

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Diploma in Electronics & Telecommunication/Instrumentation/Computer Science & Engineering/Information Technology (Group-II)

Semester - I

Scheme of Studies:

S.No	Board of Study	Course Code	Course Titels	Scheme of Studies (Hours/Week)			
				L	P	T	Credit $L+(P+T)/2$
1	Humanities	2000151(046)	Communication Skills-I	3		1	4
2	Applied Science	2000152(014)	Applied Maths-I	3		1	4
3	Applied Science	2000159(015)	Applied Physics	3		1	4
4	Applied Science	2000157(011)	Applied Chemistry	3		1	4
5	Computer Science and Engineering	2000155(022)	Computer Fundamentals & Applications	1		2	2
6	Applied Science	2000166(015)	Applied Physics Lab		3		2
7	Applied Science	2000165(011)	Applied Chemistry Lab		3		2
8	Computer Science and Engineering	2000162(022)	Computer Fundamentals & Applications Lab		6		3
9	Electronics & Telecommunication Engineering	2000167(028)	Electronics Work Shop Practice		4		2
10	Humanities	2000168(046)	Technical Presentation & Group Discussion Part-I		1		1
Total				13	17	6	28

L - Lecture, T - Tutorial, P - Practical,

Legend Lecture (L) --> CI : Classroom Instruction (Includes different instructional strategies i.e. Lecture and others).

Practical (P) --> LI : Laboratory Instruction (Includes Practical performances in laboratory workshop, field or other locations using different instructional strategies.

Tutorial (T) --> SL : Self Learning.

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Scheme of Examination:

S.No	Board of Study	Course Code	Course Titles	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Humanities	2000151(046)	Communication Skills-I	100	20	30			150
2	Applied Science	2000152(014)	Applied Maths-I	100	20	30			150
3	Applied Science	2000159(015)	Applied Physics	100	20	30			150
4	Applied Science	2000157(011)	Applied Chemistry	100	20	30			150
5	Computer Science and Engineering	2000155(022)	Computer Fundamentals & Applications	50	20	30			100
6	Applied Science	2000166(015)	Applied Physics Lab				50	20	70
7	Applied Science	2000165(011)	Applied Chemistry Lab				50	20	70
8	Computer Science and Engineering	2000162(022)	Computer Fundamentals & Applications Lab				100	20	120
9	Electronics & Telecommunication Engineering	2000167(028)	Electronics Work Shop Practice					30	30
10	Humanities	2000168(046)	Technical Presentation & Group Discussion Part-I					10	10
Total				450	100	150	200	100	1000

ESE : End of Semester Exam, CT: Class Test, TA: Teachers Assessment

Legend :- PRA :Process Assessment, PDA : Product Assessment.

Note : i) TA in Theory includes Sessional work (SW) and Attendance (ATT) with weightage of 70% and 30% of total respectively.

ii) TA in Practical includes performance of PRA, PDA and Viva-Voce with weightage of 50%, 40% and 10% of total respectively.

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Semester-I

- A) Course Code : 2000151(046)
B) Course Title : Communication Skills - I
C) Pre-requisite Course Code and Title :
D) Rationale :

Communication Skills in English is one of the core skills to be developed in diploma holders as students exchange information and convey their ideas and opinions with different stakeholders. In recent years English has emerged as language of communication to exchange ideas, information and views amongst top and middle level management in organization/institution. It is the need of the day to be proficient in communication skills to perform effectively. Students in technical institutes need to be trained for this. The present curriculum focuses on the attainment of course outcomes related to speaking, reading, writing and listening, so that the students are confident, self-reliant and capable of communicating in varied situations.

Many industrial surveys have indicated that most of the pass outs from educational institutions are found to be lacking in soft skills especially in communication skills, thus adversely affecting their efficiency and effectiveness at work.

E) Course Outcomes:

- CO-1 Use elementary grammar to form correct sentences while Speaking & Writing.
CO-2 (a) Demonstrate ability to read and interpret documents/news paper/reports with correct pronunciation, audibility & accent.
(b) Demonstrate effective speaking skills with clarity in an organized and professional manner.
(c) Listen and reproduce the same in the oral and written form.
CO-3 Provide response in written form related to prescribed short stories and passages.

F) Scheme of Studies:

S.No	Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)			
				L	P	T	Total Credit L+(P+T)/2
1	Humanities	2000151(046)	Communication Skills-I	3	-	1	4

Legend: L-Lecture, P-Practical, T-Tutorial

G) Scheme of Assessment:

S.No	Board of Study	Course Code	Course Title	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Humanities	2000151(046)	Communication Skills-I	100	20	30	-	-	150

Legend: ESE: End Semester Exam, CT: Class Test, TA: Teacher Assessment

Note: Separate passing is must for End Semester Assessment.

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Semester-I

H) Course-Curriculum Detailing:

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

CO-1 Use elementary grammar to form correct sentences while Speaking & Writing.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO1.1 Use proper determiners SO1.2 Use singular and plural verb forms. SO1.3 Use correct voice in sentences. SO1.4 Use appropriate auxiliaries SO1.5 Supply correct prepositions	LE1.1 Prepare grammatically correct sentences as per given instruction LE1.2 Speak on a given topic using grammatically correct sentences.	Unit-1.0 English Grammar 1.1 Determiners 1.2 Auxiliaries 1.3 Tenses 1.4 Active and Passive Voice 1.5 Prepositions 1.6 Subject-Verb Agreement 1.7 Rearrangement of Jumbled words	<ul style="list-style-type: none"> One Word Substitution Rearrangement of Jumbled words

SW-1 Suggested Sessional Work (SW):

a. Assignments:

- Fill in the blanks, match the following, multiple choice question on the topic: Determiners, Auxiliaries, Tenses, Active and Passive Voice, Prepositions, Subject-verb Agreement, etc.

b. Mini Project:

- Express your views by writing an incidence using proper grammar.
- Select topic and share your views on the same with the audience. (2-3 min.)

c. Other Activities (Specify):

- Practice for speaking skills in front of mirror for self feedback.

- CO-2 (a) Demonstrate ability to read and interpret documents/news paper/reports with correct pronunciation, audibility & accent.
- (b) Demonstrate effective speaking skills with clarity in an organized and professional manner.
- (c) Listen and reproduce the same in the oral and written form.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO2.1 Summarize the given contents of news papers/ letters/ reports/arti	LE2.1 Deliver extempore speech of short duration (2 minutes) using appropriate	Unit-2.0 Effective Communication 2.1 Factors Affecting communication Classroom Environment,	Practice paralinguistic features

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Semester-I

<p>cles in oral and written form</p> <p>SO2.2 Communicate effectively using correct pronunciation, accent, modulation, intonation, pace, pitch, tone etc. during conversation, presentation, debates, mock interviews and viva - voce.</p>	<p>verbal & non-verbal communication.</p> <p>LE2.2 Interpret & Communicate Aural instructions to others in Oral and Written Form.</p>	<p>Teaching Aids, Interruption, Miscommunication, Communication Gap</p> <p>2.2 Seven Cs of Communication</p> <p>2.3 Different Communication Skills: Listening, Speaking, Reading</p> <p>2.4 Presentation skills - Clarity of objectives & logical sequencing of contents, Ethics in Presentation, Copyright, Oral Presentation</p> <p>2.5 Listening skills- Learning to Listen, Qualities of a Good Listener, Purpose of Effective Listening, How to improve Listening</p>	
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SW-2 Suggested Sessional Work (SW):

a. Assignments:

- Prepare a report on different factors affecting communication.
- Discuss various factors affecting Listening.
- List down the dos & don'ts to be taken care of for attending a counseling

b. Mini Project

- Recorded Lecture, Presentation, Discourse from different channels like Peace of Mind/Astha, may be recorded and played in the class. Students are asked to listen and answer the questions

c. Other Activities (Specify):

- Group discussion on different topics can be arranged by the teacher like Skills Development & youth, PM Skill Development Mission, Importance of Soft Skills, Professional Ethics & Values, Being Human, Environmental Protection, Gender Bias, Improving Presentation Skills etc.

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Semester-I

CO-3 Provide response in written form related to prescribed short stories and passages.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO3.1 Express views in written and oral form after reading the stories SO3.2 Comprehend the passages. SO 3.3 Use appropriate verb forms in sentences. SO3.4 Exhibit the Procedure of summarizing	LE3.1 Interpret & Communicate aural instructions to others in oral and written form. LE3.2 Use dictionary, thesaurus and reference books as per requirement.	*SOs Reading and Writing skills will be developed through following content for CO2 as well Unit-3.0 Short Stories 3.1 Selfish Giant-Oscar Wilde 3.2 A Letter to God-Gregario Lapex Y-Fuentes 3.3 An astrologer's Day –R.K. Narayan 3.4 The last Leaf-O Henry Unit 4.0 Suggestive passages for Comprehension 4.1 Language of Science 4.2 Robotic Revolution 4.3 Designing a Car 4.4 New Wonders of Camera 4.5 Non-conventional sources of Energy 4.6 Our Environment 4.7 Safety practices 4.8 Entrepreneurship	<ul style="list-style-type: none">Summarize Short Stories and passages as mentioned in Class room Instruction

SW-3 Suggested Sessional Work (SW):

a. Assignments:

- Loud reading of given stories by each student in the class. Students will listen the story carefully and summarize with moral of the story.
- Answer briefly questions of the prescribed stories and chapters.

b. Mini Project:

- A group of students will select some short stories from Panchtantra or good source. Each student will read the different story loudly. It is reproduced/narrated by another student turn wise which is audio recorded through mobile etc. Teacher acts as facilitator.
- Read and interpret documents/news paper/internet for understanding the prescribed content

c. Other Activities (Specify):

- Paragraph writings on general topics such as Time Management, Developing Positive Attitude, Team Building, environment, entrepreneurship, Developing Learning to Learn skills etc.
Group discussion, debate and extempore on current topics.

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Semester-I

I) Suggested Specification Table (For ESE of Classroom Instruction):

Unit Number	Unit Titles	Marks Distribution			Total Marks
		R	U	A	
I	English Grammar	4	11	10	25
II	Effective communication	2	8	10	20
III	Short Stories	-	10	10	20
IV	Passages for Comprehension	5	10	20	35
Total		11	39	50	100

Legend: R: Remember, U: Understand, A: Apply and above

Note: There will be no end semester examination (ESE) for laboratory instructions and the practical activity will be assessed for term work.

J) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Role Play
6. Demonstration
7. ICT Based Teaching Learning (Video Demonstration/Tutorials CBT, Blog, Facebook, Twitter, Whatsapp, Mobile, Online sources)
8. Brainstorming

K) Suggested Learning Resources:

(a) Books :

S. No.	Title	Author	Publisher	Edition & Year
1	English Grammar in Use	Murphy Raymond	Cambridge Publications	4 th Edition
2	Living English Structure	Allen	Cambridge Publications	Fifth edition(2009)
3	Effective English with CD	Kumar, E. Suresh; Sreehari,P.; Savithri, J.	Pearson Education, Noida, New Delhi	2009 ISBN: 978-81-317-3100-0
4	English Grammar at Glance	Gnanamurali, M.	S. Chand and Co. New Delhi,	2011 ISBN:9788121929042
5	Communication Skill for Technical Students		Somaiya Publication	
6	Elementary English Grammar and Composition	Agarwal N.K.	Goyal Brothers Prakashan	Latest Edition

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(b) Open source software and website address:

1. <https://www.englishgrammar.org/>
2. <http://www.englishgrammarsecrets.com/>
3. <https://www.usingenglish.com/handouts/>
4. <http://learnenglish.britishcouncil.org/en/english-grammar>
5. <https://www.englishclub.com/grammar/>
6. <http://www.perfect-english-grammar.com/>
7. <http://www.englishteacheramelanie.com/category/grammar/>
8. <https://www.grammarly.com/blog/category/handbook>
9. <https://www.britishcouncil.in/english/learn-online>
10. <http://learnenglish.britishcouncil.org/en/content>
11. <http://www.talkenglish.com/>
12. [language-labsystem.com](http://www.language-labsystem.com)
13. www.wordsworthelt.com

(c) Others:

1. Learning Packages.
2. Lab Manuals.
3. Language software Manual
4. Users' Guide

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1	Computers	A complete computer system with headphones & Speakers	All
2	Soft ware	English communication softwares – Globalina, A-One Solutions, Wordsworth, Spears	All
3	Computer tables & chairs	Depending upon the size of the Language Lab	All

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N) Mapping of POs & PSOs with COs:

Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	PO-1 Basic knowledge	PO-2 Discipline knowledge	PO-3 Experiments and practice	PO-4 Engineering Tools	PO-5 The engineer and society	PO-6 Environment and sustainability	PO-7 Ethics	PO-8 Individual and team work	PO-9 Communication	PO-10 Life-long learning	PSO-1	PSO-2
CO-1 Use elementary grammar to form correct sentences while Speaking & Writing..	2	1	1	1	-	-	-	1	2	3	1	1
CO-2 (a) Demonstrate ability to read and interpret documents/news papers/reports with correct pronunciation, audibility & accent. (b) Demonstrate effective speaking skills with clarity in an organized and professional manner. (c) Listen and reproduce the same in the oral and written form.	1	1	2	2	-	-	-	2	2	3	1	1
CO-3 Provide response in written form related to prescribed short stories and passages	2	1	2	2	-	1	-	2	3	2	1	1

Legend: 1 – Low, 2 – Medium, 3 – High

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O) Course Curriculum Map:

POs & PSOs No.	COs No.& Titles	SOs No.	Laboratory Instruction(LI)	Classroom Instruction (CI)	Self Learning (SL)
PO1,2,3,4,8,9,10 PSO 1,2	CO-1 Use elementary grammar to form correct sentences during Speaking & Writing.	SO1.1 SO1.2 SO1.3 SO1.4 SO1.5	LE1.1 LE1.2	Unit-1.0 English Grammar 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7	As mentioned in relevant pages
PO 1,2,3,4,8,9,10 PSO 1,2	CO-2 (a) Demonstrate ability to read & interpret documents/news papers/reports with correct pronunciation, audibility & accent. (b) Demonstrate effective speaking skills with clarity in an organized and professional manner. (c) Listen and reproduce the same in the oral and written form.	SO2.1 SO2.2	LE2.1 LE2.2	Unit-2.0 Effective Communication 2.1, 2.2, 2.3, 2.4, 2.5	
PO 1,2,3,4,8,9,10 PSO 1,2	CO-3Provide response in written form related to prescribed short stories and passages	SO3.1 SO3.2 SO3.3 SO3.4	LE3.1 LE3.2	Unit-3.0 Short Stories 3.1 ,3.2,3.3,3.4 Unit-4.0 Passages for comprehension 4.1, 4.2, 4.3, 4.3, 4.4, 4.5, 4.6,4.7,4.8	

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

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Semester-I

- A) Course Code : 2000152(014)
B) Course Title : Applied Maths-I
C) Pre- requisite Course Code and Title :
D) Rationale :

Mathematics has the potential to understand the core technological studies. This course of Applied Mathematics-I is being introduced as a foundation, which will help in developing the requisite course outcomes to most of the Diploma programs, and hence caters to the needs of the industry enhancing the employability. It will help the students to apply the principles of the fundamental engineering mathematics to solve related technology problems. The course will give the students an insight to apply and analyze the Engineering problems scientifically based on Determinants, Matrices, Differential Calculus, Co-ordinate Geometry and Fundamentals of the Statistics.

