

Government Polytechnic, Pune

'180 OB' – Scheme

Programme	Diploma in ET/CE/EE//ME/MT/CM/IT/DDGM
Programme code	01/02/03/04/05/06/07/08/16/17/21/22/23/24/26
Name of Course	Communication Skills I
Course Code	HU1101
Prerequisite	--
Class Declaration	NO

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	100
2	1	-	3	40	10	25	25	

():OE(Oral Examination) Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to*

3) RATIONALE

This is been noticed that diploma pass outs lack in grammatically correct written and oral communication in English. It is also been noticed that communication is not a problem of students, communication in correct English is the basic problem of Diploma pass outs. Students will have to interact in this language so far as their career in industry is concerned. In order to enhance this ability in students English is introduced as a subject to groom their personality.

4) COMPETENCY

The aim of this course is to attend following industry competency through various teaching learning experiences:

- To develop English Language Speaking Abilities, enrich fluency.
- To build confidence in written correspondence required in technical fields.
- To become familiar with use of multimedia mostly online transactions.

5) COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

CO1: Communicate effectively to overcome barriers

CO2: Apply Nonverbal codes for effective communication.

CO3: Apply Learning Skills.

CO4: Interpret information to present orally.

CO5: Use Language lab for improving listening and speaking abilities.

6) SUGGESTED PRACTICALS/ EXERCISES

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. required
1	Introduction to Communication Cycle	1	1
2	Analyze Communication Events.	1	1
3	Collect Different Pictures Depicting Body actions.	2	2
4	Utilize Signs, Symbols & color codes.	2	1
5	Loud Reading of Given Paragraph.	3	2
6	Utilize Techniques of Listening with the help of lingua phone	3	2
7	Topic Writing on Current Issues	4	1
8	Comprehending Information and extempore it	4	1
9	Practice Vocabulary I (Identify words from various Technical Jargons.)	5	2
10	Practice Vocabulary II(Homophones/abbreviations/Synonyms/antonyms)	5	2
Total			16

S.No.	Performance Indicators	Weightage in %
a.	Arrangement of available equipment / test rig or model	-
b.	Setting and operation	-
c.	Safety measures	-
d.	Observations and Recording	40
e.	Interpretation of result and Conclusion	-
f.	Answer to sample questions	30
g.	Submission of report in time	30
Total		100

7. THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 1. Introduction and principles of communication	a) Interpret different communication skills b) Define elements of communication c) Describe process of communication d) Identify barriers for finding remedies e) Interpret principles of communication	a. Introduction to communication b. Definition and elements of communication c. Process of communication d. Barriers to communication and remedies to overcome it. e. Principles of communication
UNIT 2 Nonverbal Communication	a) Differentiate graphic communication b) Use different nonverbal codes c) Interpret various graphic forms.	a. Graphic communication b. Nonverbal codes [Kinesics, Proxemics, Chronemics, Haptics, Vocalics, Dress and Appearance] c. Reading graphic forms [Bar graph, Pie chart]
UNIT 3 Learning Skills	a) Recall listened information b) Apply oral skills c) Perceives various fonts & use it d) Compose sentences & paragraphs	a. Listening skills b. Speaking skills c. Reading skills d. Writing Skills

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT4 Comprehension	a) Improve writing techniques b) Interpret information c) Summarize to extempore	a. Topic Writing (current issues) b. Comprehend various information c. Extempore some current Activities
UNIT 5 Language skills	a) Use phonetic signs and symbols for pronunciation b) Practice Pronunciation using lingua-phone c) Utilize listening skills d) Classify jargon wise vocabulary for improvement	4 a. Phonetics (practice of pronunciation) 4 b. Listening skills 4 c. Use of lingua-phone (language lab) 4 d. Vocabulary building

8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction and principles of communication	08	04	06	02	12
II	Nonverbal Communication	06	02	02	06	10
III	Comprehension	06	00	02	04	06
IV	Learning Skills	06	00	00	04	04
V	Language skills	06	-	02	06	08
Total		32	06	12	22	40

9. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practical, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	Pr O. No.
1	Language Lab	5,6
2		

10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Prepare journal based on practical performed in Ling phone laboratory. Journal consists of drawing, observations, required equipment's, date of performance with teacher signature.
- b. Collection of Paper cuttings from magazines, Newspapers, periodicals etc
- c. Encyclopedia

