hence calculate its volume.
3. Determine the thickness of given metal and glass plate using screw gauge.
4. Determine the diameter of given thin wire using screw gauge and hence, to calculate its volume.

5. Determine the diameter of given metallic sphere using screw gauge and hence, calculate its volume.
6. Verify the law of parallelogram of forces.
7. Verify the converse of triangle law of forces.
8. Verify lami's theorem.
9. Verify the conditions of equilibrium of coplanar parallel forces using Moment bar.

PART- B

10. Determine the coefficient of viscosity of water by Poiseuille's method
(For a given radius of capillary tube)
11. Determine the frequency of given tuning fork by comparison method using sonometer.
12. Determine the frequency of given tuning fork by absolute method using sonometer.
13. Determine the velocity of sound in air at room temperature by using resonance Air column Apparatus.
14. Determine the Surface Tension of water by capillary rise method.
(For a given radius of capillary tube)
15. Verify Boyle's law using Boyle's law apparatus.

Scheme of Valuation for SEE (Semester End Examination)

Sl. no.	Performance	Max. Marks
1	Writing Observation, Tabular column, formula.	05x2=10
2	Conduction of experiment.	10x2=20
3	Calculation and Result.	05x2=10
4	Viva Voce.	10
TOTAL		50 Marks

Note: The students will submit record books at the time of semester end exam.

Guidelines for Question Paper Setting

The question paper must be prepared by selecting **ONE** experiment from **PART – A** and **ONE** question from **PART – B**.

Specification of the Apparatus Required for Applied Science Lab

The following are the specification of the apparatus required for science lab, and number of apparatus required for the batch of 20 students.

Sl. No.	Name of the Apparatus	Specification	Required Number
1	Vernier calipers	With L.C 0.01cm having Metallic scale marked in cm, with objects :solid cylinder &hollow cylinder	10
2	Screw gauge	U-Shaped metallic frame with L.C 0.01mm with objects :glass plate, metal plate, thin wire and metallic sphere	10
3	Law of concurrent forces apparatus	Vertical Drawing Board fixed with pulleys. Weights 50g each with weight hangers set	10
4	Moment bar	Having two vertical metallic stands, two spring balances measuring up to 500 g .horizontal bar.	10
5	Surface tension apparatus	Traveling microscope, having L.C 0.005cm, both horizontal and vertical movement of telescope, eye piece with fine cross-wire, slow moving stand, beaker, with capillary tube	10
6	Viscosity apparatus	Aspiratory bottle, cork, capillary tube, stopwatch, measuring jar. With stand to keep Aspiratory bottle	10

7	Boyle's law apparatus	Wide bore glass tube mounted vertically in front of a scale graduated 0 to 60cm Zero corresponds to the inside of the closed (top) end of the tube Air is confined in the tube by a coloured oil contained in a metal pressure chamber Pressure chamber is fitted with a Bourdon type gauge calibrated 0 to 3.5kg cm ² (0 to 50 lb/in ²) actual pressure A valve is fitted to the air inlet tube from the pump As the pressure in the oil chamber is increased, oil level and its actual (total) pressure are directly indicated Tube is made of extra strong glass and is securely covered with transparent plastic on the front Overall height of apparatus approx. 690mm	05
8	Sonometer	Wooden box fixed with meter scale, pulley, metallic string, weight with weight hanger (500g each)	10
9	Resonance air column apparatus	Consists of a resonance tube brass N.P. 100cms, reservoir brass N.P. 250ml & meter scale both sides millimeters, which are mounted on wooden polished board. The reservoir is caged in wooden block that has sliding facility.	10
10	Electronic balance	0.1g accuracy 500g capacity	01
11	Tuning fork set	Set of eight tuning forks of different frequency blue steel(Ragg's type)	06

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Government of Karnataka
Department of Technical Education, Bengaluru

Course: APPLIED SCIENCE LAB

Course code: 15SC04P


Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Mr. R B Pawar	Principal	Govt. Polytechnic, Bijapur
2	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
3	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
4	Dr. HanumanthaNayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
5	Ms. Bhagirathi B N	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru

Curriculum Review Committee

	Name	Designation	Institution
1	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
2	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
3	Smt. Revathi	Selection Grade Lecturer	M.E.I. Polytechnic, Bengaluru

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: SURVEYING PRACTICE - I		
	Credits (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15CE23P
	Type of Course: Practical and Mini-Project	Credit : 03	Core/ Elective: Core
CIE- 25 Marks		SEE- 50 Marks	

Pre requisites: Practical knowledge of Basic Science and Mathematics in Secondary Education

Course Objective:

1. To provide knowledge of basic Principles of surveying.
2. Develop skills in using survey instruments, taking measurements and plotting the details

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

Course Outcome		Experiments linked	CL	Linked PO	Teaching Hrs
CO1	Use of instruments in chain surveying and conducting experiments.	1 to 9	U/Ap	1,2,3,4,8,	24
CO2	Use of instruments in compass surveying and conducting experiments.	10 to 13	U/Ap	1,2,3,4,8	21
CO3	Use of instruments in levelling and conducting experiments on methods of levelling.	14 to 18	U/Ap	1,2,3,4,8, 10.	21
CO4	Conduct Longitudinal and cross sectioning for the given alignment and analyze the data by Block levelling (contours) prepare the drawings.	19,20	U/Ap	1,2,3,4,5, 8,9	12
CO5	Perform suggested activity related to surveying, exploring in groups and able to present it.	Suggested activity	U/Ap/ Ay/C	1 to 10	*
Total sessions					78

