CONTENTS

PERIYAR CENTENARY POLYTECHNIC COLLEGE

Periyar Nagar, Vallam – 613 403, Thanjavur

AUTONOMOUS INSTITUTION

VISION

Periyar Centenary Polytechnic College aspires to be recognized as one of the leaders in imparting quality technical education and strives to prepare rural students with excellent technical and life skills for the benefit of the stakeholders and society at large.

MISSION

1. To impart quality technical education to the students and equip them with knowledge, skills and attitudes that will lead to successful employment in industry/business, entrepreneurship and higher education.
2. To provide conducive learning environment and adopt well structured teaching – learning practices to make the students technically competent.
3. To strengthen the collaboration with industry and community for career development, placement and extension services.
4. To develop the personality of the students and identify themselves as good individuals, professionals and responsible citizens with ethical values.
5. To inculcate lifelong learning skills to face challenges with innovations.

PROGRAM OUTCOMES (POs)

1. **Basic and Discipline specific knowledge:**Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
2. **Problem analysis:**Identify and analyse well-defined engineering problems using codified standard methods.
3. **Design/ development of solutions:**Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
4. **Engineering Tools, Experimentation and Testing:**Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.
5. **Engineering practices for society, sustainability and environment:**Apply appropriate technology in context of society, sustainability, environment and ethical practices.
6. **Project Management:**Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
7. **Life-long learning:**Ability to analyze individual needs and engage in updating in the context of technological changes.

OUTCOME BASED EDUCATION(OBE)

Our institution is practicing Outcome Based Education(OBE) which is student centered instruction model that focuses on measuring student performance through outcomes. Outcomes include knowledge, skills and attitudes.

In the OBE model, the required knowledge and skill sets for a particular diploma programme is predetermined and the students are evaluated for all the required parameters (Outcomes) during the course of the program.

The OBE model measures the progress of the graduate in four parameters, which are

- Program Educational Objectives (PEO)
- Program Specific Outcomes (PSO)
- Program Outcomes (PO)
- Course Outcomes (CO)

Program Educational Objectives (PEO)is broad statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve. PEO's are measured 4-5 years after graduation.

Program Specific Outcomes (PSO) are the statements that describe what the graduates ofspecific engineering program should be able to do.

Program Outcomes(PO) are narrower statements that describe what students are expected to know and be able to do by the time of graduation.

Course Outcomes (CO) are the measurable parameter which evaluates each students performance for each course that the student undertakes in every semester. The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy. According to revised Bloom's taxonomy, the levels in cognitive domain are as follows:

Level	Descriptor	Level of attainment
1	Remembering	Recalling from memory of previously learned material
2	Understanding	Explaining ideas or concepts
3	Applying	Using information in another familiar situation
4	Analyzing	Breaking information into part to explore Understandings and relationships
5	Evaluating	Justifying a decision or course of action
6	Creating	Generating new ideas, products or new ways of Viewing things.

DIPLOMA PROGRAMME IN ENGINEERING / TECHNOLOGY
(Implemented from 2020 -2021)

D SCHEME

RULES AND REGULATIONS

1. Description of the Programme:

a. Full Time (3 years)

The Programme for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters***** and the First Year is common to all Engineering Branches.

b. Sandwich (3 1/2 years)

The Programme for the Sandwich Diploma in Engineering shall extend over a period of three and half academic years, consisting of 7 semesters***** and the First Year is common to all Engineering Branches. The courses of three years full time diploma programme being regrouped for academic convenience.

During 4^{th} and/or during 7^{th} semester the students undergo industrial training for six months / one year. Industrial training examination will be conducted after completion of every 6 months of industrial training.

***Each Semester will have 16 weeks duration of studies with 35 hrs / Week for all Diploma Programmes.**

The Curriculum for all the 6 Semesters of Diploma Programme (Engineering & Special Diploma Programmes Viz. Modern Office Practice) have been revised and revised curriculum is applicable for the candidates admitted from 2020 - 2021 academic year onwards.

2. Condition for Admission:

Condition for admission to the Diploma Programmes shall be required to have passed in the S.S.L.C Examination of the Board of Secondary Education, Tamil Nadu.

(Or)

The Anglo-Indian High School Examination with eligibility for Higher Secondary Course in Tamil Nadu.

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education, Tamil Nadu.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time

3. Admission to Second year (Lateral Entry):

A pass in HSC (academic) or (vocational) courses mentioned in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board with eligibility for University Courses of study or equivalent examination &should have studied the following courses.

A pass in 2 Years ITI with appropriate Trade or Equivalent examination.

Sl.No	Programmes	H.Sc Academic	H.Sc Vocational		Industrial Training Institutes Courses
		Subjects Studied	Subjects Studied		
			Related Subjects	Vocational Subjects	
1	All the Regular and Sandwich Diploma Programmes	Physics and Chemistry as compulsory along with Mathematics / Biology	Maths / Physics / Chemistry	Related Vocational Subjects Theory & Practical	2 years courses to be passed with appropriate Trade
2	Diploma Programme in Modern Office Practice	English & Accountancy English & Elements of Economics English & Elements of Commerce	English & Accountancy English & Elements of Economics English & Management principles & Techniques English & Typewriting	Accountancy & Auditing Banking Business Management, Co – operative Management, International Trade, Marketing& Salesmanship, Insurance & Material Management, Office Secretaryship	-

- For the Diploma Programmes related with Engineering/ Technology, the related / equivalent subjects prescribed along with Practicals may also be taken for arriving the eligibility.
- Programme will be allotted according to merit through counseling by the Principal as per communal reservation.
- For admission to the Modern Office Practice Diploma Programme the candidates studied the related courses will be given first preference.
- Candidates who have studied Commerce courses are not eligible for Engineering Diploma Programmes.

4. Age Limit: No Age limit.

5. Medium of Instruction: English

6. Eligibility for the Award of Diploma:

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed Programme of study for a period of not less than 3 academic years in any institution affiliated to the State Board of Technical Education and Training, Tamil Nadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Programmes are as given below:

Diploma Programme	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3 ½ Years	6 ½ Years

This will come into effect from D Scheme onwards i.e. from the academic year 2020-2021

7. Courses of Study and Curriculum outline:

The courses of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical courses.

The curriculum outline is given in Annexure - I.

8. Examinations:

Autonomous Examinations in all courses of all the semesters under the scheme of examinations will be conducted at the end of each semester.

The internal assessment marks for all the courses will be awarded on the basis of continuous internal assessment earned during the semester concerned. For each course 25 marks are allotted for internal assessment. Autonomous Examinations are conducted for 100 marks and reduced to 75.

The total marks for result are 75 + 25 = 100 Marks.

9. Continuous Internal Assessment:

A . For Theory Courses

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	-	5 Marks
ii)	Test	-	10 Marks
iii)	Assignment	-	5 Marks
iv)	Seminar	-	5 Marks

	Total	-	**25 Marks**
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i) Course Attendance **5 Marks**

(Award of marks for course attendance to each course Theory/Practical will be as per the range given below)

80%	-	83%	1 Mark
84%	-	87%	2 Marks
88%	-	91%	3 Marks
92%	-	95%	4 Marks
96%	-	100%	5 Marks

ii)Test# 10 Marks

3 tests each of 2 hours duration for a total of 50 marks are to be Conducted. Average of these 3 test marks will be taken and the marks to be reduced to: **05 Marks**

The Test – IV is to be the Model Examination covering all the five units and the marks so obtained will be reduced to: **05 Marks**

Test	Units	When to conduct	Marks	Duration
Test – I	Unit I & II	End of 6th week	50	2 hrs
Test – II	Unit III & IV	End of 12th week	50	2 hrs
Test – III	Unit V	End of 15th week	50	2 hrs
Test– IV	**Model Examination - Compulsory** Covering all the 5 units (Autonomous Examination – question paper pattern)	End of 16th Week	100	3 hrs

 # From the Academic Year 2020 – 2021 onwards.

Question Paper Pattern for the Test – I, Test – II and Test - III is as follows. The tests should be conducted by proper schedule. Retest marks should not be considered for internal assessment.

For I Year

Question Pattern (Without Choice):

Part A Type Questions: 6 Questions x1 mark : 06 marks
Part B Type Questions: 8 Questions x 2 marks : 16 marks
Part C Type Questions: 4 Questions x 7 marks : 28 marks

Total : 50 marks

For II & III Year

Question Pattern (Without Choice):

Part A Type questions : 5 Questions × 2 marks	:	10 marks
Part B Type questions : 4 Questions × 3 marks	:	12 marks
Part C Type questions : 2 Questions × 14 marks	:	28 marks

Total	**:**	**50 marks**
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iii)Assignment **05 marks**

For each course, three assignments are to be given each for 20 marks and the average marks scored should be reduced for 5 marks.

Assignment 1: Written notes in relevant topics from the courses in unit I& II.

Assignment 2: Written notes in relevant topics from the courses in unit III , IV &V.

Assignment 3: Objective type online test to understand the principles and thereby gain in-depth knowledge about the course.

iv) Seminar Presentation **05 Marks**

The students have to select the topics either from their courses or general courses which will help to improve their grasping capacity as well as their capacity to express the course in hand. The students will be allowed to prepare the material for the given topic using the library hour and they will be permitted to present seminar(For First and Second Year, the students will be permitted to present the seminar as a group not exceeding six members and each member of the group should participate in the presentation. For the Third Year, the students should present the seminar individually.) The seminar presentation is mandatory for all theory courses and carries 5 marks for each theory course. The respective course faculty may suggest topics to the students and will evaluate the submitted materials and seminar presentation. (21/2 marks for the material submitted in writing and 2 1/2 marks for the seminar presentation). For each course minimum of two seminars are to be given and the average marks scored should be reduced to 5 marks.

All Test Papers, Assignment Papers / Notebooks and the seminar presentation written material after getting the signature with date from the students must be kept in safe custody in the department for verification and audit. It should be preserved for one semester after publication of Autonomous Exam results and produced to the flying squad and the inspection team at the time of inspection/verification.

B. For Practical Courses:

I, II and III Year

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows:

a) Attendance (Award of marks same as theory courses)	:	**05 Marks**
b) Procedure/ observation and tabulation/ Other Practical related Work	:	**05 Marks**
c) Tests#	:	**10 Marks**
d) Student Centered Learning (SCL) work sheet	:	**05 Marks**

TOTAL		**25 Marks**

 # Tests **10 Marks**

3 tests each of 2 hours duration for a total of 50 marks are to be Conducted. Average of these 3 test marks will be taken and the marks to be reduced to: **05 Marks**

The Test – IV is to be the Model Examination covering all the experiments and the marks so obtained will be reduced to: **05 Marks**

- All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Autonomous examinations.
- The observation note book / manual should be maintained. The observation note book / manual with sketches, circuits, programme, reading and calculation written by the students manually depends upon the practical course during practical classes should be evaluated properly during the practical class hours with date.
- The Record work for every completed exercise should be submitted in the subsequent practical classes.
- At the end of the Semester, the average marks of all the exercises should be calculated for 20 marks (including Observation, Tests and SCL work sheet) and the marks awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)
- Only regular students, appearing first time have to submit the duly signed bonafide record note book/file during the Practical Autonomous Examinations.

All the marks awarded for Assignments, Tests, Seminar presentation and Attendance should be entered periodically in the Personal Theory Log Book of the staff, who is handling the theory course. The marks awarded for Observation, SCL work sheet, Tests and Attendance should be entered periodically in the Personal Practical Log Book of the staff, who is handling the practical course.

10. Communication Skill Practical, Computer Application Practical and Physical Education:

The Communication Skill Practical and Computer Application Practical with more emphasis are being introduced in First Year. Much Stress is given to increase the Communicative skill and ICT skill of students. As per the recommendation of MHRD and under Fit India scheme, the Physical education is introduced to encourage students to remain healthy and fit by including physical activities and sports.

11. Project Work and Internship:

The students of all the Diploma Programmes have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise**. The Project work must be reviewed twice in the same semester. The project work is approved during the V semester by the properly constituted committee with guidelines.**

a) Internal Assessment Mark for Project Work & Internship:

Project Review I	:	**10 marks**
Project Review II	:	**10 marks**
Attendance	:	**05 marks** (Award of marks same as theory course pattern)

Total	**:**	**25 marks**

Proper record should be maintained for the two Project Reviews and preserved for one semester after the publication of Autonomous Exams results. It should be produced to the flying squad and the inspection team at the time of inspection/verification.

b) Allocation of Marks for Project Work & Internship in Autonomous Examinations:

Demonstration/Presentation	25 marks
Report	25 marks
Viva Voce	30 marks
Internship Report	20 marks

Total	**100* marks**
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*Examination will be conducted for 100 marks and will be converted to 75 marks.

c) Internship Report:

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year "Project Work & Internship" for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centre / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Autonomous examination.

12. Industrial Training and Project Work (Architectural Assistantship(SW)

i. Industrial Training

In IV and VII semesters, students should undergo the industrial training under the registered architects without fail. During this period, they should have 80% of attendance. Candidates not fulfilling the above are not eligible to appear for the practical examinations and the candidates should redo the industrial training in the next academic year.

The internal Assessment is based on the monthly report, Weekly report and drawing works completed in training period.

Work diary (internal Assessment)	**25 marks**
Monthly report	5 Marks
Weekly report	5 Marks
Drawing works	10 Marks
Attendance	5 Marks

Total	**25 Marks**

Architect office and studio practice –I &II (IV & VII Sem)

Report writing	60 marks
Viva- voce	40 marks

Total	**100 marks***
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*Examination will be conducted for 100 marks and will be converted to 75 marks.

ii. Project work

a) Internal Assessment Mark for Project Work

Project Review I	**10 marks**
Project Review II	**10 marks**
Attendance	**05 marks** (Award of marks same as theory course pattern)

Total	**25 marks**
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b) Project work & Viva voce – Autonomous Examination

Project Report	25 marks
Drawing &Presentation	25 marks
Viva Voce	30 marks
Model	20 marks

Total	**100* marks**
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*Examination will be conducted for 100 marks and will be converted to 75 marks.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the project Work & Viva voce Autonomous Examination.

13. Scheme of Examinations:

The Scheme of examinations for courses is given in Annexure - II.

14. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed programme of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the courses prescribed in the curriculum.

2. A candidate shall be declared to have passed the examination in a course if he/she secures not less than 40% in theory courses and 50% in practical courses out of the total prescribed maximum marks including both the Internal Assessment and the Autonomous Examinations marks put together, subject to the condition that he/she secures at least a minimum of 40 marks out of 100 marks in the Autonomous Theory Examinations and a minimum of 50 marks out of 100 marks in the Autonomous Practical Examinations.

15. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2023 onwards (Joined first year in 2020 -2021) will be done as specified below.

First Class with Superlative Distinction:

A candidate will be declared to have passed in **First Class with Superlative Distinction** if he/she secures not less than 75% of the marks in all the courses and passes all the semesters in the first appearance itself and passes all courses within the stipulated period of study 2/3/3 ½ /4 years [Full time(lateral entry)/Full Time/Sandwich/Part Time) without any break in study.

First Class with Distinction:

A candidate will be declared to have passed in **First Class with Distinction** if he/she secures not less than 75% of the aggregate marks in all the semesters put together and passes all the semesters except the I and II semester in the first appearance itself and passes all courses within the stipulated period of study 2/3/3 ½ /4 years [Full time(lateral entry)/Full Time/Sandwich/Part Time) without any break in study.

First Class:

A candidate will be declared to have passed in **First Class** if he/she secures not less than 60% of the aggregate marks in all the semesters put together and passes all the courses within the stipulated period of study 2 / 3/ 3½ / 4 years [Full time(lateral entry)/ Full Time/Sandwich/Part Time) without any break in study.

Second Class:

All other successful candidates will be declared to have passed in **Second Class**.

The above classifications are also applicable for the Sandwich / Part-Time students who pass out Final Examination from October 2023 /April 2024 onwards (both joined First Year in2020 -2021)

16. Duration of a period in the Class Time Table:

The duration of each period of instruction is 1 hour and the total period of instruction hours excluding interval and lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical)

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ANNEXURE - I

D SCHEME

(Implemented from the Academic year 2021-2022 onwards)

CURRICULUM OUTLINE

FIRST SEMESTER

Col No.	Course Code	Course	Hours Per Week				
			Theory	Drawing	Tutorial	Practical	Total
1	D101	Communicative English-I	5				5
2	D102	Engineering Mathematics-I	6				6
3	D103	Engineering Physics-I	5				5
4	D104	Engineering Chemistry-I	5				5
5	D105	Engineering Graphics-I		6			6
6	D106	Engineering Physics– I Practical				2	2
7	D107	Engineering Chemistry– I Practical				2	2
8	D001 D002	Communication Skill Practical * Computer Applications Practical ^				2	2
			21	6		6	33
Extra / Co-Curricular Activities		Physical Education					1
		Library					1
Total							**35**

* For Circuit Branches only

^ For Non-Circuit Branches only

D SCHEME

(Implemented from the Academic year 2021-2022 onwards)

CURRICULUM OUTLINE

SECOND SEMESTER

Col No.	Course Code	Course	Hours Per Week				
			Theory	Drawing	Tutorial	Practical	Total
1	D201	Communicative English-II	4				4
2	D202	Engineering Mathematics-II	5				5
3	D203	Engineering Physics-II	4				4
4	D204	Engineering Chemistry-II	4				4
5	D205	Engineering Graphics-II		5			5
6	D206	Engineering Physics– II Practical				2	2
7	D207	Engineering Chemistry– II Practical				2	2
8	D208	Basics of Industries and Workshop Practical	2			3	5
9	D001 D002	Communication Skill Practical * Computer Applications Practical ^				2	2
			19	5		9	33
Extra / Co-Curricular Activities		Physical Education					1
		Library					1
Total							**35**

* For Non-Circuit Branches only

^ For Circuit Branches only

ANNEXURE – II

SCHEME OF EXAMINATIONS

FIRST SEMESTER

Col No.	Course Code	Course	Examination Marks		Total Marks	Minimum for Pass	Duration of Exam Hours
			Internal Assessment Marks	Autonomous Exam Marks #			
1	D101	Communicative English–I	25	75	100	40	3
2	D102	Engineering Mathematics - I	25	75	100	40	3
3	D103	Engineering Physics–I	25	75	100	40	3
4	D104	Engineering Chemistry –I	25	75	100	40	3
5	D105	Engineering Graphics – I	25	75	100	40	3
6	D106	Engineering Physics- I Practical	25	75	100	50	3
7	D107	Engineering Chemistry- I Practical	25	75	100	50	3
8	D001 D002	Communication Skill Practical * Computer Applications Practical ^	25	75	100	50	3
	Total		**200**	**600**	**800**	**-**	**-**

* For CircuitBranches only

^ For Non-Circuit Branches only

#Autonomous Examinations will be conducted for 100 marks and will be reduced to 75 marks.

SECOND SEMESTER

Col No.	Course Code	Course	Examination Marks		Total Marks	Minimum for Pass	Duration of Exam Hours
			Internal Assessment Marks	Autonomous Exam Marks #			
1	D201	Communicative English - II	25	75	100	40	3
2	D202	Engineering Mathematics -II	25	75	100	40	3
3	D203	Engineering Physics – II	25	75	100	40	3
4	D204	Engineering Chemistry - II	25	75	100	40	3
5	D205	Engineering Graphics - II	25	75	100	40	3
6	D206	Engineering Physics- II Practical	25	75	100	50	3
7	D207	Engineering Chemistry- II Practical	25	75	100	50	3
8	D208	Basics of Industries and Workshop Practical	25	75	100	50	3
9	D001 D002	Communication Skill Practical * Computer Applications Practical ^	25	75	100	50	3
	Total		**225**	**675**	**900**	**-**	**-**

* For Non-Circuit Branches only

^ ForCircuit Branches only

#Autonomous Examinations will be conducted for 100 marks and will be reduced to 75 marks.

D101 - COMMUNICATIVE ENGLISH-I

Programme Name : I YEAR GENERAL ENGINEERING
Course Code : D101
Semester : I SEMESTER
Course Title : COMMUNICATIVE ENGLISH – I

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Communicative English - I	5	80	25	100*	100	3Hrs

*** Examinations will be conducted for 100 marks and will be reduced to 75 marks.**

TOPICS ANDALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	Functional Grammar and Usage	17
II	Vocabulary Enrichment	15
III	Situational English	14
IV	Creative English	14
V	English for Scholarly Presentation/ Fluency	11
Test & Model Exam		09
Total		**80**

COURSE DESCRIPTION:

- With the advent and supremacy of the Internet, smart phones, e-Commerce and Social Media in global communication, English has metamorphosed itself with new dimensions to get the communicator's thoughts, feelings and interactions dressed in alien colours.
- To execute the tasks in Technical Environment, whether academic, professional or social, proficiency in English plays a vital role and a requisite for communication skills has gained momentum both for e-communication, higher studies abroad and placement in MNCs.
- Amazing and inconceivable developments in technology has led various industries to coin and employ their own new words every day and hence revision of syllabus, especially to cater to the need for essential updated vocabulary has become in evitable.

- In addition to the retention of certain functional grammar parts to attest accuracy in communication, new components such as vocabulary enrichment, situational English, Creative English and English for Scholarly Presentation have been introduced to equip the learners to cope up with revamping technical scenario.

OBJECTIVES:

At the completion of the study of I and II semesters, the students will be able to

- Apply functional grammar to produce pristine presentations in English. Carry out effective interaction with the aid of formation of interrogatives.
- Enrich his/her vocabulary to cater to the needs of changing linguistic requirements.
- Understand and respond to the e-content available elsewhere in academic, professional and social environments.
- Understand and review e-books, movies and TV programmes and post his/her reviews online.
- Execute dialogues with his/her friends, teachers and colleagues in day-to-day situations.
- Describe and interpret visuals, images, machine drawings, events in books and on the Net.
- Understand, acquire and employ new structures in scholarly presentations with an exposure to works of Great personalities.
- Communicate effectively with idioms and phrases appropriate to real-life situations.

COURSE OUTCOMES:

After the completion of the course the student will be able to	
D101.1	Apply functional grammar &Identify Nouns& Verbs, adjectives and adverb.
D101.2	Enrich his/her vocabulary to cater to the needs of changing linguistic requirements.
D101.3	Execute dialogues with his/her friends, teachers and colleagues in day-to-day situations.
D101.4	Develop their skill of converting visuals into verbal using images, machine drawings, events in books and on the Net.
D101.5	Communicate effectively with idioms and phrases appropriate to real-life situations.

D101 - COMMUNICATIVE ENGLISH -I

Unit	Name of the Topics	Hours
I	**Functional Grammar and Usage** • Parts of Speech • Functional Units • Use of Main Verb & Auxiliary Verb • Application of Tense Forms (Simple Present, Present Continuous, Present Perfect, Simple Past, Past Continuous, Past Perfect, Simple Future, Future Continuous only) • Framing Yes / No Questions • Framing Wh-Questions • Application of Active Voice and Passive Voice • Use of Prepositions • Singular and Plural	17
II	**Vocabulary Enrichment** • Word Conversion (selective 25 words) • Collocation - Noun with Verb, Adjective with Noun (Selective 25collocations) • Homophones (selective 25 homophones) • One-word Substitution (Textual) • Idiomatic expressions for Daily Life (frequently used 25 expressions) • Frequently Used Phrasal verbs (selective 25 phrasal verbs) • Note-making and summarizing.	15
III	**Situational English** • Dialogue for Day to Day Situations • Short Messages for e-Communication • Letter Writing for Academic Purpose (Leave Application, Requisition for Bonafide Certificate, Applying for TC) • Writing the Essentials • Comprehension • Rearranging Jumbled Words	14
IV	**Creative English** • Review Writing (Book / Movie / TV Program) • Visual Description • Advertisement Writing • Word Cloud • Transforming Verbal Passage into Graphics • Describe your travel experience/ Hobbies / Excursion.	14
V	**English for Scholarly Presentation/ Fluency** • "A Snake in the Grass" by R.K. Narayan • “Of Parents and Children” by Francis Bacon • "On His Blindness" by John Milton • When I Have Fears" by John Keats • Mending wall “ by Robert frost”	11

TEXT BOOKS:

S.NO	TOPICS
1	Communication English – I DOTE, Tamilnadu
2	Communication Skill in English for Polytechnics, NITTTR, Chennai.

REFERENCE BOOKS:

- **Grammar**

1	Just Enough English Grammar Illustrated, Gabriele Stobbe, McGraw-Hill Osborne Media, 2008
2	Visual Guide to Grammar and Punctuation, DK Publishing, 2017
3	English Grammar in Use, Raymond Murphy, Cambridge University Press, 2019
4	Intermediate English Grammar, Raymond Murphy, Cambridge University Press, Second Edition.
5	Essential English Grammar, Raymond Murphy, Cambridge University Press, New edition.

- **Motivation**

1	An Autobiography; Or, The Story of My Experiments with Truth, Mahatma Gandhi, Penguin Books, 2001
2	You Can Win, Shiv Khera, New Dawn Press, 2004
3	Chicken Soup for the Soul, Jack Canfield, Mark Victor Hansen, 2001

LEARNING WEBSITES:

1	https://www.engineering-dictionary.com/
2	https://techterms.com/definition/
3	https://dictionary.tamilcube.com/ https://www.lexilogos.com
4	https://English/tamil_dictionary.hm

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	5 marks
ii)	Test	10 marks
iii)	Assignment	5 marks
Iv)	Seminar	5 marks
	Total Marks	**25 marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CD101.1	3	3	3	3	3	2	3	3	2	2
D101.2	3	3	3	3	3	2	3	3	2	2
D101.3	3	3	3	3	3	2	3	3	2	2
D101.4	3	3	3	3	3	2	3	3	2	2
D101.5	3	3	3	3	3	2	3	3	2	2
Total	15	15	15	15	15	10	15	15	10	10
CorrelationLevel	3	3	3	3	3	2	3	3	2	2

Correlation level 1 – Slight (Low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (High)

QUESTION PAPERSETTING

The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy. The question paper should consist of 90% questions based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom's Taxonomy Level	Lower order Thinking Skills (LOTs)	Higher Order Thinking Skills (HOTs)
	R – Remember, U-Understand, Ap-Apply	An-Analyse, E-Evaluate, C-Create
% to be included	90%	10%

MODEL QUESTION PAPER

D101 - COMMUNICATIVE ENGLISH - I

Time – 3 Hours **Max.Marks : 100**

I	**Answer any TEN of the following:(10X4=40 Marks)**	Unit	Bloom's Level	CO	PO
1.	Frame a sentence by using the parts of speech given below: a) Adjective: brilliant b) Verb: live c) Noun : office d) Adverb: well	I	U	D101.1	PO1,PO2
2	Frame a sentence for the first two patterns and write the patterns of the last two: a) S+V+O+A b) S+V+C+A c) She was tired. d) People elected him the new president.	I	AP	D101.1	PO1,PO2
3	Make use of each of the following main verb or auxiliary verb to make four sentences of your own. a) bring b) have c) discuss d) is	I	R	D101.1	PO1,PO2
4	Frame four sentences by using the subject - Children and verb - play in the following tense forms: a) Simple Present b) Past Continuous c) Present Perfect d) Simple Future	I	AP	D101.1	PO1,PO2
5	Frame four Yes/No questions for the given situations: a) Context: Talking to your friend about next week exam b) Context: Talking to your sister at home c) Context: Talking to your teacher about weekend classes. d) Context: Talking to your uncle about his arrival	I	E	D101.1	PO1,PO2
6	Ask four WH questions to the following people you contact: a) To the bus conductor b) To your HOD c) To your mother d) To your college librarian	I	AP	D101.1	PO1,PO2
7	Fill in the blanks by writing suitable active or passive form of the verb given in bracket: a) The report _____to the Head of the Committee.(submit) b) He has_____ from Delhi. (return) c) The data on computer_____ by somebody in his absence.(access) d) About 150 injured people_____ in the hospital. (admit)	I	AP	D101.1	PO1,PO2

8	Fill in the blanks by using suitable prepositions: a) The meeting will be held_____ Tuesday. b) His continuous lecture_____ three hours bored everyone. c) Candidates_____ hall ticket will not be permitted into the exam hall. d) I will be available here_____ Monday _____ Friday.	I	U	D101.1	PO1,PO2
9	Fill in the blanks with the suitable word given in the brackets. a) A porter carries Tiffin _____ (box). b) The farmers buy _____ (cow) in the market. c) They travel by different ____ (mode) of transport. d) They write many _____ (letter).	I	AP	D101.1	PO1,PO2
10.	Write down any four possible derivatives of the following word.	II	U	D101.2	PO1,PO2
11	Match the following and form collocations: a) Heavy - Ambassador b) Fast - a record c) bottle up - News d) Make - Food e) Have - your emotions f) Break - a difference g) Hot - Rain h) Brand - a headache	II	AP	D101.2	PO1,PO2
12.	Frame a sentence for the homophones given below: Peace – piece	II	AP	D101.2	PO1,PO2
13.	Write one word substitutes for the following: a) Rest or sleep in the early afternoon. b) Statements which are ordinary, uninteresting, and unimportant. c)Future generations especially the descendants of a specific person. d) an undesirable event such as an accident.	II	R	D101.2	PO1,PO2
14.	Frame a sentence for each of the following idioms: a) Once in a blue moon. b) At the eleventh hour. c) Beat about the bush. d) A fish out of water.	II	R	D101.2	PO1,PO2
15	Frame a sentence for each of the following phrasal verbs: a) Take care of b) Log in c) Go through d) Call off	II	AP	D101.2	PO1,PO2
16.	Make Notes and Summarize the following: We all know what we mean by a “good” man. The ideally good man does not drink or smoke, avoids bad language, converses in the presence of men only exactly as he would if there were ladies, present, attends church regularly, and holds the correct opinions on all subjects. He has a wholesome horror of wrong-doing and realizes that it is our painful duty to castigate Sin. He has a still greater horror of wrong-thinking, and considers it the business of the authorities to safeguard the young against those who question the wisdom of the views generally accepted by middle- aged successful citizens. Apart from his professional duties, at which he is assiduous, he spends much time in good works; he may encourage patriotism and military training; he may promote industry, sobriety, and	II	U	D101.2	PO1,PO2

	virtue among wage-earners and their children by seeing to it that failures in these respects receive due punishment; he may be a trustee of a university and prevent an ill-judged respect for learning from allowing the employment of professors with subversive ideas. Above all, of course, his “morals” in the narrow sense, must be irreproachable.				
II .	**Answer any FOUR of the following: (4X5=20)**				
1.	Complete the Dialogue: Friend 1 : Hi Ranjani,_____ ? Friend 2 : I didn’t expect a heavy traffic. Sorry for coming late. Friend 1 : _____as we planned? Friend 2 : Sure! I’m very much interested in shopping. But Where is Geeta?_____? Friend 1 : _____ Friend 2 : What happened to her? Anything serious? Friend 1 : Her father is not feeling well and has been admitted in the hospital. Friend 2 : Shall we go to the hospital now? Friend 1 : That sounds right. It’s Vijaya Hospital just a mile away from here.	III	U	D101.3	PO1,PO2 PO5,PO7
2.	Write a short message to your friend asking him to send study materials for the forthcoming examinations.	III	AN	D101.3	PO1,PO2 PO5,PO7
3.	Draft a letter to your HOD requesting him to issue bonafide certificate for opening a savings bank account.	III	AN	D101.3	PO1,PO2 PO5,PO7
4.	Write the essentials for the purchase of a mobile phone	III	AP	D101.3	PO1,PO2
5.	Read the passage below and answer the questions that follow. Information technology (IT) is the use of computers to store, retrieve, transmit, and manipulate data or information. IT is typically used within the context of business operations as opposed to personal or entertainment technologies. IT is considered to be a subset of Information and Communications Technology (ICT). An information Technology system (IT system) is generally an information system, a communication system or, more specifically speaking, a computer system – including all hardware, software and peripheral equipment – operated by a limited group of users. Humans have been storing, retrieving, manipulating, and communicating information since the Sumerians in Mesopotamia developed writing in about 3000 BC, but the term information technology in its modern sense first appeared in a 1958 article published in the Harvard Business Review; authors Harold J. Leavitt and Thomas L.Whisler commented that "the new technology does not yet have a single established name. We shall call it Information Technology (IT)".	III	AP	D101.3	PO1,PO2 PO5,PO7

	The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several products or services within an economy are associated with information technology, including computer hardware, software, electronics, semiconductors, internet, telecom equipment, and e-commerce. **Questions:** 1. Humans have been storing information for more than 5000 years-True or False. 2. Who coined the term "Information Technology"? 3. The term "Information Technology" was first used in _____ 4. What do you mean by Information Technology? 5. Name the products and services that are associated with Information Technology.				
6.	**Rearranged the Jumbled Words into meaningful sentences:** 1) a, writes, in, the room class letter, he. 2) learn, the, grammar, students. 3) doctor, Kala, an ,is, efficient. 4) went, yesterday, to, they ,trichy.	III	AP	D101.3	PO1,PO2 PO5,PO7
III. Answer any FOUR of the following (4X5=20)					
1.	Write a review of the book "My Experiments with Truth" in about 50 words.	IV	E	D101.4	PO1,PO2
2.	Describe the picture below in about 50. 	IV	AP	D101.4	PO1,PO2 PO5,PO7
3.	Write an advertisement for a Home Appliances Show Room highlighting Diwali festival offers.	IV	AN	D101.4	PO1,PO2 PO5,PO7
4.	Frame 5 sentences using any five words from the given word cloud. 	IV	AP	D101.4	PO1,PO2 PO5,PO7
5.	**Read and transform the following passage into apie-chart.** A survey was conducted to Europe. Five study people using different browsers in browsers – Firefox, Chrome, Opera, Safari and Internet Explorer were selected for this purpose to see the	IV	CR	D101.4	PO1,PO2 PO5,PO7

	impact of browsers on the Internet Users. It was found that as much as 37.9 % people used Firefox that was the highest of all other browsers accessed through the Net. Next came the Internet Explorer that was used by 36.9% of people, a little less than that of Firefox. Next to Internet Explorer, Chrome was accessed by 15.5% of the internet users. The number of users of the remaining two browsers equally fell around 4.55%. It was also found that all other browsers were used by less. Number of people who . Number of people who were around less than 1 percentage.				
6	Describe your travel experience/Tour/Excursion.	IV	CR	D101.4	PO1,PO2
IV.	**Answer any FOUR of the following in about 50 words. (4X5=20)**				
1.	Bring out the observations of Bacon on the duties of Parents towards children.	V	AP	D101.5	PO1,PO2
2.	How does Milton arrive at the conclusion-"They also served who only stand and wait."?	V	E	D101.5	PO1,PO2 PO5,PO7
3.	Explain the irony at the end of the Snake in the Grass.	V	R	D101.5	PO1,PO2 PO5,PO7
4.	Explain by listing out the fears that Keats refers to in his poem?	V	R	D101.5	PO1,PO2 PO5,PO7
5.	Elucidate the narrative skill of R. K. Narayan with reference to the short story you studied**.**	V	E	D101.5	PO1,PO2 PO5,PO7
6.	Explain the message of the poem 'Mending wall'.	V	E	D101.5	PO1,PO2 PO5,PO7

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as presented below:

Bloom's Taxonomy Level	**Lower order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R – Remember, U-Understand, Ap-Apply	**An-Analyse, E-Evaluate, C-Create**
% to be included	90%	10%

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D102 - ENGINEERING MATHEMATICS - I

(Implemented from the Academic year 2021-2022 onwards)

ProgrammeName: I YEAR GENERAL ENGINEERING

Course Code D 102

Semester : I SEMESTER

CourseTitle : ENGINEERING MATHEMATICS- I

TEACHING AND SCHEME OF EXAMINATION

Number of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Mathematics - I	6	96	25	100*	100	3Hrs

*** Examinations will be conducted for 100 marks will be reduced to 75 marks.**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	Algebra	17
II	Complex Numbers	17
III	Trigonometry	17
IV	Differential Calculus –I	18
V	Differential Calculus –II	18
Test & Model Exam		09
Total		**96**

COURSE DESCRIPTION:

This subject being a branch of “Logic” is classified as one of the basic sciences and intendsto teach students, basic facts, concepts and principles of Mathematics as a tool to analyze Engineering problems. Mathematics lay down foundation of understanding core technology subjects.