E) Course Outcomes:

- CO-1 Solve engineering related problems based on concepts of Algebra.
CO-2 Use basic concepts of Differential Calculus to solve engineering related problems.
CO-3 Compute maxima, minima, tangent and normal for engineering related problems.
CO-4 Solve engineering problems under given conditions of straight lines and conic sections.
CO-5 Use basic concepts of Statistics to solve engineering related problems.

F) Scheme of Studies:

S.No	Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)			
				L	P	T	Total Credit $L+(P+T)/2$
1.	Applied Science	2000152(014)	Applied Maths-I	3	-	1	4

Legend: L-Lecture, P-Practical, T-Tutorial

G) Scheme of Assessment:

S.No	Board of Study	Course Code	Course Title	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Applied Science	2000152(014)	Applied Maths-I	100	20	30	-	-	150

Legend: ESE: End Semester Exam, CT: Class Test, TA: Teacher Assessment

Note: Separate passing is must for End Semester Assessment.

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Semester-I

H) Course-Curriculum Detailing:

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

CO-1 Solve engineering related problems based on concepts of Algebra.

(Approx. Hrs: 13)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO1.1 Calculate the area of the given triangle by determinant method. SO1.2 Solve given system of linear equations using Cramer's rule. Solve given system of linear equations using matrix inversion method.		Unit-1.0 Algebra 1.1 Determinants 1.11 Concept and properties of determinants 1.12 Solution of simultaneous equations in three unknowns by Cramer's rule 1.2 Matrices 1.21 Algebra of Matrices 1.22 Inverse of Matrices 1.23 Solution of Simultaneous equations by matrix inversion method of order 3x3	1.1 (a) Solution of simultaneous equations by determinants 1.2 (a) Solution of simultaneous equations by matrix

SW-1 Suggested Sessional Work (SW):

a. Assignments:

- Explain examples of determinant in day today life.
- Explore the use of simultaneous equations by matrix method in daily life.
- Explain examples of inverse of matrix for real world problems.

b. Mini Project:

- Prepare charts using determinants to find the area of triangle.
- Prepare flow charts for solutions of system of equations by matrix method.
- Prepare models using matrices to solve simple problems based on Cryptography.

c. Other Activities (Specify):

- Identify engineering problems based on real world problems with the use of free tutorials available on the Internet.
- Use graphical software EXCEL, D-PLOT and GRAPH for related topics.
- Use MATH-CAD as mathematical tool to solve the problems of differential calculus.
- Seminar on basic applications of matrices
- Seminar on application of algebra to engineering related problems.

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Semester-I

CO-2 Use basic concepts of Differential Calculus to solve engineering related problems.

(Approx. Hrs.: 13)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO2.1 Utilize basic concepts of trigonometry to solve given elementary engineering problems. SO2.2 Calculate limit of given functions. SO2.3 Obtain derivatives of given function of functions.	--	Unit-2.0 Differential Calculus 2.1 Basic Trigonometry 2.11 Multiple and sub multiple angles 2.2 Functions and Limits 2.21 Independent and dependent variables 2.22 Different types of functions 2.23 Concept of Limit and its evaluation 2.3 Differentiation of elementary functions 2.31 Differentiation of Algebraic, Trigonometric, Exponential and Logarithmic functions 2.32 Differentiation of sum, product, quotient of two functions 2.33 Differentiation of function of a function	2.1 (a) Limit for given function of one variable 2.1 (b) Derivatives of given Algebraic, Trigonometric, Exponential and Logarithmic functions

SW-2 Suggested Sessional Work (SW):

a. Assignments:

- I. Enumerate the value of the limit for given function of one variable.
- II. Explore the applications of derivative of given Algebraic, Trigonometric, Exponential and Logarithmic functions in engineering.

b. Mini Project:

- i. Prepare charts showing formulas of multiple and sub multiple trigonometric functions.
- ii. Prepare graphical representation for the existence of limits of given functions.

c. Other Activities (Specify):

- I. Identify engineering problems based on real world problems with the use of free tutorials available on the Internet.
- II. Use graphical software EXCEL, D-PLOT and GRAPH for topics related to calculus.
- III. Use MATH-CAD as mathematical tool to solve the problems of differential calculus.
- IV. Seminar on engineering applications of derivatives of functions.

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Semester-I

CO- 3 Compute maxima, minima, tangent and normal for engineering related problems.

(Approx. Hrs: 19)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO3.1 Calculate second order derivatives of given functions. SO3.2 Apply the concepts of differentiation to find the equation of tangent and normal for given problem. SO3.3 Utilize the concepts of differentiation to calculate maxima and minima for given function under certain conditions.	--	Unit-3.0 Applications of Differential Calculus 3.1 Second order derivatives Second order derivatives (without examples) 3.2 Equation of Tangent and Normal Equation of Tangent and Normal for functions of one variable only 3.3 Maxima and minima 3.31 Maxima and minima for functions of one variable only	3.1(a) Applications of derivatives 3.1(b) Maximum and minimum value of given functions

SW-3 Suggested Sessional Work (SW):

a. Assignments:

- Explore the role of differentiation to second order derivatives.
- Analyze the equation of tangent and normal for given function and expound what it reflects.
- Calculate the maximum and minimum value of given function for engineering related problems.

b. Mini Project:

- Prepare flow charts showing method of getting maximum and minimum value of given function.
- Prepare graph for tangent and normal for given function.
- Prepare model showing the application of tangent and normal to bending of roads in case of sliding of vehicle.

c. Other Activities (Specify):

- Identify engineering problems based on real world with the use of free tutorials available on the Internet.
- Use graphical software EXCEL, D-PLOT and GRAPH for applications of calculus and related topics.
- Use MATH-CAD as mathematical tool to solve the problems of applications of differential calculus.
- Seminar on the engineering applications of maxima and minima.
- Seminar on applications of tangent and normal for engineering related problems.

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CO-4 Solve engineering problems under given conditions of straight lines and conic sections.

(Approx. Hrs.: 16)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO4.1 Calculate angle between given two straight lines. SO4.2 Obtain parallel distance between the given two parallel lines. SO4.3 Form the equation of circle under given conditions. SO4.4 Calculate the parameters of given parabola and ellipse.		Unit-4.0. Co-ordinate Geometry Various forms of straight lines 4.11 Co-ordinate systems, slope point form, two point form 4.12 Distance between two points, division of a line segment 4.13 Two points intercepts form, general form 4.14 Perpendicular distance from a point on the line, perpendicular distance between two parallel lines Conic sections 4.15 Definition, standard forms 4.16 General equation 4.17 Center and radius of a circle 4.18 Focus, axis, directrix, latus rectum and vertex of parabola and ellipse	4.1 (a)Co-ordinate geometry of straight lines and given conic sections 4.2 (b)Parameter s of focus, axis, directrix, vertex and latus rectum of ellipse and parabola

SW-4 Suggested Sessional Work (SW):

- **Assignments:**
 - i. Enumerate the angle and distance between two lines.
 - ii. Prepare a model showing various forms of equation of circle under given conditions.
 - iii. Write the specific features of the parameters like focus, axis, directrix, vertex and latus rectum of ellipse and parabola.
- **Mini Project:**
 - i. Prepare flow charts showing different forms of straight lines.
 - ii. Prepare graph for plotting ellipse and parabola.
- **Other Activities (Specify):**
 - i. Identify engineering problems based on real world problems with the use of free tutorials available on the Internet.
 - ii. Use graphical software EXCEL, D-PLOT and GRAPH for related topics.
 - iii. Use MATH-CAD as mathematical tool to solve the problems of differential calculus.
 - iv. Seminar on the conversion of different forms of straight lines.
 - v. Seminar on charts showing method of getting maximum and minimum value of given functions.

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CO- 5 Use basic concepts of Statistics to solve engineering related problems. (Approx. Hrs: 19)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO5.1 Draw the graph for given frequency distribution (distributions). SO5.2 Calculate mean, median and mode for the given set of observations. SO5.3 Calculate standard deviation for given set of engineering problems. SO5.4 Determine the variance and coefficient of variance of grouped and ungrouped data.	--	UNIT 5. Fundamentals of Statistics 5.1 Frequency distribution and central tendency 5.11 Introduction, graphical representation of frequency distribution 5.12 Central tendency, mean, median, frequency distribution and mode 5.2 Dispersion and deviation 5.21 Measure of dispersion. 5.22 Range, quartile deviation. 5.23 Standard deviation, root mean square deviation 5.3 Variance and coefficient of variance 5.31 Variance and coefficient of variance	5.1 (a) Frequency distribution and central tendency 5.2(a) Standard deviation for the given frequency distribution

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-5 Suggested Sessional Work (SW):

- **Assignments:**
 - i. Prepare detail report on frequency distribution for the given data.
 - ii. Represent the given frequency distribution in graphical form.
 - iii. Enumerate the mean, median and mode of the given data.
 - iv. Write the importance of calculating standard deviation for the given frequency distribution to engineering applications.
 - v. Analyze variance and coefficient of variance of the given data to industry specific problems.
- **Mini Project:**
 - i. Prepare charts for grouped and ungrouped data.
 - ii. Prepare chart showing mean, median and mode values of given data.
 - iii. Prepare frequency curves like histogram, frequency polygon and ogive by graphical method.
- **Other Activities (Specify):**
 - i. Identify engineering problems based on real world problems with the use of free tutorials available on the Internet.
 - ii. Use graphical software EXCEL, D-PLOT and GRAPH for related topics.
 - iii. Use MATH-CAD as mathematical tool to solve the problems of differential calculus.
 - iv. Seminar on different types of dispersion and deviations.
 - v. Seminar on applications of central tendencies likes mean, median and mode for engineering related problems.

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Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

I) Suggested Specification Table (For ESE of Classroom Instruction CI+SW+SL):

Unit Number	Unit Title	Marks Distribution			Total Marks
		R	U	A	
I	Algebra	4	6	10	20
II	Differential Calculus	4	6	10	20
III	Applications of Differential Calculus	4	6	10	20
IV	Co-ordinate Geometry	4	6	10	20
V	Fundamentals to Statistics	4	6	10	20
Total		20	30	50	100

Legend: R: Remember, U: Understand, A: Apply and above

J) Suggested Specification Table (For ESE of Laboratory Instruction*): NA

Laboratory Instruction Number	Short Laboratory Experiment Title	Assessment of Laboratory Work (Marks)			
		Performance		Viva-Voce	
		PRA	PDA		
-	-	-	-	-	-

*Assessment rubric, process and product check list with rating scale need to be prepared by the course wise teachers for each experiment for conduction and assessment of laboratory experiments /practicals.

Legend: PRA: Process Assessment, PDA: Product Assessment

Note: Only one experiment has to performed at the end semester examination of Marks as per assessment scheme.

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Industrial visits
6. Industrial Training
7. Field Trips
8. Portfolio Based Learning
9. Role Play
10. Demonstration
11. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
12. Brainstorming
13. Others

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L) Suggested Learning Resources:

(a) Books:

Sl. No.	Title	Author	Publisher	Edition & Year
1	Advanced Engineering Mathematics	Krezig, Ervin	Wiley Publ., New Delhi	2014, ISBN: 978-0-470-45836-5
2	Advanced Engineering Mathematics	H. K. Das	S. Chand & Co, New Delhi	ISBN: 9788121903455
3	Higher Engineering Mathematics	B. S. Grewal	Khanna Publ., New Delhi	2015, ISBN: 8174091955
4	Engineering Mathematics, Volume 1	S. S. Sastry	PHI Learning, New Delhi	2009, ISBN: 978-81-203-3616-2
5	Fundamentals of Mathematical Statistics	S. C. Gupta	S. Chand & Sons	2014

(b) Open source software and website address:

- 1 www.scilab.org/ -SCI Lab
- 2-www.dplot.com/ -DPlot
- 3 www.allmathcad.com/ -MathCAD
- 4 www.wolfram.com/mathematica/ - MATHEMATICA
5. www.easycalculation.com

(c) Others:

1. Learning Packages.
2. Lab Manuals.
3. Manufacturers' Manual
4. Users' Guide

M) List of Major Laboratory Equipment and Tools: NA

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
-	-	-	-

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O) Course Curriculum Map:

POs & PSOs No.	COs No. & Title.	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO-1, 2,3,8,9,10 PSO---	CO-1 Solve engineering related problems based on concepts of Algebra.	SO1.1 SO1.2 SO1.3		Unit-1.0 Algebra 1.1, 1.2	1.1(a), 1.2(a)
PO-1, 2,3,8,9,10 PO-10 PSO-----	CO-2 Use basic concepts of Differential Calculus to solve engineering related problems.	SO2.1 SO2.2 SO2.3		Unit-2.0 Differential Calculus 2.1,2.2,2.3	2.1(a), 2.1(b)
PO-1, 2,3,8,9,10 PSO-----	CO-3 Compute maxima, minima, tangent and normal for engineering related problems.	SO3.1 SO3.2 SO3.3		Unit-3.0 Applications of Differential Calculus 3.1,3.2,3.3	3.1(a), 3.1(b)
PO-1, 2,3,8,9,10 PO-10 PSO-----	CO-4 Solve engineering problems under given conditions of straight lines and conic sections.	SO4.1 SO4.2 SO4.3		Unit-4.0 Co-ordinate Geometry 4.1, 4.2	4.1(a), 4.1(b)
PO-1,2,3,8,9,10 PSO-----	CO-5 Use basic concepts of Statistics to solve engineering related problems.	SO5.1 SO5.2 SO5.3		Unit-5.0 Fundamentals of Statistics 5.1,5.2,5.3	5.1(a),5.2(a)

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies)
SL: Self Learning

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- A) Course Code : 2000159(015)
 B) Course Title : Applied Physics
 C) Pre- requisite Course Code and Title :
 D) Rationale :

Engineering diploma holders have to deal with physical properties of various materials, measurements of physical quantities, basic tools, and maintenance of machines in the industrial environment. Diploma holder must have a skill to apply the knowledge of basic concepts and principles of measurements, mechanics, waves, properties of materials, motion, friction, fluid mechanics, optics, optical instruments, electricity, magnetism and modern physics in solving broad based engineering problems. This course of engineering physics helps diploma engineers to achieve the course outcomes and provide sound background for self-development in future to cope up with new innovations.

E) Course Outcomes:

- CO-1 Estimate errors in measurement of physical quantities.
 CO-2 Solve mechanics related engineering problems by applying the knowledge of forces and properties of materials.
 CO-3 Solve engineering problems using relevant optical equipment by applying the principles of ray optics.
 CO-4 Apply concepts of electrostatics, magnetism and electricity to solve engineering problems.
 CO-5 Solve engineering problems by applying the knowledge of modern physics.