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for **self-directed learning** and assess the development of the COs through classroom presentations (see implementation guideline for details).
- c. With respect to item No.8, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- d. Guide student(s) in undertaking micro-projects.
- e. Correlate subtopics with power plant system and equipment.
- f. Use proper equivalent analogy to explain different concepts.
- g. Use Flash/Animations to explain various components, operation and
- h. Teacher should ask the students to go through instruction and Technical manuals

12. SUGGESTED MICRO-PROJECTS(Only for Class Declaration Courses)

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs

which are in fact, an integration of POs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

13. SUGGESTED LEARNING RESOURCES

Sr.No.	Author	Title	Publication
1	Joyeeta Bhattacharya	Communication skills	Macmillan Co.
2	Sarah Freeman	Written communication in English	Orient Longman Ltd.
3	Krishna Mohan and Meera Banerji	Developing Communication skills	Macmillan India Ltd.

14. SOFTWARE/LEARNING WEBSITES

- A) www.talkenglish.com
- B) Edutech.com
- C) Coursera
- D) Future Learn
- E) Swayam
- F) www.makeuseof
- G) www.mooc.org

15. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	-	-	1	-	-	1
CO2	3	-	-	-	1	-	1
CO3	3	1	-	-	1	1	1
CO4	3	-	-	-	1	-	1
CO5	2	-	-	-	1	-	1
	3	0.25	-	0.25	1.75	0.25	1

	<u>PSO1</u>	<u>PSO2</u>	<u>PSO3</u>	<u>PSO4</u>
<u>CO1</u>	-	1		
<u>CO2</u>	-	1		
<u>CO3</u>	1	1		
<u>CO4</u>	-	1		
<u>CO5</u>	-	-		
TOTAL	1	4		

Course Code _____

14. Prepared by :

Signature of Course Expert <i>Bam</i>	Signature of Head of Department <i>Wid</i>
Name of Course Expert MB Patil S. C.	Name of Head of Department MH Bhide Y.D.
Signature of Program Expert	Signature of CDC In charge <i>Zanpure</i> Mr. Zanpure
Name of Program Head	Name of CDC In charge

Government Polytechnic, Pune

'180 OB' – Scheme

Programme	Diploma in ET/CE/EE//ME/MT/CM/IT/DDGM
Programme code	01/02/03/04/05/06/07/08/16/17/21/22/23/24/26
Name of Course	Communication Skills II
Course Code	HU1102
Prerequisite	--
Class Declaration	NO

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
2	1		3	40	10	-	50	

(*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to

2. RATIONALE

This is been noticed that diploma pass outs lack in grammatically correct written and oral communication in English. It is also been noticed that communication is not a problem of students, communication in correct English is the basic problem of Diploma pass outs. Students will have to interact in this language so far as their career in industry is concerned. In order to enhance this ability in students English is introduced as a subject to groom their personality.

3. COMPETENCY

The aim of this course is to attend following industry competency through various teaching learning experiences:

- **To develop English Language Speaking Abilities, enrich fluency.**
- **To build confidence in written correspondence required in technical fields.**
- **To become familiar with use of multimedia mostly online transactions.**

4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

- CO1: Prepare various speeches for presentation
- CO2: Write application for Business purposes.
- CO3: Write various technical reports.
- CO4: Write business letters

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. required
1	practice to write various speeches like vote of thanks ,guest introduction etc	1	2
2	write job application, resume, leave application	1	2
3	draft a project report to start a new industry (or to write down the market survey report)	2	2
4	prepare industrial visit report after visit	3	1
5	write a placing an order letter, complain letter	3	2
6	write a joining letter	4	1
7	draft a notice , circular and memorandum	3	2
8	write a fall in production report	3	1
9	Work Progress Report	3	1
10	Description of Devices	4	2
Total			16

S.No.	Performance Indicators	Weightage in %
a.	Arrangement of available equipment / test rig or model	-
b.	Setting and operation	-
c.	Safety measures	-
d.	Observations and Recording	50
e.	Interpretation of result and Conclusion	20
f.	Answer to sample questions	20
g.	Submission of report in time	10
Total		100

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practicals, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	Pr O. No.
1	NA	

7. THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT1 Writing speeches	a) Give in own words the introduction of guest. b) Express feelings in own words to welcome c) Express feelings in own words for Farewell Speech d) Give in own words	1 a. Introduction of guest 1 b. welcome speech 1 c. farewell speech 1 d. Vote of thanks
UNIT2 writing applications	a) Write official correspondence for Job Application with Resume b) Write application for leave. c) Write application for getting NOC from corporation. d) Students can write various applications	2 a. Job application with resume 2 b. Leave application 2 c. Miscellaneous applications
UNIT3 Writing Reports and Notices	Students can write various reports and notices	3 a. Visit report 3 b. Survey report(feasibility report) 3 c. Fall in production report 3 d. Circular/notice Memos
UNIT4 Business letters	Students can write variety of business letter	4 a. Enquiry letter 4 b. Placing an order letter 4 c. Complaint letter 4 d. Appointment letter 4 e. Joining letter

8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Writing speeches	08	2	2	6	10
II	Writing applications	06	2	2	4	08
III	Writing Reports and Notices	10	2	2	6	10
IV	Business letters	08	2	4	6	12
Total		32	8	10	22	40

9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a. Prepare journal based on practical performed in Lingua- phone- laboratory. Journal consists of drawing, observations, required equipment's, date of performance with teacher signature.

10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- b. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- c. With respect to item No.8, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- d. Guide student(s) in undertaking micro-projects.
- e. Correlate subtopics with power plant system and equipments.
- f. Use proper equivalent analogy to explain different concepts.
- g. Use Flash/Animations to explain various components, operation and
- h. Teacher should ask the students to go through instruction and Technical manuals

11. SUGGESTED MICRO-PROJECTS (Only for Class Declaration Courses)

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be *individually* undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit micro-project by the end of the semester to develop the industry oriented COs.

A suggestive list of micro-projects is given here. Similar micro-projects could be added by the concerned faculty:

12. SUGGESTED LEARNING RESOURCES

Sr.No.	Author	Title	Publication
1	Joyeeta Bhattacharya	Communication skills	Macmillan Co.
2	Sarah Freeman	Written communication in English	Orient Longman Ltd.
3	Krishna Mohan and Meera Banerji	Developing Communication skills	Macmillan India Ltd.

13. SOFTWARE/LEARNING WEBSITES

- A) www.talkenglish.com
- B) Edutech.com
- C) Coursera
- D) Future Learn
- E) Swayam
- F) www.makeuseof
- G) www.mooc.org

14. PO –PSO- - CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	1	3	1	2
CO2	3	1	-	-	2	1	3
CO3	3	3	-	1	2	1	3
CO4	3	2	-	1	2	-	3
	3	2	-	0.75	2.25	0.75	2.75
CO							

	<u>PSO1</u>	<u>PSO2</u>	<u>PSO3</u>	<u>PSO4</u>
<u>CO1</u>	-	-		
<u>CO2</u>	-	-		
<u>CO3</u>	1	1		
<u>CO4</u>	-	-		
TOTAL	1	1		

Prepared by :

Course Code:

14. Prepared by :

Signature of Course Expert <i>Bam</i>	Signature of Head of Department <i>W</i>
Name of Course Expert <i>MB Patil S. C.</i>	Name of Head of Department <i>MH Bhide Y.D.</i>
Signature of Program Expert	Signature of CDC In charge <i>Zampure</i> <i>Mr. Zampure</i>
Name of Program Head	Name of CDC In charge

Government Polytechnic, Pune

'180 OB' – Scheme

Programme	Diploma in CE/EE/ET/ME/MT/CM/IT
Programme code	01/02/03/04/05/06/07/15/16/17/18/19/21/22/23/24/26
Name of Course	APPLIED MAHEMATICS I
Course Code	SC1101
Prerequisite	--
Class Declaration	NO

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)				Total Credits (L+T+P)	Examination Scheme				
					Theory		Tutorials		Total Marks
L	T	P	C	ESE	PA	ESE	PA	125	
03	02	00	05	Marks	80	20	--		25
				Exam Duration	3 Hrs	1 Hr	--	--	

Legends: *L- lecture, T-Tutorial/teacher guided theory practice, P-practical, ESE-End semester examination, PA- Progressive Assesment*

2. RATIONALE

The students of Diploma in Engineering and technology must acquire some essential Competencies in Mathematics

3. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Solve various engineering related problems using the principles of applied mathematics**

4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Apply the concepts of algebra to solve engineering related problems.
2. Utilize basic concepts of trigonometry to solve elementary engineering problems.
3. Solve basic engineering problems under given conditions of straight lines.
4. Solve the problems based on measurement of regular closed figures and regular solids.