OBJECTIVES:

- To develop the logical thinking which is useful in comprehending the principles of all other subjects.
- To acquire analytical and systematic approach towards any problem is developed.
- To understand the knowledge about Matrices and its types
- To apply the concept of Determinant ,solve the simultaneous equation by using cramer’s rule

- To be able to come up with realistic predictions binomial theorem is used in the field.
- To understand the trigonometric Identities and Inverse Trignometric Functions
- To acquire the knowledge about limits and methods of differentiation.
- To acquire the knowledge about successive and partial differentiation.

COURSE OUTCOMES

After the completion of this course, the students will be able to	
D102.1	Understand the determinant and its properties, types of matrices,solve the simultaneous equations by using cramer's rule , and Binomial theorem.
D102.2	Understand the basic concepts about complex number and Argand plane
D102.3	Acquire knowledge in Trigonometric Identities and Inverse Trigonometric Functions.
D102.4	Acquire knowledge in Limits and Differentiation methods, chain rule and implicit functions.
D102.5	Apply the knowledge of Differentiation and its applications and partial differentiation.

D102- ENGINEERING MATHEMATICS – I

UNIT	NAME OF THE TOPIC	HOURS
I	**ALGEBRA** **1.1 MATRICES AND DETERMINANTS:** MATRICES: Definition, Concept and Types of Matrices. DETERMINANTS: Definition - Determinants of a square Matrix of order 2 X 2 and 3 X 3 – Properties of determinant only(Not included related problems) Singular and non –singular Matrices - Simple problems.	**5**
	1.2 APPLICATIONS OF MATRICES AND DETERMINANTS: Co-factor, Adjoint of Matrix, Inverse of Matrix - Rank of a matrix by determinant method – Simple problems. Solution of simultaneous equations using Cramer's rule - simple problems.	**6**
	1.3 BINOMIAL THEOREM: Introduction – Factorial, Permutation and Combinations – Values of nP_r and nC_r(results only-not for Examination) Statement of Binomial theorem for positive integral index-Applications of Binomial Theorem . Expansion of Binomial - Finding general term – Middle term – Coefficient of x^n and term independent of x – Binomial theorem for rational index up to -3.	**6**

II	**COMPLEX NUMBERS** **2.1 ALGEBRA OF COMPLEX NUMBERS** Introduction – Complex Numbers – Conjugates – Algebra of complex numbers (without geometrical proof), Properties of complex conjugates Modulus and Amplitude - polar and Euler form of a complex number – Simple problems. Argand diagram – Collinear points,Three points forming triangles(equilateral,isosceles and right angle triangle) and four points forming square, rectangle, rhombus and parallelogram only - Simple problems. **2.2 DE MOIVRE'S THEOREM** De Moivre's Theorem (Statement & Applications) – related simple problems. **2.3 ROOTS OF COMPLEX NUMBERS** Finding the n^{th} roots of unity – solving the equations of the form $x^n \pm 1 = 0$ where $n \leq 7$ - Simple problems.	**6** **6** **5**
III	**TRIGONOMETRY** **3.1 TRIGONOMETRIC IDENTITIES-1** Trigonometric Ratios of sum & difference of two angles – Multiple and Sub multiple angles. **3.2 TRIGONOMETRIC IDENTITIES - 2** Functions of 3A angles – Sum and Product Identities -Simple problems**.** **3.3 INVERSE TRIGONOMETRIC FUNCTIONS** Inverse Trigonometric Functions – Principal value – Properties of Inverse Trigonometric functions – Simple problems**.**	**6** **5** **6**
IV	**DIFFERENTIAL CALCULUS - I** **4.1 LIMITS** Definitions of Limits, Problems using the following results: (i) $\lim_{x\to a}\left(\frac{x^n-a^n}{x-a}\right) = na^{n-1}$ (ii) $\lim_{\theta\to 0}\left(\frac{\sin\theta}{\theta}\right) = 1$ (iii) $\lim_{\theta\to 0}\left(\frac{\tan\theta}{\theta}\right) = 1$(θ in radians) results only) **4.2 DIFFERENTIATION** The derivative of a Function – differentiation of constant, x^n , sinx , cosx , tanx, cotx, secx, cosecx, logx, e^x, a^x , $\sin^{-1}x$, $\cos^{-1}x$, $\tan^{-1}x$, $\sec^{-1}x$, $\text{cosec}^{-1}x$ and $\cot^{-1}x$ (Formulae only)- Differentiation Rules:u ± v , uv, uvw , u/v – Simple problems**.** **4.3 DIFFERENTIATION METHODS** Chain rule –Differentiation of implicitfunctions –Simple problems	**6** **6** **6**

V	**DIFFERENTIAL CALCULUS – II** **5.1 SUCCESSIVE DIFFERENTIATION** Successive differentiation upto second order (parametric form not included). Definition of differential equation, order and degree, formation of differential equation. simple problems **5.2 PARTIAL DIFFERENTIATION** Definition - Partial Differentiation of two variables upto second order only - simple problems. **5.3APPLICATIONS OF DIFFERENTIATION** Velocity and Acceleration- simple problems	**6** **7** **5**

TEXT BOOKS

S.NO	TOPICS
1	Higher Secondary +1&+2 Mathematics volume I&II. Tamil Nadu Text book corporation.
2	Engineering Mathematics – I DOTE , Tamilnadu

REFERENCE BOOKS

S.NO	TOPICS
1	Engineering Mathematics V. Sundaram, R. Balasubramanian
2	Engineering Mathematics – I C.B.Gupta ,A.K.Malik, New age international Publishers, 1st edition – 2008.
3	Differential Calculus S. BalachandraRao, CK Shantha New age Publishers
4	Vectors and Geometry GS. Pandey, RR Sharma, New age international publishers
5	Engineering Mathematics – I GuruprasadSamanta, New age international publishers, 2nd edition 2015.
6	Engineering Mathematics ReenaGarg, Khanna publishing house, New Delhi, Revised edn. – 2018.
7	Engineering Mathematics Volume I P. Kandasamy and K.Thilagavathy, S. Chand & Company Ltd.

LEARNING WEBSITES :

1	https://bookboon.com/en/fundamentals-of-mathematics-ebook
2	https://nptel.ac.in

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	5 Marks
ii)	Test	10 Marks
iii)	Assignment	5 Marks
iv)	Seminar	5 marks
	Total	**25 Marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D102.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D102.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D102.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D102.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D102.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
CorrelationLevel	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

QUESTION PAPER SETTING

The teaching learning process and assessments are being carried out in accordance with the revised Bloom's Taxonomy.

The question paper should consist of 90% question based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom's TaxonomyLevel	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

AUTONOMOUS EXAMINATION-QUESTION PAPER PATTERN

For all theory subjects except Communicative English I& II

and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. **Max.Marks:100**

PART - A Answer any **10** Questions Choosing the correct answer out of **15**Questions . Each question carries one mark.

PART-B Answer any **10** Questions out of **15**Questions . Each question carries two marks

PART - C All the **5** question to be answered. Each question in **PART-C** will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered for **7** marks each .

The questions are to be numbered from 1 to 35. All the units are to be covered with equal weightage.

PART –A Objective type questions Question Number 1 to 15	**10**x1 = **10** marks
PART –B Short answer type questions Question Number 16 to 30	**10**x2 = **20**marks
PART –C Descriptive answer type questions Question Number 31 to 35 Each question inPART –C will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered .	**5**x 14 = **70** marks
Total	**100**Marks *

Note: * Autonomous Examinations will be conducted for 100 Marks and converted to 75 Marks**.**

MODEL QUESTION PAPER

D102 - ENGINEERING MATHEMATICS - I

Time : 3 Hrs.Max.Marks : 100

Note :

1. Answer any TEN questions in PART A. Each question carries one Mark.
2. Answer any TEN questions in PART B. Each question carries two marks.
3. Answer all questions in PART C Choosing any two subdivisions from each question. Each question carries 7 marks.
4. Clarkes Table and programmable calculators are not permitted.

PART – A (10X1=10 MARKS)					
Answer any TEN questions choosing the correct answer					
S.No	**QUESTIONS**	**UNIT**	**BLOOM'S LEVEL**	**CO**	**PO**
1	If $\begin{vmatrix} x & 4 \\ 4 & x \end{vmatrix} = 0$, then the value of x is a) x=±16 b) x=±4 c) x=±2 d) x=4	I	Ap	D102.1	PO1,PO2, PO3
2	The adjoint of a matrix $\begin{pmatrix} 4 & -3 \\ 0 & 3 \end{pmatrix}$ a) $\begin{pmatrix} 3 & -3 \\ 0 & 4 \end{pmatrix}$ b) $\begin{pmatrix} 4 & 0 \\ -3 & 3 \end{pmatrix}$ c) $\begin{pmatrix} 3 & 3 \\ 0 & 4 \end{pmatrix}$ d) $\begin{pmatrix} -3 & -3 \\ 0 & -4 \end{pmatrix}$	I	U	D102.1	PO1,PO2 ,PO3
3	The number of terms in the expansion of $(5x+2y)^{11}$ is a)11 b)12 c)10 d)9	I	Ap	D102.1	PO1,PO2, PO3
4	Find the modulus and amplitude of 1+i (a)$\sqrt{2}$,45° (b)$\sqrt{3}$,30° (c)$\sqrt{2}$,60° (d)$\sqrt{2}$	II	Ap	D102.2	PO1,PO2, PO3
5	The value of $(\cos3\theta+i\sin3\theta)^2(\cos2\theta+i\sin2\theta)^3$ is (a)cos12θ+isin12θ (b)cosθ+isinθ (c)cos5θ+isin5θ (d)cos7θ+isin7θ	II	U	D102.2	PO1,PO2, PO3
6	If ω is the cube roots of unity then the value of $1+\omega+\omega^2$ is (a)0 (b)1 (c)-1 (d)1/2	II	R	D102.	PO1,PO2, PO3
7	The value of sin23° cos22° + cos23° sin20° is a)0 b)1 c)1/2 d)1/√2	III	Ap	D102.3	PO1,PO2, PO3
8	The value of $3\sin10^\circ - 4\sin^3 10^\circ$ is a) 0 b)$\frac{1}{4}$ c)$\frac{-1}{2}$ d)$\frac{1}{2}$	III	R	D102.3	PO1,PO2, PO3
9	The value of $\sin^{-1}(1/x)$ is a)$\cos^{-1}x$ b)$\text{cosec}^{-1}x$ c)$\sec^{-1}x$ d)$\tan^{-1}x$	III	U	D102.3	PO1,PO2, PO3
10	The value of $\lim_{\theta\to0}\frac{\sin7\theta}{2\theta}$ is a)/77 b)2 c)7/2 d)2	IV	U	D102.4	PO1,PO2, PO3
11	If y=cotx, then $\frac{dy}{dx}$ is a) secx b)$\sec^2x$ c)secxtanx d)-cosec^2x	IV	R	D102.4	PO1,PO2, PO3
12	If $xy = c^2$, then $\frac{dy}{dx}$ is a) $\frac{y}{x}$ b) $\frac{-y}{x}$ c) $\frac{x}{y}$ d)xy	IV	R	D102.4	PO1,PO2, PO3

13	If $y=e^{-5x}$,then $\frac{d^2y}{dx^2}$ is a)$25e^{-5x}$ b)$5e^{-5x}$ c)$-5e^{-5x}$ d)$5e^{5x}$	V	Ap	D102.5	PO1,PO2, PO3
14	If $u = x^2 + y^2$, then $\frac{\partial u}{\partial x}$ is a)2x b)2y c)2 d)2x +2y	V	R	D102.5	PO1,PO2, PO3
15	If $s = 5t^2 + 6t + 4$,then the velocity is a) -1ot -6 b)5t +6c)10t + 6 d) 10t	V	R	D102.5	PO1,PO2, PO3

PART – B (10X2=20MARKS)

Answer Any TEN Questions. All Questions Carries Two Marks.

S.NO	QUESTIONS	UNIT	BLOOM'S LEVEL	CO	PO
16	Show that the matrix $\begin{pmatrix} 2 & -5 & 1 \\ 3 & 7 & -2 \\ 5 & 0 & 1 \end{pmatrix}$ is singular	I	Ap	D102.1	PO1,PO2, PO4
17	Find the rank of a matrix $\begin{pmatrix} 5 & -6 \\ 2 & 9 \end{pmatrix}$	I	U	D102.1	PO1,PO2, PO4
18	Find the general term of $(3x-y)^8$.	I	R	D102.1	PO1,PO2, PO3
19	Find the distance between the complex numbers (4+3i) and (-4-9i).	II	Ap	D102.2	PO1,PO2, PO3
20	Using Demoivre's theorem, simplify $\frac{\cos 3\theta + i\sin 3\theta}{\cos\theta - i\sin\theta}$	II	U	D102.2	PO1,PO2, PO4
21	Simplify $(1+\omega)(1+\omega^2)$	II	R	D102.2	PO1,PO2, PO4
22	Find the value of $\frac{tan20°+tan25°}{1-tan20°tan25°}$	III	Ap	D102.3	PO1,PO2, PO7
23	Prove that $\sin A = \frac{\sin 3A}{1+2\cos 2A}$	III	U	D102.3	PO1,PO2, PO3
24	Prove that $\cos^{-1}(1-2x^2) = 2\sin^{-1} x$	III	U	D102.3	PO1,PO2, PO3
25	Evaluate $\lim_{x\to 1} \frac{x^2-3x+2}{x^2-5x+4}$	IV	E	D102.4	PO1,PO2, PO7
26	If $y=x^2 \sin 2x \cos 3x$, find $\frac{dy}{dx}$	IV	R	D102.4	PO1,PO2, PO7
27	If $x^2 + y^2 = a^2$, find $\frac{dy}{dx}$	IV	U	D102.4	PO1,PO2, PO7
28	If y = tanx , find $\frac{d^2y}{dx^2}$	V	U	D102.5	PO1,PO2, PO7
29	If $u = e^{x^2+y^2}$ then show that $\frac{\partial u}{\partial x} = 2xu$	V	Ap	D102.5	PO1,PO2, PO3
30	The distance – time formula for a moving particle is S = 2 cos3t. Find its velocity and acceleration.	V	U	D102.5	PO1,PO2, PO3

PART – C (5X2x7=70MARKS)					
Note: **(i) Answer all questions Choosing any two subdivisions from each question.** **(ii) All subdivision carry equal Marks.**					
S.No	**QUESTIONS**	**UNIT**	**BLOOM'S LEVEL**	**CO**	**PO**
31(a)	Solve by using Cramer's Rule: $3x - y+2z=8, x+y-z=2$ and $2x+y-z=-1$	I	Ap	D102.1	PO1,PO2, PO3,PO4
(b)	Find the inverse of a matrix $\begin{pmatrix} 5 & -2 & 0 \\ 4 & 4 & -1 \\ 5 & 0 & -3. \end{pmatrix}$	I	U	D102.1	PO1,PO2, PO3,PO4
(c)	Find the co-efficient of x^{11} in the expansions of $(x+\frac{2}{x^2})^{17}$	I	R	D102.1	PO1,PO2, PO3,PO4
32(a)	Find the modulus and amplitude parts of $\frac{1+3\sqrt{3}i}{\sqrt{3}+2i}$	II	Ap	D102.2	PO1,PO2, PO3,PO4
(b)	Simplify $\frac{(\cos x - i\sin x)^3 x(\cos 3x + i\sin 3x)^5}{(\cos 2x - i\sin 2x)^5 x(\cos 5x + i\sin 5x)^7}$ when $x=\frac{2\pi}{3}$	II	U	D102.2	PO1,PO2, PO3
(c)	Solve: $x^8-x^5+x^3-1=0$.	II	R	D102.2	PO1,PO2, PO3,PO4
33(a)	If $\sin A=\frac{1}{\sqrt{10}}$ and $\sin B=\frac{1}{\sqrt{5}}$, show that $A+B=\frac{\pi}{4}$	III	U	D102.3	PO1,PO2, PO4,PO5
(b)	Prove that $\sin 20^\circ \sin 40^\circ \sin 80^\circ = \frac{\sqrt{3}}{8}$	III	Ap	D102.3	PO1,PO2, PO4,PO5
(c)	Prove that $\sin^{-1} x+\sin^{-1} y=\sin^{-1}\left[x\sqrt{1-y^2}+y\sqrt{1-x^2}\right]$	III	R	D102.3	PO1,PO2, PO4,PO5
34(a)	Evaluate : $\lim_{x\to 3}\frac{x^5-243}{x^3-27}$	IV	E	D102.4	PO1,PO2, PO3,PO4
(b)	Find $\frac{dy}{dx}$ for the following (i) $y=\frac{2x-4}{4x-5}$ (ii) $y=(3x^2+2x+1)e^x \operatorname{cosec} x$	IV	U	D102.4	PO1,PO2, PO3,PO4
(c)	Find $\frac{dy}{dx}$ for the following (i) $y=\log(\sec x+\tan x)$ (ii) $x^2+y^2=a^2$	IV	Ap	D102.4	PO1,PO2, PO3
35(a)	If $y=x^2\cos x$, then prove that $x^2\frac{d^2y}{dy^2}-4x\frac{dy}{dx}+(x^2+6)y=0$	V	R	D102.5	PO1,PO2, PO3
(b)	If $u=\log(x^2+y^2)$, find $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}$	V	U	D102.5	PO1,PO2, PO3
(c)	The distances travelled by a particle along a straight line is given by $s=2t^3+3t^2-72t+1$. Find the acceleration when the velocity vanishes. Find the initial velocity.	V	Ap	D102.5	PO1,PO2, PO3

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as presented below:

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R-Remember, **U-**Understand , **Ap-**Apply	**An-**Analyze, **E-**Evaluate, **C-**Create
% to be included	90%	10%

D103- ENGINEERING PHYSICS - I

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D103

Semester : I SEMESTER

Course Title : ENGINEERING PHYSICS – I

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester : 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Physics-I	5	80	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	S I Units and Statics	15
II	Properties of Matter	14
III	Dynamics – I	14
IV	Dynamics – II	14
V	Sound and Magnetism	14
	Test & Model Exam	09
	Total	**80**

COURSE DESCRIPTION:

The exponential growth of Engineering and Technology has benefited the mankind with extreme sophistication and comfort. To sustain this development, continuous research and development should take place not only in Engineering andTechnology but also in Basic Science such as Physics.

The various divisions of Physics like Optics, Acoustics, Dynamics, Semiconductor Physics, Surface Physics, Nuclear Physics, Energy Studies, MaterialsScience, etc provide the Foundation by enlightening the Fundamental facts,Principles, Laws and Correct sequence of events to develop the Engineering andTechnology field for the prosperity of human beings.

OBJECTIVES:

The objective of this Course is to make the student:

- To understand the importance of SI units and dimensional formulas.
- To acquire broad ideas about resultant, moment of a force and torque of a couple
- To understand the elastic property and the types of modulus of elasticity, Viscosity and Surface Tension.
- To acquire knowledge about projectile motion, circular motion and its application.
- To understand the concepts of simple harmonic motion.
- To acquire knowledge about moment of inertia .kinetic energy and angular momentum of rigid bodies.
- To acquire broader idea about variation of acceleration with respective height and its importance in launching satellites
- To understand the propagation of sound, ultrasonic and acoustics of buildings.
- To explain the importance of hysteresis of magnetic materials and its uses.
- To solve simple problems involving expressions derived in all the above topics.

COURSE OUTCOMES:

After the completion of this course, the students will be able to	
D103.1	Determine dimensional formula, S.I units and analyze vector in mechanics
D103.2	Express the basic concepts in properties of matter like Elasticity, Viscosity and Surface Tension.
D103.3	Solve problems in projectile motion, angle of banking and centripetal force
D103.4	Solve the moment of inertia, kinetic energy, and angular momentum in rotational motion of rigid body, gravitation and acquire basic knowledge in escape velocity and orbital velocity in satellite
D103.5	Analyse the propagation of sound,acoustics of building and Importance of hysteresis loop in magnetism.

D103- ENGINEERING PHYSICS - I

Unit	Name of the Topic	Hours
I	**SI UNITS AND STATICS** **1.1 UNITS AND MEASUREMENTS:** Unit – Definition - Fundamental Quantities – Definition - Seven fundamental quantities; their SI units and symbol for the units - Supplementary quantities- plane angle and solid angle; their SI units and symbol for the units Derived physical quantities. Dimensional formula for length, mass and time-derivation of dimensionalformula for area, volume, density, velocity, momentum, acceleration, force, impulse, work or energy and power. Uses of Dimensional formula. Conventions followed in SI Units- Multiples & sub-multiples and prefixes of units – Unit conversions (Horse Power to watt & calorie to joule) -Applications of the method of dimensional analysis. **1.2 STATICS:** Scalar and vector quantities – Definitions and examples – Concurrent forcesand coplanar forces – Definition - Resolution of a vector into two perpendicular components - Resultant and equilibrant – Definition - Parallelogram law of forces-statement - Expressions for magnitude anddirection of the resultant of two forces acting at a point with an acute anglebetween them - Lami's theorem – Statement and explanation – Experimentalverification of parallelogram law of forces and Lami's theorem. Simpleproblems based on expressions for magnitude and direction of resultant. Moment of a force - Clockwise and anti-clockwise moments - Principle ofmoments – Couple – Torque acting due to a Couple - Experiment to verify the principle of moments- Experimental determination of mass of the given body using principle of moments - Solved problems.	5 10
II	**PROPERTIES OF MATTER** **2.1 ELASTICITY:** Elastic and plastic bodies – Definition - stress, strain – Definitions – Hooke's law – statement - three types of strain – Elastic and plastic limit –Young's modulus, Bulk modulus, Rigidity modulus – Definitions -Uniform and non-uniform bending of beams - Experimental determination of the Young's modulus of the material of a beam by uniform bending method - Poisson's ratio - Simple problems based on stress, strain and Young's modulus - Applications of elasticity.	5

	2.2VISCOSITY Viscosity – Definition - Coefficient of viscosity - Definition, SI unit and dimensional formula - Stream line flow, turbulent flow – Explanation - Critical velocity – Reynolds number – Definition - Experimental comparison of coefficient of viscosity of two low viscous liquids – Terminal velocity – Definition – Derivation of Stoke's formula by dimensional method for highly viscous liquid-Experimental determination of coefficient of viscosity of a highly viscous liquid by Stokes method – Practical applications of viscosity - Practical applications of Stoke's law. **2.3 SURFACE TENSION:** Surface tension & angle of contact – Definitions - Expression for surfacetension of a liquid by capillary rise method - Experimental determination of surface tension of water by capillary rise method – Practical applications of capillarity. Simple problems based on expression for surface tension – Applications of surface tension – Solved problems.	5 4
III	**DYNAMICS–I** **3.1STRAIGHT LINE MOTION:** Introduction-Newton's Laws of motion-Fundamental Equations of motion forobjects- horizontal motion-falling freely-thrown vertically upwards. **3.2 PROJECTILE MOTION** Projectile motion, angle of projection, trajectory, maximum height, time of flight and horizontal range–Definitions-Expressions for maximum height, time of flight and horizontal range–Condition for getting the maximum range of the projectile. Path of the projectile (the trajectory) is a Parabola - Simple problems based on expressions for maximum height, time of flight and horizontal range – Examples of projectile motion **3.3 CIRCULAR MOTION:** Circular motion, angular velocity, period and frequency of revolutions – Definitions – Relation between linear velocity and angular velocity – Relation between angular velocity, period and frequency – Normal acceleration, centripetal force and centrifugal force – Definitions – Expressions for normal acceleration and centripetal force. Banking of curved paths – Angle of banking – Definition – Expression for the angle of banking of a curved path. $\{\tan\theta = v^2/(r\ g)\}$ - Simple harmonic motion, amplitude, frequency and period - Definition. Simple problems based on the expressions for centripetal force and angle of banking - Applications of centripetal force and centrifugal force – Solved problems.	2 5 7

IV	**DYNAMICS–II** **4.1 ROTATIONAL MOTION OF RIGID BODIES:** Rigid body – Definition - Moment of inertia of a particle about an axis - Moment of inertia of a rigid body about an axis–expressions–Radius ofgyration- Definition–Expression for the kinetic energy of a rotating rigidbody about an axis–Angular momentum– Definition–Expression for the angular momentum of a rotating rigid body about an axis – Law of conservation of angular momentum – Examples. **4.2 GRAVITATION:** Newton'slaws of gravitation–Acceleration due to gravity on the surface ofearth – Expression for variation of acceleration due to gravity with altitude **4.3 SATELLITES:** Kepler'slaw of planetary motion - Satellites – Natural and artificial – Escape velocity and orbital velocity – Definitions – Expression for escape velocity and Orbital velocity – Polar and Geostationary satellites– Uses of artificial satellites. Simple problems based on the expressionsfor escape velocity and Orbital velocity.	6 3 5
V	**SOUND AND MAGNETISM** **5.1 SOUND:** Wave motion – Introduction and definition – Audible range – Infrasonic – Ultrasonics - Progressive waves, longitudinal and transverse waves Examples - Amplitude, Wave length, period and frequency of a wave – Definitions – Relation between wavelength, frequency and Velocity of a wave – Stationary or standing waves. Vibrations - Free & forced vibrations and resonance – definitions and examples - Laws of transverse vibration of a stretched string - Sonometer – Experimental determination of frequency of a tuning fork. Acoustics of buildings – Echo - Reverberation, reverberation time, Sabine's formula for reverberation time (no derivation) – Coefficient of absorption of sound energy – Noise pollution. Simple problems based on expression for frequency of vibration. Doppler effect – Definition and Applications – Ultrasonic and its uses – SONAR – Solved Problems.	9

	5.2 MAGNETISM Basicproperties of magnetism–Properties of magnetic materials- Para, Dia,Ferromagnetic materials-Pole strength – Definitions –Magnetic moment, intensity of magnetisation, magnetising field intensity, magnetic induction, Permeability, hysteresis, saturation, retentivity and coercivity-Definitions - Method of drawing hysteresis loop of a specimen using asolenoid – Uses of Hysteresis loop. Simple problems based on intensity of magnetization – Types of magnetic materials and their applications - Solved problems.	5

TEXT BOOKS

1	Physics – Higher secondary – First year – Volume I & II – Tamil Nadu text bookCorporation 2004
2	Engineering Physics I - .DOTE, Tamilnadu

REFERENCE BOOKS:

1	Physics – Resnick and Haliday – Wisley Toppan publishers–England
2	Engineering Physics – B.L.Theraja – S. Chand Publishers
3	A text book of sound – R.L. Saighal& H.R. Sarna – S.Chand& Co.
4	Mechanics – NarayanaKurup – S. Chand Publishers.

WEBSITES:

1	https://bookboon.com/en/fundamentals-of-physics-ebook

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are tobe distributed as follows:

i)	Attendance	5 marks
ii)	Test	10 marks
iii)	Assignment	5 marks
Iv)	Seminar	5 marks
	Total Marks	**25 marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D103.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D103.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D103.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D103.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D103.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

Question Paper Setting

The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy. The question paper should consist of 90% question basedonLowerOrder Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills(HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

AUTONOMOUS EXAMINATION-QUESTION PAPER PATTERN

For all theory subjects except Communicative English I & II

and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. **Max.Marks:100**

PART - A Answer any **10** Questions Choosing the correct answer out of **15**Questions . Each question carries one mark.

PART-B Answer any **10** Questions out of **15**Questions . Each question carries two marks

PART - C All the **5** question to be answered.Each question in **PART-C** will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered for **7** marks each .

The questions are to be numbered from 1 to 35. All the units are to be covered with equal weightage.