F) Scheme of Studies:

S.No	Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)			
				L	P	T	Credit L+(P+T)/2
1	Applied Science	2000159(015)	Applied Physics	3	-	1	4
2	Applied Science	2000166(015)	Applied Physics (Lab)	-	3	-	2

Legend: L-Lecture, P-Practical, T-Tutorial

G) Scheme of Assessment:

S.No	Board of Study	Course Code	Course Title	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Applied Science	2000159(015)	Applied Physics	100	20	30	-	-	150
2	Applied Science	2000166(015)	Applied Physics Lab	-	-	-	50	20	70

Legend: ESE: End Semester Exam, CT: Class Test, TA: Teacher Assessment

Note: Separate passing is must for End Semester Assessment.ss

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H) Course-Curriculum Detailing:

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Tensional Work (SW) and Self-Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

CO-1 Estimate errors in measurement of physical quantities.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO1.1 Convert unit of the given physical quantity from one-unit system to other. SO1.2 Derive the formula of derived physical quantity using dimensional analysis. SO1.3 Calculate the error in the given measurement with justification.	LE1.1 Use Vernier Calipers to measure the dimensions of given object in significant figures and estimate errors precisely. LE1.2 Use Screw gauge to measure the dimensions of given object in significant figures and estimate errors precisely. LE1.3 Use Spherometer to measure the dimensions of given objects in significant figures and estimate error precisely.	Unit-1.0 Units, Measurement and Error analysis 1.1 Unit of physical quantity 1.11 Fundamental and derived unit 1.2 Unit system 1.21 CGS, MKS and SI (a) Advantages/disadvantages of SI unit system (b) Seven basic and Supplementary units. 1.3 Dimensional Analysis 1.31 Dimensional formula and equations. 1.32 Applications of Dimensional equations. 1.33 Numerical problems on Dimensional analysis. 1.4 Measurement 1.41 Accuracy, Precision and Errors. 1.42 Absolute, Relative and percentage Error. 1.5 Significant figures and rounding off.	1.21(a) Advantages/disadvantages of SI unit system 1.21 (b) Seven basic and Supplementary units

SW-1 Suggested Sessional Work (SW):

a. Assignments:

- Measure dimensions of class room, house hold items, thickness of paper, aluminum foil, iron bar and items found in surroundings.
- Analyze the correctness of given physical relation using dimensional analysis.

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- iii. Identify the instruments used for measurement of seven fundamental quantities.
- iv. Identify instruments used for measurement of derived quantities.

b. Mini Project:

- i. Prepare working model of measuring instruments – Vernier Calipers, screw gauge.
- ii. Collect low dimension items from household and market and calculate the thickness with the help of Vernier Calipers and screw gauge.

c. Other Activities (Specify):

- i. Seminar on Errors in measurements.
- ii. Seminar on precision and accuracy of any instrument.

CO-2 Solve mechanics related engineering problems by applying the knowledge of forces and properties of materials.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO2.1 Classify conservative and non-conservative forces in a given situation. SO2.2 Explain Gravitational forces and related constants at given place. SO2.3 Differentiate between types of Moduli of elasticities for given solids. SO2.4 Select a given fluid on the basis of surface tension and viscosity.	LE2.1 Determine g using simple pendulum. LE2.2 Determine terminal velocity of given object by Stoke's law apparatus. LE2.3 Determine surface tension of water by Capillary rise method.	Unit-2.0 Force and General Properties of matter 2.1 Force 2.11 Types of Forces (a) Conservative and non-conservative forces (b) Frictional Forces, Limiting static and dynamic friction. (c) Centripetal and centrifugal force and their illustration. (d) Gravitational Force 'G' and 'g' and their interrelation, Factors affecting 'g' 2.2 Elasticity 2.21 Hooke's law (a) Elastic limit and elastic fatigue 2.22 Moduli of elasticities (a) Young's modulus, Bulk Modulus, Shear modulus of rigidity 2.3 Surface Tension 2.31 Molecular force, surface energy, effect of	2.11. Types of Forces. (d) Factors affecting 'g' 2.21 (a) Elastic limit and elastic fatigue 2.32 Cohesive and adhesive force 2.42 Streamline and turbulent flow

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Session Outcomes	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
		temperature 2.32 Cohesive and adhesive force 2.33 Excess pressure and its illustration, rise of liquid in capillary tube 2.4 Viscosity 2.41 Coefficient of viscosity, Newton's law of viscosity 2.42 Streamline and turbulent flow, Reynolds number 2.43 Poiseuille's equation (no derivation of formula), Stoke's law and their applications	

SW-2 Suggested Sessional Work (SW):

a. Assignments:

- Find the value of 'g' at different locations of India and justify the reasons for variations.
- Enumerate the examples of conservation of angular momentum in day to day life.
- Enumerate the applications of surface tension in daily life.
- Explore the use of different liquid on the basis of their viscosity.

b. Mini Project:

- Prepare a setup to show frictionless motion on slanting surface.
- Prepare a model to compare elasticity of different materials.

c. Other Activities (Specify):

- Seminar on artificial and natural satellite.
- Seminar on weightlessness in lifts and space.

CO-3 Solve engineering problems using relevant optical equipment by applying the principles of ray optics.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO3.1 Compare the wavelength and frequency of different components of electromagne	LE3.1 Calculate refractive index of material of glass slab. LE3.2 Calculate refractive index of material of glass prism. LE3.3 Calculate focal length of convex/concave lenses	Unit-3.0 Optics, optical instruments and optical fibers a. Refraction 3.11 Laws of refraction 3.12 Lenses and combination of lenses	3 b. Absolute and relative refractive index 3.32 Applications of TIR

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Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
<p>SO3.2 Explain the phenomena of total internal reflection in optical fiber.</p> <p>SO3.3 Select materials on the basis of refractive index.</p>	<p>accurately.</p> <p>LE3.4 Determine the Critical angle for total Internal reflection of given medium w. r. t. air.</p> <p>LE3.5 Determine Numerical aperture of Optical fiber</p>	<p>b. Absolute and relative refractive index 3.13 Refraction through prism, Angle of minimum deviation and its relation</p> <p>c. Total internal reflection of light 3.31 Critical angle. 3.32 Applications of TIR 3.33 Optical fiber, NA of Optical fiber</p> <p>3. 4 Optical instruments 3.31 Simple and compound microscope 3.32 Spectrometer</p> <p>3.5 Electromagnetic spectrum 3.31 Pure and Impure spectrum, Visible range</p>	

SW-3 Suggested Sessional Work (SW):

a. Assignments:

- Write details of method of finding refractive index of liquid using hollow prism
- Prepare detail report on the frequency range of electromagnetic waves interaction in daily life.

b. Mini Project:

- Prepare working model to demonstrate the TIR in Optical fiber.
- Prepare model of microscope with house hold materials and lens.

c. Other Activities (Specify):

- Visit to BSNL like organizations to observe the role of optical fibers in communication.
- Seminar on industrial application of Optical fiber

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CO-4 Solve electrical engineering problems by applying concepts of electrostatics, magnetism and electric current.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
<p>SO4.1 Explain Coulomb's law, electric potential and electric field for given charge distribution.</p> <p>SO4.2 Determine capacity of a capacitor with given dielectric materials.</p> <p>SO4.3 Use Ohm's law for different combinations of resistance to calculate current and potential difference.</p>	<p>LE4.1 Use Ohm's law to calculate unknown resistance in a given circuit.</p> <p>LE4.2 Determine the resistance of given circuits by applying series and parallel combination of resistance.</p> <p>LE4.3 Determine the specific resistance of the given material by using meter bridge.</p> <p>LE4.4 Use deflection magnetometer for comparison of magnetic moments of two bar magnets.</p> <p>LE4.5 Draw the magnetic lines of forces using bar magnet and compass needle.</p> <p>LE4.6 To compare e.m.f of two cells using potentiometer.</p> <p>LE4.7 To determine internal resistance of a cell.</p>	<p>Unit-4.0. Electrostatics, Magnetism and Current Electricity</p> <p>4.1 Electric Charge, Coulomb's Law</p> <p>4.2 Electric Field, Potential, Potential Difference between Two Points, Equipotential Surfaces</p> <p>4.3 Types of dielectrics and dielectric Strength</p> <p>4.4 Capacity, Units, Principle of Capacitor</p> <p>4.41 Factors Affecting Capacity, type of capacitors</p> <p>4.5 Magnetism: -</p> <p>4.51 Magnetic lines of force, lines of induction,</p> <p>4.6 Current Electricity</p> <p>4.61 Resistance, Specific resistance</p> <p>4.62 Series and parallel combination of resistance</p> <p>4.63 Internal resistance of a cell</p> <p>4.64 Potential difference and e.m.f of a cell</p> <p>4.65 Combination of cells in series and in parallel.</p> <p>4.66 Simple applications of Wheatstone bridge, metre bridge and Potentiometer.</p> <p>4.67 Electrical power</p>	<p>4.2 Equipotential Surfaces</p> <p>4.41 Factors affecting Capacity, types of capacitors</p> <p>4.61 Specific resistance</p> <p>4.62 Wheatstone Bridge principle applications</p>

SW-4 Suggested Sessional Work (SW):

a. Assignments:

- Prepare list of dielectric materials with dielectric constant.
- Analyze the role of resistance and capacitors in house hold electrical items viz. electric fans etc.

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iii. Prepare list of instruments/ equipment's using Magnets in house hold appliances and Labs.

b. Mini Project:

- Prepare working models of capacitors.
- Collect some resistance and capacitors from nearby electrical shops and measure its value using multi-meter.
- Prepare circuits with LED to illustrate the series and parallel combination of resistance.
- Prepare cells using different electrolytes.

c. Other Activities (Specify):

- Seminar on applications of resistance and capacitors.
- Market survey for availability of electronic items in the local market.
- Calculate domestic monthly electricity bill.

CO- 5 Solve engineering problems by applying the knowledge of modern physics.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO5.1 Apply the knowledge of photoelectric effect and X-rays in a given situation. SO5.2 Compare laser with other sources of light. SO5.3 Explain the working principle and applications of Optical fiber	LE5.1 Calculate the work function of given photoelectric materials accurately. LE5.2 Calculate the divergence of given laser.	UNIT 5. Modern Physics 5.1 Photoelectric effect 5.11 Laws of photoelectric emission, Photoelectric equation and threshold frequency 5.12 Photo cell 5.2 X-rays 5.21 Production of X rays, properties & uses. 5.3 Laser 5.31 Spontaneous and stimulated emission 5.32 population inversion, pumping scheme and active system Ruby Laser and semiconductor laser 5.4 Ultra-sonics 5.41 Frequency range 5.42 Methods of production- Magnetostriction & Piezo electric method 5.43 Properties of ultra-	5.12 Photo cell 5.21 Properties & uses of X rays. 5.43 Applications of Optical Fiber

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Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
		sonics 5.44 Applications of ultra-sonics.	

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self-Learning

SW-5 Suggested Sessional Work (SW):

a. Assignments:

- To study different medical applications of ultra-sonics and X-rays.
- Prepare list of type of laser used in office and house hold devices.

b. Mini Project:

- To design a working model for the production of ultra-sonics.
- Determine the divergence of key chain laser purchased from local market.

c. Other Activities (Specify):

- Seminar on industrial applications of ultra-sonics.
- Seminar on X ray.
- Seminar on engineering applications of laser

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

I) Suggested Specification Table (For ESE of Classroom Instruction):

Unit Number	Unit Title	Marks Distribution			Total Marks
		R	U	A	
I	Units, Measurement and Error analysis	8	5	7	20
II	Forces and General Properties of matter	5	5	10	20
III	Optics, optical instruments and optical fibers	8	6	6	20
IV	Electrostatics, Magnetism and Current Electricity	5	8	7	20
V	Modern Physics	6	7	7	20
Total		32	31	37	100

Legend: R: Remember, U: Understand, A: Apply and above

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Semester-I

J) Suggested Specification Table (For ESE of Laboratory Instruction*):

Laboratory Instruction Number	Short Laboratory Experiment Title	Assessment of Laboratory Work (Marks)		
		Performance		Viva-Voce
		PRA	PDA	
LE1.1	Vernier Calipers	15	25	10
LE1.2	Screw gauge	15	25	10
LE 1.3	Spherometer	15	25	10
LE2.1	Young modulus	25	15	10
LE2.2	'g' by Simple pendulum	25	15	10
LE2.3	Viscosity of liquid	25	15	10
LE2.4	Surface tension by capillary rise method	25	15	10
LE3.1	Refractive index of glass slab	20	20	10
LE3.2	Combination of lens	25	15	10
LE3.3	Refractive index of Prism	20	20	10
LE4.1	Ohm's Law	15	25	10
LE4.2	Series and parallel combination of resistance	25	15	10
LE4.3	Specific Resistance	25	15	10
LE 4.4	Deflection galvanometer	25	15	10
LE4.5	Magnetic lines of Forces	20	20	10
LE4.6	Comparison of e.m.f of cells	20	20	10
LE4.7	Internal resistance of a cell	20	20	10
LE5.1	Photo electric effect	20	20	10
LE5.2	Diode laser	15	25	10

50 Marks are allocated for performance under ESE.

* Assessment rubric, process and product check list with rating scale need to be prepared by the course wise teachers for each experiment for conduction and assessment of laboratory experiments /practicals

Legend: PRA: Process Assessment, PDA: Product Assessment

Note: Only one experiment has to performed at the end semester examination of 50 Marks as per assessment scheme

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Semester-I

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Industrial visits
6. Industrial Training
7. Field Trips
8. Portfolio Based Learning
9. Role Play
10. Demonstration
11. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
12. Brainstorming
13. Others

L) Suggested Learning Resources:

(b) Books:

S. No.	Title	Author	Publisher	Edition & Year
1	Fundamentals of Physics	Halliday, David; Resnik, Robert and Walker, Jearl	John Wiley and sons	Tenth edition 2013
2	The Feynman Lectures on Physics	Feynman P.Richar, B. Leighton Robert Sands Matthew	Pearson Education India	First edition 2012
3	University physics	Young Hugh, Freedman Roger	Pearson Education India	Thirteenth Edition 2013

(b) Open source software and website address:

1. Some relevant Experiments: <http://cdac.olabs.edu.in>
2. VernierCalipers: <http://www.tutorvista.com/physics/animations/vernier-callipers-animation>
3. Screw gauge: www.notesandsketches.co.uk/Measuring_Tools_Small.swf
4. <http://www.stefanelli.eng.br/en/virtual-vernier-caliper-simulator-05-millimeter>
5. Some relevant Experiments and theory topics:
<https://phet.colorado.edu/en/simulations/category/physics>
6. Photoelectric effect: <http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1>
7. Deflection magneto meter: http://emv-au.vlabs.ac.in/Deflection_Magnetometer/

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Semester-I

8. Laser: <https://spaceplace.nasa.gov/laser/en/>

(c) Others:

1. Learning Packages.
2. Lab Manuals.
3. Manufacturers' Manual
4. Users' Guide

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1	Vernier calipers	Stainless steel body, Range: 0-150mm, Resolution: 0.1mm	LE1.1
2	Screw gauge	Stainless steel spindle and ratchet top brass body with satin chrome finish. Graduated to read up to 25mm in 0.01mm divisions with screw pitch of 0.5mm, ratchet lock nut	LE 1.2
3	Spherometer	Brass double disc superior quality, stainless steel legs and screw 1/100mm pitch each.	LE1.3
4	Pendulum apparatus for determination of 'g'	200 mm diameter metal wheel mounted with fixed stand and a meter scale, stop watch to measure time. steel case fly back action least count 1/10 th or 1/5 th of second	LE2.2
5	Stoke's Law apparatus	Glass tube (~1-inch diameter and length ~ 1 m) with stand, timer, steel sphere, glass beads	LE2.3
6	Surface tension set up	Travelling microscope with horizontal and vertical movement (LC 0.001 cm), capillary tube, beaker, pin fixed on adjustable stand	LE2.4
7	Glass slab	Rectangular, all sides polished, made from slightly greenish glass free from bubbles, 75*50*18 mm	LE3.1
8	Glass Prism	Equilateral or right angled, from bubble free borosil crown glass 38 x 38	LE 3.2
9	Ohm's law apparatus	Box type with D.C meter to verify ohm's law with fitted ammeter & voltmeter	LE4.1
10	Post Office Box	Complete set in polished wooden box, Split brass contact blocks holding precision cut, interchangeable plug having molded black fluted tops. Coils of constantan wire with 4 pair of ratio arms.	LE4.2
12	Meter Bridge (Wheatstone)	Sun mica top, two gap type having lock type	LE4.3