5.SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. required
1	Solve simple problems of Logarithms based on definition and laws	1	2
2	Solve problems on determinant to find area of triangle, and solution of simultaneous equation by Cramer's Rules.	1	4
3	Resolve into partial fraction using linear non repeated, repeated, and irreducible factors	1	4
4	Solve problems on Compound, Allied, multiple and sub multiple angles..	2	4
5	Practice problems on factorization and de factorization.	2	2
6	Solve problems on inverse circular trigonometric ratios.	2	2
7	Practice problems on equation of straight lines using different forms.	3	4
8	Solve problems on perpendicular distance, distance between two parallel lines, and angle between two lines.	3	2
9	Solve problems on Area, such as rectangle, triangle, and circle.	4	2
10	Solve problems on surface and volume, sphere, cylinder and cone.	4	2
11	Solve simple problems of Logarithms based on definition and laws	4	2
12	Skill test		2
Total			32

S.No.	Performance Indicators	Weightage in %
a.	Prepare experimental set up	-
b.	Handling of instruments during performing practical.	-
c.	Follow Safety measures	-
d.	Accuracy in calculation	20
e.	Answers to questions related with performed practices.	40
f.	Submit journal report on time	20
g.	Follow Housekeeping	10
h.	Attendance and punctuality	10
Total		100

6.MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practicals, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	PrO. No.
1	LCD Projector	1-11
2	Interactive Classroom	1-11

7. THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency.

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Units 1 : Algebra	
1.a. Solve the given simple problem based on laws of logarithm. 1.b. Calculate the area of the given triangle by determinant method. 1.c. Solve given system of linear Equations using by Cramer's rule. 1.d. Obtain the proper and improper partial fraction for the given simple rational function	1.1 Logarithm: Concept and laws of logarithm 1.2 Determinant a. Value of determinant of order 3×3 b. Solutions of simultaneous equations in three unknowns by Cramer's rule. 1.3 Partial Fractions: Types of partial fraction based on nature of factors and related Problems.
Unit 2: Trigonometry	
2.a. Apply the concept of Compound angle, allied angle, and multiple angles to solve the given simple engineering problem(s) 2.b. Apply the concept of Sub- multiple angle to solve the given simple engineering related problem 2.c. Employ concept of factorization and de-factorization formulae to solve the given simple engineering problem(s). 2.d. Investigate given simple problems utilizing inverse trigonometric ratios	2.1 Trigonometric ratios of allied angles, compound angles, multiple angles ($2A$, $3A$), submultiples angle.(without proof) 2.2 Factorization and De factorization formulae (without proof). 2.3 Inverse Trigonometric Ratios and related problems 2.4 Principle values and relation between trigonometric and inverse trigonometric ratios.
Unit 3: Co ordinate geometry	
3.a. Calculate angle between given two straight lines. 3.b. Formulate equation of straight lines related to given engineering problems. 3.c. Identify perpendicular distance from the given point to the line.. 3.d. Calculate perpendicular distance between the given two lines.	3.1 Straight line and slope of straight line a. Angle between two lines. b. Condition of parallel and perpendicular lines. 3.2 Various forms of straight lines. a. Slope point form, two point form. b. Two points intercept form. c. General form. 3.3. Perpendicular distance from a Point on the line. 3.4 Perpendicular distance between two parallel lines
Unit 4: Mensuration	
4.a. Calculate the area of given triangle and circle 4.b. Determine the area of the given square, parallelogram, rhombus, trapezium. 4.c. Compute surface area of given cuboids, sphere, cone and cylinder. 4.d. Determine volume of given cuboids, sphere, cone and cylinder.	4.1 Area of regular closed figures, Area of triangle, square, parallelogram, rhombus, trapezium and circle. 4.2 Volume of cuboids, cone, cylinders and sphere.