PART –A Objective type questions Question Number 1 to 15	**10**x1 = **10** marks
PART –B Short answer type questions Question Number 16 to 30	**10**x2 = **20**marks
PART –C Descriptive answer type questions Question Number 31 to 35 Each question inPART –C will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered .	**5**x 14 = **70** marks
Total	**100**Marks *

Note: * Autonomous Examinations will be conducted for 100 Marks and converted to 75 Marks**.**

D103 - ENGINEERING PHYSICS - I

MODEL QUESTION PAPER

Time : 3 Hrs. **Max.Marks : 100**

PART- A				**(10 X 1 = 10 Marks)**	
Answer Any TEN Questions choosing the Correct Answer					
S.No.	**Questions**	**Unit**	**Bloom's Level**	**CO**	**PO**
1.	The dimensional formula for length (a) L (b) LT (c) MLT (d) T	I	R	D103.1	PO1,PO2,PO3
2	What is the SI unit of impulse? (a) Kgm (b) Kgm^{-1} (c) Kgm s^{-1} (d) Kgm s^{-2}	I	AP	D103.1	PO1,PO2,PO3
3	The unit of solid angle (a)Radian (b)stradian (c)Mole (d)kelvin	I	U	D103.1	PO1,PO2,PO3
4.	Which one is the low viscous liquid (a) castor oil (b) chloroform (c) Honey (d) water	II	U	D103.2	PO1,PO2,PO3
5.	The unit of stress is (a) N (b) Nm (c) Nm^{-2} (d) m	II	R	D103.2	PO1,PO2,PO3
6.	The unit of surface tension is (a) N (b) Nm (c) Nm^{-1} (d) m	II	AP	D103.2	PO1,PO2,PO3
7.	The path of a projectile is (a) parabola (b) straight line (c) circle (d) none of these	III	U	D103.3	PO1,PO2,PO3
8.	What is the Formula for angular velocity (a) $\omega = s/t$ (b) $\omega = \theta / t$ (c) $\omega = t/\theta$ (d) $\omega = \theta t$	III	R	D103.3	PO1,PO2,PO3
9.	The condition for maximum range of projectile is (a) 45° (b) 50° (c) 55° (d) 60°	III	AP	D103.3	PO1,PO2,PO3
10.	The expression for kinetic energy is (a) I (b)) ½ mv^2 (c) mv (d) 1/2 Iw	IV	U	D103.4	PO1,PO2,PO3
11.	The angular momentum of a rigid body is (a) I (b)) ½ mv (c) mv (d) 1/2 Iw	IV	R	D103.4	PO1,PO2,PO3
12.	The value of gravitational force is (a) 8 (b) 10 (c)9 (d) 9.8	IV	AP	D103.4	PO1,PO2,PO3
13.	The number of oscillations made in one second is called (a) Linear density (b)Tension (c) Resonance (d) Frequency	V	AP	D103.5	PO1,PO2,PO3
14.	The unit of frequency is (a) ohm (b) amphere (c) volt (d) hertz	V	U	D103.5	PO1,PO2,PO3
15.	The intensity of magnetization is (a) M=B/H (b) M=m/V (c) M=BIL (d) M=Bqv	V	R	D103.5	PO1,PO2,PO3

PART- B (10 X 2 = 20 Marks)					
Answer any TEN Questions.AllQuestions carries equal marks.					
16.	Define derived Quantity	I	R	D103.1	PO1,PO2,PO3
17.	What is scalar quantity?	I	U	D103.1	PO1,PO2,PO3
18.	State Parallelogram Law of forces.	I	R	D103.1	PO1,PO2,PO3
19.	What is terminal velocity?	II	U	D103.2	PO1,PO2,PO3
20.	Define Young's modulus.	II	R	D103.2	PO1,PO2,PO3
21.	State Hooke's law.	II	U	D103.2	PO1,PO2,PO3
22.	Define trajectory.	III	R	D103.3	PO1,PO2,PO3
23.	Define angular velocity.	III	R	D103.3	PO1,PO2,PO3
24.	Define angle of banking.	III	R	D103.3	PO1,PO2,PO3
25.	State Newton's law of gravitation.	IV	R	D103.4	PO1,PO2,PO3
26.	Define moment of inertia.	IV	R	D103.4	PO1,PO2,PO3
27.	What is orbital velocity?	IV	R	D103.4	PO1,PO2,PO3
28.	Define resonance	V	R	D103.5	PO1,PO2,PO3
29.	What is infrasonic?	V	U	D103.5	PO1,PO2,PO3
30.	Define intensity of magnetization.	V	R	D103.5	PO1,PO2,PO3

PART – C (5x2x7 = 70Marks)					
[Note: (i) Answer all questions choosing any two subdivisions from each question. **(ii) All subdivision carry equal Marks**]					
31.	a) List the conventions followed in S I units.	I	R	D103.1	PO1,PO2,PO3
	b) Derive expressions for the magnitude and direction of the resultant of two forces acting at a point with an acute angle between them.	I	AP	D103.1	PO1,PO2,PO3
	c) Describe an experiment to determine the mass of the given body using principle of moments.	I	U	D103.1	PO1,PO2,PO3
32.	a)Describe an experiment to determine the Young's modulus ofthe material of a beam by uniform bending method.	II	AP	D103.2	PO1,PO2,PO3
	b) Describe an experiment to determine coefficient of viscosity ofhigh viscous liquid	II	U	D103.2	PO1,PO2,PO3
	c) A capillary tube of bore 0.5 mm is dipped vertically in	II	U	D103.2	PO1,PO2,PO3

	water ofsurface tension 0.072 Nm . Find the height of capillary rise.				
33.	a) Derive an expression for the angular momentum of a rigid body rotating about an axis.	III	U	D103.3	PO1,PO2,PO3
	b) Derive an expression for the orbital velocity of a satellite.	III	U	D103.3	PO1,PO2,PO3
	c) Derive the expression for the variation of acceleration due to gravity with altitude.	III	U	D103.3	PO1,PO2,PO3
34.	a)Show that path of a projectile is a parabola.	IV	U	D103.4	PO1,PO2,PO3
	b) Obtain expressions for the normal acceleration	IV	U	D103.4	PO1,PO2,PO3
	c) Derive an expression for the angle of banking of a curved path	IV	U	D103.4	PO1,PO2,PO3
35.	a)Explain Acoustics of buildings.	V	U	D103.5	PO1,PO2,PO3
	b) A sonometer wire is loaded with a mass of 2 kg. The Linear density of the wire is 2×10^{-3} $kgm^{-1.}$ When an excited tuning forkis placed on the sonometer box, the resonating length is found to be 15.4 cm. Find the frequency of the tuning fork.	V	U	D103.5	PO1,PO2,PO3
	c) Compare the usefulness of Hysteresis loop of a Soft iron and Steelin the selection of magnetic materials for industrial purpose.	V	An	D103.5	PO1,PO2,PO3

Note: The question paper setters are requested to follow the revised Bloom's Taxonomy levels as presented below:

Bloom's TaxonomyLevel	**Lower order thinking skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R-Remember,**U**-Understand, **AP**-Apply	**An**- Analyse, **E**-Evaluate, **C**-Create
% to be included	90 %	10 %

D104 -ENGINEERING CHEMISTRY-I

Programme Name : I YEARGENERALENGINEERING

Course Code : D104

Semester : I SEMESTER

Course Title : ENGINEERING CHEMISTRY – I

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Chemistry-I	5	80	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	**Basic Concepts in Chemistry**– AtomicStructure and Chemical bonding, PeriodicTable, Acids and Bases	15
II	**Surface Chemistry** - Colloids , Nanotechnology, Catalysis	15
III	**Minerals and Metallurgy** - Metallurgy of Iron, Metallurgy of Tungsten and Titanium , Powder metallurgy	14
IV	**Industrial Chemistry** - Nuclear Chemistry, Cement , Ceramics, Refractories and Glass	14
V	**Chemistry of Engineering materials** - Polymer, Abrasives, Composite materials.	13
	Test & Model exam	09
Total		**80**

COURSE DESCRIPTION:

The subject Engineering Chemistry I lay foundation of all the elements, structure and periodic classification. The latest trends on nanotechnology, its application on various fields of engineering is also dealt with. It provides basic concepts about minerals and its resources, the metal extraction, heat treatment and powder metallurgy. It also imparts knowledge about few Engineering Materials like cement, ceramics, refractory and glass. It also deal with polymers, abrasives and composite materials.

OBJECTIVES:

The objective of this Course is to make the student:

1. To know about atomic structure, chemical bonding, periodic classification and acids and bases.
2. To Learn about surface chemistry, colloidal particles and nanoparticles and their application.
3. To know about the mineral resources of Tamilnadu and the fundamentals of metal extraction, iron and steel manufacture, heat treatment and powder metallurgy.
4. To Study about the importance of Engineering Chemistry in industry.
5. To know about Engineering materials like cement, ceramics, refractory, glass, rubber, plastic and composites.

COURSE OUTCOMES :

After the completion of this course, the students will be able to	
D104.1	Describe the structure of atom, periodic table,andbasicconcepts of P^{H}, P^{OH}
D104.2	Express the properties and applications of colloids, Nano particles,catalysis
D104.3	Describe the Minerals and Metallurgy,Extraction of Tungsten, Titanium and Aluminium, Powder Metallurgy
D104.4	Explain about the Nuclear chemistry,Cement,Ceramics,Refractories and Glass
D104.5	Understand the Polymer,Rubber,Abrasives, Composite materials

D104 -ENGINEERING CHEMISTRY - I

Unit	Name of the Topic	Hours
I	**BASIC CONCEPTS IN CHEMISTRY**	
	1.1 Atomic Structure and Chemical Bonding	6
	Atom – definition - Bohr's atomic model - Fundamental particles of Atom – proton – electron – neutron – atomic number - mass number – definition - Isotopes and Isobars – Definition with Suitable examples – formation of cation and anion by electronic concept of oxidation and reduction - extra nuclear part –filling up of electrons – Aufbau principle –s–p–d–f orbitals–electronic configuration – molecule , molecular formula , mole – definition and simple problems - definition of atomic mass, molecular mass, equivalent mass, valency (definitions only) – octet rule – electrovalent bond – sodium chloride formation – covalent bond – formation of ammonia.	
	1.2 Periodic Table	4
	Modern periodic law – periodic classification of elements – features of modern periodic table – properties of s–p–d–f block elements.	
	1.3 Acids and Bases	5
	Properties of acids and bases – theories of acids and bases – Arrhenius theory – Lowry-bronsted theory - Lewis concept of acids and bases – advantages – p^H and p^{OH} – Definition – Numerical problems – Indicator – Definition – Buffer solution – Definition – Types of buffer solution with examples – Application of pH in industries.	
II	**SURFACE CHEMISTRY**	
	2.1 Colloids	6
	Colloids – Definition – True solution and Colloidal solution – Differences – Types of colloids – Lyophilic and Lyophobic colloids – Differences Properties – Tyndall effect – Brownian movement– Electrophoresis Coagulation – Industrial applications of colloids – Smoke Precipitation by Cottrell's method, Purification of water, Cleansing action of soap, Sewage disposal – tanning – and artificial rain- Emulsion-definition-types and properties.	
	2.2 Nanotechnology	4
	Nano particles – definition –Importance of nano particles - properties – application of Nanotechnology – Engineering – medicine – Electronics - biomaterial.	

	2.3 Catalysis Catalyst – Definition – Positive – Negative catalyst – Definition – Types of catalysis – Homogeneous and Heterogeneous – Promoter – Catalyst poison – active centre – Definition – Characteristics of a catalyst – Industrial applications of catalysts.	**5**
III	**MINERALS AND METALLURGY** **3.1 Minerals and Metallurgy** Mineral – Minerals of Tamilnadu – Sources and Uses (Basic conceptsonly) – Extraction of iron – Blast furnace – cast iron – steel manufacture – Bessemer converter – heat treatment of steel – hardening – annealing – tempering.	**6**
	3.2 Metallurgy of Tungsten and Titanium Extraction and uses of Tungsten , Titanium and Aluminium.	**4**
	3.3 Powder metallurgy Definition – Powder metallurgical process – Preparation of Metal Powder – Atomization – Reduction of Metal Oxide - blending – compacting – sintering – finishing – Applications of Powder metallurgy	**4**
IV	**INDUSTRIAL CHEMISTRY** **4.1 Nuclear Chemistry** Nuclear reaction – Differences between nuclear reaction and ordinary chemical reaction – Radioactive decay – alpha emission – beta emission – gamma emission – half-life period – Simple problems– Nuclear fission - nuclear fusion – chain reaction - components nuclear reactor, reactor core, nuclear reactor coolant, Control rods, neutron moderator – steam turbine – Application of radioactive isotopes.	**6**
	4.2 Cement and ceramics Definition – Manufacture of Portland Cement – Wet Process – Setting of Cement (No equation) – Ceramics – White pottery – Definition Manufacture of White pottery – Uses – Definition of glazing – purpose Method – Salt glazing – liquid glazing.	**4**
	4.3 Refractories and Glass Definition – requirements of a good refractory – types – acidic, basic and neutral refractories - with examples and uses – uses of silica, fire clay and alumina. Composition of Glass –Definition - Manufacture of Glass – annealing of glass - varieties of glass – Optical glass, wind shield glass and Photo chromatic glass.	**4**

V	**CHEMISTRY OF ENGINEERING MATERIALS** **5.1 Polymer** Definition – Natural polymer – Rubber – definition -preparation from latex – Defects of natural rubber –Compounding of rubber – Ingredients and their functions – Vulcanization – definition and purpose – reclaimed rubber-definition – process – properties and uses. Plastics – definition – polymerization – addition polymerization – formation of polythene - condensation polymerization – formation of Bakelite - types – Thermoplastics and Thermosetplastics – Differences – Mechanical properties of plastics – advantages of plastics over traditional materials (wood and metal)Reinforced or filled plastics – Definition - advantages – applications - Polymers in Surgery – Biomaterials - Definition – Biomedical uses of Polyurethane, PVC, Polypropylene and Polyethylene. **5.2 Abrasives** Definition – classification – hardness in Moh's scale – Natural abrasives - Diamond, Corundum, Emery and Garnet. Synthetic abrasives – Carborundum – Boroncarbide manufacture – properties and uses. **5.3 Composite Materials** Definition – examples – Classification of composites – Advantagesover metals and polymers – General applications.	**6** **4** **3**

TEXT BOOKS:

1.	Chemistry – Higher Secondary – 1 st and 2nd year, Vol. I & II, Tamil Nadu Text Book Corporation, 2018
2.	Engineering Chemistry – I , DOTE - Tamilnadu

REFERENCES:

1.	Introduction to Engineering Chemistry, ShradhaSinha , S SDara&Sudha Jain, S. Chand Publishers, 2004.
2.	S.Chand's Engineering Chemistry, S SDara, Sudha Jain &ShradhaSinha, 2005.
3.	A Textbook of Engineering Chemistry, Dr. Uday Kumar, 2013.
4.	Engineering Chemistry Fundamentals and Applications, ShikhaAgarwal, Cambridge University Press, 2019.
5.	Government of India, Geological Survey of India, Geology and Mineral Resources of The States of India Part VI – Tamil Nadu and Pondicherry
6.	Indian Minerals Yearbook 2011, Government of India Ministry of Mines, Indian Bureau of Mines Indira Bhavan, Civil Lines, Nagpur – 440 004

WEBSITE REFERENCES:

1.	https://bookboon.com/en/fundamentals-of-chemistry-ebook

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	5 marks
ii)	Test	10 marks
iii)	Assignment	5 marks
Iv)	Seminar	5 marks
	Total Marks	**25 marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D104.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D104.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D104.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D104.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D104.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)

Correlation level 3 – Substantial (high)

QUESTION PAPER SETTING

The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy.The question paper should consist of 90% question based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom's TaxonomyLevel	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills(HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

AUTONOMOUS EXAMINATION-QUESTION PAPER PATTERN

For all theory subjects except Communicative English I & II

and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. **Max.Marks:100**

PART - A Answer any **10** Questions Choosing the correct answer out of **15**Questions . Each question carries one mark.

PART-B Answer any **10** Questions out of **15**Questions . Each question carries two marks

PART - C All the **5** question to be answered.Each question in **PART-C** will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered for **7** marks each .

The questions are to be numbered from 1 to 35. All the units are to be covered with equal weightage.

PART –A Objective type questions Question Number 1 to 15	**10**x1 = **10** marks
PART –B Short answer type questions Question Number 16 to 30	**10**x2 = **20**marks
PART –C Descriptive answer type questions Question Number 31 to 35 Each question inPART –C will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered .	**5**x 14 = **70** marks
Total	**100**Marks *

Note: * Autonomous Examinations will be conducted for 100 Marks and converted to 75 Marks**.**

D104 - ENGINEERING CHEMISTRY- I

MODEL QUESTION PAPER

Time : 3 Hrs. **Max. Marks : 100**

PART - A (10X1=10Marks)					
Answer Any TEN Questions choosing the correct Answer.					
S.No	QUESTIONS	Unit	Bloom's Level	**CO**	**PO**
1	P^H of human blood (a) 7.2(b)4(c) 3(d) 9	I	R	D104.1	PO1,PO2,PO3,
2	What is the charge of protons? (a)Positive (b)Negative (c)Neutral (d)None of these	I	R	D104.1	PO1,PO2,PO3,
3	Give an example of Lewis Acid theory (a)$AlCl_3$ (b)OH (c)H_2O (d)NaCl	I	R	D104.1	PO1,PO2,PO3,
4	The optical property of colloids (a)Brownian movement(b) Tyndall effect (c) Electrophoresis(d) Coagulation	II	R	D104.2	PO1,PO2,PO3,
5	Iron (Fe) catalyst is used to ……..the chemical reaction. (a) Increase (b) Decrease (c) Neutral (d) All the above	II	U	D104.2	PO1,PO2,PO3,
6	The exampleforpromotorsis ……. (a) MO (b) Fe (c) Fe^{2+} (d) Fe^{3+}	II	R	D104.2	PO1,PO2,PO3,
7	Which one is the ore of Titanium…….. (a) Rutile (b) Wolframite c)Scheelite(d)Tungstite	III	R	D104.3	PO1,PO2,PO3,,PO7
8	Tungsten filament is used……. (a) Electrical lamp (b) X-ray (c) Aircraft (d)Dyeing	III	R	D104.3	PO1,PO2,PO3,,PO7
9	Kroll's reduction process used to preparation of ……. (a) Titanium (b) Tungsten (c) Iron (d) Aluminium	III	R	D104.3	PO1,PO2,PO3,
10	Cement contains mainly in ……. (a) Silicates (b) Carbon (c) Zinc (d) Iron	IV	R	D104.4	PO1,PO2,PO3,
11	Give one example of Ceramics (a) Tiles (b) Emery(c) Talc (d) China dish	IV	R	D104.4	PO1,PO3,PO4,
12	Example of Refractories (a) Crucible (b) Beaker (c) Glass rod (d) Tiles	IV	R	D104.4	PO1,PO2,PO3
13	Give an example for Natural Abrasives (a) Diamond (b) Boron (c) Silicon (d) Norbide	V	R	D104.5	PO1,PO2,PO3
14	Pure Alumina is called…….. A)Corundum (b) Diamond (c) Emery (d) Silica	V	U	D104.5	PO1,PO2,PO3
15	Emery is mixture of……. a)Alumina (b) Brass (c) Alloys (d) Carbon	V	U	D104.5	PO1,PO2,PO3

PART - B (10X2=20Marks)					
Answer Any TEN Questions. All Questions Carries Equal Marks.					
16	Define P^H	I	R	D104.1	PO1,PO2,PO3 ,PO4,PO5,PO 7
17	Define Atomic number.	I	R	D104.1	PO1,PO2,PO4 ,PO5,PO7
18	Define Isotopes.	I	R	D104.1	PO1,PO3,PO7
19	What are the types of Colloids?	II	U	D104.2	PO1,PO3,PO4 ,PO5,PO7
20	Define Catalysis .	II	R	D104.2	PO1,PO2,PO3 PO4,PO6,PO7
21	What are called nano particles?	II	U	D104.2	PO1,PO2,PO3 PO4,PO5,PO7
22	How will you purify Titanium?	III	U	D104.3	PO1,PO3,PO5 ,PO7
23	Define Annealing.	III	R	D104.3	PO1,PO3,PO7
24	Define Powder metallurgy.	III	R	D104.3	PO1,PO3,PO4 ,PO5,PO7
25	Define Nuclear fission.	IV	R	D104.4	PO1,PO2,PO3 PO4,PO5,PO7
26	Why is gypsum added to cement?	IV	U	D104.4	PO1,PO2,PO3 PO4,PO5,PO7
27	What are Refractories?	IV	U	D104.4	PO1,PO3,PO5 ,PO7
28	What is bakelite?	V	U	D104.5	PO1,PO3,PO5 ,PO7
29	What is Garnet?	V	U	D104.5	PO1,PO3,PO4 ,PO5,PO7
30	Define Composite materials.	V	R	D104.5	PO1,PO3,PO5 ,PO7
PART – C (5X2x7=70 Marks)					
[Note: (i) Answer all questions choosing any two subdivisionsfromeach question. (ii) All subdivision carry equal Marks]					
31	a) Describe the formation of electrovalent compound.	I	U	D104.1	PO1,PO2,PO7
	b)Define and explain the Lewis Concept of Acid and base	I	U	D104.1	PO1,PO3,PO7
	c)What are the Industrial applications of P^H?	I	U	D104.1	PO1,PO2,PO3 PO4,PO5,PO7
32	a)Distinguishbetween Lyophobic and Lyophilic colloids.	II	An	D104.2	PO1,PO3,PO5 ,PO7
	b)What are the applications of nanoparticles in Electronics?	II	U	D104.2	PO1,PO3,PO4 ,PO5,PO7
	c)Explain Industrial applications of catalysts	II	U	D104.2	PO1,PO2,PO3 PO4,PO5,PO7
33	a) Describe the extraction of Titanium from its ore.	III	U	D104.3	PO1,PO3,PO4 ,PO5,PO7
	b) Describe the extraction of Tungsten from its ore.	III	U	D104.3	PO1,PO3,PO4 ,PO5,PO7
	c)Explain the applications of powder metallurgy.	III	U	D104.3	PO1,PO3,PO5 ,PO7

34	a)Explain the applications of radioactive isotopes.	IV	U	D104.4	PO1,PO3,PO4 ,PO5,PO7
	b)Describe the manufacture of Portland cement.	IV	U	D104.4	PO1,PO3,PO4 ,PO5,PO7
	c)Describe the manufacture of white pottery.	IV	U	D104.4	PO1,PO3,PO4 ,PO5,PO7
35	a) Distinguishbetween Thermoplastics and Thermosetting plastics.	V	An	D104.5	PO1,PO3,PO4 PO5,PO6,PO7
	b)Write a note on Natural Abrasives	V	U	D104.5	PO1,PO3,PO4 ,PO5,PO7
	c)Explain the advantages of composite materials over traditional materials.	V	U	D104.5	PO1,PO3,PO4 ,PO5,PO7

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as presented below:

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills(HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

******

D105 - ENGINEERING GRAPHICS – I

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D105

Semester : I SEMESTER

Course Title : ENGINEERING GRAPHICS – I

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Graphics – I	6	96	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks**

TOPICS AND ALLOCATION OF HOURS

Unit	Topic	Time (Hrs)
I	Drawing Office Practice and Dimensioning	19
II	Geometric Constructions and Construction of Conics	19
III	Projection of Points & Straight Lines and Construction of Special Curves	19
IV	Orthographic Projections	30
Test & Model Exam		09
Total		**96**

COURSE DESCRIPTION:

Engineering Graphics is a basic subject for all branches of diploma in engineering and technology. Since engineering drawing is considered as the language of engineers, the proper understanding and practice is required with proper use of instruments. This subject is aimed at providing basic understanding of the fundamentals of Engineering Graphics; mainly visualization, graphics theory, standards of drawings, the tools of drawing and the use of drawings in engineering applications. The topics covered are based on the syllabus for diploma studies in engineering. The subject is planned to include sufficient practices which would help the student in visualization of two-dimensional objects and developing the drawing.The chapters are arranged in sequence and starts from the basic concepts of lettering,dimensioning, geometrical constructions, conic sections.

Projection of points and straightlines, construction of engineering curves, proceeds to the orthographic projection techniques. By learning this subject, it is expected that the students would be matured to visualize the engineering components by reading an engineering drawing.

OBJECTIVES:

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

- Understand the importance of drawing.
- Identify and use the drawing instruments.
- Practice the rules and methods of dimensioning.
- Acquire knowledge about geometric constructions.
- Construct conic curves.
- Understand the concepts of projection of points and straight lines.
- Acquire knowledge about the construction of special curves
- Draw orthographic views from the given pictorial drawing

Note: While practicing, usage of drawing instruments like drawing board, mini drafter,compass, divider, drawing clips / cello tape, H, 2H and HB grade drawing pencils, eraseretc., are mandatory for class work and examinations. Size of drawing sheet recommended:A2 size (420 x 594 mm).Use both sides of drawing sheets for practice.

COURSE OUTCOMES

After the completion of this course, the students will be able to	
D105.1	Applythevarious dimensioning rules as per bureau of Indian standards (BSI) on one view of the object.
D105.2	Analyze the construction of conic section.
D105.3	Analyze about the projection of straight lines.
D105.4	Analyze the orthographic projection of the simple isometric objects.

D105 - ENGINEERING GRAPHICS - I

<table>
<tr><th>Unit</th><th>Name of the Topic</th><th>Hours</th></tr>
<tr><td>I</td><td>

DRAWING OFFICE PRACTICE AND DIMENSIONING

1.1 Drawing Office Practice

Importance of engineering drawing as a graphic communication– drawing practice as per BIS code–drawing instruments: drawing board, mini-drafter, compass, divider, protractor, drawing sheets, drawing pencils, set squares etc., – title block– layout and folding of drawing sheets, Special Instrument and Templates

Lettering and numbering as per BIS –importance of legible lettering and numbering–single stroke letters–upper case and lower case letters–slanting/inclinedletters– generalproceduresforletteringand numbering–height of letters– guidelines–practices.

Scales–full size scale, reducing scale and enlarging scales (Description only).

<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises</td></tr>
<tr><td>1</td><td>Upper case, lower case, slanting letters and numerals – each 5 sentences with different heights</td></tr>
</table>

1.2 Dimensioning

Dimensioning – need for dimensioning–dimensioning terms and notations as per BIS – dimension line, extension line and leader line – dimensioning systems – methods of placement of dimensions – uni- directional and aligned systems – important dimensioning rules – dimensioning of common features – diameters, radii, holes, chamfers– addition of letters and symbols – parallel, chain and progressive dimensioning–practice of dimensioning the given drawing as per BIScode (one view of the object).

<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises</td></tr>
<tr><td>1</td><td>8 - 2D drawings</td></tr>
</table>

</td><td>6

13</td></tr>
</table>

<table>
<tr>
<td>II</td>
<td>
Geometric Constructions and Construction of Conics
2.1 Geometric Constructions
Bisect a straight line – bisect an arc – bisect an angle – divide a straight line into any number of equal parts – divide the circle into number of equal divisions – construct an arc touching two lines at any angle – construct an arc touching two arcs, Application of Geometric construction.
<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all methods</td></tr>
<tr><td>1</td><td>10</td></tr>
</table>
2.2 Construction of Conics
Conic sections – definition of locus, focus, directrix, axis, vertex and eccentricity – practical applications of ellipse, parabola and hyperbola.
Ellipse: Construction of ellipse by concentric circle method, rectangular method when major and minor axis are given and eccentricity method when focus and directrix are given–exercises in practical applications.
Parabola: Construction of parabola by rectangular method, parallelogram method when major and minor axis are given and eccentricity method when focus and directrix are given – exercises in practical applications.
Hyperbola: Construction of hyperbola by rectangular method and eccentricity method whenfocus and directrix are given – exercises in practical applications.
<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all methods</td></tr>
<tr><td>2</td><td>7</td></tr>
</table>
</td>
<td>6

13</td>
</tr>
<tr>
<td>III</td>
<td>
PROJECTION OF POINTS & STRAIGHT LINES AND CONSTRUCTION OF SPECIAL CURVES
3.1 Projection of Points and Straight Lines
Projection of points–position of a point on four quadrants and on the reference planes – system of notation–Place a point on four quadrants with different distances –exercises, Three View Projection of Point.
</td>
<td>11</td>
</tr>
</table>

Projection of straight lines–line in the first quadrant and on theReference planes–parallel to one plane and perpendicular to other plane – inclined to one plane and parallel to the other plane – parallel to both the planes – simple exercises.

Minimum criteria for class assessment	
No. of Drawing sheets	No. of Exercises
2	12

3.2 Construction of Special Curves **08**

Definition and construction of cycloid – epicycloids- hypocycloid – involute of a circle – Archimedean spiral for one revolution – helix – practical applications – exercises.

Minimum criteria for class assessment	
No. of Drawing sheets	No. of Exercises covering all methods
2	6

IV **Orthographic Projections**

4.1 First angle: Simple components **11**

Introduction – projection terms – orthographic projection – planes of projection – principal orthographic views – designation of views – four quadrants – first angle projection – third angle projection - Relative position of all six views – Symbols and arrangement of views for first angle and third angle projections – comparison – simple exercises in first angle projection with minimum two views of simple components (Without curves and circles).

Minimum criteria for class assessment	
No. of DrawingSheets	No. of Exercises
1	6

4.2 First angle Projections only: Engineering components **19**

Draw the projections of the simple engineering components using first angle projection – exercises in drawing orthographic views – three views- front view, top view and right / left side views. (For Autonomous examinations any two views can be asked.)

Minimum criteria for class assessment	
No. of Drawing sheets	No. of Exercises
3	12

TEXT BOOKS:

1	Bhatt.N.D.“EngineeringDrawing”,CharotarPublishingHouse, Pvt. Ltd.
2	Gill P.S. ,“ Engineering Drawing”, S.K. Kataria& Sons, 11th Edition, 2012

REFERENCE BOOKS:

1	Gopalakrishna .K.R., "Engineering Drawing" (Vol. I and II combined), Subhas Publications.
2	Venugopal.K, Prabhu Raja. V, “Engineering Graphics”, New Age International Publishers.
3	Nataraajan K V “A Text Book of Engineering Drawing and Graphics” N DhanalakshmiPulishers.
4	Shah M B, Rana B C, “Engineering Drawing”, Second Edition, 2009, Pearson.
5	BasantAgrawal,AgrawalCM“Engineering Drawing”,TataMcGrawHillEducationPvt. Ltd.,
6	Parkinson AC," First Year Engineering Drawing", Sir Isaac Pitman& Sons Ltd Publishers.
7.	Thomas E. French, Charles J .Vierck,“ The Fundamentals of Engineering Drawing “ McGrawHill Book Co. Inc.

LEARNING WEBSITES :

1	https://nptel.ac.in/courses/112/103/112103019/
2	mrcet.com>digital _notes>E… PDF engineering graphics practice manual –mrcet

CONTINUOUS INTERNAL ASSESSMENT:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Class Assessment Sheets (Minimum 10 sheets)	10 Marks
ii)	Average of three Assessment tests	05 Marks
iii)	Model Examination	05 Marks
iv)	Attendance	05 Marks
Total		**25 Marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D105.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D105.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D105.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D105.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**12**	**12**	**12**	**12**	**12**	**8**	**12**	**12**	**8**	**8**
Correlation level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (Low)

Correlation level 2 – Moderate (Medium)

Correlation level 3 – Substantial (High)

QUESTION PAPER SETTING

The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy. The question paper should consist of 90% questions based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R-Remember, **U**-Understand, **Ap**-Apply	**An** -Analysis, **E**- Evaluate, **C** -Create
% to be included	90%	10%

D105 – ENGINEERING GRAPHICS – I

AUTONOMOUS EXAMINATION

QUESTION PAPER PATTERN

Time: 3 Hrs **Max. Marks: 100**

Note:
1. Answer all the questions only in the drawing sheet.
2. Assume missing dimensions suitably, if required.
3. Proper drawing instruments and board should be used

PART – A (4x5 = 20)

Note: Five questions will be asked (Sl. No: 1 to 5). Answer any four questions.

Each question carries five marks.

Minimum one question should be asked from each unit first chapter.

(Chapters: 1.1, 2.1, 3.1, 4.1)

PART – B (4x20 = 80)

Note: Six questions will be asked (Sl. No: 6 to11). Answer any four questions.

Each question carries twenty marks.

Minimum one question should be asked from each unit second chapter.

(Chapters: 1.2, 2.2, 3.2, 4.2)

D105 - ENGINEERING GRAPHICS – I

MODEL QUESTION PAPER

Time : 3 Hrs **Max Marks : 100**

Note:
1. Answer all the questions only in the drawing sheet supplied.
2. Assume missing dimensions suitably, if required.
3. Use proper drawing instruments and drawing board.
4. First angle projection is to be followed.
5. All dimensions are in`mm'.