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	Bridge)	terminals with pencil jockey.	
13	Deflection magnetometer	Wooden base length~ 1 m, magnetic compass, meter scale and magnets	LE4.4
14	Bar magnet	Alnico size 3" - 4"	LE 4.5
15	Potentiometer	10K Ohm 500mW Linear Slide Potentiometer. About 10 m wire of Manganin and constantan with high resistivity and low temperature coefficient stretched on a wooden board attached with a meter scale and pencil jockey.	LE 4.6 LE 4.7
16	Photoelectric apparatus	Includes photo cell, light sources, voltmeter, ammeter	LE5.1
17	Diode laser	Power 5 mW, randomly polarized	LE5.2

N) Mapping of POs & PSOs with COs:

Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2
CO-1	3	2	3	-	-	-	1	1	2	1		
CO-2	3	2	2	1	-	1	-	1	1	1		
CO-3	3	2	2	1	1	1	-	1	1	1		
CO-4	3	1	1	1	1	1	1	1	1	1		
CO-5	3	1	1	-	-	-	-	1	-	1		

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O) Course Curriculum Map:

POs No.	COs No.	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self-Learning (SL)
PO-1,2,3,7,8,9,10 PSO---	CO-1	SO1.1 SO1.2 SO1.3	LE1.1 LE1.2 LE1.3	Unit-1.0 Units, Measurement and Error analysis 1.1, 1.2,1.3,1.4,1.5	1.21 (a) 1.21 (b)
PO-1,2,3,4,6,8,9,10 PO-10 PSO-----	CO-2	SO2.1 SO2.2 SO2.3 SO2.4	LE2.1 LE2.2 LE2.3	Unit-2.0 Forces and General Properties of matter 2.1,2.2,2.3,2.4	2.11 d 2.21 a 2.32 a 2.42
PO-1,2,3,4,5,6,8,9,10 PSO-----	CO-3	SO3.1 SO3.2 SO3.3 SO3.4	LE3.1 LE 3.2	Unit-3.0 Optics, optical instruments and optical fibers 3.1,3.2,3.3,3.4	3.3 d 3.4 d 3.5 b
PO-1,2,3,4,5,6,7,8,9,10 PSO-----	CO-4	SO4.1 SO4.2 SO4.3	LE4.1 LE4.2 LE4.3 LE4.4 LE4.5 LE 4.6 LE4.7	Unit-4.0 Electrostatics, Magnetism and Current Electricity 4.1,4.2,4.3,4.4,4.5, 4.6	4.2 4.41 4.61 4.62
PO-1,2,3,8,10 PSO-----	CO-5	SO5.1 SO5.2 SO5.3	LE5.1 LE5.2	Unit-5.0 Modern Physics 5.1,5.2,5.3,5.4,	5.12 5.21 5.43

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self-Learning

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- A) Course Code : 2000157(011)
 B) Course Title : Applied Chemistry
 C) Pre-requisite Course Code and Title :
 D) Rationale :

Diploma engineers have to deal with various materials. The study of concepts of chemistry and application parts from applied chemistry like atomic structures, chemical bonding, water treatment and analysis, electrochemistry and batteries, metals, alloys, insulators, fuels and combustion will help in understanding the technology courses where emphasis is laid on the applications of these concepts and principles in different technology applications. This course is designed by which fundamental information will help the technologists to apply the basic concepts and principles of chemistry to solve broad-based problems.

E) Course Outcomes:

- CO-1 Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
 CO-2 Use relevant water treatment method to solve industrial problems.
 CO-3 Solve the engineering problems using concept of Electrochemistry.
 CO-4 Solve the engineering problems by applying the knowledge of metallurgical process and Metals Alloys.
 CO-5 Use relevant fuel and lubricants for industrial applications.

F) Scheme of Studies:

S.No	Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)			
				L	P	T	Credit L+(P+T)/2
1	Applied Science	2000157(011)	Applied Chemistry	3	-	1	4
2	Applied Science	2000165(011)	Applied Chemistry (Lab)	-	3	-	2

Legend: L-Lecture, P-Practical, T-Tutorial

G) Scheme of Assessment:

S.No	Board of Study	Course Code	Course Title	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Applied Science	2000157(011)	Applied Chemistry	100	20	30	-	-	150
2	Applied Science	2000165(011)	Applied Chemistry (Lab)	-	-	-	50	20	70

Legend: ESE: End Semester Exam, CT: Class Test, TA: Teacher Assessment

Note: Separate passing is must for End Semester Assessment.

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H) Course-Curriculum Detailing:

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

Convert unit of the given physical quantity from one unit system to other.

CO-1 Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO1.1 Determine the electronic structure of the given atom for the material used in industry. SO1.2 Calculate the quantum numbers for various energy levels of industrially applicable metals. SO1.3 Use theory of chemical bonding for identification of different properties material used in the industries.	--	Unit-1.0 Atomic Structure and Chemical Bonding 1.1 Atomic Structure 1.1.1 Electronic structure of atoms, 1.1.2 Discovery of electrons, protons and neutrons. 1.1.3 Rutherford model and Bohr's – Burry scheme of distributions of electrons. 1.1.4 Heisenber's uncertainty principle, 1.1.5 Quantum numbers, sub energy level 1.1.6 Distribution of electrons in sub-shells and concept of Electronic configuration of atoms, 1.1.7 Auffbaus's rule, 1.1.8 Pauli's exclusion principle. 1.1.9 Hund's rule of maximum multiplicity. 1.2 Chemical Bonding 1.2.1 Theory of Chemical Bonding, 1.2.2 Types of Bonds, a. Ionic or electrovalent bonds, b. Covalent bond, c. coordination bond, d. Hydrogen bonding.	<ul style="list-style-type: none">Discovery of electrons, protons and neutrons.

SW-1 Suggested Sessional Work (SW):

a. Assignments:

- Write electronic structure of the given atoms.

b. Mini Project:

- Prepare Rutherford model and Bohr's – Burry models.
- Create element cards with different elements showing covalent and ionic bonds.

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Semester-I

c. Other Activities (Specify):

- i. Seminar on Quantum numbers.

CO-2 Use relevant water treatment method to solve industrial problems.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO2.1 Perform water softening for the industrial hard water. SO2.2 Use the relevant water treatment method for municipal water. SO2.3 Differentiate Natural and Synthetic Rubbers.	LE2.1 Determine total hardness, temporary hardness and permanent hardness of water sample by EDTA method. LE2.2 Determine the alkalinity of given water sample. LE2.3 Determine the turbidity in given water sample by Nephelometric method. LE2.4 Determine the total dissolved and suspended solids in given water sample. LE2.5 Determine the biological oxygen demand in the given water sample.	Unit-2.0 (A) Water Treatment 2.1 Hardness 2.1.1 Types of Hardness 2.1.2 Determination of hardness using EDTA method 2.2 Hard water 2.3 Boiler Problems 2.3.1 Boiler corrosion 2.3.2 caustic embrittlement 2.3.3 priming and foaming, 2.3.4 scales and sludges 2.4 Water softening: 2.4.1 lime soda process a. Hot lime soda process b. Cold lime soda process, 2.4.2 Zeolite process, 2.4.3 ion exchange process a. Cation exchange b. Anion exchange 2.5 Municipal Water Treatment, 2.5.1 Sedimentation 2.5.2 Coagulation 2.5.3 Filtration 2.5.4 Sterilization 2.6 BOD & COD Unit-2.0 (B) Polymer 2.1 Classification of polymer 2.2.1 Types of rubber : 2.2.2 Natural and, synthetic, 2.2.3 processing of natural rubber. Synthetic rubber 2.2.4 Properties and applications of Buna-N, Thiokol, Neoprene.	<ul style="list-style-type: none"> • Hardness • Types of Hardness

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SW-2 Suggested Sessional Work (SW) :

a. Assignments:

- Prepare model to find the soap foaming capacity of bore water on addition of soda ash.

b. Mini Project:

- Collect water samples from different water sources and find the characteristics like acidity, conductivity, dissolved solids, suspended particles.
- Collect 3 to 5 water samples to find the dosage of bleaching powder required for its sterilization.

c. Other Activities (Specify):

- Seminar on impurities in municipal water Conduct a seminar on " ".
- Visit the municipal water treatment plant.
- Visit the DM water plant.

CO-3 Solve the engineering problems using concept of Electrochemistry.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO3.1 Describe the factors affecting of Conductance. SO3.2 Explain Electrical conductance in metals and Electrolytes SO3.3 Describe the different types of Electrodes & Batteries. SO3.4 Define Electrical Insulator and its classification	LE3.1 Determine the conductance of the given solution by conductometric titration. LE3.2 Determine the variation of conductance with temperature for the given Electrolytes. LE3.3 Determine the conductivity of given water sample. LE3.4 Determine the pH for given solution using glass electrode. LE3.5 Determine the voltage generated from chemical reaction using Daniel Cell.	Unit-3.0 (A) Electrochemistry and Batteries 3.1 Conductance: 3.1.1 Nature of solute, 3.1.2 Nature of solvent, 3.1.3 Temperature, 3.1.4 Concentration or dilution. 3.2 Electrical conductance in metals and electrolytes, 3.2.1 specific conductance, 3.2.2 equivalent conductance, 3.2.3 cell constant. 3.3 Electrodes: 3.3.1 Hydrogen electrode, 3.3.2 calomel electrode 3.3.3 glass electrode 3.4 Conductometric Titration 3.5 Batteries 3.5.1 Type of batters with examples 3.5.2 Primary battery 3.5.3 Secondary battery Unit-3.0 (B) Electrical Insulator and thermocouple alloy 3.1 Electrical insulators: 3.1.1 Classification and example 3.2 Thermocouple alloy: Composition and characteristics 3.2.1 platinum / rhodium,	Conductance: • Nature of solute, • Nature of solvent, • Temperature, • Concentration or dilution.

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Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
		3.2.2 tungsten/ rhenium,	

SW-3 Suggested Sessional Work (SW) :

a. Assignments:

- Prepare the chart displaying working process of lithium ion and Ni & Cd batteries.
- Prepare the model, expressing the working process of fuel cell.
- Prepare chart showing properties of Thermocouple alloy.

b. Mini Project:

- Collect the samples of different types of electrodes used in various batteries and prepare a report on their conductance.
- Prepare the working model of Daniel cell and calculate the current flow by Daniel cell.
- Collect the sample of alloying elements like Pt, Ni, W, Fe and prepare a report of their effects on the properties of thermocouple Alloy.

c. Other Activities (Specify):

- Organize quiz on Electric Conductivity.
- Organize quiz on metal insulators.

CO-4 Solve the engineering problems by applying the knowledge of metallurgical process and Metals Alloys.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO4.1 Extract the ore from chemical reaction for industrial application	LE4.1 Determine the percentage of copper in given copper ore.	Unit- 4.0 (A) Metallurgy	<ul style="list-style-type: none"> Properties of metals like copper, aluminum, tungsten, platinum nickel.
SO4.2 Prepare the metal alloy for industrial application.	LE4.2 Standardization of KMnO_4 solution using standard oxalic acid and Determine the percentage of iron present in given Hematite ore by KMnO_4 solution.	4.1 Metallurgy: 4.1.1 Mineral, 4.1.2 Ore, 4.1.3 Gangue, 4.1.4 Flux, 4.1.5 Slag. 4.2 Metallurgical process of iron and copper	
SO4.3 Use the Refractory material for industrial applications.		Unit- 4.0 (B) Metal Alloys 4.1 Properties of metals like copper, aluminum, tungsten, platinum nickel. 4.2 Ferrous alloys: 4.2.1 Low carbon 4.2.2 Medium carbon 4.2.3 High carbon steels. 4.3 Non-ferrous alloy: 4.3.1 Brass, 4.3.2 Bronze,	

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Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
		4.3.3 Duralumin, 4.3.4 Tinman Solder 4.3.5 Woods metal Unit-4.0 (C) Cement: 4.1 Portland cement, 4.1.1 Constituent 4.1.2 Setting and Hardening.	

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others) , LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-4 Suggested Sessional Work (SW) :

a. Assignments:

- Prepare chart showing properties of refractory materials.
- Prepare chart showing different industrial application of metal and relate it with required property or properties using internet.
- Prepare chart of showing percentage composition, properties and industrial applications of different types of steel based on above alloying elements using internet.

b. Mini Project:

- Collect different samples of cement and find their initial and final setting time.
- Find the effect of alloying elements like Mn, Cr, Ni, W, V, Co on properties of steel.

c. Other Activities (Specify):

- Organize quiz on metal properties, Alloy and ores.
- Visit Metal industries to learn metallurgy process.

CO- 5 Use relevant fuel and lubricants for industrial applications.

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
SO5.1 Select the relevant fuel for industrial applications. SO5.2 Test the quality of coal for industrial uses. SO5.3 Perform fractional distillation process for refining of petroleum in	LE4.1 Determine the moisture content, ash and volatile matter in given coal sample using proximate analysis. LE4.2 Determine the calorific value of the given solid fuel using Bomb calorimeter. LE4.3 Determine the effect of temperature on viscosity for given	Unit-5.0 (A) Fuel and Combustion 5.1 Fuel: Calorific value and ignition temperature, classification. 5.2 Solid fuels: Coal, Classification and composition , 5.2.1 Proximate analysis, 5.2.2 Ultimate analysis, 5.2.3 Bomb calorimeter.	<ul style="list-style-type: none"> Classification of fuel. Solid fuel classification. Octane number and Cetane number.

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Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self Learning (SL)
<p>industries.</p> <p>SO5.4 Test the properties of the given lubricant for industrial applications.</p> <p>SO5.5 Identify the different ingredients of paints and varnish for engineering applications.</p>	<p>lubricating oil using Redwood viscometer –I</p> <p>LE4.4 Determine the flash and fire point of given lubricating oil using Cleavland open cup apparatus.</p> <p>LE4.5 Determine the cloud and pore point of the given lubricant.</p> <p>LE4.6 Separate the various fractions of the given sample of petroleum using fractional distillation.</p>	<p>5.2 4 Carbonization of coke by Otto Hofmann's oven.</p> <p>5.3 Liquid fuels:</p> <p>5.3.1 Fractional distillation of crude petroleum,</p> <p>5.3.2 Boiling range,</p> <p>5.3.3 Composition and properties.</p> <p>5.3.4 Knocking,</p> <p>5.3.5 Cracking,</p> <p>5.3.6 Octane number and Cetane number.</p> <p>5.4 Gaseous fuels:</p> <p>5.4.1 Biogas, LPG, and CNG.</p> <p>5.4.2 Combustion equation of gaseous fuels,</p> <p>Unit 5.0 (B) Lubricants, Paints and Varnishes</p> <p>5.1 Lubricant-</p> <p>5.1.1 Types,</p> <p>a. Liquid</p> <p>b. Solid</p> <p>c. Semisolid</p> <p>5.1.2 Theory of lubrication,</p> <p>5.1.3 Properties of a good lubricants</p> <p>5.1.4 Flash and Fire point,</p> <p>5.1.5 Pour point and cloud point.</p> <p>5.1.6 Specification number and viscosity,</p> <p>5.2 Paints and Varnish</p> <p>5.2.1 Constituents,</p> <p>5.2.2 Properties and uses.</p>	

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SW-5 Suggested Sessional Work (SW) :

a. Assignments:

- Prepare chart showing different types of liquid fuels their calorific values and uses.
- Prepare a chart differentiating proximate and ultimate analysis of Coal.
- Prepare the comparative chart of commercially available lubricants on the basis of mechanism of lubrication.
- Prepare the chart displaying applications of different paints and Varnish.

b. Mini Project:

- Prepare a report on effect of LPG and CNG on environment
- Collect the sample of various lubricants and prepare the report about properties and uses.

c. Other Activities (Specify):

- Seminar on combustion of gaseous fuel.
- Visit the paint industry.