8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Algebra	12	6	12	6	24
II	Trigonometry	18	6	6	12	24
III	Co ordinate geometry	09	2	6	8	16
IV	Mensuration	09	2	6	8	16
Total		48	16	30	34	80

9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course:

- Identify engineering problems based on real world problems and solve with the use of free tutorials available on internet.
- Use graphical software's: EXCEL, DPLLOT and GRAPH for related topics.
- Use Mathcad as Mathematical Tool and solve the problems on Calculus.
- Identify problems based on applications of differential equations and solve these problems

10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- Use Flash/Animations to explain various components, operation and
- Teacher should ask the students to go through instruction and Technical manuals
-

11. SUGGESTED MICRO-PROJECTS

(Only for Class Declaration Courses)

N.A.

12. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Higher Engineering Mathematics	Grewal B.S	Khanna Publications, New Delhi
2	A Text Book of Engineering Mathematics	Dutta D	New Age Publications, New Delhi
3	Mathematics for Polytechnic students	S.P. Deshpande	Pune Vidyarthi Griha Prakashan
4	Advance Engineering Mathematics	H.K. Das	S. Chand & Co. Ltd. Delhi
5	Advance Engineering Mathematics	Krezig, Ervin	Wiley Publications New Dehli.

13. SOFTWARE/LEARNING WEBSITE

- a. www.scilab.org/ -SCI Lab
- b. www.mathworks.com/product/matlab/ -MATLAB
- c. Spreadsheet Applications
14. www.dplot.com
- d. <https://www.khanacademy.org/math?gclid=CNqHuabCys4CFdOJaddHoPig>

15. PO - COMPETENCY- CO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<u>1</u>	2	2	1	-	-	-	1
<u>2</u>	3	3	1	-	-	1	2
<u>3</u>	3	3	-	-	-	-	1
<u>4</u>	3	3	1	1	-	-	1
<u>AVERAGE</u>	2.8	2.8	1	1	-	1	<u>1.2</u>

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

CO-PSO Matrices of course

CO	CM	
	PSO1	PSO2
1	-	2
2	-	1
3	-	-
4	-	1
Average	-	2

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

PREPARED BY:

Sign: Name: 1.Shri V.B.Shinde 2.Mrs.P.R.Nemade (Course Expert /s)	Sign: Name: (Head of Department)
Sign: Name: (Head of Program)	Sign: Name: Shri A.S.Zanpure (CDC)

Government Polytechnic, Pune

'180 OB' – Scheme

Programme	Diploma in CE/EE/ET/ME/MT/CM/IT
Programme code	01/02/03/04/05/06/07/15/16/17/18/19/21/22/23/24/26
Name of Course	APPLIED MAHEMATICS II
Course Code	SC1102
Prerequisite	SC1101
Class Declaration	NO

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)				Total Credits (L+T+P)	Examination Scheme				
					Theory		Tutorials		Total Marks
L	T	P	C	ESE	PA	ESE	PA	125	
03	02	00	05	Marks	80	20	--		25
				Exam Duration	3 Hrs	1 Hr	--	--	

Legends: L- lecture, T-Tutorial/teacher guided theory practice, P-practical, ESE-End semester examination, PA- Progressive Assesment

2. RATIONALE

This subject intends to teach students basic facts, concepts, principles and procedure of Mathematics as a tool to analyze Engineering problems and as such it lays down foundation for the understanding of engineering science and core technology subjects

3. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Solve various engineering related problems using the principles of applied mathematics**

4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Calculate the equation of tangent, maxima, minima, by differentiation.
2. Solve the given problems of integration using basic formulae.
3. Use basic concepts of statistics to solve engineering related problems.
4. Apply the concept of numerical methods to find the roots of equation.
5. Apply the concept of matrix to solve the engineering problems.