	PART – A (4x5 = 20 Marks) **Answer any FOUR questions. Each question carries five marks.**	**UNIT**	**BLOOM'S LEVEL**	**CO**	**PO**
1.	Write the following statements in a single stroke in upper case letters of 10 mm height. DRAWING IS THE LANGUAGE OF ENGINEERS ALL DIMENSIONS ARE IN MM ALL LETTERS SHOULD BE UNIFORM IN SHAPE, SIZE AND SPACING DIMENSION LINES SHOULD NOT CROSS EACH OTHER BUREAU OF INDIAN STANDARDS (BIS) IS OUR NATIONAL STANDARD.	I	U	D105.1	PO1,PO2 ,PO3
2.	Construct an arc of 50 mm radius touching two arcs of 25 mm and 50 mm radius externally, at a centre offset distance of 120mm.	I	AP	D105.1	PO1,PO2 ,PO3
3.	A point A is 20 above H.P, 30 in front of V.P and 25 in front of P.P. Draw (i) front view, (ii) top view and (iii) left side view of the point.	III	U	D105.3	PO1,PO2 ,PO3
4.	A straight line AB 50 mm long is parallel to the VP and inclined at an angle of 30^{o} to the HP. The end A is 20 mm above the HP and 15 mm in front of the VP. Draw the projections of the line.	III	U	D105.3	PO1,PO2 ,PO3
5.	The pictorial view of a component is given in Fig: 1. Draw its front view and right side view.	IV	AP	D105.4	PO1,PO2 ,PO3

	PART – B (4x20= 80 Marks) **Answer any FOUR questions. Each question carries Twenty marks**	UNIT	BLOOM'S LEVEL	CO	PO
6.	Redraw the object shown in Fig: 2 and make the correct dimensioning as per BIS standards.	I	R	D105.1	PO1,PO2, PO3
7.	The major and minor axes of an ellipse are 120 mm x 80 mm respectively. Draw the ellipse using rectangular method.	II	AP	D105.2	PO1,PO2, PO3
8.	Construct a parabola, when the distance of the focus from the directrix is 40mm.	II	C	D105.2	PO1,PO2, PO3
9.	A circle of diameter 40 mm rolls on the outside of another circle of diameter 160 mm without slipping. Draw the path traced by a point on the smaller circle.	III	AP	D105.3	PO1,PO2, PO3
10.	The pictorial view of the machine component is given in Fig:3. Draw the front view and right hand side view.	IV	AP	D105.4	PO1,PO2, PO3
11.	The pictorial view of the machine component is given in Fig:4.Draw the front view and top view.	IV	AP	D105.4	PO1,PO2, PO3

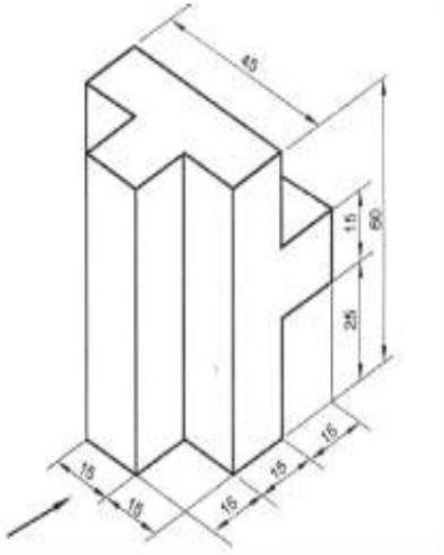

Fig: 1

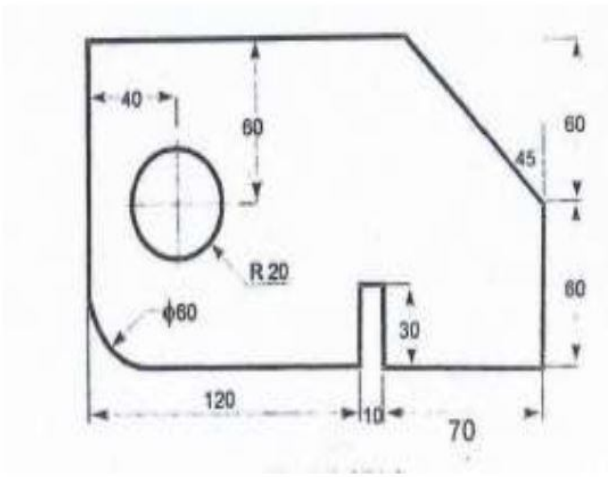

Fig: 2

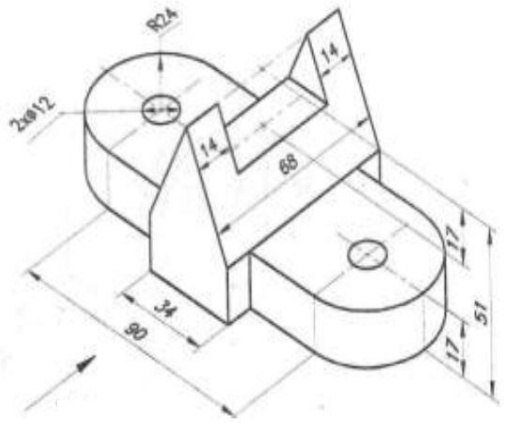

Fig: 3

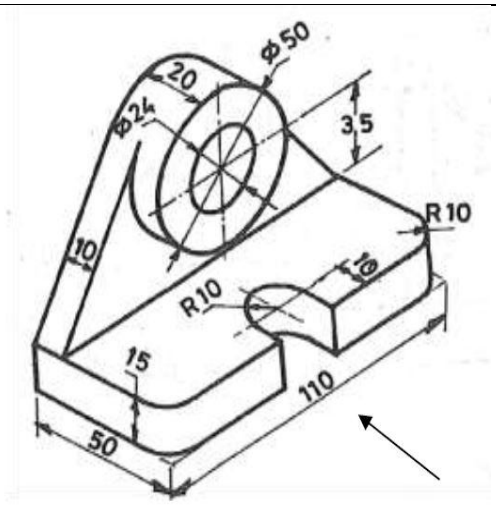

Fig: 4

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as prescribed below:

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R – Remember, U –Understand, **Ap**– Apply	**An** – Analysis, **E** – Evaluate, **C** - Create
% to be included	90%	10%

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D106 - ENGINEERING PHYSICS - I PRACTICAL

ProgrammeName :I YEAR GENERAL ENGINEERING

Course Code : D106

Semester : I SEMESTER

Course Title : ENGINEERING PHYSICS – I PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

Number of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Physics – I Practical	2	32	25	100*	100	3 Hrs

***Examination will be conducted for 100 marks and will be reduced to 75 marks.**

COURSE DESCRIPTION:

In diploma level Engineering education skill development plays a vital role. The skill development can be achieved by hand's on experience in handling various instruments, apparatus and equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories.

RULES

- All the experiments should be completed in the First Semester.
- The mini project given as 10^{th} experiment is activity based and it may be given to group maximum of 6 students for hands on experience and to create scientific temper.
- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations.
- In order to develop best skills in handling Instruments / Equipment and taking reading in the practical classes , every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than two students while admitting a batch of 30 students during Autonomous Examinations.

OBJECTIVES :

1. To measure the thickness, length and diameter using Screw gauge and Vernier caliper
2. To determine the Parallelogram law of forces andLami's theorem.
3. To measure the frequency of the given tuning fork
4. To Compare magnetic moments of two magnets
5. To Verify the Principle of moments .
6. To compare the co-efficient of viscosities of two low viscous liquids and determine the co-efficient of viscosity of high viscous liquid.

COURSE OUTCOMES :

After the completion of the course, the students will be able to	
D106.1	Measure the thickness, length and diameter using Screw gauge andVernier caliper
D106.2	Determine the Parallelogram law of forces and Lami's theorem.
D106.3	Compare the co-efficient of viscosities of two low viscous Liquids and determine the co-efficient of viscosities of high Viscous liquid.
D106.4	Measure the frequency of the given tuning fork,compare the magnetic moments and verify the principle of moments
D106.5	Identify real time application and apply acquired knowledge to develop mini-project.

D106 - ENGINEERING PHYSICS - I PRACTICAL

LIST OF EXPERIMENTS

S.No	Name of the Experiment	Course Outcome
1.	MICROMETER (SCREW GAUGE). Measure the thickness of the given irregular glass plate using micrometer. To determine the area of the glass plate using a graph sheet and to calculate the volume of the glass plate.	D106.1
2.	VERNIER CALIPERS. Measure the length and diameter of the given solid cylinder using Vernier calipers and to calculate the volume of the solid cylinder.	D106.1
3.	PARALLELOGRAM LAW. Verify the parallelogram law using concurrent force.	D106.2
4.	LAMI'S THEOREM Verify Lami's theorem using concurrent forces.	D106.2
5.	COMPARISON OF VISCOSITIES Compare the co-efficient of viscosities of two low viscous liquids by capillary flow method.	D106.3
6.	STOKES' METHOD Determine the co-efficient of viscosity of a highly viscous liquid.	D106.3
7.	SONOMETER. Determine the frequency of the given tuning fork.	D106.4
8.	DEFLECTION MAGNETOMETER Compare the magnetic moments of the two bar magnets using Deflection Magnetometer in Tan A position, by equal distance method.	D106.4
9.	PRINCIPLE OF MOMENTS Verify the law of the Principle of moments	D106.4
10.	Mini Project	D106.5

AUTONOMOUS PRACTICAL EXAMINATIONS

- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations
- The students should maintain observation note book / manual and record notebook. Inthe observation, the student should draw diagram, mention the readings /observations, calculations and result manually. The same have to be evaluated for the observation mark
- The record note book should be submitted during the Autonomous Practical Examinations.The record work for the experiments should be completed and evaluated in therespective semesters.
- All experiments should be given and the students are allowed to select any one by lot.
- The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.
- The examiners should ensure the proper safety measures before the commencement of practical examinations.

DETAILED MARK ALLOCATION

1.	Formula and diagram	20
2.	Tabulation with proper units	10
3.	Observation (including taking readings)	40
4.	Calculation	10
5.	Result	05
6.	Viva voce	05
7.	Mini project	10
	Total	**100**

Mini Project Evaluation (10 marks)

Breakup Details

1.	Project Description	05
2.	Project Demo	05
	Total	**10**

Continuous Internal Assessment

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows

a) Attendance	5 marks –(awards of marks same as theory subjects)
b) Procedure/ observation and tabulation/ other Practical related work	10 marks
c) Record writing	10 marks
Total	**25 marks**

LEARNING WEBSITES :

1	www .labster.com
2	www .ulab.co.in
3.	ulab.amirta.edu

CO- PO & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D106.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D106.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D106.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D106.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D106.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
CorrelationLevel	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

LIST OF EQUIPMENTS

Minimum Two set of equipment / components are required for the Batch of 30 Students.

1. MICROMETER (SCREW GAUGE).
   Screw gauge, graph sheet and irregular glass plate.

2. VERNIER CALIPERS.
   VernierCalipersand Solid Cylinder

3. PARALLELOGRAM LAW.
   Vertical drawing board, two Z pulleys, three sets of slotted weights (5 x 50g) andtwine thread.

4. LAMI'S THEOREM
   Vertical drawing board, two Z pulleys, three sets of slotted weights (5 x 50g) andtwinethread.

5. COMPARISON OF VISCOSITIES
   Burette stand, graduated burette without stopper, rubber tube, capillary Tube,

6. STOKE'S METHOD.
   Stokes' Apparatus, highly viscous liquid (Castrol oil), glass beads of different radii, digital stop watch and screw gauge.

7. SONOMETER.
   Sonometer, screw gauge, tuning fork, rubber hammer, slotted weight hanger set (5x 0.5kg) and paper rider.

8. DEFLECTION MAGNETOMETER
   Deflection Magnetometer, meter scale and two bar magnets

9. PRINCIPLE OF MOMENTS
   Retort stand, Spring balance, meter scale, Thread

D106 - ENGINEERING PHYSICS - I PRACTICAL

MODEL QUESTION PAPER

S.No.	Experiments
1.	Measure the thickness of the given irregular glass plate using micrometer. To determine the area of the glass plate using a graph sheet and to calculate the volume of the glass plate.
2.	Measure the length and diameter of the given solid cylinder using vernier calipers and to calculate the volume of the solid cylinder.
3.	Verify the parallelogram law using concurrent force
4.	Verify Lami's theorem using concurrent force
5.	Compare the co-efficient of viscosities of two low viscous Liquids by capillary flow method
6.	Determine the coefficient of viscosity of a highly viscous liquid.
7.	Compare the magnetic moments of the two bar magnets using deflection Magnetometer in Tan A position, by equal distance method
8.	Determine the frequency of the given tuning fork.
9.	Verify the law of the principle of moments
10.	Mini Project

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D107 - ENGINEERING CHEMISTRY- I PRACTICAL

Programme Name : I YEARGENERALENGINEERING
Course Code : D107
Semester : I SEMESTER
Course Title : ENGINEERING CHEMISTRY – I PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

Number of weeks per semester : 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Chemistry – I Practical	2	32	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks.**

COURSE DESCRIPTION

In diploma level Engineering education skill development plays a vital role. The skill development can be achieved by hand's on experience in handling various instruments, apparatus and equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories

OBJECTIVES

1. At the end of the program the student will have knowledge about volumetric analysis in acidimetric, alkalimetric and permanganometric titration and their applications
2. To get knowledge of estimation of total hardness, temporary and permanent hardness in the hard water sample
3. To get knowledge about measurement of TDS, pH and to calculate Hydrogen ion concentration in a solution.
4. To get knowledge of estimation of dissolved chlorine in a water sample.

COURSE OUTCOMES:

After the completion of the course the student will be able to	
D107.1	Estimate the amount of sodium carbonate, sodium hydroxide and Mohr's salt.
D107.2	Estimate the composition of a mixture of acid - base by conductometric titration.
D107.3	Estimate the total hardness by EDTA method to determine the presenceof bicarbonate, chlorides, sulphates of calcium and magnesium ions.
D107.4	Demonstrate P^H values and H^+ ion concentration.
D107.5	Identify real time application and apply acquired knowledge to develop mini-project.

D107- ENGINEERING CHEMISTRY – I PRACTICAL

Intellectual Skills

1. Carrying out Volumetric titrations and calculation of masses
2. Knowing units for Concentrations of solutions

Motor Skills

1. Measure quantities accurately
2. Observe chemical reactions
3. Handle the apparatus carefully

EXPERIMENTS

S.No	Name of the Experiment	Course Outcome
	i) Acidimetric and Alkalimetry	
1.	Estimate the quantity of sulphuric acid present in ……. ml of a given Solution usingStandard solution of HCl of strength……N and an approximately decinormal solution FnaOH.	D107.1
2.	Estimate the amount of NaOH present in ……..ml of the given Solutionusinga standard solution of KOH of strength ……N and Approximatelydecinormal solution of H_2SO_4	D107.1
3.	Compare the strength of two given hydrochloric acids and estimate the stronger/weaker solution present in ……ml using a standard solution of sodium hydroxide of strength ……N	D107.1
	ii) Permanganometry	
4.	Estimation of the amount of Mohr salt present in…….ml of the given using standard solution of ferrous sulphate of strength ……N and an approximately decinormal solution of $KMnO_4$.	D107.2
5.	Estimation of the amount of Fe 2+ present in…….ml of the given solution using astandard solution of ferrous ammonium sulphate of strength ……N and anapproximatelydecinormal solution of $KMnO_4$.	D107.2
6.	Compare the strength of two given KMnO4 solution and estimate the stronger/weaker solution present in ……ml using a standard solution of ferrous ammoniumsulphate of strength ……N	D107.2
	iii) Water Analysis	
7.	Water analysis for residual chlorine	D107.3
8.	Estimation of total hardness of a sample using EDTA	D107.3
9.	Water quality testing, pH (3 sample)	D107.4
10.	Water quality testing TDS (3 sample)	D107.4
11.	Mini Project	D107.5

Determination of pH and TDS using a pH meter and TDS meter respectively and calculation of hydrogen ion Concentrations (For three given samples, one of the samples brought from home by each student) **(This question must be given to any two students per batch in the Autonomous Examination).**

AUTONOMOUS PRACTICAL EXAMINATIONS

- All experiments should be completed in the First Semester.
- The mini project given as 11th experiment is activity based and it may be given to group maximum of 6 students for hands on experience and to create scientific temper.
- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations.
- The students should maintain observation note book / manual and record notebook. In the observation, the student should draw diagram, mention the readings / observations, calculations and result manually. The same have to be evaluated for the observation mark.
- The record note book should be submitted during the Autonomous Practical Examinations.
- All experiments should be given as per the model question paper and the students are allowed to select any one by lot.
- The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.

  The examiners should ensure the proper safety measures as per the guidelines before the commencement of practical examinations.

Guide lines for Evaluation

SCHEME OF EVALUATION

DESCRIPTION	MARKS
Short procedure	15
Titration I	25
Titration II	25
Calculations	20
Viva – voce	05
Mini project	10
Total	**100**

Mini Project Evaluation (10 marks)

Breakup Details

1.	Project Description	05
2.	Project Demo	05
	Total	**10**

Volumetric Analysis: Titration value accuracy for Titration I and II

Accuracy	Marks
±0.2ml	25
above ±0.2 ml to ±0.4 ml	22
above ±0.4 ml to ±0.6 ml	19
above ±0.6 ml	12

Scheme of Evaluation

DESCRIPTION	MARKS
Answer for short questions on pH and TDS	10
Determination of pH of three samples (3X11)	33
Calculation of H^+ (3X3)	09
Determination of TDS - three samples (3X11)	33
Viva – voce	05
Mini project	10
Total	**100**

Accuracy per pH value

ACCURACY	MARKS
±0.2	11
above ±0.2 to ±0.4	09
above ±0.4	06

TDS Value

ACCURACY	MARKS
±0.2%	11
above ±0.2 to ±0.4%	09
above ±6%	06

CONTINUOUSINTERNAL ASSESSMENT

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows

a) Attendance	5 marks (awards of marks same as theory subjects)
b) Procedure/ observation and tabulation/ Other Practical related work	10 Marks
c) Record writing	10 Marks
Total	**25 marks**

LEARNING WEBSITES :

1	https://youtu.be/sFpFCPTDv2w
2	https://youtu.be/2vQM8sueZ8u
3.	https://youtu.be/NrtDlc6BfaE

CO – PO & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D107.1	3	3	3	3	3	2	3	3	2	2
D107.2	3	3	3	3	3	2	3	3	2	2
D107.3	3	3	3	3	3	2	3	3	2	2
D107.4	3	3	3	3	3	2	3	3	2	2
D107.5	3	3	3	3	3	2	3	3	2	2
Total	15	15	15	15	15	10	15	15	10	10
Correlation Level	3	3	3	3	3	2	3	3	2	2

Correlation level 1 – Slight (low)

Correlation level 2 – Moderate (Medium)

Correlation level 3 – Substantial (high)

D107 - ENGINEERING CHEMISTRY - I PRACTICAL

MODEL QUESTION PAPER

MODEL 1 : **3 Hours**

Estimate the mass of Iron present in whole of the given ferrous sulphate solution using a standard solution of ferrous ammonium sulphate of strength 0.1N and an approximately decinormal solution of potassium permanganate.

MODEL 2 : **3 Hours**

Calculate the total hardness of the given sample of water using a standard hard water solution of molarity 0.01M and an approximately decimolar solution of EDTA.

MODEL 3 : **3 Hours**

Determine the pH of three given samples using pH meter and calculate the hydrogen ion concentration of the samples determine the TDS of the same sample. (Any two students per batch).

MODEL 4 : **3 Hours**

Estimate the amount of sulphuricacid present in the whole of the given sulphuricacid using a standard solution of hydrochloric acid of strength 0.1N and an approximately decinormal solution of sodium hydroxide.

NOTE:

Determination of pH using a pH meter and calculation of hydrogen ion concentrations in the solutions and TDS using TDS meter (For three given samples) (This question may be given to any two students per batch).A single experiment with different skill value may be given for a batch. The Nineth experiment (Determination of pH) may be given to any two students per batch**.**

- **Mini Project**

SAFETY MEASURES (DO'S & DON'TS)

Experiment should be carried out with the supervision of Lab instructor / staff i/c.

- Do not enter into the Laboratory without proper supervision
- Do wear protective equipment for eye protection and make sure to wear a laboratory coat.
- Do not smell, inhale taste of chemicals.
- Do label all containers with chemicals.
- Do avoid direct contact with chemicals, far from your hands face, clothes and shoes.
- Do not use Hazardous chemical without proper directions
- Do Use separate cabinets for acid solutions with concentration more than 6M.
- Whenever, accidentally when concentrated acids fallen on hands / clothwash thoroughly with running water, and after taking first aid, and the student may be taken to hospital.
- Do attach chemical labels with all necessary information to all containers.
- Do read the warning labels when opening newly received reagent chemicals. This will help to be aware of any special storage precautions such as refrigeration or inert atmosphere storage.
- Do periodic check on chemical containers for rust, corrosion and leakage.
- Do Store bottles in chemicals afe bags especially those hazardous and moisture absorbing chemicals.
- Do not use of mouth suction to fill a pipette. Use a pipette bulb or other filling devices.
- Do not Smoke, drink, eat and the application of cosmetics is forbidden in areas where hazardous chemicals are used or stored.
- Do use chemicals with adequate ventilation.
- Do wash thoroughly with soap and water whenever you leave the lab after handling any chemicals.
- Do Keep your hands and face clean free from any trace of chemicals.
- Do not play with chemicals.

List of Apparatus to be provided for each student in Chemistry Laboratory during the Engineering Chemistry –I Practical Classes / Autonomous Examination in addition to the required reagents:

LIST OF EQUIPMENTS

List of Equipment Required for a Batch of 30 Students

Non-Consumable Items

S.No	Name of the Item	Quantity
1	LPG Connection	1
2	Exhaust Fan (High Capacity)	Sufficient Nos
3	Fire Extinguisher	1
4	First Aid Box (Full Set)	2
5	Safety Chart	1
6	Chemical Balance	1
7	Fractional Weight Box	1
8	pH Meter	2
9	TDS meter	2
10	Working Table with all accessories	8

GLASSWARE AND OTHER ITEMS

S.No	Name of the Item	Quantity
1	Burette(50ml)	35
2	Burette Stand	35
3	Pipette(20ml) (With safety bulb)	35
4	Pipette(10ml)	35
5	Conical Flask(250ml)	35
6	Funnel (3”)	50
7	Porcelain Tile	35
8	Measuring Cylinder (10 ml)	5
9	Measuring Cylinder (1000 ml)	2
10	Reagent Bottle (White) (250ml)	60
11	Reagent Bottle (White) (125ml	100
12	Reagent Bottle (Amber)(250ml)	80
13	Glass Trough	5
14	Beaker(100ml)	35
15	Plastic Bucket(15L)	10
16	Filter Papers (Round)	Sufficient
17	Pipette bulb / filling devices	35

D001 -COMMUNICATION SKILL PRACTICAL

Programme Name : I YEARGENERALENGINEERING
Course Code : D001
Semester : I SEMESTER
Course Title : COMMUNICATION SKILL PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16weeks

Course	Instructions	Examination				
Communication Skill Practical	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
	2	32	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks and will be reduced to 75 marks.**

TOPICS AND ALLOCATION OF HOURS

Unit	Topic	Time (Hrs)
I	Listening Skill	10
II	Reading Skill	6
III	Speaking Skill	10
IV	Writing Skill	6
Total		**32**

COURSE DESCRIPTION:

"The quality of your life is in the quality of your communication" opined Antony Robins. Language is the means of self-expression and one of the prime most tools for communication. Communicative fluency augments one's personal, academic, social and professional life.

The present syllabus, focusing on four Communication Skills, viz. Listening, Reading, Speaking and Writing, enables the students at Diploma level gain confidence and fluency in communication which in turn would enhance them face their career commitments with globalized standards.

OBJECTIVES:

At the completion of the study, the students will be able to

- Improve their auditory skills to attentively listen, effectively comprehend and to identify important information and keywords.
- Fine tune their reading skills and make them articulate lucidly with proper stress and intonation.
- Perfect their reading comprehending skills using the techniques like Skimming to get the general idea and scanning to grasp specific information.
- Pronounce words renewed confidence.
- Express their needs, obligations, suggestions, gratitude and apology with poise and conviction.
- Introduce themselves and others in a self-assuring manner.
- Partake in face to face conversation with skilled agility.
- Emphatically write and complete the missing parts.
- Acquire a sound knowledge on the usage of non-verbal communication.

COURSE OUTCOMES

After the completion of the course the student will be able to	
D001.1	Attentively listen, effectively comprehend and to identify important information and keywords.
D001.2	Enrich reading skills using the techniques like Skimming to get the general idea and scanning to grasp specific information.
D001.3	Enrich their self confidence in a self-assuring manner .
D001.4	Communicate effectively & acquire a sound knowledge on the usage of non-verbal communication.

D001 - COMMUNICATION SKILL PRACTICAL

DETAILED SYLLABUS

Unit	Name of the Topic	Hours	Course Outcome
I	**Listening Skill** Listening to Speeches by Great Speakers/ TV News (Assessment through note taking) Listening to Short Stories (Assessment by Vocabulary Check) Listening to Indian / British / American English (Assessment by Cloze) Introduction to Phonetics	10	D001.1
II	**Reading Skill** Stress & Intonation Tongue Twisters / Tongue Modulators Frequently Mispronounced Words Reading Newspaper – (Skimming & Scanning)	06	D001.2
III	**Speaking Skill** Polite Expressions (Greeting, Requesting, Thanking, Apologizing, Opinions, Suggestions) Introducing Yourself/ Friends/ Family Recite - quotes of Leaders / Scholars / Scientists Face to Face Conversation Role play	10	D001.3
IV	**Writing Skill** Thought Fillers Completing an Incomplete Story Non-Verbal Communication	06	D001.4

AUTONOMOUS PRACTICAL EXAMINATIONS

Note:

1. The students should be given proper practice in all the exercises. All the exercises should be completed before the examinations.
2. The students should maintain a record notebook. The record note book should be submitted during the Autonomous Practical Examinations.
3. The external examiner should verify the availability of the facility for the batch strength before the commencement of Practical Examination.
4. PART D should be conducted first for all the students. Part A, Part B and Part C can be conducted by both examiners by dividing the students into two groups.

Part A - Listening (No. of Exercises: 3, Duration:45 min.)

Question No.1: The examiner shall play either the audio of the speech of a great speaker or that of TV news running from 3 to 5 min. The audio can be played twice. The candidates may be given 10 minutes to take notes as directed in the question paper.

Question No.2: A short story selected by the external examiner shall be played only once without transcript. The objective of this exercise is to test the Listening ability of the candidate and therefore questions should be framed accordingly in the pattern of question and answer. The time to complete this exercise is 5 minutes.

Question No.3: Any one of the audios (British English, American English or Indian English) may be selected by the external examiner and the same shall be played only once. Maximum of 5 questions for filling in the blanks may be given and the candidates may be provided maximum of 10 minutes to answer the questions.

This part shall be completed within 45 minutes including the time used for playing listening audios.

Part B – Reading (No. of Exercises 3, Duration: 45 min.)

Each batch may be divided into two. Both examiners may engage all the students.

Question No. 1: Readout the tongue twister.

Question No. 2: A passage from newspaper can be given for reading.

Question No.3: Pronounce the words correctly. Part B shall be completed within 45 minutes.

Part C – Speaking (No. of Exercises: 4, Duration: 45 min)

Divide the students to make it convenient for conversations in English by a pair. Both examiners can handle.

Question No. 1 : Polite expressions for the context provided.

Question No. 2 : Self-introduction for the interview.

Question No. 3 : Any five quotes can be recited from the given list of quotes of Leaders, Scholars and Scientists.

Question No. 4 : The candidates have to speak as directed by the concerned examiner. Allthe questions are mandatory. Part C shall be completed within 45 minutes.

Part D – Writing (No. of Exercises: 3, Duration: 45 min.)

All students should appear for this part.

Question No.1: Five questions with blanks shall be asked based on a list of 25 frequently used thought fillers already trained during lab classes

Question No. 2: Shall consist of an unknown incomplete story providing scope for further development and application of imagination. (minimum 3 lines for completion with suitable title and moral)

Question No. 3: Questions can be taken from a list of fifteen important questions covering the core areas of non-verbal communication. (Five out of eight questions to be answered)

Students shall be provided maximum of 30 minutes to complete Part-D.

DETAILED ALLOCATION OF MARKS

S.No	Description	Maximum Marks
A	Listening	30
B	Reading	20
C	Speaking	30
D	Writing	20
Total		**100**

Guidelines for Conduct of Practical Classes and Writing Record Note:

There are 13 experiments in total equally distributed to each skill as follows:

S.No	Name of the Exercise	Minimum Exercises to be Practiced / written in Record Note
	Listening Skill	
1	Listening to Speeches by Great Speakers/ TV News	Each One Exercises
2	Listening to Short Stories	Minimum of two exercises
3	Listening to Indian / British /American English	Minimum of two exercises
	Reading Skill	
4	Reading Tongue Twisters	A list of 25 tongue twisters
5	Reading English Newspapers	Minimum 2 passages from any English Newspaper
6	Frequently mispronounced words	List of 25 words
	Speaking Skill	
7	Making Polite Expressions	Polite expressions - Greeting, requesting, Thanking, Apologizing, Opinions, Suggestions
8	Introducing oneself / friends/family	Minimum two exercises for introducing oneself and introducing others
9	Reciting quotes	Quotes of Leaders/Scholars/ Scientists (List of 25 quotes)
10	Face to face conversation	Minimum two exercises
	Writing Skill	
11	Use of Thought Fillers	A list of 25 frequently used thought fillers
12	Completing an Incomplete Story	Minimum of two exercises. (conclusion – minimum 3 lines, title &moral)
13	Non-Verbal Communication	A list of10 questions and answers relating to non- verbal communication.

Notes:

1. Each exercises shall be awarded 10 marks and the total marks secured in all exercisesshall be averaged to 10marks.
2. Attendance mark shall be calculated for 5 marks as per the given norms.
3. Total internal mark is 25
4. Observation note is not applicable for this practical.
5. Listening Skill Exercises

For each exercise under Listening Skill, minimum exercise should be provided for practice and should be recorded in the record note.(as per the tabular column)

Open sources available online on the sites such as
www.youtube.com, www.lestalk.com
http.//www.bbc.co.uk/learningenglish/English/features/features/6 minute- English, and
https://esl-lab.com/,can be utilized for sessions on improving listening skills.

Note:

Since there is no observation note for English Communication Practical, the worksheets practiced by the students should be preserved along with the Record Note.

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributedas follows:

1.	Attendance (Award of marks same as theory subject)	5 Marks
2.	Observation / Other practical related work.	10 Marks
3.	Record work	10 Marks
Total		**25 Marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D001.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D001.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D001.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D001.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**12**	**12**	**12**	**12**	**12**	**8**	**12**	**12**	**8**	**8**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (Low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (High)

MODEL QUESTION PAPER

D001 - COMMUNICATION SKILL PRACTICAL

Time : 3 Hrs. **Max.Marks : 100**

PART A: Listening (30 Marks)

I **Answer the following:**

1. Listen to the speech of a Great Speaker / TV News played to you and take notes. (10)
2. Listen to the Short Story / conversation read out / played to you and answer the questions. (10)
3. Listen to the following American English / British English / Indian English Audio and fill in the blanks. (10)

PART B: Reading(20 Marks)

II Answer the following

1. Read out the following tongue twisters as fast as possible: (10)
   a) Find a kind mind to wind and bind you with the kind mind like a wind.
   b) How many cookies could a good cook cook if a good cook could cook cookies?
   c) We should fight for our rights as fight is might.
   d) Can you can a can as a canner can a can?
   e) Lesser leather never weathered wetter weather better.
2. Read the given newspaper passage with proper intonation. (5)
3. Pronounce the following commonly mispronounced words rightly.(5)
   a)pizza b)dengue c) bury d)asthma e)Wednesday

PART C: Speaking (30 Marks)

III Answer the following

1. Make polite expressions for the contexts provided: (5)
   a) Request your teacher for a book.
   b) How will you politely apologize for coming late to the meeting?
2. Introduce yourself /friend/family members a candidate appearing for the interview.(10)
3. Recite any five quotes of Leaders/scholars/Scientists. (5)
4. Attempt a face to face conversation with your friend about the addiction to mobile phone by youngsters.(5exchanges) (10)

PART D: Writing (20 Marks)

IV Answer the following

1. Fill in the blanks with suitable thought fillers given in the brackets. (5)
   (look, I mean, you know, well, anyway)
   a. I can't tell her name, _____, she may grow angry.
   b. _____What do you want me to do for that?
   c. Nobody told me about this marriage ,_____ no one even in my own department.
   d. _____ as I said ,I'm going to talk to the manager to cancel this meeting.
   e. _____ it is not the way to talk to your senior.

2. **Complete the following story by adding three more lines and give a suitable title to it.** **(**5)
   Once upon a time there was a poor farmer in a village. He had two sons and a daughter. Both sons were lazy whereas the daughter was so intelligent. One day the father was sick at bed. The daughter who went to market in the morning did not return till late night….

3. **Answer any FIVE of the following in about 50 words:** (5X2=10)

   Questions from Non Verbal Communication

LABORATORY REQUIREMENT:

1. An echo-free room.
2. A Projector.
3. A minimum of two computers with internet access.
4. DVD player with home theatre.
5. P.A system with two nos. of wired/wireless mike.
6. Any Two Standard English Newspapers.
7. A White Board with Markers.
8. Comics / Story books – 2 Nos.

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D002 - COMPUTER APPLICATIONS PRACTICAL

Programme Name : I YEARGENERALENGINEERING
Course Code : D002
Semester : I SEMESTER
Course Title : COMPUTER APPLICATIONS PRACTICAL

SCHEME OF INSTRUCTION AND EXAMINATION

No. of weeks per semester : 16 weeks

Course	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Autonomous Examination	Total	
COMPUTER APPLICATIONS PRACTICAL	2	32	25	100	100	3 Hrs

*** Examinations will be conducted for 100 marks and will be reduced to 75 marks.**

TOPICS AND ALLOCATION OF HOURS

Unit	Topic	Duration (Hrs)
I	Basics of Computer	3
II	Word Processing	7
III	Spread Sheet and MS Access	13
IV	Presentation	9
Total		**32**

COURSE DESCRIPTION:

In diploma level engineering skill development plays a vital role. The skill development can be achieved by hands on experience in working with computer system. This is accomplished by doing computer related experiments in practical classes in the computer laboratory.

OBJECTIVES :

1. At the end of the programme the students will have knowledge on the fundamentals of the computer and windows operating systems.
2. To get the knowledge of the different facilities available in the word processor.
3. To get knowledge on creating and manipulating spread sheet and MS Access database.
4. To get knowledge of Powerpointpresentation.