Unit Number	Unit Titles	Marks Distribution			Total Marks
		R	U	A	
I	Atomic Structure and Chemical Bonding	8	7	5	20
II	Water Treatment and Polymer	5	5	10	20
III	Electrochemistry, Batteries, Insulator and Electrical Thermocouple	8	6	6	20
IV	Metallurgy, Metal Alloys and Cements	5	7	8	20
V	Fuel and Combustion, Lubricants, Paints Varnish	8	5	7	20
Total		34	30	36	100

I) Suggested Specification Table (For ESE of Classroom Instruction):

Legend: R: Remember, U: Understand, A: Apply and above

J) Suggested Specification Table (For ESE of Laboratory Instruction*):

Laboratory Instruction Number	Short Laboratory Experiment Titles	Assessment of Laboratory Work (Marks)		
		Performance		Viva-Voce
		PRA	PDA	
LE2.1	Complexometric Titration	15	10	5
LE2.2	Alkalinity	15	10	5
LE2.3	Turbidity	15	10	5
LE2.4	TDS & SS	20	05	5
LE2.5	BOD	12	13	5
LE3.1	Conductometric titration	15	10	5
LE3.2	Conductometer	17	08	5
LE3.3	Conductometer	18	07	5
LE3.4	pH meter	16	09	5
LE3.5	Daniel cell	15	10	5
LE4.1	Percentage of Cu	16	09	5
LE4.2	Percentage of Fe	16	09	5

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LE5.1	Proximate analysis	15	10	5
LE5.2	Bomb calorimeter	15	10	5
LE5.3	Redwood viscometer-I	16	09	5
LE5.4	Cleveland open cup	16	09	5
LE5.5	Cloud and pore point	16	09	5
LE5.6	Fractional distillation	15	10	5

* Assessment rubric, process and product check list with rating scale need to be prepared by the course wise teachers for each experiment for conduction and assessment of laboratory experiments /practicals ,

Legend : PRA: Process Assessment, PDA : Product Assessment

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Industrial visits
6. Industrial Training
7. Field Trips
8. Portfolio Based Learning
9. Role Play
10. Demonstration
11. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
12. Brainstorming
13. Others

L) Suggested Learning Resources:

(a) Books :

No.	Titles	Author	Publisher	Edition & Year
1	Engineering Chemistry	Agarwal, Shikha	Cambridge university press ; New Delhi,	2015
2	Engineering Chemistry	Dara, S. S. and Dr.S.S.Umare	S.Chand. Publication, New Delhi,	2015
3	Engineering Chemistry	Jain & Jain	Dhanpat Rai and sons; New Delhi	2015
4	Engineering Chemistry	Dr.Vairam, S.	Wiley India Pvt.Ltd., New Delhi\	2013
5	Chemistry for engineers	Agnihotri, Rajesh	Wiley India Pvt.Ltd.	2014

(b) Open source software and website address :

1. www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
2. www.visionlearning.com (Atomic structure and chemical bonding)
3. www.chem1.com (Atomic structure and chemical bonding)

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Semester-I

4. <https://www.wastewaterelearning.com/elearning/> (Water Treatment)
5. www.chem1.com/acad/webtext/elchem/ec6.html (Electrochemistry and batteries)
6. www.em-ea.org/guide%20books/book_2/2.1%20fuels%20and%20combustion.pdf (Fuel and Combustion)
7. www.chemcollective.org (Metals, Alloys)
8. www.wqa.org (Water Treatment)

(c) Others:

1. Learning Packages.
2. Lab Manuals.
3. Manufacturers' Manual
4. Users' Guide

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipments	Broad Specifications	Relevant Experiment Number
1	Electronic balance,	scale range of 0.001g to 500g. pan size 100 mm; response time 3-5 sec.; power requirement 90-250 V, 10 watt.	All
2	Nephelometer	Auto-ranging from 20-200 NTU, +/- 2% of reading plus 0.1 NTU, power 220 Volts +/- 10% AC 50 Hz.	LE 2.3
3	Conductometer	Range 0-199.9ms; resolution 0.1ms/0.01ms/0.001ms/0.1μs/0.01μs; accuracy ±0.5% ±2 digits	LE3.2
4	pH meter	Working range 0-14; resolution 0.1/0.01 pH; temperature compensation 0-100 ⁰ C	LE3.4
5	Electric oven	inner size 18"x18"x18"; temperature range 100 to 250 ⁰ C. with the capacity of 40lt.	LE 5.1
6	Muffle furnace,	Temperature up to 900 ⁰ C, digital temperature controller with an accuracy of +/- 3 ⁰ C	LE 5.1
7	Bomb calorimeter	Measurement unit J/kg, cal/gm, BTU/lb; temp. resolution 0.0001 ⁰ C or better; combustion bomb-halogen and acid resistant stabilized stainless steel; resolution 0.001kcal/gm; measurement range up to 40,000 J/gm	LE 5.2
8	Redwood viscometer-1	Suitable to operate at 220 volts AC mains with tap ; stainless steel jet; cup cover; thermometer ;electronic digital indicator ; controller etc	LE5.3
9	Cleveland open cup apparatus	Energy regulator-to regulate the rate of rise in temperature; 220V; 50 Hz; single phase; AC supply	LE5.4
10	Cloud and pore point apparatus	Energy regulator ,to regulate the rate of rise in temperature,200V,50Hz, single phase,AC supply etc.	LE 5.5
11	Fractional distillation assembly	Capacity 1.5 lt.	LE 5.6

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Semester-I

N) Mapping of POs & PSOs with COs:

Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	PO-1 Basic knowledge	PO-2 Discipline knowledge	PO-3 Experiments and practice	PO-4 Engineering Tools	PO-5 The engineer and society	PO-6 Environment and sustainability	PO-7 Ethics	PO-8 Individual and team work	PO-9 Communication	PO-10 Life-long learning	PSO-1	PSO-2
CO-1 Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.	3	1	1	-	-	-	1	2	2	1	-	1
CO-2 Use relevant water treatment method to solve industrial problems.	3	1	3	3	2	2	1	3	1	2	1	1
CO-3 Solve the engineering problems using concept of Electrochemistry	3	1	2	2	1	2	-	3	2	2	-	1
CO-4 Solve the engineering problems by applying the knowledge of metallurgical process and Metals Alloys	3	1	3	3	-	2	-	3	1	2	1	1
CO-5 Use relevant fuel and lubricants for industrial applications.	3	1	3	2	1	1	-	2	1	2	1	1

Legend: 1 – Low, 2 – Medium, 3 – High

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O) Course Curriculum Map:

POs & PSOs No.	COs No. & Titles	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO-1,2,3,7,8,9,10 PSO-2	CO-1 Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.	SO1.1 SO1.2 SO1.3		Unit-1.0 Units , Atomic Structure and Chemical Bonding 1.1 , 1.2	As mentioned in relevant pages
PO-1,2,3,4,5,6,7,8,9,10 PSO-1,2	CO-2 Use relevant water treatment method to solve industrial problems.	SO2.1 SO2.2 SO2.3	LE2.1 LE2.2 LE2.3 LE2.4 LE2.5	Unit-2.0 (A) Water Treatment 2.1, 2.2, 2.3, 2.4, 2.5, 2.6 Unit-2.0 (B) Polymer 2.1, 2.2, 2.3, 2.4	
PO-1,2,3,4,5,6,8,9,10 PSO-2	CO-3 Solve the engineering problems using concept of Electrochemistry	SO3.1 SO3.2 SO3.3 SO3.4	LE3.1 LE3.2 LE3.3 LE3.4 LE3.5	Unit-3.0 (A) Electrochemistry and batteries 3.1, 3.2, 3.3 Unit-3.0 (B) Electrical Insulator and thermocouple alloys 3.1, 3.2	
PO-1,2,3,4,6,8,9,10 PSO-1,2	CO-4 Solve the engineering problems by applying the knowledge of metallurgical process and Metals Alloys.	SO4.1 SO4.2 SO4.3	LE4.1 LE4.2	Unit-4.0 (A) Metallurgy 4.1, 4.2 Unit-4.0 (B) Metal alloys 4.1, 4.2, 4.3 Unit-4.0 (C) Cement 4.1	
PO-1,2,3,4,5,6,8,9,10 PSO-1,2	CO-5 Use relevant fuel and lubricants for industrial applications.	SO5.1 SO5.2 SO5.3 SO5.4 SO5.5	LE5.1 LE5.2 LE5.3 LE5.4 LE5.5 LE5.6	Unit-5.0 (A) Fuel and Combustion 5.1, 5.2 , 5.3, 5.4 Unit-5.0 (B) Lubricants paints and varnishes 5.1, 5.2	

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

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Semester-I

- A) Course Code : 2000155(022)
 B) Course Title : Computer Fundamentals and Applications
 C) Pre- requisite Course Code and Title :
 D) Rationale :

This course will enable diploma engineers to use computers and different applications for various computing purposes. It will enable technicians to perform for day-to-day computing activities, in particular- preparing professional documents, analyzing details graphical representations, and multimedia presentation for time to time decision making by the management of academia, business and industry. They would also be able to use Internet, cloud services and its security features for effective computing.

- E) **Course Outcomes:** The course content should be taught and implemented with the aim to develop the following outcomes in the students.

- CO-1 Use effectively computer system and its peripherals.
 CO-2 Prepare a professional document using various features of word-processing for academic/business/ industry.
 CO-3 Create a spread sheet, analyze the data using different formula/ functions and represent it in different form of chart for solving academic/business/industrial problem.
 CO-4 Create a professional multimedia presentation using its various features for an academic/business/ industrial application.
 CO-5 Use Internet, Cloud services, and its security features for computing.

F) Scheme of Studies

S.No	Board of Study	Course Code	Course	Scheme Of Studies (Hours/Week)			
				L	P	T	Total Credit L+(P+T)/2
1	Computer Science and Engineering	2000155(022)	Computer Fundamentals and Applications	1	-	2	2
2	Computer Science and Engineering	2000162(022)	Computer Fundamentals and Applications (Lab)	-	6	-	3

Legend: L-Lecture, P-Practical, T-Tutorial

G) Scheme of Assessment

S.No	Board of Study	Course Code	Course	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Computer Science and Engineering	2000155(022)	Computer Fundamentals and Applications	50	20	30	-	-	100
2	Computer Science and Engineering	2000162(022)	Computer Fundamentals and Applications (Lab)	-	-	-	100	20	120

Legend: ESE-End semester Examination, CT-Class test, TA-Teachers' Assessment

Note: Separate passing is must for Progressive and End Semester Assessment.

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Semester-I

H) Course-Curriculum Detailing

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessionals Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

CO-1 Use effectively computer system and its peripherals.

(Approx. Hrs: CI+LI+SW+SL = 20)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO1.1 Use functions of CPU, ALU, Memory Unit and I/O Units using block diagram of Computer SO1.2 Explain purpose and function of OS in computer SO1.3 Use various file handling operations in Windows operating system. SO1.4 Describe any five important features of Windows control panel. SO1.5 Describe Green IT concept for environment ally sound computing.	LE1.1 Perform various file handling operations of Windows OS (Create, copy, rename, delete, move files and folder) LE1.2 Use accessories utilities of windows OS (Notepad, Paint etc.)	Unit-1.0 Basics of Computer System 1.1 Computer block diagram 1.1.1 Central Processing Unit (CPU), Control Unit, Arithmetic logic Unit (ALU), Memory Unit 1.1.2 Input Output Units- Monitor, Printers: Dot matrix, Laser, Inkjet, Plotters, Scanner 1.2 Data Representation 1.2.1 Bit, Byte, Nibble, Word, ASCII, BCD, EBCDIC, UNICODE 1.3 Concept of Hardware and Software 1.3.1 System software & Application Software 1.4 Operating system 1.4.1 Concepts, Purpose and its Functions 1.4.2 Operations of Windows OS 1.5 Operations of Windows OS 1.5.1 Create and name file and folders 1.5.2 Copy file, Rename and Delete of files and folders, Search files and folders 1.5.3 Install Application,	<ul style="list-style-type: none"> Block Diagram of Computer System Features of Windows OS Advance Features of Windows OS Utilities Concept of Green IT

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Semester-I

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
		Create shortcut of application on the desktop 1.6 Windows OS Utilities 1.6.1 Windows accessories Utilities 1.6.2 Control Panel, Taskbar 1.7 Green IT Concepts: Ergonomics, Power Plans to maximize computer's performance and conserve energy, Concept of minimizing Carbon Footprint, computing ewaste its toxic constituent and Health effects, ewaste management & recycling	

SW-1 Suggested Sessional Work (SW):

a) Assignments

- Describe functions of CPU, ALU and Memory Unit using block diagram of Computer
- List different features of operating system.

b) Mini Project

- Prepare a report on different type of computer system and printers with its specifications in your computer lab.

c) Other Activities (Specify)

- A Seminar on 'Various features of Windows O.S. of computer'
- A Seminar on 'The Green IT concept for environmentally sound computing'.

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Semester-I

CO-2 Prepare a professional document using various features of word-processing for an academic/business/ industry.

(Approx. Hrs: CI+LI+SW+SL =24)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO2.1 Use the various features of a word processing software for preparing a professional document.	<p>LE2.1 Prepare a sample academic/ business/ industrial/ letter document applying formatting features on text like bold, italics, underline, font type, color and size.</p> <p>LE2.2 Apply bullet, and numbering feature in the above sample document</p> <p>LE2.3 Insert images and manipulate tables in the above sample document.</p> <p>LE2.4 Use mail merge feature of word processing to write and send a personalized letter or e-mail to different people at the same time such as appointment or invitation letters.</p> <p>LE2.5 Develop typing speed for documentation at a proficiency level.</p>	<p>Unit-2.0 Word Processing</p> <p>2.1 Overview of Word processor</p> <p>2.1.1 Basics of Font- Type, Size, Color, Effects like Bold, Italic, Underline, Subscript and superscript, Case changing options</p> <p>2.2 Working with Text</p> <p>2.2.1 Inserting & Deleting, Undo and Redo</p> <p>2.2.3 Copy and Moving (cutting) text within a document</p> <p>2.3 Formatting Paragraphs</p> <p>2.3.1 Lists Setting, Line spacing</p> <p>2.4 Page settings</p> <p>2.4.1 Margins Setting, Header and Footer</p> <p>2.5 Spelling and Grammatical checks</p> <p>2.6 Table and its options</p> <p>2.6.1 Inserting rows or columns, Merging and Splitting cells, Arithmetic Calculations in a Table</p> <p>2.7 Working with pictures</p> <p>2.7.1 Inserting Pictures from Files</p> <p>2.8 Using Drawings & Objects</p> <p>2.8.1 WordArt, Lines and Shapes, Modifying Drawn Objects, Formatting Drawn objects</p>	<ul style="list-style-type: none"> • Features of word-processing software • Advance features of word processing • Features for working with pictures and drawing objects

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Semester-I

SW-2 Suggested Sessional Work (SW):

a. Assignments

- Make a report file on short cut key for different word processing commands.
- Describe mail merge feature of word processing software for sending mass letter.

b. Mini Project

- Prepare a learning material in form of a document on the sessions taken on word processing.

c. Other Activities (Specify)

- A Seminar on 'Features of Word processing Software'

CO-3 Create a spread sheet, analyze the data using different formula/ functions and represent it in different form of chart for solving academic/business / industrial problem.