5. SUGGESTED PRACTICALS/ EXERCISES

The practicals in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. required
1	Solve problems based on finding value of the function at different points	1	2
2	Solve problems based on standard formulae of derivatives	1	2
3	Solve problems to find derivatives of implicit function and parametric function.	1	2
4	Solve problems to find derivative of logarithmic and exponential functions	1	2
5	Solve problems based on finding equation of tangent and normal.	1	2
6	Solve problems based on finding maxima, minima of function	1	2
7	Solve problems based on finding radius of curvature at a given point.	1	2
8	Solve the problems based on standard formulae of integration.	2	2
9	Solve problems on finding range, coefficient of range and mean deviation.	3	2
10	Solve problems on standard deviation.	3	2
11	Solve problems on coefficient of variation and comparison of two sets. 2	3	2
12	Solve the algebraic equation using Bisection method, Regula falsi method and Newton –Raphson method	4	2
13	Solve the simultaneous equation using Gauss elimination method, Gauss Seidal and Jacobi's method	4	2
14	Solve elementary problems on Algebra of matrices.	5	2
15	Solve solution of Simultaneous Equation using inversion method.	5	4
Total			32

S.No.	Performance Indicators	Weightage in %
a.	Prepare experimental set up	-
b.	Handling of instruments during performing practical.	-
c.	Follow Safety measures	-
d.	Accuracy in calculation	20
e.	Answers to questions related with performed practices.	40
f.	Submit journal report on time	20
g.	Follow Housekeeping	10
h.	Attendance and punctuality	10
Total		100

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here **will usher** in uniformity in conduct of practical's, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	PrO. No.
1	LCD Projector	1-15
2	Interactive Classroom	1-15

7. THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency.

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit 1 : Differential Calculus	
1.a. Solve the given simple problems based on functions. 1.b. Solve the given simple problems based on rules of differentiation. 1.c. Obtain the derivatives of logarithmic, exponential functions. 1.d. Apply the concept of differentiation to find given equation of tangent and normal. 1.f. Apply the concept of differentiation to calculate maxima and minima and radius of curvature for given function.	1.1 Functions and Limits : a) Concept of function and simple b) Concept of limits without examples. 1.2 Derivatives: a) Rules of derivatives such as sum, Product, Quotient of functions. b) Derivative of composite functions to find derivative of given function (chain Rule), implicit and parametric functions. c) Derivatives of inverse, logarithmic and exponential functions. 1.3 Applications of derivative : a) Second order derivative without examples. b) Equation of tangent and normal c) Maxima and minima d) Radius of curvature
Unit 2: Integration	
2.a Solve the given simple problem(s) based on rules of integration.	2.1 Simple Integration: Rules of integration and integration of standard functions
Unit 3: Statistics	
3.a. Obtain the range and coefficient of range of the given grouped and ungrouped data. 3.b. Calculate mean and standard deviation of discrete and grouped data related to the given simple engineering problem. 3.c Determine the variance and coefficient of variance of given grouped and ungrouped data. 3.d. Justify the consistency of given simple sets of data.	3.1 Range, coefficient of range of discrete and grouped data. 5.2 Mean deviation and standard from mean of grouped and ungrouped data, weighted means 3.3 Variance and coefficient of variance. 3.4 Comparison of two sets of observation.
Unit 4: Numerical Methods	
4.a. Apply the concept of approximate to find root of algebraic equation 4.b. Apply the concept of iteration to solve the system of equations in three unknowns	4.1 Solution of algebraic equations : a. Bisection method, b. Regula falsi method and c. Newton –Raphson method. 4.2 Solution of simultaneous equations containing 3Unknowns : Gauss elimination method. Iterative methods- Gauss Seidal and Jacobi's method
Unit 5: Matrices	
5.a Solve given system of linear equations using matrix inversion method	5.1 Matrices, algebra of matrices, transpose adjoint and inverse of matrices. 5.2 Solution of simultaneous equations by matrix inversion method.

8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Differential Calculus	24	8	12	20	40
II	Integration	06	2	8	--	10
III	Statistics	06	2	--	8	10
IV	Numerical methods	06	2	4	4	10
V	Matrices	06	2	4	4	10
Total		48	16	28	36	80

9. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course:

- Identify engineering problems based on real world problems and solve with the use of free tutorials available on internet.
- Use graphical software's: EXCEL, DPLLOT and GRAPH for related topics.
- Use Mathcad as Mathematical Tool and solve the problems on Calculus.
- Identify problems based on applications of differential equations and solve these problems

10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- Use Flash/Animations to explain various components, operation and
- Teacher should ask the students to go through instruction and Technical manuals

11. SUGGESTED MICRO-PROJECTS

(Only for Class Declaration Courses)

N.A.

12. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Higher Engineering Mathematics	Grewal B.S	Khanna Publications, New Delhi
2	A Text Book of Engineering Mathematics	Dutta D	New Age Publications, New Delhi
3	Mathematics for Polytechnic students	S.P. Deshpande	Pune Vidyarthi Griha Prakashan
4	Advance Engineering Mathematics	H.K. Das	S. Chand & Co. Ltd. Delhi
5	Advance Engineering Mathematics	Krezig, Ervin	Wiley Publications New Dehli.

13 .SOFTWARE/LEARNING WEBSITES

- a. www.scilab.org/ -SCI Lab
- b. www.mathworks.com/product/matlab/ -MATLAB
- c. Spreadsheet Applications
- d. www.dplot.com
- e. <https://www.khanacademy.org/math?gclid=CNqHuabCys4CFdOJaddHoPig>

14. PO - COMPETENCY- CO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<u>1</u>	3	3	1	-	-	-	1
<u>2</u>	2	2	-	-	-	1	1
<u>3</u>	3	3	-	-	-	-	1
<u>4</u>	3	3	1	1	-	-	1
<u>5</u>	3	3	1	-	-	-	2
<u>AVERAGE</u>	2.8	2.8	0.6	0.2	-	0.2	<u>1.2</u>

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

CO-PSO Matrices of course

CO	CM	
	PSO1	PSO2
1	-	2
2	-	-
3	-	2
4	-	2
5	-	2
Average	-	2

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

PREPARED BY:

Sign: Name: 1.Shri V.B.Shinde 2.Mrs.P.R.Nemade (Course Expert /s)	Sign: Name: (Head of Department)
Sign: Name: (Head of Program)	Sign: Name: Shri A.S.Zanpure (CDC)

Government Polytechnic, Pune

'180 OB' – Scheme

Programme	Diploma in EE/ET/CO/IT
Programme Code	02/03/06/07/16/17/22/23
Name of the Course	Engineering Physics
Course Code	SC1104
Prerequisite	NO
Class Declaration	NO

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme					
L	T	P		Theory		Practical		Total Marks	
03	00	02	05	ESE	PA	ESE	PA	150	
				Marks	80	20	25	25	
				Exam Duration	3 Hrs	1 Hrs	2 Hrs	--	--

(*):PE- Practical Examination)

Legends: L-lecture, T-Tutorial/teacher guided theory practice, P-practical, ESE-End semester examination, PA- Progressive Assessment.

2. RATIONALE

This course is designed in the way by which fundamental information will help the diploma engineers to apply the basic principles and concepts of physics to solve broad-based engineering problems. The study of basic principles and concepts of motion, light, electricity, and modern physics will help in understanding the technology courses where emphasis is on the applications of these in different technology applications.

3. COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Apply principles of physics to solve broad-based engineering problems.**

4. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Estimate errors in measurement of physical quantities.
2. Apply laws of motion in various applications.
3. Apply principles of electricity and magnetism to solve engineering problems.
4. Use basic principles of light, X-ray and Laser in related engineering problems.

5. SUGGESTED PRACTICALS/ EXERCISES

The practical's in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency:

S. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. required
1	Identify given instrument and i) Mention name and range of given instrument. ii) Calculate least count of given instrument. iii) List the uses of given instrument.	1	2
2	Use Vernier caliper to : i) Identify and calculate instrumental error. ii) Measure dimensions of different objects. iii) Estimate error in the measurement (if any).	1	2
3	Use micrometer screw gauge to: i) Identify and calculate instrumental error. ii) Measures dimensions and determine volume of given object. iii) Estimate error in the measurement.	1	2
4	Use simple pendulum to determine acceleration due to gravity.	1	2
5	Determine refractive index of glass slab using total internal reflection.	2	2
6	Study the properties and working of laser using He-Ne laser beam.	2	2
7	Determine permittivity of free space (Concept of electrostatics).	3	2
8	Construct circuit to verify Ohm's law and i) Determine resistance of given material of wire. ii) Calculate specific resistance of given material of wire.	4	2
9	Use meter bridge to: i) Determine resistance of given material of wire. ii) Calculate specific resistance of given material of wire.	4	2
10	Use potentiometer to : i) Determine potential gradient of given cell (Principle of potentiometer). ii) Calibrate given voltmeter.	4	2
11	Use potentiometer to : i) Compare emf of two cells	4	2
12	Use potentiometer to: i) Find internal resistance of a cell.	4	2
13	Use magnetic compass to draw magnetic lines of force of magnet of different shapes.	5	2
14	Use photoelectric cell to study effect of : i) Intensity of light on photoelectric current. ii) Applied potential on photoelectric current.	6	2
Total			28