COURSE OUTCOMES

After the completion of this course the students will be able to	
D002.1	Understand the fundamentals of the computer and windows operating systems.
D002.2	Usethe different facilities available in the word processor
D002.3	Create and manipulate the data base in spread sheet& MS Access
D002.4	Prepare Powerpoint presentation

D002- COMPUTER APPLICATIONS PRACTICAL

Units	Topic	Hrs.
I	**Basics of Computer:** Computer Basics – Hardware & Software – General understanding of various computer hardware components – CPU – Memory – Display – Keyboard- Mouse - HDD & Other Peripheral Devices – Types of Software – Application Software & System Software.	3
II	**Word Processing:** Creating new document – Opening an existing document - Edit & Save a document – Typing a text – Deleting a text – Inserting a text – Finding a text – Replacing a text – Copying & Moving a text – Selecting Font & Font Size – Justifying Texts – Bold – Italic – Underline – Strike – Double Strike – Coloring Text – Spell Check – Ruler – Formatting Page – Line Spacing – Margins – Page Size – Page Border – Page Color – Page Columns – Watermark – Page Break – Section Break – Portrait – Landscape – Inserting Symbols, Equations & Shapes – Text Box – Word Art – Hyperlink – Inserting Pictures – Picture Arrangement - Align Objects – Bullets & Numbering – Working with Tables – Header & Footer – Table of Contents – Inserting Page Number – Changing Character width & Line Spacing – Printing the document – Print Preview – Shortcuts for various activities in Word Exercises.	7
III	**Spread sheet :** Creating a new worksheet - Opening an existing worksheet - Editing and Saving a worksheet - Creating, Renaming and Deleting worksheets in a workbook - Types of data like Numeric, text etc. - Entering in a cell- Manipulation of a cell, row and column (deleting, inserting, finding, replacing,copying and moving) - Justifying in a cell, Merging cells and columns - Addition, Subtraction and using formula - Selecting Font and Font Sizes - Using and manipulating tables, inserting / deleting of rows and columns - Sorting Columns- Using Header and footer, Inserting Page number - Border and Shading of cells, rows and columns - Formatting page, margins, page size, portrait and landscape - Selecting area for printing, Printing of a worksheet and workbooks, Using print preview - Copy / moving text between two different worksheets and workbooks - Using Chart Wizard, Creation of different types of charts – Protect sheet using password - Shortcuts for various activities in spreadsheet – Exercises.	8

	MS ACCESS Concept of Data base – Creating database with a wizard – blank Database – Opening – Closing database. **Tables:** Creating table by using Table wizard – Entering data – Changing column width & row height – Editing data in the table – saving – Data sheet view – Design view – Field Properties – data types – Sorting – filtering. **Forms**: Creating a form using wizard – Auto form - Creating Pivot table wizard form – Creating forms using Design – view. **Queries:** Creating a Query using the query wizard – Design view – Viewing – printing – SQL View – Selecting Query – Running –– Updating – Deleting – Saving – Printing. **Reports**: Creating Report – Auto report – Tabular report – Report Wizard.	5
IV	**Presentations:** Creating New Presentations - Opening Presentations -Saving Presentation - Inserting new Slides - Slide Layout - Slide Design - Presentation View - Adding Text - Font formatting - Paragraph formatting – Inserting Clipart & Pictures - Inserting and Manipulating Smart Art - Running a slide show - Insert Slide Number - Slide Header & Footer - Applying Slide Animation – Custom Animation - Inserting Shapes - Insert Video & Sound - Insert Action - Hyperlinks - Charts - Tables – Page Setup - Print Preview - Printing - Shortcuts of various activities in presentations – Exercises.	9

EXERCISES **COURSE OUTCOME**

EXERCISE 1 : WORD PROCESSING **D002.2**

Prepare a report from the given printed document of minimum 250 words. (Use text formatting tools, header & footer, page number, line spacing, font & images)

Page Setup:

Set Margin: Left-1.5, Right-1.5, Top-1.5 & Bottom-1.5 / Orientation: Portrait / Paper Size: A4 / No. of Columns: 2

Page Background Settings:

Watermark / Page Color / Page Borders

Text & Paragraph Settings:

Title: Font size: 16 – Centered – Bold – Suitable font

Heading: Font size: 14 – Left Aligned – Underlined – Set the Suitable Font Face

Body Text: Font size: 12 – Justified – 1.5 Line Spacing – Set the Suitable Font Face

Header & Footer:

Header – Seminar Name, Name of the student, Reg. No. & Branch

Footer - Page No., Data and Time

Insert:

Footer – Page No., Date and Time

Picture/Clipart/Shapes/Tables

Minimum No. of Words: 250 words

EXERCISE 2 : WORD PROCESSING **D002.2**

Create a resume for placement from the given printed template with your personal details.

Publish a copy of the resume as PDF.

Page Setup:

Margin: Left-0.5, Right-0.5, Top-0.5 & Bottom-0.5 / Orientation: Portrait / Paper Size: A4 /No. of Columns: As per the given resume format.

Page Borders:

Insert Page Border if required.

Font & Paragraph:

Heading : Font size: 12 - Bold – Underlined – Set the Suitable Font Face

Body Text : Font size: 12 – Justified – 1 Line Spacing – Set the Suitable Font Face

Insert, Bullets & Numberings wherever required.

Insert:

Photo for your Resume / table Academic Records.

Save as PDF:

Publish a copy of the Resume as PDF using any PDF Converting Tools.

EXERCISE 3 : WORD PROCESSING D002.2

Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database and generate labels for the applying organizations.

Page Setup:

Margin: Left-1.5, Right-1.5, Top-1.5 & Bottom-1.5 / Orientation: Portrait / Paper Size: A4

Page Background:

Add Page Border for the Letter

Font & Paragraph:

Title: Font size: 16 – Centered – Bold – Suitable font

Heading: Font size: 14 – Left Aligned – Underlined – Set the Suitable Font Face

Body Text: Font size: 12 – Justified – 1.5 Line Spacing – Set the Suitable Font Face

Mailings:

Select Recipients and add a New List of HR Database.

Start Mail Merge through Step by Step Mail merge wizard.

EXERCISE 4 : SPREAD SHEET D002.3

Create a worksheet for the given relational data (minimum ten records) and show the data in the Line Chart, Bar Chart and Pie Chart.

10 Records

Add text to the spreadsheet to the various fields require to analyze the data in Chart

Font & Alignment

Font Face – Font size – Font color

Formulae

Use formulae for the selected data for calculation.

Insert

Charts – Line Chart, Bar Chart & Pie Chart

EXERCISE 5 : SPREAD SHEET D002.3

Create a worksheet for the given data with various functions like Sum, Average, Count, Min, Max & Logical functions [IF, AND].

Data

Create a worksheet and insert various record to the cells.

Formatting

Set the Font using Font Name, Font Size and with various Alignment tools.

Formulas and Functions

Use some functions like Sum, Average, Count, Min, Max and Logical Functions. [IF, AND]

EXERCISE 6 : SPREAD SHEET **D002.3**

Create a worksheet for the given data and analysis the data with various filters and conditional formatting.

Data

Formatting

Text Font Face – Font Size –Font Color - Alignment

Functions

Conditional Formatting

Filters

EXERCISE 7:MS ACCESS **D002.3**

Create a database by using MS Access

Create Design

Creating a Data Base

Creating a Parent Table – Basic Data Table

Creating Form

Query: Extracting Data from single Table

Building Relationship

Manipulation of Data

Retrieving Data from Multiple Tables

Creating and Running Reports

EXERCISE 8:PRESENTATION **D002.4**

Create a presentation of minimum 10 slides from engineering related topic.

Design & Layout

Add a suitable Theme and Layout according to the content of all 10 slides.

Header &Footer Header: Insert the Title & Author Footer : Insert the Date & Slide Number

Font & Paragraph

Font Face – Font Size – Font Color - Alignment – Bullets & Numberings

Insert

Images & Tables

EXERCISE 9 :PRESENTATION **D002.4**

Create a presentation of 10 slides about your college with Slide & Custom Animation, Shapes, Header & Footer, Slide number, Video, Audio, Picture, Tables and Hyperlink between slides.

Design & Layout

Add a suitable Theme and Layout according to the content of all 10 slides.

Header & Footer

Header: Insert the Title & Author

Footer : Insert the Date & Slide Number

Font & Paragraph

Font Face – Font Size – Font Color - Alignment – Bullets & Numberings

Insert

Video / Audio / Tables / Shapes

Hyperlink

Use hyperlink to link between slides.

Animation

Custom Animation for individual Objects / Slide Transition to all slides

D002 - COMPUTER APPLICATION PRACTICAL

AUTONOMOUS PRACTICAL EXAMINATIONS

Note:

1. The student should be given proper training in all the exercises. All the exercises should be completed before the examinations.
2. The student should maintain observation note book / manual and record notebook. The record note book should be submitted during the Autonomous Practical Examinations. Common printout for the record note book should not be allowed. Individual studentoutput for every exercise should be kept in the record note book.
3. All exercises should be given in the question paper and student is allowed to select any one by lot. All exercises with the hard copy of the template related to the exercise should be provided by the external examiner for the examination. Template can be varied for every batch.
4. The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.

DETAILED MARK ALLOCATION

S.No	Description	Marks Awarded
1	Aim & Procedure	20
2	Execution *	50
3	Output Printout / Handout ^	20
4	Vivavoce	10
Total Marks		**100**

* Should be evaluated during the execution by the examiners only.

^ Students all actual output should be printed and submitted with the exam paper for evaluation**.**

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows

a) Attendance	5 marks (awards of marks same as theory subjects)
b) Procedure/ observation and tabulation/ Other Practical related work	10 Marks
c) Record writing	10 Marks
Total	**25 marks**

LEARNING WEBSITES :

1	https://youtu.be/sFpFCPTDv2w
2	https://youtu.be/2vQM8sueZ8u
3.	https://youtu.be/NrtDlc6BfaE

CO – PO & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D002.1	3	3	3	3	3	2	3	3	2	2
D002.2	3	3	3	3	3	2	3	3	2	2
D002.3	3	3	3	3	3	2	3	3	2	2
D002.4	3	3	3	3	3	2	3	3	2	2
Total	12	12	12	12	12	8	12	12	8	8
Correlation Level	3	3	3	3	3	2	3	3	2	2

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

Hardware and Software Requirements

Minimum Hardware Requirements:

- Desktop Computers – 30Nos
- Processor: 1 GHz, RAM: 1 GB, Hard Drive: 500 GB, Monitor: 15”, Keyboard & Mouse, other accessories
- Overhead Projector: 1 No.
- Laser Printer: 1 No.

Minimum Software Requirements:

- Operating System: Any GUI Operating System
- Office Package (Open Office Packages)

D201 COMMUNICATIVE ENGLISH-II

PROGRAMME NAME : I YEAR GENERAL ENGINEERING
COURSE CODE : D201
SEMESTER : II SEMESTER
COURSE TITLE : COMMUNICATIVE ENGLISH – II

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Communicative English - II	4	64	25	100*	100	3 Hrs.

* **Examinations will be conducted for 100 marks and will be reduced to 75 marks.**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	Functional Grammar and Usage	13
II	English For Enrichment	10
III	Situational English	11
IV	Creative English	10
V	English for Scholarly Presentation/ Fluency	11
Test & Model Exam		09
Total		**64**

COURSE DESCRIPTION:

With the increasing variety of options and opportunities emerging for Diploma Students, fulfilling their communication needs become highly important. Proficiency in communication can equip them to be confident and to cope with the employment and educational situation in any part of the world. Communication levels inspire Higher aspiratory levels in the process of upward mobility in career and socio-cultural evolution of the young individuals. At the end of the course the student should be able to express himself in oral and written communication effectively.

OBJECTIVES:

- To apply functional grammar to produce pristine presentations in English.
- To execute dialogues with his/her friends, teachers and colleagues in day-to-day situations.
- To describe and interpret visuals, images, machine drawings, events in books and on the Net.
- To understand, acquire and employ new structures in scholarly presentations with an exposure to works of Great personalities.
- To communicate effectively with idioms and phrases appropriate to real-life situations.

COURSE OUTCOMES:

After the completion of the course the student will be able to	
D201.1	Apply functional grammar to apply model verb, use negative forms, subordinate conjunction, conational, dialogue to indirect speech and Punctuation
D201.2	Enrich theirlanguage skill using language game, phrases to improve the writing skill.
D201.3	Enhance their knowledge and skill to take the real life situational for their improvements.
D201.4	Develop their creative skills through language and familiar with the technical words in order to achieve their personal goal.
D201.5	Improve their language fluency and presentation skill.

D201 COMMUNICATIVE ENGLISH-II

Unit	Name of the Topics	Hours
I	**Functional Grammar and Usage** • Application of Modal Verbs • Negative Formation (No, Never, Nothing, Hardly, Seldom, No longer, None, Nowhere, Neither …nor) • Use of Subordinating Conjunctions • Use of Conditionals • Reported Speech (Dialogue to Indirect Speech) • Punctuation • Synonyms	13
II	**English for Enrichment** • The Language Game: Unscramble • Phrases (Noun Phrase, Verb Phrase, Prepositional Phrase,etc.) • Cause and Effect • Writing Suitable Responses to the Given Questions • Giving Instructions • Answer for the verbal questions	10
III	**Situational English** • Email for OfficialCommunication • Social MediaLanguage • Reacting to Situations • Correction ofSentences • Proverbs for Everyday Situations	11
IV	**Creative English** • The Language Game: Word PuzzleGrid • Notice Writing for the Given Situations • Slogan Writing • Technical Words • Info graphics Comprehension	10
V	**English for Scholarly Presentation/ Fluency** • "The Lost Child"byMulk Raj Anand • "My Vision for India" by Abdul Kalam • "From Lover's Gift" by Rabindranath Tagore • "The Flower" by Tennyson • "Ozymandias " by B.P.Shelly	11

TEXT BOOKS:

S.No.	TOPICS
1.	Communication English II, Dr. S.Sadasivam, Nice Publications
2.	Communication English II, S.Raghavan, J.Publications

REFERENCE BOOKS

- **Grammar**

1.	Just Enough English Grammar Illustrated, Gabriele Stobbe, McGraw-Hill Osborne Media, 2008
2.	Visual Guide to Grammar and Punctuation, DK Publishing, 2017
3.	English Grammar in Use, Raymond Murphy, Cambridge University Press, 2019
4.	Intermediate English Grammar, Raymond Murphy, Cambridge University Press, Second Edition.
5.	Essential English Grammar, Raymond Murphy, Cambridge University Press, New edition.

- **Motivation**

1	An Autobiography; Or, The Story of My Experiments with Truth, Mahatma Gandhi, Penguin Books, 2001
2	You Can Win, Shiv Khera, New Dawn Press, 2004
3	Chicken Soup for the Soul, Jack Canfield, Mark Victor Hansen, 2001

LEARNING WEBSITES

1	https://www.engineering-dictionary.com/
2	https://techterms.com/definition/
3	http://dictionary.tamilcube.com/
4	https://www.lexilogos.com/english/tamil_dictionary.htm

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	5 marks
ii)	Test	10 marks
iii)	Assignment	5 marks
iv)	Seminar	5 marks
Total marks		**25 marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D201.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D201.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D201.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D201.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D201.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (Low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (High)

QUESTION PAPER SETTING

The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy. The question paper should consist of 90% question based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

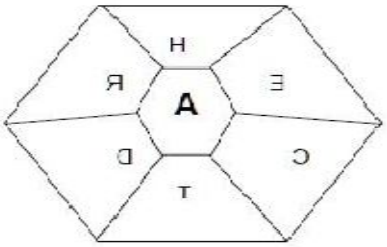
Bloom's Taxonomy Level	**Lower order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R – Remember, **U**-Understand, **Ap**-Apply	**An-**Analyse, **E**-Evaluate, **C-**Create
% to be included	90%	10%

MODEL QUESTION PAPER

D201 - COMMUNICATIVE ENGLISH - II

Time – 3 Hours **Max.Marks : 100**

PART-A (10X4=40 Marks)					
Note : Answer any **TEN** of the following:		**Unit**	**Bloom's Level**	**CO**	**PO**
1.	Rewrite the following sentences using suitable modal verbs without changing the meaning: a) She is able to speakEnglish. b) You are allowed to gohome. c) It is not necessary for you to wait anylonger. d) He will probably pass thetest.	I	AP	D201.1	PO1,PO2, PO3
2.	Fill in the following sentences using suitablenegatives: a) _____of Sankar's friends is invited for theparty. b) Lions_____fight with eachother. c) ___Inmy class is going for thetour. d) ___is as refreshing as the fragrance ofjasmine.	I	AP	D201.1	PO1,PO2, PO3
3.	Rewrite the following sentences using the subordinating conjunctions given in the brackets: a) The meeting had to be postponed due to the Chairman's illness.(Rewrite with 'because') b) We were late. We missed the train. (Rewrite with'Since') c) If we don't hurry up, we will miss our flight. (Rewrite with' Otherwise') d) It was cold but we went for swimming. (Rewrite with'although')	I	U	D201.1	PO1,PO2, PO3
4.	Complete the following conditional sentences with suitable verb given in thebrackets: a) If they_____their house, they would be rich. (sell / sold / willsell) b) If Aruna_____, call me. (comes / came / willcome) c) Thezookeeper_____her with a fine if she had fed the animals.(punished / would have punished / willpunish) d) I would call the officeif I_____you. (was / were /am)	I	AP	D201.1	PO1,PO2, PO3
5.	Rewrite the following conversation into reported speech: Jai : Where are yougoing? Gopi: To theairport. Jai : May I drop you there in mycar? Gopi: Thanks a lot. It will be a great help tome	I	C	D201.1	PO1,PO2, PO3
6.	Correct the paragraph by adding appropriate punctuation andcapitalization: my heart leaps up when I behold a rainbow in the sky wrote Wordsworth the famous poet most of us share his feelings	I	AN	D201.1	PO1,PO2, PO3

<table>
<tr><td></td><td>when we are lucky enough to see a rainbow have you ever tried to reach a rainbowsend.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>7.</td><td>Write the synonyms using the words given in brackets:
a) Shut ---------- (open/close/end)
b) Complete ---------- (final/relevant/total)
c) Fundamental ---------- (secondary/advanced/primary)
d) Risk ---------- (safety/danger/plan)</td><td>I</td><td>AN</td><td>D201.1</td><td>PO1,PO2, PO3</td></tr>
<tr><td>8.</td><td>Make any 4 words by combining the letters in the hexagon. The central letter should be common in eachword.
 
</td><td>II</td><td>AP</td><td>D201.2</td><td>PO1,PO2, PO3</td></tr>
<tr><td>9.</td><td>Make use of the following phrases and write your ownsentences:
a) The black cat
b) Without fail
c) To a great extent
d) Has been working</td><td>II</td><td>AP</td><td>D201.2</td><td>PO1,PO2, PO3</td></tr>
<tr><td>10.</td><td>Combine the cause with the effect and rewrite the sentences using appropriate connectives:
<table><tr><th>Sl. No</th><th>Cause</th><th>Connectives</th><th>Effect</th></tr><tr><td>a</td><td>Their son is ill</td><td>As a result</td><td>We stayed at home.</td></tr><tr><td>B</td><td>It was raining.</td><td>Because</td><td>We had to cancel match.</td></tr><tr><td>C</td><td>She liked the puppy.</td><td>Consequently</td><td>They had to cancel thetrip.</td></tr><tr><td>D</td><td>The weather bad.</td><td>So</td><td>She adopted it.</td></tr><tr><td></td><td></td><td>Therefore</td><td></td></tr><tr><td></td><td></td><td>This causes</td><td></td></tr></table></td><td>II</td><td>C</td><td>D201.2</td><td>PO1,PO2, PO3</td></tr>
<tr><td>11.</td><td>Write suitable responses for the following wh questions asdirected:
a. How are you?
b. Which is your native place?
c. Where are you going?
d. When do you get up from the bed?</td><td>II</td><td>U</td><td>D201.2</td><td>PO1,PO2, PO3</td></tr>
<tr><td>12.</td><td>Use imperatives and write any 4 instructions to be followed</td><td>II</td><td>C</td><td>D201.2</td><td></td></tr>
</table>

<table>
<tr><td></td><td>in the chemistry lab.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>13.</td><td>Write suitable responses for the following verbal questions.
a. Do you like sweets? (Affirmative)
b. Can you do the work? (Negative)
c. Will you come to my home? (Negative)
d. Is he a doctor? (Affirmative)</td><td>II</td><td>AP</td><td>D201.2</td><td>PO1,PO2, PO3</td></tr>
<tr><td colspan="4">II. Answer any FOUR ofthe following:(4 x 5 = 20)</td><td></td><td></td></tr>
<tr><td>1.</td><td>You are Mr.Arul and you recently bought a mobile phone from Smart Mobiles. Write an email to the Manager of Smart mobiles, explaining the poor quality of service offered in yourcity.</td><td>III</td><td>C</td><td>D201.3</td><td>PO1,PO2, PO3</td></tr>
<tr><td>2.</td><td>Convert the following acronyms / abbreviations used in social media into formal language:
a. NVM
b. RSVP
c. TYT
d. BTW
e. POV</td><td>III</td><td>AP</td><td>D201.3</td><td>PO1,PO2, PO3</td></tr>
<tr><td>3.</td><td>Write a dialogue with minimum 5 exchanges between the class tutor and a student on submitting assignments</td><td>III</td><td></td><td>D201.3</td><td>PO1,PO2, PO3</td></tr>
<tr><td>4.</td><td>Identify the grammatical / lexical errors in the following sentences and correct them:
<table>
<tr><th>Sl.No</th><th>Sentence</th><th>Error</th><th>Correction</th></tr>
<tr><td>A</td><td>Amar is a artist.</td><td></td><td></td></tr>
<tr><td>B</td><td>He love to paint and draw.</td><td></td><td></td></tr>
<tr><td>C</td><td>His favorite color is bright green.</td><td></td><td></td></tr>
<tr><td>D</td><td>He has buided his house.</td><td></td><td></td></tr>
</table></td><td>III</td><td>AN</td><td>D201.3</td><td>PO1,PO2 ,PO3</td></tr>
<tr><td>5.</td><td>Match the meanings with their proverbs
<table>
<tr><th>Meanings</th><th>Proverbs</th></tr>
<tr><td>a) If you can’t see someone or something, you soon forget about them.
b) Achieve two goals with one action.
c) If you want to know about someone, look at his friends.
d) Some people never change.
e) No choice atall.</td><td>1. A leopard can’t change itsspots.
2. Kill two birds with onestone
3. Too many cooks spoil thebroth.
4. Out of sight, out ofmind.
5. A double-edged sword.
6. A person is known by the company he keeps.
7. Hobson’s choice</td></tr>
</table></td><td>III</td><td>AN</td><td>D201.3</td><td>PO1,PO2, PO3</td></tr>
<tr><td>1.</td><td>Find the antonyms of the given words in the vocabulary grid
a.Happy b.Hard c.Late d.Hot</td><td>IV</td><td></td><td>D201.4</td><td>PO1,PO2, PO3</td></tr>
</table>

	W	S	A	P	A	E	H	C		AP		
	E	O	U	G	L	Y	I	O				
	T	E	A	S	Y	E	G	L				
	S	A	D	O	A	U	H	D				
	O	R	I	G	H	T	T	E				
	F	L	V	E	F	D	I	N				
	T	Y	E	Q	U	I	C	K				
2	You are Sports – in – charge. Write a noticecongratulating and praising the achievement of your college cricket team that has won the district level trophy.								IV	U	D201.4	PO1,PO2, PO3
3	Write 2 Slogans on your own on “SAVEENVIRONMENT”.								IV	AP	D201.1	PO1,PO2, PO3
4	Write the appropriate technical words for thefollowing: a) The area of Artificial Intelligence concerned with the practical use ofrobots. b) The plan / design of something that is laidout. c) The creation of something in themind. d) An elaborate and systematic plan ofaction. e) A weakened state caused by long stress on a material.								IV	C	D201.4	PO1,PO2, PO3
5	Look at the following in graphics and prepare a report of about 50 words using the information presented init: 								IV	C	D201.4	PO1,PO2, PO3
IV Write short notes on any FIVE of the following in about50 words: (5x4=20)												
1.	Appreciate the former President Dr. Kalam’s vision forIndia.								V	AN	D201.5	PO1,PO2, PO3
2.	List out the things the child sees on his way to thefair.								V	AN	D201.5	PO1,PO2, PO3
3.	“It is to life what Newton’s law is to astronomy’ –Explain.								V	U	D201.5	PO1,PO2, PO3
4.	What makes one side of the roadshady?								V	C	D201.5	PO1,PO2, PO3
5.	Bring out the theme of the poem “TheFlower”.								V	AN	D201.5	PO1,PO2, PO3
6.	Identify an individual’s role in India’sdevelopment								V	U	D201.5	PO1,PO2, PO3
7.	Describe the philosophical ideas in Shelley’s Ozymandias.								V	AN	D201.5	PO1,PO2, PO3

Note : The question paper setters are requested to follow the Revised Blooms Taxonomy levels as presented below

Bloom’s Taxonomy Level	**Lower order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R – Remember, **U-**Understand, **Ap-**Apply	**An-**Analyse, **E-**Evaluate, **C-**Create
% to be included	90%	10%

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D202 - ENGINEERING MATHEMATICS – II

(Implemented from the Academic year 2021-2022 onwards)

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D202

Semester : II SEMESTER

Course Title : ENGINEERING MATHEMATICS - II

TEACHING AND SCHEME OF EXAMINATION

Number of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Mathematics - II	5	80	25	100*	100	3 Hrs

*** Examinations will be conducted for 100 marks will be reduced to 75 marks.**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	Analytical Geometry	13
II	Vector Algebra	13
III	Integral Calculus – I	15
IV	Integral Calculus – II	15
V	Application of Integration	15
	Test & Model Exam	09
	Total	**80**

COURSE DESCRIPTION:

The basic idea of Engineering is to develop new technologies for the effective use of materials and produced maximum outputs thereby attain maximum profit. Many of the physical problems in Engineering becomes the differential equation when mathematical modeling is done. To solve this problems, integration, the strong tool in mathematics is utilized, which intends to give basic concepts of integration.

OBJECTIVES:

- To acquire knowledge of circle ,concepts, principles and different methods.
- To acquireknowledge in Dot and Cross product inVector Algebra.
- To acquire knowledge in basic concepts of integration.
- To solve this problems, integration, the strong tool in mathematics is utilized.
- To enhance the knowledge about the Applications of Integration.

COURSE OUTCOMES:

After the completion of this course, the students will be able to	
D202.1	Understand the concept of straight lines, pair of straight lines , Family of circles and Applications of Conics.
D202.2	Acquire the knowledge about types of vectors, Applications of scalar and vector product
D202.3	Understand the basic concepts of Integration and its types.
D202.4	Acquire the knowledge about Bernoulli's Formulae and Definite Integrals
D202.5	Acquire the knowledge about the Application of Integration

D202- ENGINEERING MATHEMATICS – II

Unit	Name of the Topics	Hours
I	**ANALYTICAL GEOMETRY** **1.1 ANALYTICAL GEOMETRY I:** Circles –General equation of a circle – simple problems. Equation of the circle on the line joining the points (x_1, y_1) and (x_2, y_2) as a diameter - simple problems. **1.2 ANALYTICAL GEOMETRY II:** Family of circles-Concentric circles – Orthogonal circles(condition only) – contact of circles - simple problems. **1.3 CONICS** Definition of a conic, Focus, Directrix and Eccentricity. General equation of a conic $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$(statements only) . condition for conic (i) For circle : a = b and h = 0 (ii) For pair of straight line $\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = 0$ (iii) For parabola $h^2 - ab = 0$ (iv) For ellipse $h^2 - ab < 0$ and (v) For hyperbola $h^2 - ab > 0$ simple problems.	3 4 6

II	**VECTOR ALGEBRA** **2.1 VECTOR – INTRODUCTION** Definition of vector – types, addition, subtraction and scalar multiplication of vector, properties of addition and subtraction. Position vector, Resolution of vector in three dimensions, distance between two points, Direction cosines and direction ratios-simple problems. **2.2 PRODUCT OF TWO VECTORS** Scalar product – Vector product – condition for parallel and perpendicular vectors, properties, angle between two vectors, unit vector perpendicular to two vectors –simple problems. **2.**3 **APPLICATION OF SCALAR AND VECTORPRODUCT** Application of Scalar and Vector product- Work done by force - Moment offorce – simple problems.	**5** 4 4
III	**INTEGRAL CALCULUS – I** **3.1 INTEGRATION - DECOMPOSITON METHOD** Historical approach for integration - Anti derivative - Definition of the integral as an anti-derivative - Fundamental rules for integration - Integration using decomposition method - simple problems based on Engineering Applications. **3.2 METHODS OF INTEGRATION - INTEGRATION BY SUBSTITUTION** Integralsoftheform $\int [f(x)]^n f(x)\,dx$, where $n \neq -1$, $\int \frac{f'(x)}{f(x)}dx$, $\int F[f(x)]\, f'(x)\, dx$ and $\int e^{f(x)} f'(x)dx$ -simple problems **3.3 STANDARDINTEGRALS** Integrals of theform $\int \frac{dx}{a^2 \pm x^2}$, $\int \frac{dx}{x^2 - a^2}$, $\int \frac{dx}{\sqrt{a^2 - x^2}}$ $\int \sqrt{a^2 - x^2}\,dx$, $\int \sqrt{x^2 \pm a^2}\,dx$ - Simple problems.	**5** **5** **5**
IV	**INTEGRAL CALCULUS - II** **4.1METHODS OF INTEGRATION - INTEGRATION BYPARTS** Integrals of the form $\int x \sin nx\,dx$, $\int x \cos nx\,dx$, $\int xe^{nx}dx$, $\int x^n \log x\,dx$, and $\int \log x\,dx$ - Simple problems. **4.2 BERNOULLI'SFORMULA** Evaluation for the integrals $\int x^m \sin nx\,dx$, $\int x^m \cos nx\,dx$ and $\int x^m e^{nx}dx$ Where $m \leq 3$ using Bernoulli's formula - Simple problems.	**4** **5**

	4.3DEFINITEINTEGRALS Definition of definite integral – Properties of definite integrals - Simple problems	6
V	**APPLICATION OF INTEGRATION** **5.1 Area and volume** Area and volume – Area of circle – volume of sphere and cone- simple problems. **5.2. First order Differential Equation** Solution of first order variable separable type , differential equation- simple problems. **5.3Linear type Differential Equation** Solution of Linear differential equation – simple problems.	**5** **5** **5**

TEXT BOOKS

S.NO	TOPICS
1	Higher Secondary +1 & +2 Mathematics volume I&II. Tamil Nadu Text book corporation.
2	Engineering Mathematics – II DOTE , Tamilnadu

REFERENCE BOOKS

S.NO	TOPICS
1	Engineering Mathematics V.Sundaram, R. Balasubramanian
2	Engineering Mathematics – I C.B.Gupta ,A.K.Malik, New age international Publishers, 1st edition – 2008.
3	Differential Calculus S. BalachandraRao, CK Shantha New age Publishers
4	Probability theory and stochastic Process B.Prabhakara Rao,TSR Murthy,BS publishers
5	Vectors and Geometry GS. Pandey, RR Sharma, New age international publishers
6	Engineering Mathematics – I GuruprasadSamanta, New age international publishers, 2nd edition 2015.
7	Engineering Mathematics ReenaGarg, Khanna publishing house, New Delhi, Revised edn. – 2018.
8	Engineering Mathematics Volume I P. Kandasamy and K.Thilagavathy, S. Chand & Company Ltd.

LEARNING WEBSITES :

1	https://bookboon.com/en/fundamentals-of-mathematics-ebook
2	https://nptel.ac.in

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	5 Marks
ii)	Test	10 Marks
iii)	Assignment	10 Marks
iv)	Seminar	5 Marks
Total		**25 Marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D202.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D202.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D202.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D202.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D202.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
CorrelationLevel	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

QUESTION PAPER SETTING

The teaching learning process and assessments are being carried out in accordance with the revised Bloom's Taxonomy.The question paper should consist of 90% question based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

AUTONOMOUS EXAMINATION-QUESTION PAPER PATTERN

For all theory subjects except Communicative English I & II
and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. **Max.Marks:100**

PART - A Answer any **10** Questions Choosing the correct answer out of **15**Questions . Each question carries one mark.

PART-B Answer any **10** Questions out of **15**Questions . Each question carries two marks

PART - C All the **5** question to be answered.Each question in **PART-C** will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered for **7** marks each .

The questions are to be numbered from 1 to 35. All the units are to be covered with equal weightage.