(Approx. Hrs: CI+LI+SW+SL= 24)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO3.1 Use Spread Sheet software to create, analyze and represent it different form of charts.	<p>LE3.1 Create a sample worksheet for any academic/ business/ industrial problem. (pay bill/ pay slip/ electricity bill/ examination results/ admission list).</p> <p>LE3.2 Apply different formula and functions in the above sample sheet for analyzing data.</p> <p>LE3.3 Use graphics and auto shapes in above sample sheet.</p> <p>LE3.4 Create and manipulate charts on the analyzed data for above sample sheet.</p>	<p>Unit-3.0 Spread sheet/ Data Analysis & Chart Presentation</p> <p>3.1 Introduction to spread sheet/ Data Analysis & Graphical Presentation</p> <p>3.1.1 Introduction to data, cell address</p> <p>3.1.2 Excel Data Types</p> <p>3.2 Concept of hyperlink</p> <p>3.3 Introduction to Formatting</p> <p>3.3.1 Formatting Number, Text, Formatting Date & Time, Formatting Concept of Worksheet, Formatting Concept of Workbook</p> <p>3.4 Understanding Formulas</p> <p>3.4.1 Operators in spread sheet</p> <p>3.4.2 Operators Precedence</p> <p>3.5 Understanding Functions</p> <p>3.5.1 Common Excel Functions</p> <ul style="list-style-type: none"> Math & Trig Functions such as Sum, Round, Sqrt, Power etc. Statistical Function such as Average, Min, Max, etc. Date & Time Lookup & Reference such as transpose etc. Logical Functions such as IN, AND, OR etc. Text Function such as Upper, Lower 	<ul style="list-style-type: none"> Features of spread-sheet software Advance features of Data Analysis Type of data representation/ Charts

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Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
		3.6 Types of Graphics 3.6.1 Word Art, Auto Shapes, Images 3.7 Introduction to charts 3.7.1 Overview of different types of Charts, 3.7.2 Using different Types of Charts such as Bar Chart, Pi-Chart etc 3.8 Printing in spreadsheet 3.8.1 Print Area, set Margins, Header & Footer 3.8.2 Page Setup options	

SW-3 Suggested Sessional Work (SW):

a) Assignments

- Describe the use of Spread Sheet software to create, analyze and represent it different form of charts.

b) Mini Project

- Create a student result sheet using Spreadsheet software, analyses the data and represent it in form of chart with respect to scores of previous exams/test/ Assignment.

c) Other Activities (Specify)

- A Seminar on 'Features of Spread sheet/ Data Analysis & Chart Presentation software'

CO-4 Create a professional multimedia presentation using its various features for any academic/business/industrial application.

(Approx. Hrs: CI+LI+SW+SL = 22)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO4.1 Use various features of multimedia presentation software.	LE4.1 Create a sample multimedia presentation for any academic/ business/ industrial application. LE4.2 Perform various operation on above sample presentation. LE4.3 Apply formatting features like font setting, text fill, space formatting on above sample presentation. LE4.4 Apply word arts, styles, bullets and numbers on	Unit-4.0 Multimedia/ Graphic Presentation 4.1 Introduction to Multimedia/Graphic Presentation package 4.1.1 Outline of an effective presentations, Starting a New Presentation Files, Saving work, Creating new Slides 4.2 Work with textboxes 4.2.1 Adjusting character spacing, Adjusting line spacing,	<ul style="list-style-type: none"> Features of Multimedia Presentation software Advance features of Multimedia Presentation Features of drawing tools, clip art's, multimedia elements

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Semester-I

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
	<p>above sample presentation.</p> <p>LE4.5 Apply drawing tools, shapes object borders, object fill and effects on above sample presentation.</p> <p>LE4.6 Insert video, animation and sound files on above sample presentation.</p> <p>LE4.7 Create hyperlink and use action buttons on above sample presentation.</p> <p>LE4.8 Print the above multimedia presentation as per given format.</p>	<p>Formatting text boxes,</p> <p>4.2.2 Create new Slides</p> <p>4.3 Introduction to Formatting</p> <p>4.3.1 Change a slides Layout, Applying a theme, Changing Colors, Using various types of effects, Creating and managing custom Color, Changing the background, Formatting bulleted and numbered list, Styles</p> <p>4.4 Work with Fonts</p> <p>4.4.1 Change the font, font size, font color, Creating and managing custom font theme & Color, Using text fill</p> <p>4.5 Work with Slides</p> <p>4.5.1 Change slides Layout, Slides Master, Slide Sorter</p> <p>4.5.2 Apply & Manage theme</p> <p>4.6 Use Drawings & Objects</p> <p>4.6.1 Word Arts, Selecting, deleting, moving, copying, resizing and arranging objects, working with drawing tools, Apply shape or picture styles, Applying object borders, Apply object fill, Apply object effects, Apply object borders</p> <p>4.7 Work with Clip Art & Picture</p> <p>4.7.1 Insert Clip Art, Modify Clip Art, Insert & Editing Pictures</p> <p>4.8 Find and replace text,</p>	

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Semester-I

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
		Correcting your spelling 4.9 Use Tables 4.9.1 Creating a new Table, Editing a table's structure 4.10 Work with Video 4.10.1 Embed a video, Link to a video, Size a video, Video playback options 4.11 Use Animation, Sound & Effects 4.11.1 Using Custom Animation for Text & Picture 4.11.2 Configure a sound playback, Add a digital music sound track, provide Transition effects and timings, Creating hyperlinks, using action buttons	

SW-4 Suggested Sessional Work (SW):

a. Assignments:

- Describe the potential use multimedia presentation.

b) Mini Project:

- Create a short slide show of any event organized in college.

c. Other Activities (Specify)

- A Seminar on 'Features of multimedia presentation Software

CO-5 Use Internet, Cloud services, and its security features for computing.

(Approx. Hrs: CI+LI+SW+SL = 22)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
SO5.1 Identify different type of computer Networks. SO5.2 Explain briefly wired and wireless	LE5.1 Identify various types of network, its devices LE5.2 Configure Internet connection and browser setting. LE5.3 Search web content based on different criteria	Unit-5.0 Basics of Internet & Cloud Computing 5.1 Types of Networks 5.1.1 LAN, MAN, WAN 5.2 Intranet, Internet, VPN, Wi-Fi, Bluetooth, switches 5.3 Brief of Internet	<ul style="list-style-type: none"> Internet and its services Browsers and search engines Network security and features of

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Semester-I

Session Outcomes (SOs)	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
internet connectivity. SO5.3 Use different types of internet services SO5.4 Identify various types of Viruses and its protection. SO5.5 Explain briefly cloud computing.	using search engine. LE5.4 Use email services to send and receive emails. LE5.5 Use voice mail, newsgroup, chat and video conferencing, ftp services LE5.6 Install and configure Anti-virus/firewall on computer system	Connectivity 5.4 Devices and Services 5.4.1 Dial up, Leased line, DSL Broadband, Access Point, Modem, Wi-Fi Router 5.4.2 Email, voice mail, Newsgroup, Chat, Video conferencing, File Transfer Protocol 5.5 Web Browsers URL, Web Site, http 5.6 Internet Services 5.6.1 Queries, Search Engines 5.7 Introduction to Virus & Antivirus 5.7.1 Virus & its type, Antivirus 5.7.3 Firewall 5.8 Overview of Cloud Computing	cloud computing

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-5 Suggested Sessional Work (SW)

a. Assignments:

- Explain Different type of networks
- List the basic features of cloud network

b. Mini Project:

Prepare report on computer network, devices, antivirus and firewall software installed in the laboratory.

c. Other Activities (Specify)

- A seminar on 'Computer Antivirus'
- A seminar on 'Computer Firewall'
- A seminar on 'Overview of Cloud Computing'

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

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Semester-I

I) Suggested Specification Table (For ESE of Classroom Instruction)

Unit Number	Unit Titles	Marks Distribution			Total Marks
		R	U	A	
I	Basics of Computer System	4	6	2	12
II	Word Processing	-	2	-	2
III	Spread sheet/ Data Analysis & Chart Presentation	-	2	-	2
IV	Multimedia/Graphic Presentation	-	2	-	2
V	Basics of Internet, Cloud Services and its Security for Computing	2	4	1	7
Total		8	18	4	25

Legend: Remember, U: Understand, A: Apply and above

J) Suggested Specification Table (For ESE of Laboratory Instruction*)

S.No/ Units	List of Practicals	Assessment of Laboratory Work (Marks)			
		Performance		Viva-Voce	
		PRA	PDA		
1	i. Perform various file handling operations of Windows OS (Create, copy, rename, delete, move files and folder) ii. Use accessories utilities of windows OS (Notepad, Paint etc.)	4	4	4	100 Marks are allocated for performance under ESE
2	Prepare a sample academic/ business/ industrial/ letter document applying formatting features on text like bold, italics, underline, font type, color and size.	12	8	4	
3	Create a sample worksheet for any academic/ business/ industrial problem.(pay bill/ pay slip/ electricity bill/ examination results/ admission list).	12	8	4	
4	Create a sample multimedia presentation for any academic/ business/ industrial application.	12	8	4	
5	i. Use voice mail, newsgroup, chat and video conferencing, ftp services ii. Install and configure Anti-virus/firewall on computer system	8	4	4	
		48	32	20	

*Assessment rubric, process and product check list with rating scale need to be prepared by the course wise teachers for each experiment for conduction and assessment of laboratory experiments /practicals

Legend: PRA: Process Assessment, PDA: Product Assessment

Note: Each student at the end of semester examination of **100 Marks**; has to undertake five experiments (one from each Unit)

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Semester-I

K) Suggested Instructional/Implementation Strategies

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Industrial visits
6. Industrial Training
7. Field Trips
8. Portfolio Based Learning
9. Role Play
10. Demonstration
11. ICT Based Teaching Learning (Video Demonstration, CBT, Blog, Face book, Mobile)
12. Brainstorming
13. Others

L) Suggested Learning Resources

M) Books

S. No.	Titles	Author	Publisher	Edition & Year
1.	Computer Fundamentals	Goel, Anita	Pearson Education, New Delhi,	2014, ISBN-13: 978-8131733097
2.	Computer Course	Ravi Kant Taxali	Tata McGraw Hills. New Delhi.	Year 2014 or latest
3.	Fundamentals of computers	V. Rajaraman, NeehariKaAdabala	PHI	6 th Edition 2014 or latest
4.	Computer Basics Absolute Beginner's Guide, Windows 10	Miller, Michael	QUE Publishing;	8th edition August 2015, ISBN: 978-0789754516 or latest
5.	The Internet Book	Douglas Comer	Prentice Hall	Year 2007 or latest
6.	Microsoft Office 2010: On Demand	Johnson, Steve	Pearson Education, New Delhi India,	-2010. ISBN :9788131770641 or latest
7.	OpenOffice.org for Dummies	Leete, Gurdy, Finkelstein Ellen, Mary Leete	Wiley Publishing, New Delhi,	2003 ISBN : 978-0764542220 or latest
8.	Computer Fundamentals	Pradeep K Sinha	BPB Publication	Year 2004 or latest

(c) Open source software and website address

1. Fundamentals of computers- V. Rajaraman, NeeharikaAdabalahttps://books.google.co.in/books?id=rGjKBQAAQBAJ&dq=Fundamentals+of++computers&source=gbs_navlinks_s
2. Computer course, Ravi Kant Taxali- https://books.google.co.in/books/about/COMPUTER_COURSE.html?id=PfHftdSmNBkC&redir_esc=y
3. Computer Fundamentals Tutorials- https://www.arstecb.com/book_argument/com_fun.pdf
4. Computer fundamentals, P.K. Sinha <http://www.edutechlearners.com/computer-fundamentals-p-k-sinha-free-pdf/>

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Semester-I

5. Microsoft office set by step Joan Lambert and Curtis Frye
<https://ptgmedia.pearsoncmg.com/images/9780735699236/samplepages/9780735699236.pdf>
6. Open Office Suit- <http://www.openoffice.us.com/download-openoffice-free.php>
7. MS Office: <https://www.microsoft.com/en-in/learning/office-training.aspx>
8. Open Office Training: <http://www.tutorialsforopenoffice.org/>
9. Star Office- https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d/Special_Edition_Using_StarOffice_6_0.pdf
10. Typing Master 10 in English for Windows: <http://www.typingmaster.com/typing-tutor/free-download.html>
11. Hindi Typing Tutor and Master <http://www.hinditypingtutor.com/>

(c) Others

1. Learning Packages.
2. Lab Manuals.
3. Manufacturers' Manual
4. Users' Guide

M) List of Major Laboratory Equipment, Tools& Software

S. No.	Name of Equipment/Tools/Software	Broad Specifications	Relevant Practical Number
1.	Computer Network	LAN Cable, Router, Switch 30*2/Hub	LE1.1 & LE1.2
2.	Printer, Scanner, Plotter, Modem	Laser Printer, Scanner, Plotter, Modem	LE1.1 & LE1.2
3.	MS Back Office 2016 or latest	Office suit	LE2.1 to LE4.8
4.	Typing Master in English for Windows(Free download) Hindi Typing Tutor and Master (Free download)	http://www.typingmaster.com/typing-tutor/free-download.html http://www.hinditypingtutor.com/	LE2.5
5.	Open Office Suit Latest	Office suit	LE2.1 to LE4.8
6.	Internet Connectivity	Broad band/Leased Line	LE5.1 to LE5.6
7.	Anti-Virus Software & Firewall	Antivirus software And Firewall	LE5.5

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Semester-I

N) Mapping of POs & PSOs with Cos

Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	PO-1 Basic knowledge	PO-2 Discipline knowledge	PO-3 Experiments and practice	PO-4 Engineering Tools	PO-5 The engineer and society	PO-6 Environment and sustainability	PO-7 Ethics	PO-8 Individual and team work	PO-9 Communication	PO-10 Life-long learning	PSO-1	PSO-2
CO-1 Use computer system and its peripherals effectively for solving various engineering problems.	3	3	3	3	3	2	2	1	2	2	3	3
CO-2 Prepare a professional document using various features of word-processing for academic/business/ industry purpose.	3	3	3	3	3	1	2	2	3	2	3	3
CO-3 Create a spread sheet, analyze the data using different formula/ functions and represent it in different form of chart for solving academic/business/ industrial problem.	3	3	3	3	3	1	2	2	3	2	3	3
CO-4 Create a professional multimedia presentation using its various features for any academic/business/ industrial application.	3	3	3	3	3	1	2	2	3	2	3	3
CO-5 Use Internet, Cloud services, and its security features for computing.	3	3	3	3	3	1	2	2	3	2	3	3

Legend: 1 – Low, 2 – Medium, 3 – High

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(Group-II)**

Semester-I

O) Course Curriculum Map

POs & PSOs No.	COs No. & Titles	SOs No.	Laboratory Instruction (LI)	Class room Instruction (CI)	Self-Learning (SL)
PO 1,2,3,4, 5,6,7, 8,9,10 PSO 1,2	CO-1 Use computer system and its peripherals effectively for solving various engineering problems.	SO1.1-SO1.5	LE1.1 LE1.2	Unit-1.0 Basics of Computer System	As mentioned in relevant pages
PO 1,2,3,4, 5,6,7, 8,9,10 PSO 1,2	CO-2 Prepare a professional document using various features of word-processing for academic/business/ industry purpose.	SO.2.1	LE2.1-LE2.5	Unit-2.0 Word Processing	
PO 1,2,3,4, 5,6,7, 8,9,10 PSO 1,2	CO-3 Create a spread sheet, analyze the data using different formula/ functions and represent it in different form of chart for solving academic/business/ industrial problem.	SO.3.1	LE3.1-LE 3.4	Unit-3.0 Spread sheet/ Data Analysis & Chart Presentation	
PO 1,2,3,4, 5,6,7, 8,9,10 PSO 1,2	CO-4 Create a professional multimedia presentation using its various features for any academic/business/ industrial application.	SO4.1	LE4.1-LE4.8	Unit-4.0 Multimedia/Graphic Presentation	
PO 1,2,3,4, 5,6,7, 8,9,10 PSO 1,2	CO-5 Use Internet, Cloud services, and its security features for computing.	SO5.1-SO5.5	LE5.1-LE5.6	Unit-5.0 Basics of Internet & Cloud Services, its security for Computing	

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

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Semester-I

- A) Course Code : 2000167(028)
 B) Course Title : Electronic Workshop Practice
 C) Pre- requisite Course Code and Title :
 D) Rationale :

Electronics & Telecommunication, Instrumentation, Computer Science, Information Technology and allied engineering diploma holders are expected to handle various, general purpose tools and test and measuring equipment in the electrical and electronics workshop. They have to supervise work related to assembly of units and soldering of electronic components and circuits in the workshop. This course will develop skills to handle general purpose tools, equipment used in the electrical and electronics workshop and perform soldering and basic testing activities.