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation E: Evaluation

*** Related to Student activity beyond classroom hours.**

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Surveying practice -I	3	3	3	3	3	1	1	3	1	2

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT

Sl. No	Experiments	Hours
CHAIN SURVEYING		
1	Study of instruments required for chain surveying.	02
2	Ranging and chaining a line	02
3.	Prolongation of a survey line	02
4	Practice of reciprocal ranging	03
5	Practice of different methods of Setting out perpendiculars	03
6	Set out Regular Polygons and compute its area	03
7	Practice of cross staff survey	03
8	Conduct traversing and record the data in the Field book	03
9	Obstacles in chaining	03
COMPASS SURVEYING		
10	Study of prismatic compass and surveyors compass	06
11	Taking bearings and finding the included angles by using prismatic compass	06
12	Set out regular and irregular Polygons using prismatic compass	06
13	Find the distance between two inaccessible points using Compass	03
LEVELLING		
14	Study of level and its temporary adjustments	03
15	Taking level of various points and recording it in a level book	03
16	Finding the difference in elevation between two points by Simple & Differential Levelling	06
17	Conduct Fly leveling to establish a Temporary BM and check its accuracy	06
18	Finding RL of given point by taking Inverted Staff Reading	03
19	Conduct Longitudinal and cross sectioning for the given alignment and plot it	06
20	Conduct Block Levelling for an area and plot Contours	06
TOTAL		78

Course Delivery: The course will be delivered through lectures, Demonstration and practices



SUGGESTED ACTIVITIES

The topic should be related to the course in order to enhance his knowledge, practical skill & and lifelong learning, communication, modern tool usage.

1. Prepare a spread sheet of Rise and fall method or height of instrument method showing the calculation by using formula bar.
2. Layout Plan of Existing Campus
3. Contour Map of Existing Campus
4. Dividing the area into plots using town planning rules, and plot it
5. Carryout reciprocal levelling and make a presentation
6. Presentation on Precise levelling
7. Presentation on Digital levelling
8. Presentation on Digital ground model
9. Presentation on Data logger
10. Presentation on Triangular grid model
11. Presentation on Units of measurements used in survey from history
12. Sensitivity of bubble used in levelling
13. Two Peg Test
14. Three Wire Levelling
15. Permanent Adjustments of a Dumpy Level

NOTE:

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:
(Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**)
2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score (Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
	Rubric Scale	Unsatisfactory 1 , Developing 2 , Satisfactory 3 , Good 4 , Exemplary 5			
1.Literature	1				
2.Fulfill team's roles & duties	4				
3.Conclusion	3				
4.Conversions	5				
Total	13				
Average=(Total /4)	3.25=4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity to attain last CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course faculty

Dimension	Rubric Scale				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary
1.Literature	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles
3.Communication	Poor	Less Effective	Partially effective	Effective	Most Effective
4.Conversions	Frequent Error	More Error	Some Error	Occasional Error	No Error

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)		Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE*	IA	Students	Two tests (average of Two tests will be computed)	Test 1	10	Blue books	1,2
					Test 2			3,4
				Graded exercises (average of marks allotted for each graded exercise)		10	Record	1 2 3 4
				Suggested activity		05	Report	1,2,3,4,5
	Total			25				
	SEE*	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,4	
Indirect Assessment	Student Feedback on course		Students	Middle of the course			Feedback forms	1, 2 Delivery of course
	End of Course Survey			End of the course			Questionnaires	1,2,3,4,5 Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	38
2	Applying the knowledge acquired from the course	30
3	Analysis	16
4	Synthesis (Creating new knowledge)	10
5	Evaluation	5

Scheme of Valuation for End Examination

Sl No	Description	Marks
1	Writing procedure	05
2	Conducting & Performance	20
3	Calculation and results	10
4	Viva-voice	05
5	Record +suggested activity report	10
	Total	50

List of equipment:

SL NO	EQUIPMENTS	QUANTITY
1	Auto / quick setting / Dumpy level with accessories	05
2	Metric chains 30m	05
3	Arrows	50
4	Tape 15m	15
5	Tape 30 m	05
6	Ranging rods	25
7	Cross staff, French cross staff , open cross staff, line ranger, optical square, prism square,	05
8	Prismatic compass	05
9	Surveyor compass	02



TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Surveying and Levelling by T P konetkar & S V Kulkarni
3. Plane Surveying by Dr. Alak De
4. Surveying and Levelling by S S Bhavikatti
5. Surveying by Duggal
6. Surveying by R Agor
7. Fundamentals of Surveying by S K Roy
8. Surveying and Levelling by N N Basak
9. Advanced Surveying by R Agor

E-links

1. www.elearning.com/survey
2. <http://nptel.ac.in/video.php?subjectId=105104101>
3. <http://media.sakshat.ac.in/NPTEL-IIT-Videos/>
4. http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
5. <http://nptel.iitk.ac.in/>