PART –A Objective type questions Question Number 1 to 15	**10**x1 = **10** marks
PART –B Short answer type questions Question Number 16 to 30	**10**x2 = **20**marks
PART –C Descriptive answer type questions Question Number 31 to 35 Each question inPART –C will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered .	**5**x 14 = **70** marks
Total	**100**Marks *

Note: * Autonomous Examinations will be conducted for 100 Marks and converted to 75 Marks**.**

MODEL QUESTION PAPER

D202 - ENGINEERING MATHEMATICS – II

Time : 3 Hrs. **Max. Marks : 100**

Note :

1. Answer any Ten questions in PART A. Each question carries one Mark.
2. Answer any ten questions in PART B. Each question carries two marks.
3. Answer all question in PART C - choosing any two subdivision from each question. All Sub division carries 14 marks
4. Clarkes Table and programmable calculators are not permitted

PART – A (10X1=10 Marks)					
Answer any TEN questions choosing the correct answer					
S.NO	**QUESTIONS**	**UNIT**	**BLOOM'S LEVEL**	**Co**	**Po**
1	The equation of the circle with centre at the origin and radius 10 units is a) $x^2+y^2=10$ b) $x^2-y^2=10$ (c) $x^2-y^2=100$ (d) $x^2+y^2=100$	I	R	D101.1	Po1,Po2, Po4,
2	Two circles having same centre with different radius is called as a) concentric circle b) contact of circle c) orthogonal circle d) symmetric circle	I	U	D101.1	Po1,Po2, Po4,
3	The condition for the parabola is a) $h^2=0$ b) $h^2 \le 0$ c) $h^2 \ge 0$ d) h= 0	I	A	D101.1	Po1,Po2, Po4,
4	The sum of the two vectors $\vec{a} = 4\vec{\imath} + 5\vec{\jmath} - 2\vec{k}$ and $\vec{b} = 2\vec{\imath} + \vec{\jmath} + 3\vec{k}$ (a) $6\vec{\imath} + 6\vec{\jmath} - \vec{k}$ (b) $6\vec{\imath} + 6\vec{\jmath} + \overrightarrow{k}$ c) $6\vec{\imath} + 5\vec{\jmath} - \vec{k}$ (d) $6\vec{\imath} + 5\vec{\jmath} + \vec{k}$	II	R	D101.2	Po1,Po2, Po4
5	If the vectors $\vec{\imath} - 2\vec{\jmath} - 4\vec{k}$ and $2\vec{\imath} - m\vec{\jmath} + 3\vec{k}$ are perpendicular, then the value of m is a)m =5 (b) m =-5 (c) m =20 (d) m =-20	II	U	D101.2	Po1,Po2, Po4,
6	If the force $\vec{F} = 3\vec{\imath} + 5\vec{\jmath} + 7\overrightarrow{k}$ and the displacement $\vec{d} = 2\vec{\imath} - \vec{\jmath} + \vec{k}$ then the work done is a $)\overrightarrow{\vec{F}\vec{d}} = -8$ b)$\vec{F} \cdot \vec{d} = 8$ c)$\vec{F} \cdot \vec{d} = 18$ d)$\vec{F} \cdot \vec{d} = 6$	II	A	D101.2	Po1,Po2, Po4,
7	The formulae for $\int \sec^2 x dx$ a) tanx +c b)$\tan^2 x$ c)secx. tanx +c d)$\text{cosec}^2 x+c$	III	U	D101.3	Po1,Po2, Po4,
8	The value of $\int e^{8x-5} dx$ a) e^{8x-5} +c b) $8e^{8x-5}$ +c c) $\frac{e^{8x-5}}{8}+c$ d) e^{8x+5} +c	III	R	D101.3	Po1,Po2, Po4,
9	The value of $\int \frac{dx}{x^2-a^2}$ is a)$cos^{-1}x$ b)$sin^{-1}\frac{x}{a}$ c) $\frac{1}{2a}\log\frac{x-a}{x+a}$ d)$\frac{1}{a}tan^{-1}\frac{x}{a}$	III	AP	D101.3	Po1,Po2, Po4,
10	The value of $\int \log x \, dx$ is a)$\frac{1}{x}$ b) x log x c)x log x - x d) x- x log x	IV	R	D101.4	Po1,Po2, Po4,

11	The value of $\int xe^x$ dx is a) $xe^x + x + c$ b) $xe^x - e^x + c$ c) $xe^x + c$ d) $e^x + c$	IV	R	D101.4	Po1,Po2, Po4,
12	The value of $\int_1^3 \frac{dx}{x}$ dx is a) log 1 b) log 3 - log 1 c) log 1- log 3 d) log 3	IV	U	D101.4	Po1,Po2, Po4,
13	The area bounded by the curve $y = x^3$ between x = 0 and x = 1 $a) \frac{1}{4}$ $b)$ 4 $c) \frac{1}{-4}$ $d)$ 0	V	A	D101.5	Po1,Po2, Po4,
14	The value of $\int x\,dx + y\,dy = 0$ is a) $x^2 - y^2 = c$ b) $x^2 = y^2$ c) $2x^2 = y^2$ d) $x^2 + y^2 = c$	V	A	D101.5	Po1,Po2, Po4,
15	The integrating factor of $\frac{dy}{dx}$ + Py = Q is a) $\int dx$ b) $e^{\int dx}$ c) $e^{\int p\,dx}$ d) $\int p\,dx$	V	R	D101.5	Po1,Po2, Po4,
PART – B (10X2=20 MARKS)					
Answer Any TEN Questions. All Questions Carries Equal Marks.					
Sl. NO	**QUESTIONS**	**UNIT**	**BLOOM'S LEVEL**		
16	Find the equation of the circle whose centre is (-1, 2) and radius 5	I	U	D101.1	Po1,Po2, Po4,Po5, Po6
17	Find the centre and radius of the circle $x^2 + y^2 - 4x + 8y - 7 = 0$	I	R	D101.1	Po1,Po2, Po4,Po5, Po6
18	Find the equation of the hyperbola with vertices (0, ±3) and foci (0,±7)	I	U	D101.1	Po1,Po2, Po4,Po5, Po6
19	Find the direction cosines of the vector $2\vec{i}+3\vec{j}-4\vec{k}$	II	U	D101.2	Po1,Po2, Po3,Po7
20	Find the value of 'p' so that $2\vec{i}+p\vec{j}+\vec{k}$ and $4\vec{i}+2\vec{j}-2\vec{k}$ may be perpendicular.	II	R	D101.2	Po1,Po2, Po3,Po7
21	Find the workdone by the force $\vec{i}+2\vec{j}-\vec{k}$ and the displacement is $2\vec{i}-\vec{j}+2\vec{k}$.	II	R	D101.2	Po1,Po2, Po3,Po7
22	Evaluate $\int (x^2 - 3x + 1)\,dx$.	III	U	D101.3	Po1,Po2, Po3,Po7
23	Evaluate $\int \frac{2x}{x^2+1} dx$	III	R	D101.3	Po1,Po2, Po3,Po7
24	Evaluate $\int \frac{1}{16+x^2}$ dx	III		D101.3	Po1,Po2, Po3,Po7
25	Evaluate $\int x \cos x\,dx$	IV	E	D101.4	Po1,Po2, Po3,Po7
26	Evaluate $\int x^2 e^{2x} dx$	IV	E	D101.4	Po1,Po2, Po3,Po7
27	Evaluate $\int_0^1 \frac{dx}{1+x^2}$	IV	E	D101.4	Po1,Po2, Po3,Po7
28	Find the volume bounded by the curve $y = x^2$ between x= 0 and x = 2	V	E	D101.5	Po1,Po2, Po3,Po7
29	Solve : $\frac{dy}{dx} = 2xy$	V	E	D101.5	Po1,Po2, Po3,Po7

30	Find the integrating factor of $\frac{dy}{dx} + \frac{y}{x} = x^2$	V	E	D101.5	Po1,Po2, Po3,Po7
PART – C (5X2x7=70 MARKS)					
[Note:(i) Answer all questions Choosing any two subdivision from each question. (ii) All subdivision carry equal Marks]					
Sl. NO	**QUESTIONS**	**UNIT**	**BLOOM'S LEVEL**		
31(a)	Find the equation of the circle passing through (2,1) and having its centre at (-3,-4).	I	AP	D101.1	Po1,Po2, Po4,Po5, Po7
(b)	Show that the circles $x^2 + y^2 - 4x - 6y + 9 = 0$ and $x^2 + y^2 + 2x + 2y - 7 = 0$ touch each other.	I	R	D101.1	Po1,Po2, Po4,Po5, Po7
(c)	Find the equation of the parabola whose focus is the point (1,2) and whose directrixis the straight line $x + y - 2 = 0$.	I		D101.1	Po1,Po2, Po4,Po5, Po7
32(a)	Show that the points whose position vectors are $2\vec{i}+4\vec{j}+3\vec{k}$, $4\vec{i}+\vec{j}-4\vec{k}$ and $6\vec{i}+5\vec{j}-\vec{k}$ form a right angled triangle.	II	R	D101.2	Po1,Po2, Po4,Po5, Po7
(b)	Find the angle and the unit vector perpendicular both the vectors $\vec{a}=\vec{i}+2\vec{j}+3\vec{k}$ and $\vec{b}=\vec{i}-\vec{j}-\vec{k}$.	II	A	D101.2	Po1,Po2, Po4,Po5, Po7
(c)	A particle acted on by forces $3\vec{i} - 2\vec{j}+2\vec{k}$ and $2\vec{i}+\vec{j}-3\vec{k}$ is displaced from the point $\vec{i}+3\vec{j}-\vec{k}$ to $4\vec{i}-2\vec{j}+2\vec{k}$.Find the workdone by the forces.	II	AP	D101.2	Po1,Po2, Po4,Po5, Po7
33(a)	Evaluate (i) $\int \tan^2 x\, dx$. (ii) $\int \sqrt{1+\sin 2x}\,dx$.	III	R	D101.3	Po1,Po2, Po4,Po5, Po6,Po7
(b)	Evaluate(i) $\int \frac{\sin x}{1-\sin x}\, dx$ (ii) $\int \frac{2ax+b}{\sqrt{ax^2+bx+c}}\, dx$	III	AP	D101.3	Po1,Po2, Po4,Po5, Po6,Po7
(c)	Evaluate (i) $\int \frac{dx}{9+4x^2}$ (ii) $\int \frac{dx}{\sqrt{49 - 9x^2}}$	III	A	D101.3	Po1,Po2, Po4,Po5, Po6,Po7
34(a)	Evaluate(i) $\int x \sin x\, dx$ (ii) $\int x\, e^{5x} dx$	IV	E	D101.4	Po1,Po2, Po4,Po5, Po6,Po7
(b)	Evaluate (i) $\int x^2 e^{2x} dx$ (ii) $\int x^3 \cos x\, dx$	IV	E	D101.4	Po1,Po2, Po4,Po5, Po6,Po7
(c)	Evaluate(i) $\int_0^{\frac{\pi}{4}} \tan x \sec^2 x\, dx$ (ii) $\int_0^{\pi} \frac{\sin x}{\sin x + \cos x}\, dx$	IV	E	D101.4	Po1,Po2, Po4,Po5, Po6,Po7
35(a)	Find the area of the circle of radius "r" by integration	V	E	D101.5	Po1,Po2, Po4,Po5, Po6,Po7
(b)	Solve $\tan x \sec^2 y\, dy + \tan y \sec^2 x\, dx = 0$	V	E	D101.5	Po1,Po2, Po4,Po5, Po6,Po7
(c)	Solve $\frac{dy}{dx} + y \cot x = 4x \operatorname{cosec} x$	V	E	D101.5	Po1,Po2, Po4,Po5, Po6,Po7

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as presented below:

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R-Remember, U-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

D203 - ENGINEERING PHYSICS – II

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D203

Course Semester : II SEMESTER

Course Subject Title : ENGINEERING PHYSICS – II

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester : 16 weeks

Course	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Autonomous Examination	Total	
Engineering Physics-II	4	64	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	Heat	11
II	Thermodynamics, Liquefactionofgases&Non-conventionalenergy	11
III	Light and Remote Sensing	11
IV	Electricity	11
V	Electronics	11
	Test &Model Exam	09
	Total	**64**

COURSE DESCRIPTION:

The exponential growth of Engineering and Technology has benefited the mankind with extreme sophistication and comfort. To sustain this development, continuous research and development should take place not only in Engineering and Technology but also in Basic Science such as Physics.

The various divisions of Physics like Optics, Acoustics, Dynamics, Semiconductor Physics, Surface Physics, Nuclear Physics, Energy Studies, Materials Science, etc provide the Foundation by enlightening the Fundamental facts, Principles, Laws and Correct sequence

of events to develop the Engineering and Technology field for the prosperity of human beings.

OBJECTIVES:

The objective of this Course is to make the student:

- To understand, Identify good conductors and insulators of heat.
- To analyse the relation between pressure, volume and temperature of gas and to interpret the results.
- To understand the process of Isothermal and Adiabatic changes of gas and basic laws of thermodynamics.
- To acquire knowledge about liquefaction process of gases.
- To realise the inevitable need for tapping Alternate energy to address the looming energy crisis.
- To identify the characteristics and properties of LASER, and Optical fibre cable and their engineering applications.
- To acquire broader ideas about the process of remote sensing in tapping the earth resources for human benefits.
- To acquire knowledge about heating, chemical and magnetic effects of electric current.
- To gain broader ideas of capacitors, diodes, transistors, integrated circuits and logic gates.
- To identify, analyse and solve Engineering field related problems involving expressions derived in all the above topics.

COURSE OUTCOMES:

After the completion of this course, the students will be able to	
D203.1	Identify good conductors and insulators of heat and to analyze the relation between pressure, volume and temperature of gas and to interpret the results
D203.2	Acquire knowledge about Thermodynamics ,liquefaction of gases and Non-conventional Energy.
D203.3	Identify the characteristics and properties of LASER, Remote Sensing ,Opticalfibre cable and their engineering applications.
D203.4	Acquire knowledge about heating, chemical and magnetic effects of electric current and solve the problems related to them.
D203.5	Gain broader ideas of diodes, transistors, integrated circuits and logic gates and solve Engineering field related problems

D203 - ENGINEERING PHYSICS – II

Unit	Name of the Topics	Hours
I	**HEAT** **1.1 TRANSFER OF HEAT** Concept of Heat and Temperature - Centigrade, Fahrenheit and Kelvin scales of temperature measurement- Conduction, convection and radiation - Definitions and explanations-Good and Poor conductors-Examples. Coefficient of thermal conductivity-Definition and SI Unit-Properties of thermal radiation – Heat conversions **1.2 KINETIC THEORY OF GASES** Postulates –Mean square velocity and Root Mean Square (RMS) velocity of molecules - Definitions and expressions – Expression for the pressure of a gas on the basis of postulates of kinetic theory of gases –Relation between pressure and kinetic energy of the gas-Relation between kinetic energy and absolute temperature–Simple problems based on the expression for the pressure of a gas. **1.3SPECIFIC HEAT CAPACITY** Specific heat capacity of a substance (solids and liquids) –Definition -Specific heat capacity of a gas at constant volume – Specific heat capacity of a gas at constant pressure– Ratio of specific heat capacities -Explanation for Cp is greater than Cv– Derivation of Mayer's relation -calculation of Universal gas constant R from the gas equation PV= RT -Simple problems based on Mayer's relation – Solved problems.	4 4 3
II	**THERMODYNAMICS, LIQUEFACTION OF GASES and NON-CONVENTIONAL ENERGY** **2.1 THERMODYNAMICS** First law of thermodynamics – Statement - Isothermal and Adiabatic changes - Explanation – Equations for isothermal and adiabatic changes(No derivation) Simple problems based on equations $P_1V_1= P_2V_2$ and$P_1V_1^{\gamma} = P_2V_2^{\gamma}$. Second law of thermodynamics – Clausius statement and Kelvin's statement - Working of Carnot's reversible engine with indicator diagram and its efficiency – Applications of heat and thermodynamics.	4

	2.2 LIQUEFACTION OF GASES Critical temperature, critical pressure and critical volume – Definitions- Principle used in cascade process –Cascade process of liquefaction of oxygen –Disadvantages of cascade process - Joule Thomson effect - Temperature of inversion – Liquefaction of air by Linde's process. **2.3 NON – CONVENTIONAL ENERGY** Introduction – Non-renewable and Renewable (Alternate) energy sources– Examples – Solar energy, Wind energy – Advantages and disadvantages of renewable energy – Tidal Energy-Geothermal energy	4 3
III	**LIGHT AND REMOTE SENSING** **3.1 OPTICS** Refraction – Laws of refraction – Refractive index of a medium- Derivationof refractive index of glass prism using minimum deviation- Definition –Spectrometer – Experimental determination of refractive index using spectrometer- Phenomenon of total internal reflection – Fiber optics- Introduction –Optical Fiber Cable as a wave guide – advantages of OFC– Problems using the refractive index – Applications of total internal reflection. **3.2 LASER** LASER – Characteristics of LASER – principle of LASER –Spontaneous emission – Stimulated emission – population inversion – Ruby Laser- Construction and working- Uses of LASER. **3.3 REMOTE SENSING** Remote sensing – Introduction – Active and passive remote sensing- Explanation and examples – Components of remote sensing – Data acquisition and data analysis - Reference data – RADAR – principle and working with block diagram.	4 3 4
IV	**ELECTRICITY** **4.1 ELECTRICAL CIRCUITS** Ohm's law – Laws of resistances – Resistivity, Conductivity, Superconductivity and Meissner effect- Definitions – Kirchhoff's current and voltage laws. Condition for balancing the Wheat Stone's bridge – Simple problems based on expression for resistivity. Capacitance of a capacitor –Definition – 'farad'– Definition– expressions for effective capacitance when capacitors are connected in series and in parallel.	4

	Simple problems based on effective capacitance for series and parallel connections of capacitors – Applications of capacitors. **4.2 EFFECTS OF CURRENT** Joule's law of heating – Experimental determination of specific heat capacity of a liquid using Joule's calorimeter – Faraday's laws on electrolysis – Electro chemical equivalent (e.c.e) of an element - Definition – Experimental determination of e.c.e. of copper –Simple problems based on expressions for e.c.e – Applications of heating effect of electric current. **4.3 MEASURING INSTRUMENTS** Expression for the force acting on a current carrying straight conductor placed in a uniform magnetic field – Fleming's Left Hand rule – Expression for the torque experienced by a rectangular current carrying coil placed inside a uniform magnetic field – Working of a moving coil galvanometer and its merits – Conversion of galvanometer into an Ammeter and Voltmeter. Simple problems based on conversion of Galvanometer into Ammeter and Voltmeter – Solved problems.	3 4
V	**ELECTRONICS** **5.1 SEMI CONDUCTORS** Semiconductors – Intrinsic semiconductors -Concept of holes – Doping-Extrinsic semiconductors – Energy bands in solids – Energy band diagram of good conductors, insulators and semiconductors–Conceptsof Fermi level – P type and N type semiconductors. **5.2 DIODES AND TRANSISTORS** P-N junction diode – Forward bias and reverse bias –Rectification action of diode – Working of full wave bridge rectifier using P N junction diodes -PNP and NPN transistors – Three different configurations-advantages of common emitter configuration – Working of NPN and PNP transistor in common base configuration- working of NPN transistor as an amplifier in common emitter configuration. **5.3 DIGITAL ELECTRONICS** Digital electronics – Introduction – Logic levels – Basic logic gates: OR,AND , NOT gates – Universal logic gates: NAND and NOR gates-Symbolic representation, Boolean expression and Truth table for allabove logic gates – Integrated circuits– Levels of integration – SSI, MSI,LSI and VLSI-Advantages of ICs – Applications of transistors, gates andICs – Solved problems.	3 5 3

TEXT BOOKS

1	Physics – Higher secondary – First year – Volume I & II – Tamil Nadu text book Corporation 2004
2	Engineering Physics II - .DOTE, Tamilnadu

REFERENCE BOOKS:

1	Fundamentals of physics – Brijlal and Subramaniam.
2	Fundamentals of Electricity – D.N. Vasudeva – S. Chand & co
3	Non- Conventional energy sources – G.D. Rai.-Khanna publishers.
4	Text book of Remote sensing and Geographical information systems – M. Anji Reddy BS publications.

LEARNING WEBSITES :

1	https:///bookboon .com/en/fundamentals-of-physics-ebook

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	5 marks
ii)	Test	10 marks
iii)	Assignment	5 marks
iv)	Seminar	5 marks
Total Marks		**25 marks**

CO- POs & PSOs MAPPING MATRIX

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
D203.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D203.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D203.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D203.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D203.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

QUESTION PAPER SETTING

The teaching learning process and assessment are being carried out in accordance with the revisedBloom'sTaxonomy.The question paper should consist of 90% question based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom'sTaxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills(HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

AUTONOMOUS EXAMINATION-QUESTION PAPER PATTERN

For all theory subjects except Communicative English I & II
and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. **Max.Marks:100**

PART - A Answer any **10** Questions Choosing the correct answer out of **15**Questions . Each question carries one mark.

PART-B Answer any **10** Questions out of **15**Questions . Each question carries two marks

PART - C All the **5** question to be answered.Each question in **PART-C** will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered for **7** marks each .

The questions are to be numbered from 1 to 35. All the units are to be covered with equal weightage.

PART –A Objective type questions Question Number 1 to 15	**10**x1 = **10** marks
PART –B Short answer type questions Question Number 16 to 30	**10**x2 = **20**marks
PART –C Descriptive answer type questions Question Number 31 to 35 Each question inPART –C will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered .	**5**x 14 = **70** marks
Total	**100**Marks *

Note: * Autonomous Examinations will be conducted for 100 Marks and converted to 75 Marks**.**

MODEL QUESTION PAPER

D203 – ENGINEERING PHYSICS - II

Time : 3 Hours **Max. Marks: 100**

PART- A (10 X 1 = 10 Marks)					
Answer Any TEN Questions choosing the Correct Answer					
S.No.	**Questions**	**Unit**	**Bloom's Level**	**CO**	**PO**
1.	The SI unit of temperature is (a) K (b) C (c) N (d) None	I	R	D203.1	PO1,PO2,PO3
2	The example of good conductor is (a)copper (b)wood (c)cork (d)none of these	I	R	D203.1	PO1,PO2,PO3
3	The relation between pressure and kinetic energy is (a) 2/3 KE (b) 1/3 KE (c) 1/3 KE^2 (d)1/2 KE^2	I	U	D203.1	PO1,PO2,PO3
4.	The critical temperature of oxygen is a) -118^o (b) 118^oC (c) 100^oC (d) -188^oC	II	U	D203.2	PO1,PO2,PO3
5.	The value of solar constant is (a) $1353Js^{-1} m^{-2}$(b) 1350 (c) $1600Nm^{-2}$ (d) none of these	II	R	D203.2	PO1,PO2,PO3
6.	The range of wind speed is (a) $4ms^{-1}$ to $25ms^{-1}$ (b) $40ms^{-1}$ to $50ms^{-1}$ (c) $40ms^{-1}$ to $100ms^{-1}$ (d) none of these	II	R	D203.2	PO1,PO2,PO3
7.	The refractive index of the medium is (a) c/v (b) cv (c) 2cv (d) none of these	III	U	D203.3	PO1,PO2,PO3
8.	What is Snell's law (a) sini/sinr (b) sinr/sini (c) sinisinr (d) none	III	R	D203.3	PO1,PO2,PO3
9.	The energy of photon is (a) hv (b) 2hv (c) h/v (d) 2h/v	III	R	D203.3	PO1,PO2,PO3
10.	The expression for ohm's law (a) IR (b)) I/R (c) VR (d) V/I	IV	U	D203.4	PO1,PO2,PO3
11.	The expression for Joule's law of heating (a) IRT (b)) I^2Rt (c) IR (d) 1/2 I^2Rt	IV	U	D203.4	PO1,PO2,PO3
12.	The unit of capacitance is (a) ohm (b) farad (c) volt (d) hertz	IV	R	D203.4	PO1,PO2,PO3
13.	The example for semiconductor is (a) silicon (b) iron (c) copper (d) nickel	V	U	D203.5	PO1,PO2,PO3
14.	The expression for OR gate is (a) A.B (b) A-B (c) A+B (d) none	V	R	D203.5	PO1,PO2,PO3
15.	The expression for AND gate is (a) A.B (b) A-B (c) A+B (d) none	V	U	D203.5	PO1,PO2,PO3

PART- B					(10 X 2 = 20 Marks)
Answer anyTEN Questions. All Questions carries equal marks.					
16.	Define conduction.	I	R	D203.1	PO1,PO2,PO3
17.	Define root mean square velocity of gas molecules.	I	U	D203.1	PO1,PO2,PO3
18.	Define specific heat capacity of a solid.	I	R	D203.1	PO1,PO2,PO3
19.	State Kelvin statement of second law of thermodynamics.	II	U	D203.2	PO1,PO2,PO3
20.	What is the disadvantage of cascade process?	II	R	D203.2	PO1,PO2,PO3
21.	What is meant by temperature of inversion?	II	R	D203.2	PO1,PO2,PO3
22.	Give the condition for total internal reflection.	II	R	D203.3	PO1,PO2,PO3
23.	Give any two properties of laser.	III	R	D203.3	PO1,PO2,PO3
24.	What is active remote sensing?	III	R	D203.3	PO1,PO2,PO3
25.	State any one law of the laws of resistance.	IV	R	D203.4	PO1,PO2,PO3
26.	State Joule's law of heating.	IV	R	D203.4	PO1,PO2,PO3
27.	State the Fleming's left hand rule.	IV	R	D203.4	PO1,PO2,PO3
28..	What are intrinsic semiconductors?	V	R	D203.5	PO1,PO2,PO3
29.	What is dopping?	V	U	D203.5	PO1,PO2,PO3
30.	Give any two advantages of an integrated circuit.	V	R	D203.5	PO1,PO2,PO3

PART – C					(5x2x7 = 70Marks)
[Note: (i) Answer all questions choosing any two sub divisions from each question (ii) All subdivision carry equal marks.]					
31.	a) What are the properties of thermal radiation?	I	R	D203.1	PO1,PO2,PO3
	b) Derive the expression for the pressure of a gas on the basis of kinetic theory of gases.	I	AP	D203.1	PO1,PO2,PO3
	c) Calculate the value of universal gas constant R from the gas equation PV = RT.	I	U	D203.1	PO1,PO2,PO3
32.	a) Explain isothermal and adiabatic change.	II	U	D203.2	PO1,PO2,PO3
	b) Describe the Linde's process for the liquefaction of air.	II	U	D203.2	PO1,PO2,PO3
	c) A certain mass of gas at 1 atm pressure is suddenly compressed toone-fourth of its original volume. Find the resulting pressure (γ=1.4)	II	U	D203.2	PO1,PO2,PO3
33.	a) Describe an experiment to determine the refractive index of glass prism using spectrometer.	III	U	D203.3	PO1,PO2,PO3
	b) Describe the construction and working of the Ruby LASER.	III	U	D203.3	PO1,PO2,PO3
	c)Explain the working of RADAR with block diagram	III	U	D203.3	PO1,PO2,PO3

34.	a) State and explain Kirchoff's current and voltage law.	IV	U	D203.4	PO1,PO2,PO3
	b) The capacitors of values 20μf, 30μf and 60μf are connected(i) in series and (ii) in parallel. Calculate the effective capacitance in each case	IV	AP	D203.4	PO1,PO2,PO3
	c) Derive an expression for the torque on a rectangular coil placed in a uniform magnetic field	IV	U	D203.4	PO1,PO2,PO3
35.	a) Explain N type and P type semiconductors..	V	U	D203.5	PO1,PO2,PO3
	b) Explain the working of full wave bridge rectifier using PN junction diode.	V	U	D203.5	PO1,PO2,PO3
	c) Explain AND, OR and NOT gates with the help of truth tables.	V	AP	D203.5	PO1,PO2,PO3

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as presented below:

Bloom's TaxonomyLevel	**Lower order thinking skills (LOTs)**	**Higher Order Thinking Skills(HOTs)**
	R-Remember,**U**-Understand, **AP**-Apply	**An**- Analyse, **E**-Evaluate, **C**-Create
% to be included	90 %	10 %

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D204 - ENGINEERING CHEMISTRY- II

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D204

Semester : II SEMESTER

Course Title : ENGINEERING CHEMISTRY – II

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Chemistry-II	4	64	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	**Electrochemistry** – Electro Chemistry - I, Electro Chemistry – II – Energy Sources.	11
II	**Chemistry of corrosion and prevention** - corrosion – theory of Corrosion – Methods of Prevention of Corrosion, Organic Coatings.	11
III	**Energy Chemistry**- Fuels, Combustion, Rocket Propellants.	11
IV	**Applied Chemistry** – Technology of Water – I, Technology ofWater – II	11
V	**Environmental Chemistry** – Air Pollution, Water Pollution, Solid Waste Management and Green Chemistry.	11
	Test & Model exam	09
TOTAL		**64**

COURSE DESCRIPTION:

- The subject Engineering Chemistry – II develop basic understanding about electrochemistry, energy resources, corrosion, methods of prevention of corrosion and its organic coatings.
- Energy chemistry explains various aspects with regard to fuels, combustion and rocket propellants.
- Prime importance is given to technology of water, its analysis of few parameters like pH, TDS, Hardness, dissolved chlorine, e-coli etc.
- Environmental chemistry explains environmental pollution, solid waste management and green chemistry.

OBJECTIVES:

The objective of this Course is to make the student:

1. To acquire knowledge about electro chemistry, electro chemical cell.
2. To know about corrosion and prevention.
3. To acquire knowledge about fuels, combustion of fuels and rocket propellants.
4. To know about water and its analysis.
5. To acquire knowledge about Environmental Chemistry.

COURSE OUTCOMES :

After the completion of this course, the students will be able to	
D204.1	Describe the electrolysis process ,Electro chemical cell and Energy Sources.
D204.2	Express about the corrosion , theory of Corrosion , Methods of Prevention of Corrosion and Organic Coatings
D204.3	Describe about the Fuels, Combustion of fuels and Rocket Propellants.
D204.4	AnalysetheTechnology of Water and purification of water.
D204.5	Acquire knowledge in the Air Pollution, Water Pollution, Solid Waste Management and Green Chemistry

D204 – ENGINEERING CHEMISTRY –II

Unit	Name of the topics	Hours
I	**ELECTRO CHEMISTRY**	
	1.1 Electrochemistry-I	
	Electronic concept of oxidation and reduction – Faradays' laws of electrolysis - simple problems – electrolytes – nonelectrolytes – electrolysis – definition - Mechanism – Industrial applications of Electrolysis – electroplating – chromeplating– kohlrausch's law.	**4**
	1.2 Electrochemical Cell	
	Electrochemical cell – Definition– Definition - Galvanic cell – Formation of Daniel cell – Electrochemical series –– significance.	**4**
	1.3 Energy Sources	
	Primary Battery – Secondary Battery – Definition and example – cell – Construction, working principle and Uses of Lead acid – Storage battery – Lithium ion – battery - Solar Cell – Definition – working principle .	**3**
II	**CHEMISTRY OF CORROSION AND PREVENTION**	
	2.1 Corrosion	
	Definition – types of corrosion – theories of corrosion – galvanic cell formation theory – differential aeration theory – factors influencing rate of corrosion – Rusting – definition.	**4**
	2.2 Methods of Prevention of corrosion	
	Galvanization – tinning – anodisation – cathodic protection – sacrificial anode method and impressed voltage method.	**4**
	2.3 **Organic Coatings**	
	Paint – definition – Components of paints – Varnish – definition – Preparation of oil varnish – differences between paint and varnish – Special Paints – Luminescent paint, fire retardant paint, Aluminum paint and distemper.	**3**

III	**ENERGY CHEMISTRY** **3.1 Fuels** Fuel and fossil fuel – Definition – Calorific value – calorie – Liquid fuels – liquid hydrogen – power alcohol – uses – Refining of Petroleum – Fractional distillation – Cracking (Concept only) – Gaseous fuels – Preparation, composition and specific uses of Producer gas and Water gas – Composition and uses of CNG and LPG – advantages of gaseous fuels. **3.2 Combustion** Definition – Combustion calculation by mass (for solid and liquid fuels) – Stoichiometric calculations – Volume of air required – Definition of Flue gas – Flue gas Analysis – Orsat Apparatus – Simple numerical problems. **3.3 Rocket Propellants** Definition – characteristics – Classification of propellants –brief idea of solid and liquid propellants.	**4** **4** **3**
IV	**APPLIED CHEMISTRY** **4.1 Technology of Water–I** Sources of water – depletion of underground water – Reasons – Rain water harvesting (Basic ideas) – advantages – Hard water and soft water – Hardness of water – Carbonate and Non–carbonate hardness – Methods of expressing hardness – mg/lit and ppm – Simple problems – Disadvantages of hard water – Estimation of total hardness by EDTA method – Problems involving Total, Carbonate and Non–carbonate hardness in ppm – Disadvantages of using hard water in boilers –Scale formation, Corrosion of boiler metal, Caustic Embrittlement – Priming and Foaming. **4.2 Technology of Water–II** Softening of hard water – Ion-Exchange method and Reverse Osmosis method – Municipal supply – purification of drinking water – Quality of potable water (WHO standard) – parameters of potable water – pH – TDS – residual Chlorine permissible limits – determination of ecoli (preliminary idea)	**6** **5**

V	**ENVIRONMENTAL CHEMISTRY** **5.1 Air Pollution** Pollution and Air pollution – Definition – Air pollutants (SO_2, H_2S, HF, CO and Dust) – Sources and Harmful effects – smog and types of smog – Formation of Acid Rain – Harmful effects – Green House Effect – Causes – Global warming – Harmful effects – Ozone Layer – Importance – Causes for Depletion of Ozone Layer (No equations) – Harmful effects of Ozone Layer Depletion – Control of Air Pollution. **5.2 Water Pollution** Causes of Water Pollution – Sewage, Effluents, Algae and Microorganisms – Harmful effects – Definition – Sewage – Sewerage – Disposal – Industrial Effluents – Harmful effects of Effluents - Treatment of Effluents – Eutrophication – definition – harmful effects.Soil pollution – Definition – causes and its effects. **5.3 Solid Waste Management** Solid Waste – Definition – Problems – Types of Solid Waste – Methods of Disposal – Land fill and Incineration – Recycling – Definition – Examples – Advantages of Recycling (Basic ideas) Green Chemistry Definition – Goals of Green Chemistry (Basic ideas)	**4** **4** **3**

TEXT BOOKS :

1.	Chemistry – Higher Secondary – 1 st and 2nd year, Vol. I & II, Tamil Nadu Text Book Corporation, 2018
2.	Engineering Chemistry – II , DOTE - Tamilnadu

REFERENCE BOOKS:

1.	Introduction to Engineering Chemistry, ShradhaSinha , S SDara&Sudha Jain, S.Chand Publishers, 2004.
2.	S.Chand's Engineering Chemistry, S SDara, Sudha Jain &ShradhaSinha, 2005.
3.	A Textbook of Engineering Chemistry, Dr. Uday Kumar, 2013.
4.	Handbook of rain water harvesting, Chennai Metrowater, 2018
5.	Engineering Chemistry, Jain&JainDhanpat Raj Publishing Company,2016 Pradeeps new course chemistry, Vol. I, Class 11,Dr.S.C. Khetarpal, Dr.S.N.Dhawan, Pradeep Publication,2018
6.	Electrochemistry and Corrosion Science,,Nestor Perez,

LEARNING WEBSITE :

1	https:///bookboon .com/en/fundamentals-of-chemistry-ebook

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Attendance	5 Marks
ii)	Test	10 Marks
iii)	Assignment	5 Marks
iv)	Seminar	5 Marks
Total		**25 Marks**

CO- POs & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D204.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D204.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D204.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D204.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D204.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
Correlation level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high**)**

QUESTION PAPER SETTING

The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy. The question paper should consist of 90% question based on Lower Order Thinking (LOTs) and the remaining 10% based on higher order thinking (HOTs) as detailed below.