E) Course Outcomes:

- CO-1 Use firefighting equipment and other safety related accessories.
 CO-2 Test general purpose electrical components (Resistor, Capacitor, Inductor and Transformer) using Multimeter.
 CO-3 Test general purpose electronic components using a multimeter (PN junction diode, Zener diode, LED, NPN and PNP Transistor).
 CO-4 Use test and measurement instruments (CRO and Function Generator).
 CO-5 Perform soldering and disordering of discrete component on a general purpose PCB.

F) Scheme of Studies:

S.No	Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)			
				L	P	T	Credit L+(P+T)/2
1	Electronics and Telecommunication Engineering	2000167(028)	Electronic Workshop Practice	-	4	-	2

Legend: L-Lecture, P-Practical, T-Tutorial

G) Scheme of Assessment:

S.No	Board of Study	Course Code	Course Title	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Electronics and Telecommunication Engineering	2000167(028)	Electronic Workshop Practice	-	-	-	-	30	30

Legend: ESE-End semester Examination, CT-Class test, TA-Teachers' Assessment

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Semester-I

H) Course-Curriculum Detailing:

This course curriculum detailing depicts learning outcomes at the course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

CO-1 Use fire fighting equipment and other safety related accessories.

(Approx. Hrs: CI+LI+SW+SL = 16)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self-Learning (SL)
SO1.1 Select the fire extinguisher to extinguish the given type of fire. SO1.2 Describe the procedure to use the given firefighting equipment. SO1.3 List the items used for first Aid. SO1.4 Describe the ways to maintain good housekeeping in the given situation.	LE1.1 Conduct mock artificial respiration and first Aid exercise to learn about safety procedures of first Aid in case of electrical/electronics hazards. LE1.2 Use Fire extinguisher to extinguish the fire in a given situation.	Unit-1.0 Safe practices and Firefighting 1.1 Safety Practice, Causes of accidents, General safety rules, Safety signs and symbols. 1.2 First Aid Box. 1.3 Artificial respiration 1.4 Fire, Causes of Fire, classification of fire types, class A, B,C and D type of fire, Basic ways of extinguishing the fire types of firefighting equipment.	<ul style="list-style-type: none">Collect the information related to various Electrical/Electronics safety norms using internet facility.Prepare general workshop layout.

Legend: CI: Classroom Instruction (Includes different instructional strategies, i.e. Lecture (L) and Tutorial (T) and others), LI : Laboratory Instruction (Includes Practical performances in the Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-1 Suggested Sessional Work (SW):

- Assignments:**
 - Prepare a report on the types of firefighting techniques.
 - Prepare safety symbols chart.
- Mini Project:**
 - Visit to an Organization /field and Submit a report on safety practices followed in the Organization /field.
- Other Activities (Specify):**
 - Show video on mock drill for fire fighting .
 - Show standard security charts used in workshops.

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Semester-I

CO-2 Test general purpose electrical components (Resistor, capacitor, inductor and transformer) using Multimeter.

(Approx. Hrs: CI+LI+SW+SL = 16)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
<p>SO2.1 Describe the steps to measure AC and DC voltage and current using multimeter.</p> <p>SO2.2 Explain the importance of Continuity testing in the fault finding.</p> <p>SO2.3 Compare various types of resistors.</p> <p>SO2.4 Identify type of capacitor in the given circuit.</p> <p>SO2.5 Identify type of inductor in the given circuit.</p>	<p>LE2.1 Use a multimeter to measure AC and DC voltages.</p> <p>LE2.2 Measure output voltages of the given batteries.</p> <p>LE2.3 Test continuity of the given circuit with the help of multimeter.</p> <p>LE2.4 Measure resistance of the given resistor from color code and verify it using Multimeter.</p> <p>LE2.5 Measure capacitance of the given capacitor (mica, ceramic, paper, electrolytic and variable) multimeter and verify with color coding printed on the body of the capacitor.</p> <p>LE2.6 Identify different types of transformers and identify Primary and Secondary winding with the help of multimeter.</p> <p>LE2.7 Identify different types of switches suggest one application of each.</p>	<p>Unit-2.0 Basic Electrical Components and Tools</p> <p>2.1 Sources: AC and DC voltage and current, batteries, regulated DC power supply</p> <p>2.2 Pliers, Nose Plier, Cutter, Screw Driver, Tester, Tongs and Tweezers, Wire Lead Bender, Lamp, Galvanometer, Ammeter, Voltmeter, Wattmeter, Clip on meter, Multimeter</p> <p>2.3 Resistor: Colour code, symbol, technical specifications like watts, tolerance of various types of resistor, wire wound resistor, carbon resistor, Linear & Logarithmic Potentiometer, Preset, Printed Circuit Resistors and their applications</p> <p>2.4 Capacitor: Colour code, symbol, technical specifications like capacitance value, tolerance of various types of capacitors, Electrolytic Capacitor, Paper Capacitor, Ceramic Capacitor, Mica Capacitor, Polystyrene, Variable Capacitor, Trimmer and their applications</p> <p>2.5 Inductor, Transformer, types of transformer step up and step down, relays, switches, types of switches, SPST, SPDT, DPDT, DPST</p>	<ul style="list-style-type: none"> Compare various types of capacitors used in the electronic circuits. Prepare the list of basic tools used in the electronic workshop.

Legend: CI: Classroom Instruction (Includes different instructional strategies, i.e. Lecture (L) and Tutorial (T) and others), LI : Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

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Semester-I

SW-2 Suggested Sessional Work (SW):

- **Assignments:**
 - i. Prepare chart to show the comparison of various types of resistors.
- **Mini Project:**
 - i. Connect resistor and capacitor in series and parallel and measure the resultant value with the help of multimeter.
 - ii. Identify the primary and secondary windings of step down transformer using multimeter.
- **Other Activities (Specify):**
 - i. Use different type of switches and prepare different type of control circuit to switch on and off the given lamp.

CO-3 Test general purpose electronic components using multimeter (PN junction diode, Zener diode, LED, NPN and PNP Transistor).

(Approx. Hrs: CI+LI+SW+SL = 16)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
SO3.1 Explain the steps to identify the anode and cathode leads of the given diode. SO3.2 Describe the steps to measure the current gain of the given transistors. SO3.3 Differentiate between LED & LCD.	SL3.1 Use multimeter to identify the anode and cathode of the given diode. SL3.2 Use multimeter to identify the emitter, base and collector of the given transistor. SL3.3 Measure the current gain of the given transistor with the help of multimeter. SL3.4 Identify the type of package of the given IC. SL3.5 Identify the leads of 7-segment LED.	Unit-3.0 Basic Electronic Components 3.1 ACTIVE DEVICES: Diodes, P-n Junction Diode, Zener-Diode, Transistors NPN and PNP 3.2 ICs: Integrated Circuits(ICs), Type of IC-Packaging (Metal Can/DIL/Flat etc.), Various Series of Linear/Analog and Digital Series 3.3 Displays:Light Emitting Displays (LED), 7- Segment LED, Matrix LED, alphanumeric Display, Liquid Crystal Displays (LCD), Nixie Tubes	<ul style="list-style-type: none">• Identify different active and passive components available in workshop.• Applications of Analog and Digital Multimeter

Legend: CI: Classroom Instruction (Includes different instructional strategies, i.e. Lecture (L) and Tutorial (T) and others), LI : Laboratory Instruction (Includes Practical performances in the Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-3 Suggested Sessional Work (SW):

- **Assignments:**
 - i. Prepare the chart to show the steps to use multimeter to measure DC Current and Voltage.

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Semester-I

- **Mini Project:**
 - i. Use LED, diode and transistor to build a simple application circuit.
- **Other Activities (Specify):**
 - i. Show video on the working of various types of electronic display.

CO-4 Use test and measurement instruments (CRO and Function Generator).

(Approx. Hrs: CI+LI+SW+SL = 16)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
SO3.1 Describe the front panel control functions of Cathode Ray Oscilloscope(CRO) SO3.2 Describe the steps to use the CRO for frequency and amplitude measurement. SO3.3 Describe the steps to use Function Generator to generate sine and square waveform.	LE4.1 Measure amplitude and frequency of the given signal using CRO. LE4.2 Generate various types of waveforms(sin, square, triangular) using Functions generator and measure the frequency of generated signal with the help of CRO. LE4.3 Compare two waveforms on the CRO screen. LE4.4 Use CRO's component tester option to test the given diode. LE4.5 Use CRO's component tester option to test the given transistor.	Unit-4.0 Common Test and Measuring Instrument 4.1 CRO: identification of various blocks of CRO, front panel functions, time and horizontal axis adjustments, CRT tube, vertical axis input and adjustment, measurement of frequency and voltage, component tester 4.2 Function generator: identification of various blocks of Function generator, front panel functions, various types of waveforms like sin, cos, square, sawtooth generated by it, attenuation and frequency range	<ul style="list-style-type: none"> • Compare technical specifications of various types of CRO on the basis of information available on the Internet.

Legend: CI: Classroom Instruction (Includes different instructional strategies, i.e. Lecture (L) and Tutorial (T) and others), LI : Laboratory Instruction (Includes Practical performances in the Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-4 Suggested Sessional Work (SW):

- **Assignments:**
 - i. Prepare Chart to show the block diagram of CRO.
- **Mini Project:**
 - i. Prepare a market survey report on 50 to 100 MHz, CRO.

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Semester-I

- **Other Activities (Specify):**

- i. Demonstrate the special features of CRO and Function generator.
- ii. Demonstrate the calibration steps of the CRO.

CO-5 Perform soldering and desoldering of discrete component on a general purpose PCB

(Approx. Hrs: CI+LI+SW+SL = 16)

Session Outcomes (SOs)	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
SO5.1 Describe various types of Soldering and Desoldering techniques. SO5.2 Explain the need of flux material used in the soldering process. SO5.3 Explain PCB design rules for the given open source EDA tools. SO5.4 Describe Steps for the PCB preparation manually.	LE5.1 Selection of soldering Iron and soldering flux and solder the electronic component on general purpose PCB. LE5.2 Build simple circuit consists of discrete components on PCB. LE5.3 Use desoldering pump to take out the electronic component from general purpose PCB.	Unit-5.0 Soldering and Desoldering 5.1 SOLDER MATERIALS:Composition of Solder-Wire,Flux & Flux-Material. 5.2 SOLDERING METHODS: General Soldering Procedures, Bits used for various types of soldering,Measures for Good Soldering,dry soldering and problems associated with it PRINTED CIRCUIT BOARDS:Various types of PCB Materials and their uses, General Purpose PCBs, General concept of PCB Layout, Types of PCBs, single sided, double sided, Steps for the PCB preparation	<ul style="list-style-type: none">• Identify the types of PCB available in your electronic workshop and prepare short report on it.• Using any one open source EDA Tools to prepare the PCB layout.• Bread Board

Legend: CI: Classroom Instruction (Includes different instructional strategies, i.e. Lecture (L) and Tutorial (T) and others), LI : Laboratory Instruction (Includes Practical performances in the Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

SW-5 Suggested Sessional Work (SW):

- **Assignments:**

- i. Compare various type of PCBs used in the electronics equipments.

- **Mini Project:**

- i. Prepare a small application circuit contain discrete components like switch on the PCB.

- **Other Activities (Specify):**

- i. Show video on the PCB preparation process.
- ii. Show video on various types of soldering methods.

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Semester-I

Note: Performance under Laboratory and Sessional work may appear in more than one COs/SOs.

I) Suggested Specification Table (For ESE of Classroom Instruction (CA)):

Unit No.	Unit Title	Marks Distribution			Total Marks
		R	U	A	
I	Safe practices and Firefighting	-	-	-	-
II	Basic Electrical Components and Tools	-	-	-	-
III	Basic Electronic Components	-	-	-	-
IV	Common Test and Measuring Instrument	-	-	-	-
V	Soldering and Desoldering	-	-	-	-
Total			-	-	-

Legend: R: Remember, U: Understand, A: Apply and above

J) Suggested Specification Table (For ESE of Laboratory Instruction*):

Laboratory Instruction Number	Short Laboratory Experiment Title	Assessment of Laboratory Work (Marks)
		TA (Including Viva-Voce)
LE1.1	Conduct mock artificial respiration and first Aid exercise to learn about safety procedures of first Aid in case of electrical/electronics hazards.	30
LE1.2	Use Fire extinguisher to extinguish the fire in a given situation.	
LE2.1	Use multimeter to measure AC and DC voltages.	
LE2.2	Measure output voltages of the given batteries.	
LE2.3	Test continuity of the given circuit with the help of multimeter.	
LE2.4	Measure resistance of the given resistor from color code and verify it using Multimeter.	
LE2.5	Measure capacitance of the given capacitor (mica, ceramic, paper, electrolytic and variable) multimeter and verify with color coding printed on the body of the capacitor.	
LE2.6	Identify different types of transformers and identify Primary and Secondary winding with the help of multimeter.	
LE2.7	Identify different types of switches suggest one application of each.	
LE3.1	Use multimeter to identify the anode and cathode of the given diode.	
LE3.2	Use multimeter to identify the emitter, base and collector of the given transistor.	
LE3.3	Measure the current gain of the given transistor	

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Semester-I

Laboratory Instruction Number	Short Laboratory Experiment Title	Assessment of Laboratory Work (Marks)
		TA (Including Viva-Voce)
	with the help of multimeter.	
LE3.4	Identify the type of package of the given IC.	
LE3.5	Identify the leads of 7-segment LED.	
LE4.1	Measure amplitude and frequency of the given signal using CRO.	
LE4.2	Generate various types of waveforms like: sine, square, triangular) using Functions generator and measure the frequency of generated signal with the help of CRO.	
LE4.3	Compare two waveforms on the CRO screen.	
LE4.4	Use CRO's component tester option to test the given diode .	
LE4.5	Use CRO's component tester option to test the given transistor.	
LE5.1	Selection of soldering Iron and soldering flux and solder the electronic component on general purpose PCB.	
LE5.2	Build simple circuit consists of discrete components on PCB.	
LE5.3	Use desoldering pump to take out the electronic component from general purpose PCB.	