Bloom's TaxonomyLevel	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills(HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

AUTONOMOUS EXAMINATION-QUESTION PAPER PATTERN

For all theory subjects except Communicative English I & II
and Engineering Graphics I & II.

Note: Clarkes Table and Programmable Calculators are not permitted.
Relevant data should be provided in the question paper for solving the problems if any required.

Time: 3 Hrs. **Max.Marks:100**

PART - A Answer any **10** Questions Choosing the correct answer out of **15**Questions . Each question carries one mark.

PART-B Answer any **10** Questions out of **15**Questions . Each question carries two marks

PART - C All the **5** question to be answered.Each question in **PART-C** will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered for **7** marks each .

The questions are to be numbered from 1 to 35. All the units are to be covered with equal weightage.

PART –A Objective type questions Question Number 1 to 15	**10**x1 = **10** marks
PART –B Short answer type questions Question Number 16 to 30	**10**x2 = **20**marks
PART –C Descriptive answer type questions Question Number 31 to 35 Each question inPART –C will contain **3** sub questions , out of these **3** sub questions **2** sub questions are to be answered .	**5**x 14 = **70** marks
Total	**100**Marks *

Note: * Autonomous Examinations will be conducted for 100 Marks and converted to 75 Marks**.**

MODEL QUESTION PAPER

D204 - ENGINEERING CHEMISTRY- II

Time : 3 Hrs. **Max. Marks : 100**

PART - A			**(10X1=10 Marks)**
Answer Any TEN Questions choosing the correct Answer.			
S.No	**Questions**	**Unit**	**Bloom's Level**
1	Example for electrolytes is (a) NaCl (b)Sugar solution (c) C6H6 (d)Alcohol	I	R
2	Give one example for galvanic cell (a)Daniel cell (b)Dry cell (c)Lechlanche cell (d)Lead acid cell	I	R
3	Give an example for primary battery (a)Dry cell (b)Solar cell (c)Lead acid storage cell (d)None of these	I	R
4	How many types of Corrosion? (a) 1 (b) 2 (c) 3 (d) 4	II	R
5	What is a chemical used in tinning? (b) Sn (b) Cu (c)Zn (d) P	II	U
6	How many types of paint? (b) 2 (b) 4 (c) 5 (d) 6	II	R
7	Give one example for gaseous fuels (b) LPG (b) Wood (c) Coal (d) Liquid hydrogen	III	R
8	Which apparatus used for analysis of Flue gas? (b) Solar cell (b) Orsat (c) Galvanic cell (d) pH meter	III	R
9	What is Rocket propellant made of ……..? (b) Kerosene (b) Diesel (c) Fuel+oxidizer (d) Petrol	III	R
10	Give one example for underground water (b) Lake (b) Pond (c) Spring water (d) River water	IV	R
11	The hardness of water is due to (b) NaCl (b) KOH (c) $Ca(OH)_2$ (d) $CaCO_3$	IV	R
12	What is the pH of neutral water? (b) 7 (b) 12 (c) 3.4 (d) 11	IV	R
13	Name the gas which cause the depletion of ozone layer (b) CFC (b) CO_2 (c) NO_2 (d) CO	V	R
14	…….. is a water plant. (a) Algae (b) Sewage (c) Eutrophication (d)Micro organism	V	U
15	Give one example for solid waste. (a) Sewage (b) silver (c) Alloys (d) Carbon	V	U

PART - B (10X2=20 Marks)			
Answer Any TEN Questions. All Questions Carries Equal Marks.			
16	Define Faraday's Ilaw of electrolysis.	I	R
17	Mention the anode and cathode of Lithium ion battery.	I	R
18	Write down the cell notation of Daniel cell	I	R
19	Define corrosion.	II	U
20	What is meant by galvanization?	II	R
21	What are luminescent paints?	II	U
22	Mention the composition of LPG.	III	U
23	Write down the equation for the calculation of finding theoretical quantity of oxygen required for the combustion of 1kg of a fuel containing carbon, hydrogen, sulphur and moisture?	III	R
24	What are rocket propellants?	III	R
25	What is called a bio material?	IV	R
26	What is hardness of water?	IV	U
27	How will you remove temporary hardness of water?	IV	U
28	What are green house gases?	V	U
29	Define eutrophication.	V	U
30	Define green chemistry.	V	R
PART – C (5X2x7=70 Marks)			
[Note: (i) Answer all questions choosing any two subdivision from each question. (ii) All subdivision carry equal Marks]			
31	a)What are the industrial applications of electrolysis?	I	U
	b) What is a secondary battery? Explain the working principle of lead acid battery	I	U
	c) Explain the cell reactions in Daniel cell.	I	U

32	a) Explain differential aeration theory of corrosion with suitable example.	II	An
	b) Distinguish between paint and varnish. Explain the preparation of oil and sprit varnish.	II	U
	c) Write notes on cathodic protection.	II	U
33	a) Write notes of refining of petroleum.	III	U
	b) Explain flue gas analysis using Orsat apparatus with a neat diagram	III	U
	c) What are the characteristics of rocket propellants.?	III	U
34	a) Write notes on rain water harvesting.	IV	U
	b)Explain ion exchange process of removing hardness	IV	U
	c) Explain Reverse Osmosis process.	IV	U
35	b) What are the harmful effects of global warming?.	V	An
	b) What is meant by depletion of ozone layer? Mention their harmful effects.	V	U
	c) Explain land fill operation and recycling of solid waste management.	V	U

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as presented below:

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills(HOTs)**
	R-Remember, **U**-Understand , **Ap**-Apply	**An**-Analyze, **E**-Evaluate, **C**-Create
% to be included	90%	10%

****

D205 - ENGINEERING GRAPHICS – II

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D205

Semester : II SEMESTER

Course Title : ENGINEERING GRAPHICS – II

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Graphics-II	5	80	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks**

TOPICS AND ALLOCATION OF HOURS

Unit	Topics	Time (Hrs)
I	Construction of Polygons and Projection of Planes	15
II	Projection of Solids and Section of Solids	19
III	Development of Surfaces	15
IV	Missing Views and Isometric Projections	22
Test & Model Exam		09
Total		**80**

COURSE DESCRIPTION:

Engineering graphics is a basic subject for all branches of diploma in engineering andTechnology. Since engineering drawing is considered as the language of engineers, the proper understanding and practice is required with the use of proper drawing Instruments.

This subject is aimed at providing basic understanding of the fundamentals of engineering drawings mainly visualization of three dimensional drawings for practical applications and the use of drawings in real life engineering applications.

The topics covered are based on the syllabus for diploma studies in engineering. The subject is planned to include sufficient practice which would help the students in visualization of three dimensional objects and developing the drawing.

The chapters are arranged in sequence and starts from the construction of polygons, concepts of projection of planes, solids and section of solids. It proceeds to the construction of development of surfaces and isometric projections.

By the end of the subject, it is expected that the students would be matured to visualize engineering components by reading an engineering drawing.

OBJECTIVES:

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

- Understand the importance of drawing
- Identify and use of the drawing instruments
- Acquire knowledge about the construction of polygons in various positions
- Understand the concepts of projection of planes
- Draw the projection of solids and section of solids
- Draw the development of solids and sheet metal components
- Draw the missing views from the given drawing
- Convert orthographic views into isometric drawings

Note: While practicing, usage of drawing instruments like drawing board, mini drafter, compass, divider, drawing clips / cello tape, H, 2H and HB grade drawing pencils, eraser etc., are mandatory for class work and examinations. Size of drawing sheet recommended: A2 size (420 x 594 mm).Use both sides of drawing sheets forpractice.

COURSE OUTCOMES

After the completion of this course, the students will be able to	
D205.1	Acquire knowledge about the construction of polygons in various positions And the concepts of projection of planes.
D205.2	Analyse about projection of solids and section of solids
D205.3	Construct the development of solids and sheet metal components
D205.4	Convert orthographic views into isometric drawings

D205 - ENGINEERING GRAPHICS - II

<table>
<tr><th>Unit</th><th>Name of the Topics</th><th>Hours</th></tr>
<tr><td>I</td><td>
CONSTRUCTION OF POLYGONS AND PROJECTION OF PLANES

1.1 Construction of Polygons

Construction of regular polygon: triangle, square, pentagon and hexagon –various positions – side of the polygon is parallel, perpendicular and inclined to principal planes.

<table>
<tr><td colspan="2">Minimum Criteria for Class Assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all Methods</td></tr>
<tr><td>1</td><td>12</td></tr>
</table>

1.2 Projection of Planes

Projection of planes – rectangle, square, hexagon and circle–plane parallel to HP and perpendicular to VP – plane parallel to VP and perpendicular to HP – plane perpendicular to both HP and VP – plane parallel to both the planes –Plane perpendicular to the H.P. and inclined to the V.P. – simple exercises.

<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all portions</td></tr>
<tr><td>2</td><td>16</td></tr>
</table>
</td><td>06

09</td></tr>
<tr><td>II</td><td>
PROJECTION OF SOLIDS AND SECTION OF SOLIDS

2.1 Projection of Solids – I

Introduction – important terms – classification of solids – triangular and hexagonal prisms and pyramids – solids of revolution – cylinder and cone– projection of solids in simple positions – axis parallel to one plane and perpendicular to other plane.

<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all portions</td></tr>
<tr><td>1</td><td>8</td></tr>
</table>

2.2 PROJECTION AND SECTION OF SOLIDS

2.2.1 Projection of Solids – II

Position of solid – axis inclined to one plane and parallel to other plane – axis parallel to both planes – simple exercises.

<table>
<tr><td colspan="2">Minimum criteria for class assessment</td></tr>
<tr><td>No. of Drawing sheets</td><td>No. of Exercises covering all portions</td></tr>
<tr><td>1</td><td>6</td></tr>
</table>
</td><td>06

13</td></tr>
</table>

	2.2.2 Section of Solids Need for section view– Procedure for drawing sectional views – cutting plane – cutting plane line–representation as per BIS code–Hatching line – true section–section of simple solids – triangular and hexagonal prisms and pyramids, cylinder, cone – position of solids – axis perpendicular to one plane and parallel to other plane – position of cutting planes – cutting plane perpendicular to one plane and parallel to another plane – cutting plane perpendicular to one plane and inclined to another plane – true shape– exercises. Minimum criteria for class assessment No. of Drawing sheets: 2 — No. of Exercises covering all portions: 8	
III	**DEVELOPMENT OF SURFACES** **3.1 Development of Regular Solids** Need for preparing development drawing with reference to sheet metal work – procedure for preparing development drawing of prism, pyramid, cylinder, cone and sphere – exercises in rectangular, square and hexagonal prisms and pyramids – exercises in regular cylinder and cone. Minimum criteria for class assessment No. of Drawing sheets: 1 — No. of Exercises covering all portions: 8 **3.2 Development of Components** Cutting plane – cutting plane line – development of truncated prism and cylinder – frustum of pyramid and cone – development of simple engineering components such as elbow, ducts, lamp shade and funnel. Minimum criteria for class assessment No. of Drawing sheets: 3 — No. of Exercises covering all portions: 10	**06** **09**
IV	**MISSING VIEWS AND ISOMETRIC PROJECTIONS** **4.1 Missing Views** Reading a drawing – missing views – visualization – possible view problems – Drawing a missing view or third view (Draw missing view only) – simple exercises. Minimum criteria for class assessment No. of Drawing sheets: 1 — No. of Exercises: 6	**09**

	4.2Isometric Projections Introduction–isometric view – isometric projection – methods of drawing an isometric view – box method – construction of arcs and circles – four centre method for drawing ellipse – construction of isometric drawing of components from the given orthographic views – Use of isometric projection, limitation –simple exercises. Minimum criteria for class assessment No. of Drawing sheets: 1 — No. of Exercises: 8	**13**

TEXT BOOKS:

1	Bhatt.N.D.andPanchalV.M.,"EngineeringDrawing",CharotarPublishingHouse,50th Edn,2010.
2	Gill P.S. ," Engineering drawing", S.K. Kataria& Sons, 11th Edition, 2012

REFERENCE BOOKS:

1	Gopalakrishna .K.R., "Engineering Drawing" (Vol. I and II combined), Subhas Publications,
2	Venugopal.K, Prabhu Raja. V, "Engineering Graphics", New Age International Publishers, 11th Edition
3	Nataraajan K V "A Text Book of Engineering Drawing and Graphics"
4	Shah M B, Rana B C, "Engineering Drawing", Second Edition, 2009, Pearson.
5	BasantAgrawal,CMAgrawal"Engineeringdrawing",TataMcGrawHillEducationPvt. Ltd.,
6	Parkinson A C, "First Year Engineering Drawing", Sir Isaac Pitman & Sons Ltd
7	Thomas E. French, Charles J. Vierck, "The Fundamentals of Engineering Drawing", McGraw Hill Book Co. Inc.

LEARNING WEBSITES :

1	https://nptel.ac.in/courses/112/103/112103019/
2	mrcet.com>digital_notes>E… PDF engineering graphics practice manual –mrcet

CONTINUOUS INTERNAL ASSESSMENT:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Class assessment Sheets (Minimum 10 Sheets)	10 Marks
ii)	Average of Two Assessment Tests	5 Marks
iii)	Model Examination	5 Marks
iv)	Attendance	5 Marks
Total		**25 Marks**

CO- POs & PSOs MAPPING MATRIX

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D205.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D205.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D205.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D205.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**12**	**12**	**12**	**12**	**12**	**8**	**12**	**12**	**8**	**8**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (Low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (High)

QUESTION PAPER SETTING

The teaching learning process and assessment are being carried out in accordance with the revised Bloom's Taxonomy. The question paper should consist of 90% questions based on Lower Order Thinking (LOTs) and the remaining 10% based on Higher Order Thinking (HOTs) as detailed below.

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R-Remember, **U**-Understand, **Ap**-Apply	**An** -Analysis, **E**- Evaluate, **C** - Create
% to be included	90%	10%

D205 - ENGINEERING GRAPHICS - II

PORTIONS FOR ASSESSMENT TEST

Assessment Test 1

Portion: Unit I and II

Question Pattern

Duration: 2 Hrs. **Max. Marks: 50**

Part – A **(2 X 5 = 10)**

Three questions will be asked.

Answer any two questions.

Each question carries five marks.

Minimum one question should be asked from each unit first chapter. (Chapter 1.1and 2.1).

Part - B (2 X 20 = 40)

Three questions will be asked.

Answer any two questions.

Each question carries twenty marks.

Minimum one question should be asked from each unit second chapter. (Chapter 1.2 and 2.2)

Assessment Test 2

Portion: Unit III and IV

Question pattern

Duration: 2 Hrs. **Max. Marks: 50**

Part - A (2 X 5 = 10)

Three questions will be asked.

Answer any two questions.

Each question carries five marks.

Minimum one question should be asked from each unit first chapter.

(Chapter 3.1and 4.1).

Part - B **(2 X 20 = 40)**

Three questions will be asked.

Answer any two questions.

Each question carries twenty marks.

Minimum one question should be asked from each unit second chapter.

(Chapter 3.2and 4.2).

D205 – ENGINEERING GRAPHICS – II

AUTONOMOUS EXAMINATION

QUESTION PAPER PATTERN

Time: 3 Hrs **Marks: 100**

Note: 1. Answer all the questions only in the drawing sheet.
2. Assume missing dimensions suitably, if required.
3. Proper drawing instruments and board should be used

PART – A (4x5 = 20)

Note: Five questions will be asked (Sl. No: 1 to 5).

Answer any four questions.

Each question carries five marks.

Minimum one question should be asked from each unit first chapter.
(Chapters: 1.1, 2.1, 3.1, 4.1)

PART – B (4x20 = 80)

Note: Six questions will be asked (Sl. No: 6 to11). Answer any four questions.

Each question carries twenty marks.

Minimum one question should be asked from each unit second chapter.
(Chapters: 1.2, 2.2, 3.2, 4.2)

MODEL QUESTION PAPER

D205 - ENGINEERING GRAPHICS – II

Time : 3 Hrs **Max Marks : 100**

Note:
1. Answer all the questions only in the drawing sheet supplied.
2. Assume missing dimensions suitably, if required.
3. Use proper drawing instruments and drawing board.
4. First angle projection is to be followed.
5. All dimensions are in `mm'.

	PART – A (4x5 = 20) **Answer any FOUR questions. Each question carries five marks.**	**UNIT**	**BLOOM'S LEVEL**
1.	Draw a regular pentagon of side 40 mm with one of its base edge inclined at 60° to HP.	I	AP
2.	Draw the projections of a cylinder of base diameter 40mm and height 60mm with its base on the HP.	II	AP
3.	A triangular pyramid of base side 30mm and height 60mm rests on HP on its base with one base edge is perpendicular to VP. Construct the front view and top view.	II	AP
4.	Draw the surface development of sphere of radius 30mm	III	AP
5.	Draw the missing top view of the object shown in Fig: 1.	IV	AP
	PART – B (4x20 = 80) **Answer any FOUR questions. Each question carries** **Twenty marks**		
6.	A triangular thin plate of 40 mm sides is inclined at 45° to the VP and perpendicular to the HP. Draw the projections of the plate if one of its sides AB is inclined at 45° to the HP with the corner A nearer to the HP and 10 mm above the HP.	I	AP
7.	A hexagonal prism of base edge 25mm and height 60mm lies on the ground on one of its rectangular faces with its axis inclined at 45° to the VP. Draw the projections of the prism.	II	AP
8.	A cone of base diameter 50mm and axis 60mm long has its base on the ground. It is cut by a cutting plane perpendicular to the VP and inclined at 30° to the HP, which meets the axis at 35 mm from the apex. Draw the front view, sectional elevation and true shape of the section.	II	C
9.	A cylinder of 30 mm diameter and 35 mm axis length is cut by a section plane inclined at 30° to HP and passes through 15 mm from base along the axis. Draw the development of the lower portion of the truncated cylinder.	III	AP
10.	Draw the development of a funnel as shown in Fig:2.	III	AP
11.	Draw the isometric view of the given component as shown in Fig:3.	IV	AP

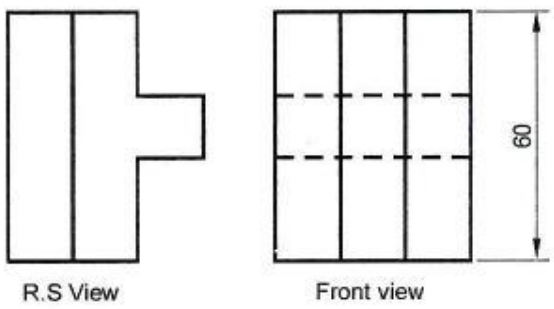

Fig:1

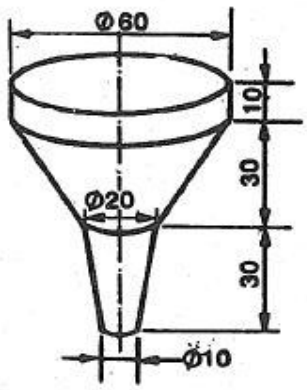

Fig:2

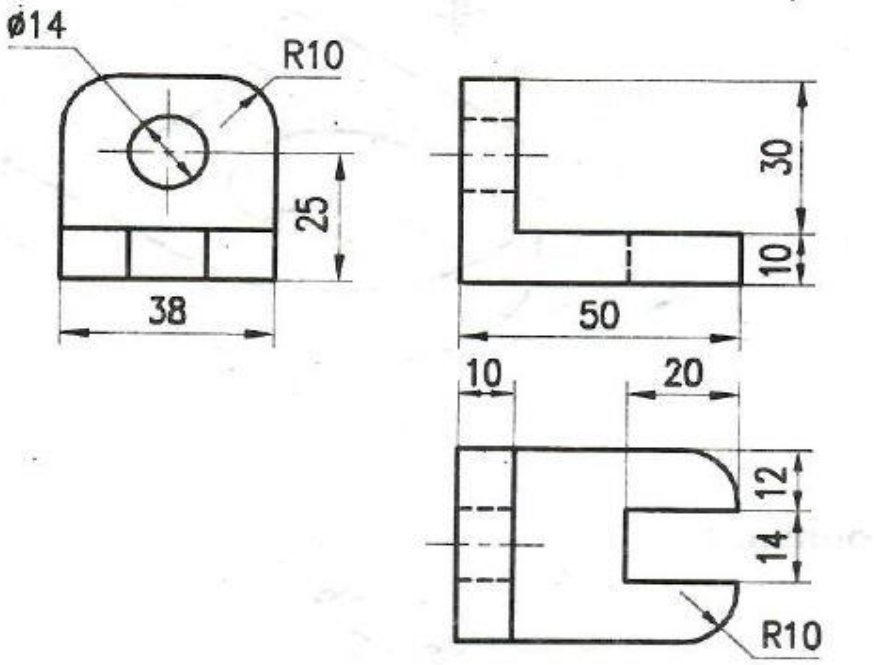

Fig:3

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as presented below:

Bloom's Taxonomy Level	**Lower Order Thinking Skills (LOTs)**	**Higher Order Thinking Skills (HOTs)**
	R – Remember, U –Understand, **Ap**– Apply	**An** – Analysis, **E** – Evaluate, **C** - Create
% to be included	90%	10%

D206 - ENGINEERING PHYSICS– IIPRACTICAL

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D206

Course Semester : II SEMESTER

Course Subject Title : ENGINEERING PHYSICS– IIPRACTICAL

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks per Semester: 16weeks

Course	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Autonomous Examination	Total	
Engineering Physics - II Practical	2	32	25	100*	100	3 Hrs

***Exam will be conducted for 100 marks and will be reduced to 75 marks.**

COURSE DESCRIPTION:

In diploma level Engineering education skill development plays a vital role. The skill development can be achieved by hand's on experience in handling various instruments, apparatus and equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories.

RULES

- All the 9 experiments should be completed in the Second Semester.
- The mini projects given as 10^{th} experiment is activity based and it may be given to group maximum of 6 students for hands on experience and to create scientific temper.
- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations.
- In order to develop best skills in handling Instruments / Equipment and taking reading in the practical classes , every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than two students while admitting a batch of 30 students during Autonomous Examinations.

OBJECTIVES :

1. To determine the refractive index of a transparent liquid (water) using travellingMicroscope and the angle of the prism using spectrometer.
2. To draw the V – I characteristics of the solar cell and to verify law's of resistances and the Ohm's law.
3. To determine the specific heat capacity of water and to determine the ece of copper using copper voltameter.
4. To draw the voltage – current characteristics in forward bias and to studylogic gates.
5. To Identify real time applications and apply acquired knowledge to develop mini project.

COURSE OUTCOMES :

At the end of II Semester the student will be able to

D206.1	Find the refractive index of liquid and angle of prism
D206.2	Study the characteristics of solarcell and verify law of resistances and Ohm's law.
D206.3	Determine the specific heat capacity of water and e.c.e. of copper
D206.4	Study the characteristics of diode and logic gates.
D206.5	Identify real time applications and apply acquired knowledge to develop mini project.

D206 - ENGINEERING PHYSICS – II PRACTICAL

LIST OF EXPERIMENTS

S.No	Name of the Experiment	Course Outcome
1.	REFRACTIVE INDEX Determine the refractive index of a transparent liquid (water) using travelling Microscope	D206.1
2.	SPECTROMETER Measure the angle of the prism using spectrometer	D206.1
3.	SOLAR CELL. Draw the V – I characteristics of the solar cell	D206.2
4.	LAWS OF RESISTANCES. Verify the laws of resistances by connecting the two given standard resistancesin series and parallel, using Ohm's law.	D206.2
5.	JOULE'S CALORIMETER Determine the specific heat capacity of water	D206.3
6.	COPPER VOLTAMETER Determinethe electro chemical equivalent (e.c.e.) of copper	D206.3
7.	P-N JUNCTION DIODE Draw the voltage – current characteristics in forward bias and to find the 'dynamic forward resistance' & 'knee voltage' from the graph	D206.4
8.	LOGIC GATES Find the output conditions for different combinations of the input for NOT gate and2 inputs AND, OR, NAND & NOR logic gates, using IC chips.(IC 7404 –NOTGate,IC 7408 – AND Gate, IC 7432 – OR gate,IC 7400 – NAND Gate,IC 7402 –NOR Gate).	D206.4
9.	OHM'S LAW Verify the Ohm's law	D206.2
10.	Mini Project	D206.5

AUTONOMOUS PRACTICAL EXAMINATIONS

- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations
- The students should maintain observation note book / manual and record notebook. Inthe observation, the student should draw diagram, mention the readings /observations, calculations and result manually. The same have to be evaluated for the observation mark
- The record note book should be submitted during the Autonomous Practical Examinations. The record work for the experiments should be completed and evaluated in the respective semesters.
- All experiments should be given and the students are allowed to select any one by lot.
- The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.
- The examiners should ensure the proper safety measures before the commencement of practical examinations.

DETAILED MARK ALLOCATION

S.NO	DESCRIPTION	MARKS ALLOTED
1.	Formula and diagram	20
2.	Tabulation with proper units	10
3.	Observation (including taking readings)	40
4.	Calculation	10
5.	Result	05
6.	Viva voce	05
7.	Mini project	10
	Total	**100**

Mini project Evaluation (10 marks)

Breakup Details

1.	Project Description	05
2.	Project Demo	05
	Total	**10**

Continuous Internal Assessment

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows

Description	Marks Allotted
a) Attendance	5 marks –(awards of marks same as theory subjects)
b) Procedure/ observation and tabulation/ other Practical related work	10 marks
c) Record writing	10 marks
Total	**25 marks**

LEARNING WEBSITES :

1	www.labster.com
2	www.ulab.co.in
3.	ulab.amirta.edu

CO- PO & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D206.1	3	3	3	3	3	2	3	3	2	2
D206.2	3	3	3	3	3	2	3	3	2	2
D206.3	3	3	3	3	3	2	3	3	2	2
D206.4	3	3	3	3	3	2	3	3	2	2
D206.5	3	3	3	3	3	2	3	3	2	2
Total	15	15	15	15	15	10	15	15	10	10
Correlation Level	3	3	3	3	3	2	3	3	2	2

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

LIST OF EQUIPMENTS

Minimum Two set of equipment / components are required for the Batch of 30 Students.

1. REFRACTIVE INDEX

   Travelling Microscope, Beaker with transparent liquid and Saw dust.

2. SPECTROMETER.

   Spectrometer, Sodium vapour lamp, Reading lens and Glass prism

3. SOLAR CELL.

   Solar cell Kit for drawing the V - I characteristics

4. LAWS OF RESISTANCES.

   Battery Eliminator, key, rheostat, ammeter, voltmeter, Connecting wires and two known standard resistances

5. JOULE'S CALORIMETER.

   Joule's Calorimeter, Battery eliminator, Rheostat, Key, Ammeter, voltmeter, stop clock, thermometer, digital Balance and connecting wires.

6. COPPER VOLTAMETER

   Copper Voltameter, Battery eliminator, Rheostat, Key, Ammeter, stop clock, digital balance, emery sheet and Connecting wires.

7. P-N JUNCTION DIODE

   P-N Junction Diode forward characteristics kit.

8. LOGIC GATES.

   Logic gates testing apparatus kit with bread board for Mounting ICs and Integrated circuit chips (IC 7404 –NOT Gate, IC 7408 – AND Gate, IC 7432 – OR gate, IC 7400 –NAND Gate, IC 7402 – NOR Gate)

9. OHM'S LAW

   Resistance boxes,Batteryeliminator,Rheostat,voltmeter,Ammeter and Connecting wires

MODEL QUESTION PAPER

D206 - ENGINEERING PHYSICS – II PRACTICAL

S.No.	Experiments
1.	Determine the refractive index of a transparent liquid (water) using travelling Microscope
2.	Measure the angle of the prism using Spectrometer
3.	Draw the V – I characteristics of the solar cell
4.	Verify the laws of resistances by connecting the two given standard resistances in series and parallel, using Ohm's law.
5.	Determine the specific heat capacity of water using Joule calorimeter.
6.	Determine the electro chemical equivalent (e.c.e.) of copper using copper voltameter.
7.	Draw the voltage – current characteristics in forward bias and to find the 'dynamic Forward resistance' & 'knee voltage' from the graph.
8.	Find the output conditions for different combinations of the input for NOT gate and 2 inputs AND, OR, NAND & NOR logic gates, using IC chips. (IC 7404 –NOT Gate,IC 7408 – AND Gate, IC 7432 – OR gate, IC 7400 – NAND Gate,IC 7402 – NOR Gate).
9.	Verify the Ohm"s law.

10. Mini Project

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D207 - ENGINEERING CHEMISTRY - II PRACTICAL

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D207

Semester : II SEMESTER

Course Title : ENGINEERING CHEMISTRY - II PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

Number of weeks per semester : 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Engineering Chemistry - II Practical	2	32	25	100*	100	3 Hrs

***Examinations will be conducted for 100 marks and will be reduced to 75 marks.**

COURSE DESCRIPTION

The skill development can be achieved by the effect of heating on substances and reagents, reactions of the radicals leading to qualitative analysis of the inorganic salts soluble in water or dilute acids, the harmful effects of effluents. This is accomplished by doing engineering related experiments in practical classes in various laboratories

OBJECTIVES

- At the end of the program the student will be able to identify the acid and basic radical present in the given Inorganic simple salt.
- To analyse the given effluent and to find out presence of heavy metal ion present it. To study about the harmful effects of the metallic pollutant

COURSE OUTCOMES:

After the completion of the course the student will be able to	
D207.1	Analyse the effect of heating on substances and reagents andthe inorganic simple salts soluble in water or dilute acids.
D207.2	Analyse the harmful effects of effluents (Lead, Copper, Zinc metal ions).
D207.3	Identify real time applications and apply acquired knowledge to develop mini project.

ENGINEERING CHEMISTRY - II PRACTICAL

Intellectual Skills

1. Studying the effect of heating on substances and reagents
2. Study of the reactions of the following radicals leading to qualitative analysis of the given Inorganic simple salt soluble in water or dilute acids
3. Studying the harmful effects of effluents

Acid Radicals: Carbonate, Chloride, Nitrate and Sulphate

Basic Radicals: Lead, Copper, Aluminium, Ferrous iron, Zinc, Barium, Calcium, Magnesium and Ammonium

Motor Skills

1. Handling the apparatus carefully
2. Awareness on Industrial safety

EXPERIMENTS

S.No	Name of the Experiment	Course Outcome
I	**Analysis of Inorganic simple salt (Qualitative Analysis)** Analysis of nine inorganic simple salts containing any one acid radical and basic radical without omitting any of the above – mentioned radicals	D207.1
II	Analysis of Effluent containing Lead, Copper and Zinc metal ions **(Effluent Analysis)** Analysis of three effluents, each containing the above – mentioned metal ions. Report on the metallic pollutant with procedure (Basic Radical Analysis Procedure) and their harmful effects	D207.2
III	Mini Project	D207.3

AUTONOMOUS PRACTICAL EXAMINATIONS

- All the experiments should be completed in the Second Semester.
- The mini projects given as 11^{th} experiment is activity based and it may be given to group maximum of 6 students for hands on experience and to create scientific temper.
- The students should be given proper practice in all the experiments. All the experiments should be completed before the examinations.
- The students should maintain observation note book / manual and record notebook. In the observation, the student should draw diagram, mention the readings / observations,

calculations and result manually. The same have to be evaluated for the observation mark.

- ❖ The record note book should be submitted during the Autonomous Practical Examinations.
- ❖ All experiments should be given as per the model question paper and the students are allowed to select any one by lot.
- ❖ The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.
- ❖ The examiners should ensure the proper safety measures as per the guidelines before the commencement of practical examinations.

CONTINUOUS INTERNAL ASSESSMENT

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows

a) Attendance	5 marks (awards of marks same as theory subjects)
b) Procedure/ observation and tabulation/ Other Practical related work	10 Marks
c) Record writing	10 Marks
Total	**25 marks**

LEARNING WEBSITES :

1	https://youtu.be/sFpFCPTDv2w
2	https://youtu.be/2vQM8sueZ8u
3.	https://youtu.be/NrtDlc6BfaE

CO – PO & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D207.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D207.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D207.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**9**	**9**	**9**	**9**	**9**	**6**	**9**	**9**	**6**	**6**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

MODEL QUESTION PAPER

D207 - ENGINEERING CHEMISTRY - II PRACTICAL

MODEL 1 : 3 Hours

I) Analyse the given Inorganic simple salt and report the acid radical and basic radical present in it.

II) Analyse the given samples (two samples) of effluent and report the metallic pollutant present in it with procedure and its harmful effects

III) Mini Project

Guidelines for Evaluation

SCHEME OF EVALUATION

DESCRIPTION	MARKS ALLOTED
Analysis of simple salt	55
Analysis of Effluent	30
Viva voce	05
Mini projects	10
Total	**100**

Mini Project Evaluation (10 marks)

Breakup Details

1.	Project Description	05
2.	Project Demo	05
Total		**10**

Guide lines for Evaluation

ENGINEERING CHEMISTRY – II PRACTICAL

DESCRIPTION	MARKS
Identification Procedure of Acid Radical with Systematic procedure	28
Identification Procedure of Basic Radical with Systematic procedure	27
Total	**55**
WITHOUT SYSTEMATIC PROCEDURE	
Identification of Acid Radical with confirmatory test only	15
Identification of Basic Radical with confirmatory test only	14
Mere Spotting of Acid Radical and Basic Radical (3+3)	6

EFFLUENT ANALYSIS (two samples to be given)

DESCRIPTION	MARKS
Identification of metallic pollutant procedure with systematic procedure Effluent sample	25
Harmful effects of metallic pollutant	05
Total	**30**
WITHOUT SYSTEMATIC PROCEDURE	
Group Identification Tests of metallic pollutant	08
Confirmatory Test of metallic pollutant	08
Mere Spotting of the pollutant	04

SAFETY MEASURES (DO'S & DON'TS)

Experiment should be carried out with the supervision of Lab instructor / staff i/c.

- Do not enter into the Laboratory without proper supervision
- Do wear protective equipment for eye protection and make sure to wear a laboratory coat.
- Do not smell, inhale taste of chemicals.
- Do label all containers with chemicals.
- Do avoid direct contact with chemicals, far from your hands face, clothes and shoes.
- Do not use Hazardous chemical without proper directions
- Do Use separate cabinets for acid solutions with concentration more than 6M.
- Whenever, accidentally when concentrated acids fallen on hands / clothwash thoroughly with running water, and after taking first aid, and the student may be taken to hospital.
- Do attach chemical labels with all necessary information to all containers.
- Do read the warning labels when opening newly received reagent chemicals. This will help to be aware of any special storage precautions such as refrigeration or inert atmosphere storage.
- Do periodic check on chemical containers for rust, corrosion and leakage.
- Do Store bottles in chemicals afe bags especially those hazardous and moisture absorbing chemicals.
- Do not use of mouth suction to fill a pipette. Use a pipette bulb or other filling devices.
- Do not Smoke, drink, eat and the application of cosmetics is forbidden in areas where hazardous chemicals are used or stored.
- Do use chemicals with adequate ventilation.
- Do wash thoroughly with soap and water whenever you leave the lab after handling any chemicals.
- Do Keep your hands and face clean free from any trace of chemicals.
- Do not play with chemicals.

List of Apparatus to be provided for each student in Chemistry Laboratory during the Engineering Chemistry –II Practical Classes / Autonomous Examination in addition to the required reagents:

LIST OF EQUIPMENTS

List of Equipment Required for a Batch of 30 Students

Sl.No.	Name of the Item	Quantity (Nos.)
1	Funnel	1
2	Glass Rod	4
3	Test Tubes (15 x 1.5 mm)	1
4	Test Tubes (15 x 1.5 mm)	1
5	Test Tube cleaning Brush	1
6	Test Tube Holder	1
7	Test Tube Stand	1
8	Wash Bottle	1

D208 - BASICS OF INDUSTRIES & WORKSHOP PRACTICAL

Programme Name : I YEAR GENERAL ENGINEERING

Course Code : D208

Semester : II SEMESTER

Course Title : BASICS OF INDUSTRIES & WORKSHOP PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

Number of weeks per semester: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Basics of Industries & Workshop Practical	5 Hrs. (Theory: 2 hrs Practical: 3 Hrs.)	80	25	100*	100	3 Hrs

*Examination will be conducted for 100 marks and will be reduced to 75 marks.

Topics and Allocation of Hours:

Unit	Topics	Time (Hrs)
A: THEORY PORTION		
I	BASICS OF INDUSTRIES	06
II	INDUSTRIAL SAFETY AND MAINTENACE	06
III	QUALITY AND STANDARDS	06
IV	BASICS OF ENGINEERING	08
V	INDUSTRY 4.0	06
B: PRACTICAL PORTION		
BASIC ENGINEERING MANUFACTURING PRACTICES		24
BASIC SERVICE AND MAINTENANCE PRACTICES		24
Total		80

COURSE DESCRIPTION:

In diploma level Engineering education skill development plays a vital role. The skill development can be achieved by hand's on experience in handling various instruments, apparatus and equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories.

OBJECTIVES :

- To learn the basics of industries.
- To understand the MSME.
- To understand the importance of safety and plant maintenance.
- To learn the importance of the quality and its standards.
- To study the basics of engineering.
- To understand the industry 4.0.
- To understand the importance of global readiness in industries.
- To understand basic tools and measuring instruments in general workshop.
- To understand and familiar with the shop floor practices and safety procedures.
- To understand the basic engineering manufacturing practices on the metal andwood works.
- To understand the basic service and maintenance practices in the wiring and basic plumbing practices.
- To learn the importance and various methods of rainwater harvesting to improve the ground water level.
- To understand the principles of basic industrial and domestic applications.

COURSE OUTCOMES:

After the completion of the course, the students will be able to	
D208.1	understand the MSME
D208.2	understand the importance of safety and plant maintenance
D208.3	Learn the importance of the quality and its standards.
D208.4	Know about the basic tools and measuring instruments in general workshop and importance and various methods of rainwater harvesting to improve the ground water level.
D208.5	Understand the industry 4.0.

BASICS OF INDUSTRIES

Unit	Name of the Topics	Hours
I	**BASICS OF INDUSTRIES:** What is Industry? – Classification– Factors influences the location of the industries –Role of industrial engineer. Types of industries: Small Scale Industries: Definitions – procedure to start. Medium scale industries: Definition. Large scale industries: Definition. Manufacturing Industry - purpose of manufacture – global manufacture. Engineering Industry: Introduction – Products of various engineering sectors.	6
II	**INDUSTRIAL SAFETY AND MAINTENACE:** Introduction – Safety equipment – Health and safety procedure – Personnel Protective Equipment – Safe working practices – Safety Signs –The reporting of injuries. Diseases and Dangerous occurrences Regulations 1995(RIDDOR). Plant Maintenance: Introduction – objectives – importance. Types of Maintenance: Break down maintenance – Preventive maintenance – Predictive Maintenance. TPM: introduction – objectives - Steps of TPM process.	6
III	**QUALITY AND STANDARDS:** Definition of Quality – Total Quality Management - introduction – basic concepts – Quality Council – objectives. 5S Principle – Sort, Set in Order, Shine, Standardise and Sustain. – Necessity of 5S – Six Sigma – Essential elements – Methodologies – Six Sigma belt – The seven traditional tools of quality. ISO standards – Intellectual Property Rights - Engineering Ethics. Brief description only.	6
IV	**BASICS OF ENGINEERING:** Tolerance - limits – Deviation – Allowance – Definitions only. Types of tolerances: Unilateral, Bilateral–Geometrical tolerance – Fits – Types of fits –selection of Fits. List of important materials used for building construction – Requirements of water for construction. Mortar: Types and its properties. Concrete: constituents – requirements. Types of roofing – Types of foundation – requirements of good foundation – Standard sizes of doors and windows.	8

	Weathering course: purpose – materials required. Earth quake: types of earth quake and its remedial measures. Rain water harvesting – types - importance. Electrical flux – electrical flux density – electrical field intensity – current – EMF – potential difference – resistivity – ohms law – work – power – energy – Kirchhoff's law – definitions only.	
V	**INDUSTRY 4.0** Industrial revolution – Definition - Industry 4.0 - Definition – Key trends. Components: Big data – Cloud computing – Internet of Things – Simulation – Autonomous Robots – Augmented reality – Cyber security – System integration – Additive manufacturing – Smart sensors Evolution of Industry 4.0 – Global readiness – Global trend – Initiative by industries and Government – Importance of Industry 4.0.	**6**

REFERENCE BOOKS:

1	Basic Manufacturing "Roger Timings" Third Edition – Newnes, An imprint of Elsevier.
2	Industrial Organisation and Engineering Economics – "T.R. Banga, S.C.Sharma"- Khanna Publishers
3	Industrial Engineering and Management "O.P.Khana" – DhanbatRai Publications.
4	Machine Drawing -K.L.Narayana, P.kannaiah, K.Venkatareddy – New Age International Publishers.
5	Elements of Civil Engineering - M.S.Palanisamy – Tata McGrawhill Publication.
6	A Text Book of Electrical Technology B.L.Theraja, A.K.Theraja – S.Chand& Company Ltd.
7	IJTSRD Conference Issue | March 2019 - The Fourth Industrial Revolution (I4.0) in India Challenges &Opportunities by Viraj Vijay Jadhav, RavindraMahadeokar.
8	Industry4.0 – All India Management Association report.
9.	CII Reports.

LEARNING WEBSITES :

S. NO	WEBSITE
1	https://nptel.ac.in
2	www.inspirenigite.com
3	www.learntoflourish.com

CONTENTS: PRACTICAL PORTION

WORKSHOP PRACTICAL

Note:

1. The observation note book or observation manual may be used. In the observation, the student should draw diagram, mention the readings / observations, calculations and result manually. The same have to be evaluated for the observation mark.

2. The proper safety procedure and norms should be followed with proper uniform(Khaki pant & shirt) with shoe during the practices.

BASIC ENGINEERING MANUFACTURING PRACTICE **24Hrs.**

(Tutorial – 6 Hrs. Practice – 18 Hrs.)

Objective:

- At the end of this course, the students will able toKnow the basic workshop production processes and general safety precautionsinside the shop.
- Read and interpret job drawings.
- Identify suitable marking and measuring tools for metal and wood materials.
- Select and use various cutting and filing tools for metal works.
- Select and use various chiselling and planning tools for woodworks.
- Learn different metal working operations like marking, cutting, filing, drilling, tappingetc.
- Understand different wood working operations like marking, planning, chiselling, sawing etc.
- Study and handle drilling machine and work holding devices.
- Produce jobs as per specified dimensions and inspect the job for the quality.
- Study the basic measuring instruments and measurements.

Skills:

- Ability to read job drawing
- Ability to identify and select proper material, tools, equipment and machine.
- Ability to set tools, work piece, and machines for desired operations.
- Ability to use safety equipment and follow safety procedures during operations.
- Ability to complete job as per job drawing in allotted time.
- Ability to measure and inspect the job for confirming desired dimensions and shape.
- Ability to acquire hands-on experience.
- Ability to use of workshop practices in day today industrial and domestic life helps to dissolve the problems.

COURSE OUTCOMES:

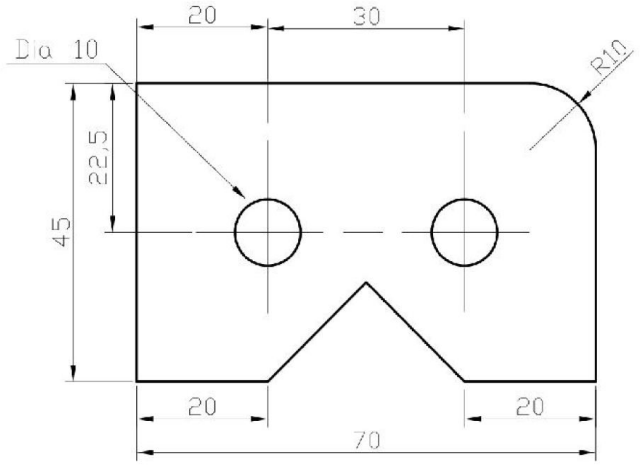
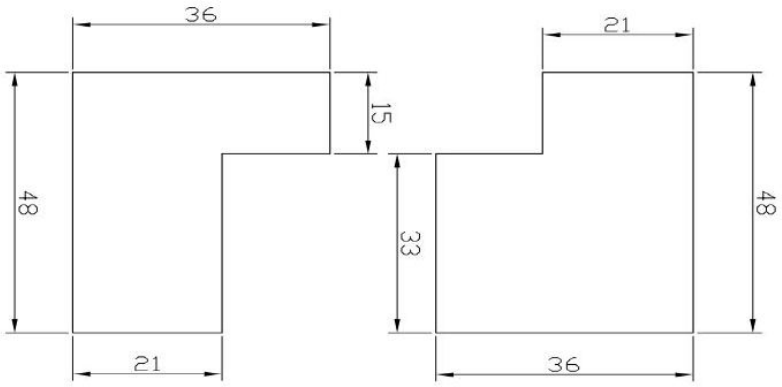
After the completion of the course, the students will be able to	
D208.6	Complete job as per job drawing in allotted time.
D208.7	Use of workshop practices in day today industrial and domestic life helps to Dissolve the problems.
D208.8	Follow safety procedures during work.
D208.9	Complete connections as per layout in allotted time.

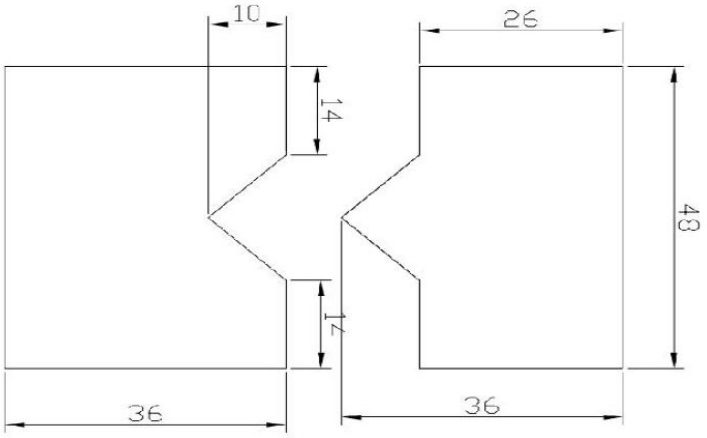
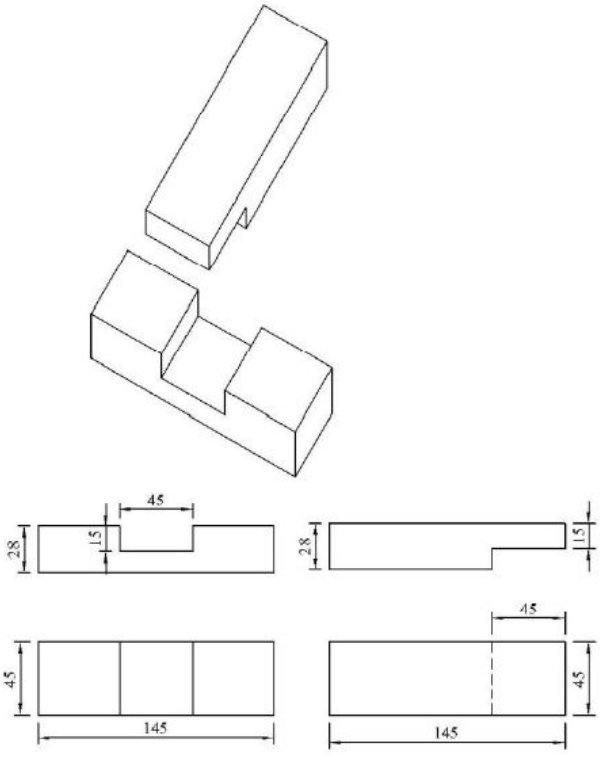
Syllabus

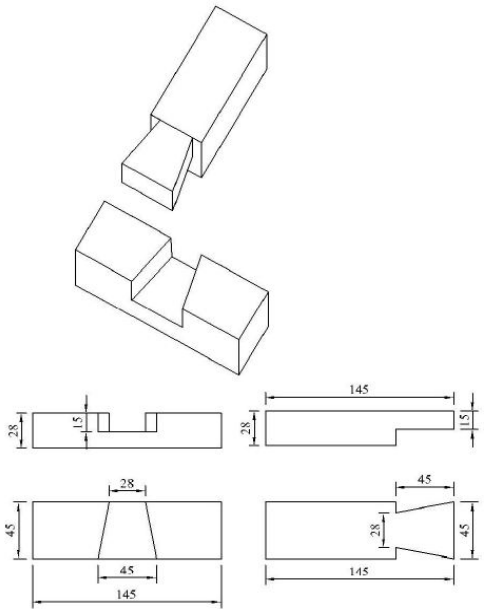
Introduction of Manufacturing: Definition – Type of manufacturing: Casting Process – Forming Process – Joining Process – Material removal process – Material additionProcess. **Bench work:** Metal work (Fitting) and Wood work (Carpentry) – Selection of material – Types of materials - Holding Devices - Striking Tools - Cutting Tools - Measuring and Marking tools- Power tools. Steps/procedures to prepare a part. Safety precautions in workshop.

Exercises

Note: Practices should be given to cover all the operations. All the students should be given sufficient practice to do the below exercises for the board practical examinations. Importance should be given for the measurement and dimensions.

Exercise No:	
1.	Raw material: 75mm X 50mm X 3 mm thick M.S. flat – 1 No  All dimensions are in mm
2.	Raw material: 50mm X 40mm X 3 mm thick M.S. flat – 2Nos.  All dimensions are in mm
3.	Raw material: 50mm X 40mm X 3 mm thick M.S. flat – 2Nos

	 All dimensions are in mm
4.	Raw material:150 mm X 50mm X 30mm thick Wood – 2Nos. All dimensions are in mm  All dimensions are in mm
5.	Raw material: 150 mm X 50mm X 30mm thick Wood –2 Nos.



All dimensions are in mm

BASIC SERVICE AND MAINTENANCE PRACTICE **24Hrs.**

(Tutorial – 6 Hrs. Practice – 18 Hrs.)

Objective:

- At the end of this course, the students will able to
- Identify, select and use various wires and colour codes practiced in the industry.
- Adopt safety practices while working with electric power supply.
- Able to know about the basic tools and measuring equipment.
- Understand the importance of earthing.
- Identify and make use of different electrical fittings and accessories.
- Read and understand circuit diagram and symbols.
- Practice simple wiring based on the circuit.
- Ability to use multimeter for measurements.
- Identify, select and use various plumbing tools and components
- To install pipes and accessories.
- To repair or replace components In case of water leakages.
- To make use of PVC pipes, pipe fittings and accessories.
- To know about different plumbing layouts and pipe joints.
- Pipe threading using standard die sets.

Skills:

- Ability to read circuit diagram.
- Ability to identify and select proper wires and tools.
- Ability to follow safety procedures during work.
- Ability to complete connections as per circuit in allotted time.
- Ability to check the connections and measure the voltage.
- Ability to read layout diagram.
- Ability to identify and select proper pipes, accessories and tools.
- Ability to follow safety procedures during work.

- Ability to complete connections as per layout in allotted time.
- Ability to check the leakages in connections.
- Ability to acquire hands-on experience

Syllabus

Electricity - Ohm's Law - current – voltage - resistor – capacitor – inductor - Wiring materials – Conducting materials - Insulating materials - Semiconductor materials - Types of switches – Types of holders – wiring accessories and tools – types of casings – MCB – types of wiring - Wiring colour codes. Distribution Board – Types of wiring circuit - Electrical hazard - First Aid for Electrical Emergencies, Rescue techniques. Lux: Definition – Use. Earthing: different methods – Importance – how to Improve of earth resistance - Earth Leakage circuit breaker (ELCB) - BIS provision. **Plumbing:** Introduction- important equipment, tools and accessories for installation andservice in piping systems- plumbing fixtures. Pipes: typesofmaterials - Pipe fittings – Power tools. Marking and measuring tools

Note: Students should draw the circuit diagram / block diagram and collect thecomponents according to their requirement. The connections should be done by the student in a board and should be verified. Suitable safety precautions should be made accordingly.

Exercise No:	
6.	Draw the circuit and connect the LED bulb, Tube light and one plug point socket with individual switch control in a board. Measure the current and voltage for various loads.
7.	Draw the circuit and connect two lamps in series and parallel with switch control in a board. Measure the current and voltage.
8.	Draw the circuit and connect stair case wiring for a LED bulb using two-way switches In aboard.
9.	Draw a block diagram and install a sink / wash basin with tap using PVC pipe and accessories such as gate valve, bend / elbow, tee, coupling, water meter etc. with draining system.
10.	Draw a block diagram and provide the tap connection with water meter and gate valve from overhead tank and rectify the leakages in tap and pipeline. Also measure the flow through the water meter.

CONTINUOUS INTERNAL ASSESSMENT:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i)	Assignment (Theory portion)*	10 Marks
ii)	Practical (Observation (5) and Record work(5))	10 Marks
iii)	Attendance	5 Marks
Total		**25 Marks**

Note: * Three assignments should be submitted. The same must be evaluated and converted to 10 marks.

Guidelines for Assignment:

First assignment – Unit I & II
Second assignment – Unit III & IV
Third assignment – All Units

Each assignment should have five two marks questions and two five marks questions.

AUTONOMOUSEXAMINATION

Note

1. The students should be taught theory portion and proper training in all the exercises. All the portions should be completed before examinations.
2. The students should maintain theory assignment, observation note book / manual and record notebook. The assignment and record note book should be submitted during the Autonomous Practical Examinations.
3. The question paper consists of theory and practical portions. All students should write the answers for theory questions (45 Marks) and any ONE exercise (50 Marks)should be completed for Autonomousexaminations.
4. All exercises should be given in the question paper and students are allowed to select by lot. If required the dimensions of the exercises may be varied for every batch. No fixed time allotted for each portion and students have liberty to do the examination for 3Hrs.
5. For theory question and answer: 45 Marks

   Ten questions will be asked for 2 marks each. Two questions from each unit.

   (10 X 2 = 20).

   Five questions will be asked for 5 marks each. One question from each unit.

   (5 X 5 = 25)
6. Required instruments / equipments / tools should be available for the batch strength as prescribed for practice and examination.
7. The external examiner should verify the availability of the equipments / instruments for the batch strength before the commencement of Practical Examination.

DETAILED ALLOCATION OF MARKS

<table>
<tr><th></th><th colspan="4">DESCRIPTION</th><th>MARKS ALLOTED</th></tr>
<tr><td>A</td><td colspan="4">Theory Question and Answer</td><td>45</td></tr>
<tr><td rowspan="4">B</td><td colspan="4">BASIC ENGINEERING MANUFACTURING PRACTICES
(or)
BASIC SERVICE AND MAINTENANCE PRACTICES</td><td></td></tr>
<tr><td>Marking, Cutting / Planning.
Tools list</td><td>15</td><td>Circuit diagram / Block Diagram. Tools list</td><td>15</td><td rowspan="3">50</td></tr>
<tr><td>Filing / Chiseling, Dimensions</td><td>25</td><td>Connection, Checking</td><td>25</td></tr>
<tr><td>Finish</td><td>10</td><td>Finish</td><td>10</td></tr>
<tr><td>C</td><td colspan="4">Viva voce</td><td>5</td></tr>
<tr><td colspan="5">TOTAL</td><td>100</td></tr>
</table>

CO- PO & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D208.1	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D208.2	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D208.3	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D208.4	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D208.5	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**15**	**15**	**15**	**15**	**15**	**10**	**15**	**15**	**10**	**10**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

CO- PO & PSOs MAPPING MATRIX

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
D208.6	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D208.7	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D208.8	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
D208.9	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**
Total	**12**	**12**	**12**	12	12	**8**	12	**12**	**8**	**8**
Correlation Level	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**

Correlation level 1 – Slight (low)
Correlation level 2 – Moderate (Medium)
Correlation level 3 – Substantial (high)

D208 - BASICS OF INDUSTRIES & WORKSHOP PRACTICAL

MODEL QUESTION PAPER

Time : 3 Hrs **Max. Marks: 45**

THEORY PORTION

PART – A (10X2=20)

Answer All the Questions, Each question carries two marks.

S.No	QUESTIONS	Unit	Bloom's Level
1	What is industry?	I	R
2	Define small scale industry?	I	R
3	What is personal protective equipment?	II	R
4	What are the types of maintenance?	II	R
5	Define quality control.	III	R
6	Define six sigma.	III	R
7	What is meant by tolerance?	IV	R
8	List out the types of roofing?	IV	R
9	Define cold computing.	V	R
10	Define system integration.	V	R

PART – B (5x5= 25)

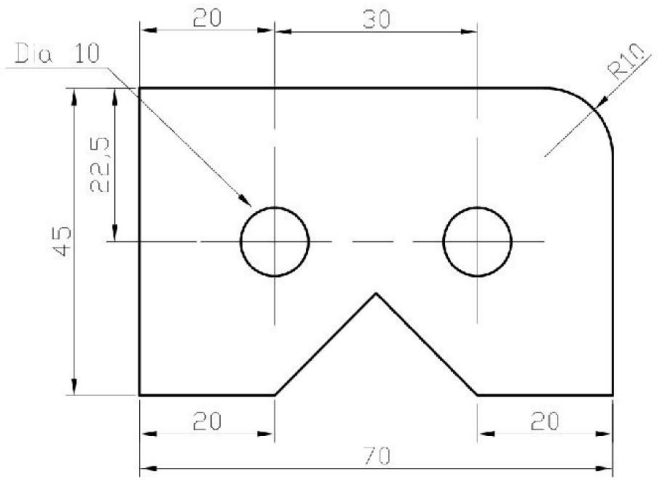
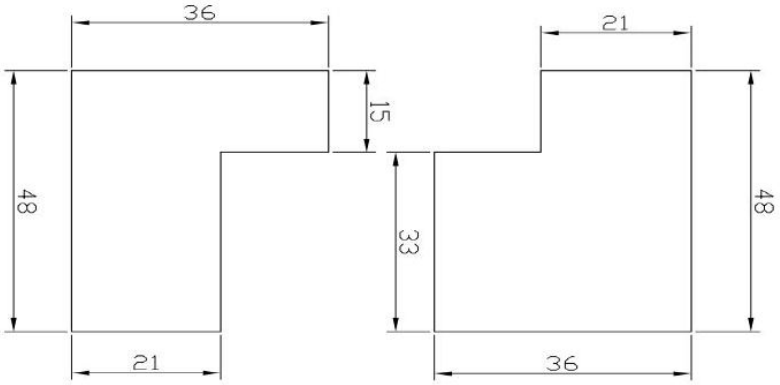
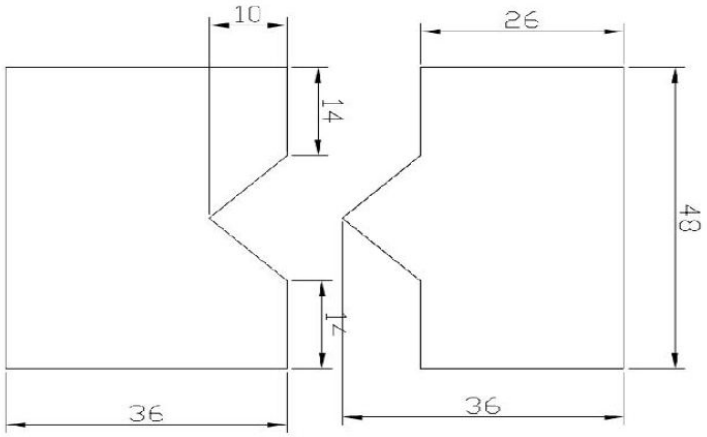
Answer All the Questions. Each question carries five marks

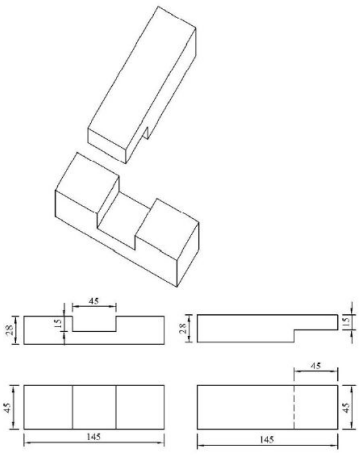
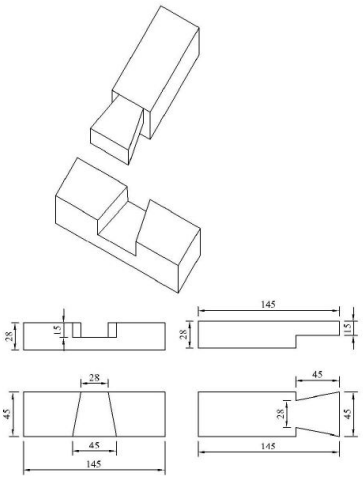
S.No	QUESTIONS	Unit	Bloom's Level
11	Summarize about the global manufacture.	I	U
12	Explain breakdown maintenance.	II	U
13	Briefly explain 5s principle.	III	U
14	Explain rain water harvesting.	IV	E
15	Explain about internet of things.	V	U

Note: The question paper setters are requested to follow the Revised Bloom's Taxonomy levels as prescribed below:

Bloom's Taxonomy Level	Lower Order Thinking Skills (LOTs)	Higher Order Thinking Skills (HOTs)
	R – Remember, **U –**Understand, **Ap –** Apply	**An –** Analysis, **E –** Evaluate, **C -** Create
% to be included	90%	10%

PRACTICAL PORTION

S.No:	Exercise
1.	Raw material: 75mm X 50mm X 3 mm thick M.S. flat – 1 No  All dimensions are in mm
2.	Raw material: 50mm X 40mm X 3 mm thick M.S. flat – 2Nos.  All dimensions are in mm
3.	Raw material: 50mm X 40mm X 3 mm thick M.S. flat – 2Nos  All dimensions are in mm

4.	Raw material:150 mm X 50mm X 30mm thick Wood – 2Nos. All dimensions are in mm  All dimensions are in mm
5.	Raw material: 150 mm X 50mm X 30mm thick Wood –2 Nos.  All dimensions are in mm
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TOOLS REQUIRED

Bench Vice - Fitted in the work bench	15 Nos.
Carpentry Vice - Fitted in the work bench	10 Nos.
Drilling machine (Separate in the First Year)	2 Nos.
Wiring board with stand	10 Nos.
Plumbing board with stand	10 Nos.
File flat 150 mm rough	10 Nos.
Fie flat 150 mm smooth	10 nos.
File flat 300mm rough / smooth	5 Nos.each
File round 150mm rough / smooth	5 Nos.each
File triangular 150mm rough / smooth	10 Nos.each
File half round 150 mm rough / smooth	10 Nos
Steel rule 300 mm	30 Nos.
Vernier caliper	10 Nos.
Vernier height gauge	3 Nos.
Try square 200 mm	20 Nos.
Scriber	10 Nos.
Marking Gauges	10 Nos.
Mortise gauge	5 Nos.
Divider	10 Nos.
Caliper Inside and Outside	10 Nos. each
Spring Caliper	10 Nos. each
Carpenters folding rule.	10 Nos
Saws	5 Nos.
Tenon saw	5 Nos.
Bow saw	5 Nos.
Keyhole saw	5 Nos.

Firmer chisel	10 Nos.
Beveled chisel	10 Nos.
Mortise chisel	10 Nos.
Jack plane	10 nos.
Screw Driver 100 mm	10 Nos.
Cutting Pliers insulated	10 Nos.
Knife Electrician D.B.	10 Nos.
Hammer Ball peen. 0.25 Kg	10 Nos.
Plumb bob 115 grams	5 Nos.
Neon tester pencil bit type 500 volt	10 Nos.
Spanner set DE Set of 6 from 6x7 to 16x7	5 Nos.
Spanner set Ring Set of 6 from 6x7 to 16x7	5 Nos.
Pliers flat nose insulated 150mm	5 Nos.
Pliers round nose insulated 200mm	3 Nos.
Pliers long nose insulated 200mm	3 Nos.
Screw driver heavy duty 200mm	3 Nos.
Screw driver heavy duty 300 mm	3 Nos.
Screw driver set 100-300 mm	5 Nos
Soldering iron 60 w/230 v	5 Nos.
Center punch 100mm	10 Nos.
Wooden mallet 1 kg	10 Nos.
Firmer chisel 1”	10 Nos
Firmer chisel ½”	10 Nos
Hammer Ball Peen 0.50 kg.	10 Nos
Hammer cross Peen 0.50 kg.	5 Nos
Adjustable spanner 300mm	3 Nos.
Allen keys Set 5 to 11	2 set

Spirit level 300mm	3 No.
Rubber gloves 5000volts	10 pairs
Multi meter AC/DC	5 Nos.
Water meter	2 Nos
Electrical hand power drilling machine 12mm	1 No.
Megger (Insulation tester) 500 volts	1 Nos
Pipe cutting machine	2 Nos
Pipe bending machine	2 Nos
Rubber matting 2meter x 1meter x 9mm	2 nos
Fire extinguishers Dry chemical 5 Kg	4 Nos.

Consumables Required quantity
Additional tools and instruments Required quantity
(To complete the exercises)

PERIYAR CENTENARY POLYTECHNIC COLLEGE

PERIYAR NAGAR, VALLAM – 613 403 – THANJAVUR – TAMIL NADU

(AUTONOMOUS INSTITUTION)

DIPLOMA IN ENGINEERING

FIRST YEAR

SYLLABUS

IYED/20/01

SEMESTER SYSTEM

D - SCHEME

IMPLEMENTED FROM 2020 - 2021