*Assessment rubric, process and product check list with rating scale need to be prepared by the course wise teachers for each experiment for conduction and assessment of laboratory experiments/ practicals

Legend: PRA: Process Assessment, PDA : Product Assessment

K) Suggested Instructional/Implementation Strategies:

1. Improved Lecture Method
2. Industrial visits
3. Expert Lecture
4. Field Trips
5. Self Learning
6. Portfolio Based Learning
7. Observation, Practice and Feedback
8. Classroom, Laboratory, Workshop, Field, Video, Live Demonstrations
9. Role Play
10. Charts
11. Demonstration
12. ICT Based Teaching Learning (Video Demonstration, CBT, Blog) can be integrated with many methods

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Semester-I

L) Suggested Learning Resources:

(a) Books :

S. No.	Title	Author	Publisher	Edition & Year
1.	Introduction to Basic Manufacturing Process & Workshop Technology	Singh, Rajender	New Age International, New Delhi	2 nd Edition , Reprint 2014, ISBN: 978-81-224-3070-7
2.	Electronic Components Handbook, V1	Lewis M. Clement , Keith Henney , Craig Walsh	Literary Licensing, LLC	Edition: 2013 , ISBN: 9781258554682, 1258554682
3.	Principles of Electronics	Mehta ,V.K.; Mehta, Rohit	S. Chand and Co. Ram Nagar, New Delhi-110 055	11 th Edition, 2014 , ISBN-13- 9788121924504
4.	Electrical engineering materials and semiconductor devices	Gupta, J.B., & Gupta, Renu	S.K Kiatar & sons	2013, ISBN- 978-93-5014-300-1 or Latest edition
5.	Handbook of Electrical Engineering	Bhatia, S.L.	Khanna Publication	2012, or Latest edition

(b) List of open source software/learning website :

1. Measuring device : <https://www.youtube.com/watch?v=3M4rsWBYaIA>
2. Types of flame: <https://www.youtube.com/watch?v=1OLppHw6GRE>
3. Transformer testing: <https://www.youtube.com/watch?v=bPhkFGwdzMM>
4. Soldering and brazing : <https://www.youtube.com/watch?v=BplzRtQAMw0>
5. www.home.howstuffworks.com/electrical-tools.htm
6. www.kpsec.freeuk.com/components/switch.htm
7. www.electronicshub.org/types-of-inductors-and-applications/
8. www.radio-electronics.com/info/data/semicond/diodes/types-of-diodes.php
9. learn.sparkfun.com/tutorials/transistors
10. Soldering: https://mightyohm.com/files/soldercomic/FullSolderComic_EN.pdf
11. Mini Project:- <http://www.eleccircuit.com>
12. ElectroSchematic:- <http://www.electroschematics.com>
13. <http://www.asnu.com.au>
14. Fire extinguisher:- <http://fireextinguishertraining.com/>

(c) Others:

1. Learning Packages.
2. Lab Manuals.
3. Manufacturers' operating Manual

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Semester-I

M) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1.	Fire extinguisher	Mechanical foam type fire extinguisher with ISI mark (9 litter, B and C type fire)	LE1.1 &1.2
2.	Fire extinguisher	A, B,C portable type fire extinguisher with ISI mark. (2Kg)	LE1.1 &1.2
3.	Multimeter	Analog and Digital AC Voltage : 0-400 V, DC Voltage : 0-24 V AC Current : 0-100 A, DC Current : 0-20 A Resistance : 0 – 1 k ohm	LE2.1 and LE2.2
4.	Digital Multimeter	Digital Multimeter 3 and ½ digit with component tester	LE2.1 to 2.6 and LE3.1 to 3.3, 3.5
5.	Cathode ray oscilloscope (CRO)	50MHz, Dual trace, Dual beam, Inbuilt +5 V supply, Component tester, Function Generator	LE4.1 to LE4.5
6.	Function Generator	0-2 MHz with Sine, square and triangular wave output with variable frequency and amplitude	LE4.1 to LE4.5
7.	Soldering Gun	Soldering Gun: 40Watts, Holding stand, Temperature Control, Power cord	LE5.1 to LE5.3
8.	Soldering Iron	Soldering iron, Flux for soldering and Solder filler material.	LE5.1 to LE5.3
9.	De-soldering Gun	De-soldering Gun: 80 Watts, output voltage 35 V	LE5.1 to LE5.3
10.	Consumable components	Resisters, Rheostat, Wire wound resistor, Carbon Film resistor, Carbon composition resistor capacitors, Paper Capacitor, Electrolytic Capacitor, Ceramic capacitor, Polyester Capacitor, Gang capacitor Diodes, Transistors, ICs, IC Sockets, General Purpose PCBs of different size, LEDs, Relays, Switches, Connectors, potentiometer fixed and variable, Connecting Wires, Soldering metal, Soldering Flux, De-soldering mesh.	
11.	Hand tool	Wire Cutter, Wire Stripper, screw driver, hammer,saw	

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N) Mapping of POs & PSOs with COs:

Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	PO-1 Basic knowledge	PO-2 Discipline knowledge	PO-3 Experiments and practice	PO-4 Engineering Tools	PO-5 The engineer and society	PO-6 Environment and sustainability	PO-7 Ethics	PO-8 Individual and team work	PO-9 Communication	PO-10 Life-long learning	PSO-1	PSO-2
CO-1 Use fire fighting equipment and other safety related accessories.	3	2	2	2	2	2	3	3	2	2	2	2
CO-2 Test general purpose electrical components (Resistor, Capacitor, Inductor and Transformer) using Multimeter.	3	3	3	2	3	1	3	2	2	2	3	3
CO-3 Test general purpose electronic components using a multimeter(PN junction diode,Zener diode, LED, NPN and PNPTransistor).	3	3	3	3	2	2	3	2	2	2	2	3
CO-4 Use test and measurement instruments (CRO and Function Generator).	2	3	3	3	2	1	2	2	2	2	2	2
CO-5 Perform soldering and desoldering of discrete component on a general purpose PCB.	2	3	3	3	2	2	2	1	1	2	3	2

Legend: 1 – Low, 2 – Medium, 3 – High

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O) Course Curriculum Map:

POs & PSOs No.	COs No. & Titles	SOs No.	Laboratory Instruction (LI)	Classroom Instruction (CI)	Self Learning (SL)
PO1-10 PSO1-2	CO-1 Use fire fighting equipment and other safety related accessories.	SO1.1, SO1.2 SO1.3, SO1.4	LE1.1 LE1.2	Unit- 1 Safe practices and Firefighting 1.1, 1.2, 1.3, 1.4	As mentioned in relevant pages
PO1-10 PSO1-2	CO-2 Test general purpose electrical components (Resistor, Capacitor, Inductor and Transformer) using Multimeter.	SO2.1, SO2.2 SO2.3, SO2.4 SO2.5	LE2.1, LE2.2 LE2.3, LE2.4 LE2.5, LE2.6, LE2.7	Unit- 2 Basic Electrical Components and Tools 2.1, 2.2, 2.3, 2.4, 2.5	
PO1-10 PSO1-2	CO-3 Test general purpose electronic components using a multimeter(PN junction diode,Zener diode, LED, NPN and PNPTransistor).	SO3.1 SO3.2 SO3.3	LE3.1 LE3.2 LE3.3 LE3.4, LE3.5	Unit- 3 Basic Electronic Components 3.1 3.2 3.3	
PO1-10 PSO1-2	CO-4 Use test and measurement instruments (CRO and Function Generator).	SO4.1 SO4.2 SO4.3	LE4.1 LE4.2 LE4.3 LE4.4 LE4.5	Unit- 4 Common Test and Measuring Instrument 4.1 4.2	
PO1-10 PSO1-2	CO-5 Perform soldering and desoldering of discrete component on a general purpose PCB.	SO5.1 SO5.2 SO5.3 SO5.4	LE5.1 LE5.2 LE5.3	Unit- 5 Soldering and Desoldering 5.1 5.2 5.3	

Legend: CI: Classroom Instruction (Includes different instructional strategies, i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in the Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

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Semester-I

- A) Course Code : 2000168(046)
B) Course Title : Technical Presentation & Group Discussion Part-I
C) Pre-requisite Course Code and Title :
D) Rationale :

Technical Writing and Presentation Skills are core skills to be developed in diploma graduates as students exchange information and convey their ideas and opinions with different stakeholders. Students in technical institutes need to be trained for this. The present curriculum focuses on the attainment of course outcomes related to soft skills, so that the students are confident, self-reliant and capable of presenting themselves appropriately.

E) Course Outcomes :

CO-1 Demonstrate effective listening and reading skills with clarity.

CO-2 Demonstrate appropriate presentation skills using different aids and techniques.

F) Scheme of Studies:

S.No	Board of Study	Course Code	Course Title	Scheme of Studies (Hours/Week)			
				L	P	T	Credit L+(P+T)/2
1	Humanities	2000168(046)	Technical Presentation & Group Discussion Part-I	-	1	-	1

Legend: L-Lecture, P-Practical, T-Tutorial

G) Scheme of Assessment:

S.No	Board of Study	Course Code	Course Title	Scheme of Examination					
				Theory			Practical		Total Marks
				ESE	CT	TA	ESE	TA	
1	Humanities	2000168(046)	Technical Presentation & Group Discussion Part-I	-	-	-	-	10	10

Legend: ESE: End Semester Exam, CT: Class Test, TA: Teacher Assessment

H) Course-Curriculum Detailing:

This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Sessional Work (SW) and Self Learning (SL). Students are expected to demonstrate the attainment of Session Outcomes (SOs) and finally Course Outcomes (COs) upon the completion of course.

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Semester-I

CO-1 Demonstrate effective listening and reading skills with clarity

Session Outcomes (SOs)	Laboratory Instruction/Classroom Instruction (LI/CI)	Self Learning (SL)
SO1- Communicate effectively using correct pronunciation, modulation, pitch etc.,	1.1 Need of Learning to learn skills (Listening, Reading and Speaking) 1.2 Methods of good study habits 1.3 Practice Loud reading 1.4 Practice Active Listening 1.5 Practice Speaking in Class(Group Discussion, Extempore, Debate, Role Play etc.,	<ul style="list-style-type: none">• One Word Substitution• Rearrangement of Jumbled words• Use Synonyms and Antonyms appropriately.• Reading Current articles from newspaper magazines

CO-2 Demonstrate appropriate Presentation Skills using different aids and techniques.

Session Outcomes (SOs)	Laboratory Instruction/Classroom Instruction (LI/CI)	Self Learning (SL)
SO-2 Display Different Presentation Skills by using different techniques	2.1 Characteristics of good oral presentation 2.2 Ways of oral presentation 2.3 Gestures Mannerism during oral presentation 2.4 Preparing Successful Presentations 2.5 Making Effective Use of Visual Aids	<ul style="list-style-type: none">• Short Stories• Magazines• Articles etc.

SW- Suggested Sessional Work (SW):

a. Assignments:

Loud reading of given stories by each student in the class.
Similar activity can be done with the help of News papers/Magazines.

b. Mini Project:

Recorded Lectures may be played in the class and students are asked to listen and answer.

c. Other Activities (Specify):

Self-Introduction, Speech and Spell Test.

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I) Suggested Specification Table (For ESE of Classroom Instruction)

Unit Number	Unit Titles	Marks Distribution			Total Marks
		R	U	A	
I	Learning to Learn Skills	01	01	03	05
II	Presentation Skills	01	01	03	05
Total		02	02	06	10

Legend: R: Remember, U: Understand, A: Apply and above

Note: There will be no end semester examination for laboratory instructions and the practical activity will be assessed for term work.

J) Suggested Instructional/Implementation Strategies:

1. Improved Lecture
2. Tutorial
3. Case Method
4. Group Discussion
5. Role Play
6. Demonstration
7. ICT Based Teaching Learning (Video Demonstration/Tutorials CBT, Blog, Facebook, Twitter, WhatsApp, Mobile, Online sources)
8. Brainstorming

K) Suggested Learning Resources:

(a) Books :

S. No.	Title	Author	Publisher	Edition & Year
1	English Grammar in Use	Murphy Raymond	Cambridge Publications	4 th Edition
2	Living English Structure	Allen	Cambridge Publications	Fifth edition(2009)
3	Effective English with CD	Kumar, E. Suresh; Sreehari,P.; Savithri, J.	Pearson Education, Noida, New Delhi	2009 ISBN: 978-81-317-3100-0
4	English Grammar at Glance	Gnanamurali, M.	S. Chand and Co. New Delhi,	2011 ISBN:9788121929042
5	Elementary English Grammar and Composition	Agarwal N.K.	Goyal Brothers Prakashan	Latest Edition

(b) Open source software and website address:

1. <https://www.englishgrammar.org/>
2. <http://www.englishgrammarsecrets.com/>

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3. <https://www.usingenglish.com/handouts/>
4. <http://learnenglish.britishcouncil.org/en/english-grammar>
5. <https://www.englishclub.com/grammar/>
6. <http://www.perfect-english-grammar.com/>
7. <http://www.englishteacheramelanie.com/category/grammar/>
8. <https://www.grammarly.com/blog/category/handbook>
9. <https://www.britishcouncil.in/english/learn-online>
10. <http://learnenglish.britishcouncil.org/en/content>
11. <http://www.talkenglish.com/>
12. [language-labsystem.com](http://www.language-labsystem.com)
13. www.wordsworthelt.com

(c) Others:

1. Learning Packages.
2. Lab Manuals.
3. Language software Manual
4. Users' Guide

L) List of Major Laboratory Equipment and Tools:

S. No.	Name of Equipment	Broad Specifications	Relevant Experiment Number
1	Computers	A complete computer system with headphones & Speakers	All
2	Soft ware	English communication softwares – Globalina, A-One Solutions, Wordsworth, Spears	All
3.	Computer tables & chairs	Depending upon the size of the Language Lab	All

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N) Mapping of POs & PSOs with COs:

Course Outcomes (COs)	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)	
	PO-1 Basic knowledge	PO-2 Discipline knowledge	PO-3 Experiments and practice	PO-4 Engineering Tools	PO-5 The engineer and society	PO-6 Environment and sustainability	PO-7 Ethics	PO-8 Individual and team work	PO-9 Communication	PO-10 Life-long learning	PSO-1	PSO-2
CO-1 Demonstrate effective listening and reading skills with clarity	2	1	1	1	-	-	-	-	2	2	1	1
CO-2 Demonstrate appropriate Presentation Skills using different aids and techniques.	1	1	2	2	-	-	-	-	2	3	1	1

Legend: 1 – Low, 2 – Medium, 3 – High

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O) Course Curriculum Map:

POs & PSOs No.	COs No.& Titles	SOs No.	Laboratory Instruction(LI)	Classroom Instruction (CI)	Self Learning (SL)
PO1,2,3,4,9,10 PSO 1,2	CO-1 Demonstrate effective listening and reading skills with clarity	SO1	LE1.1 LE1.2 LE 1.3 LE1.4 LE 1.5		As mentioned in relevant pages
PO 1,2,3,4,9,10 PSO 1,2	CO-2 Demonstrate appropriate Presentation Skills using different aids and techniques.	SO2	LE2.1 LE2.2 LE2.3 LE2.4 LE2.5		

Legend: CI: Classroom Instruction (Includes different instructional strategies i.e. Lecture (L) and Tutorial (T) and others), LI: Laboratory Instruction (Includes Practical performances in Laboratory, Workshop, field or other locations using different instructional strategies) SL: Self Learning

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