6. SCHEME OF PRACTICAL EVALUATION

S. No.	Performance Indicators	Weightage in %
a.	Arrangement of available equipment / test rig or model	10
b.	Setting and operation	10
c.	Safety measures	10
d.	Observations and Recording	20
e.	Interpretation of result and Conclusion	20
f.	Answer to sample questions	20
g.	Submission of report in time	10
Total		100

7. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

The major equipment with broad specification mentioned here will usher in uniformity in conduct of practicals, as well as aid to procure equipment by authorities concerned.

S. No.	Equipment Name with Broad Specifications	Ex. No.
1	Vernier Calliper : Range: 0-15 cm, Resolution 0.01 cm.	1,2
2	Micrometer screw gauge: Range 0-25 mm, Resolution 0.01 mm.	3
3	Simple pendulum, Stop Watch.	4
4	Glass Slab 75x50x12mm.	5
5	He-Ne laser kit	6
6	Battery eliminator (0-12 V, 2 A)	7,8,9
7	Voltmeter(0-10 V), ammeter (0-5 A)	8
8	Meter Bridge (100 cm), Galvanometer (30-0-30) and jockey.	9
9	Potentiometer (400 cm).	10, 11, 12
10	Potentiometer, Daniell cell, Leclanche cell.	11,12
11	Bar Magnet, Magnetic Needle.	13
12	Photoelectric cell.	14

8. THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency:

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit 1 General Physics (Weightage -12, Hrs - 08)	
<p>1a. List fundamental and derived quantities with their unit.</p> <p>1b. Explain various systems of unit and its need for the measurement.</p> <p>1c. Estimate errors in measurement.</p> <p>1d. Derive relation between linear velocity and angular velocity.</p> <p>1e. Calculate angular velocity of the given body</p> <p>1f. Distinguish between centripetal and centrifugal force.</p> <p>1g. Derive equation of SHM.</p>	<p>1.1 Units and Measurement Introduction, Definition of unit, Fundamental and derived units, Different System of units, Errors in measurements.</p> <p>1.2 Circular Motion: Definition, Uniform circular motion(UCM) Displacement, angular velocity, angular acceleration and units, relation between linear and angular velocity, relation between linear acceleration and angular acceleration, explanation of centripetal and centrifugal force, examples, applications of centripetal and centrifugal force, analytical treatment.</p> <p>1.3 SHM: Concept of time period, Frequency, Amplitude, Wavelength, Relation between wave velocity frequency and wavelength. Definition of SHM, examples of SHM, SHM as a projection of UCM on the diameter, Equation of SHM starting from mean position, analytical treatment.</p>
Unit 2 Optics and Laser (Weightage -12, Hrs - 06)	
<p>2a. State laws of reflection and refraction.</p> <p>2b. Describe phenomenon of total internal reflection.</p> <p>2c. Calculate acceptance angle and numerical aperture for given optical fiber.</p> <p>2d. Distinguish between optical fiber communication system and ordinary system.</p> <p>2e. Differentiate between properties of ordinary light and laser light.</p> <p>2f. Explain spontaneous and stimulated emission.</p> <p>2g. Describe working of He-Ne laser with energy level diagram.</p> <p>2h. State applications of laser in different field.</p>	<p>2.1 Light: Introduction to reflection and refraction of light, Laws of reflection and refraction, Snell's law, Refractive index, Physical significance of refractive index, Critical angle, Total internal refraction of light, analytical treatment.</p> <p>2.2 Fiber optics: Propagation of light through optical fiber, Structure of optical fiber, Numerical aperture, Acceptance angle, Acceptance cone, Types of optical fibers, Applications of optical fiber, Comparison of optical fiber communication with electrical cable communication.</p> <p>2.3 LASER: Definition, Properties of LASER, Spontaneous and Stimulated emission, Population inversion, Metastable</p>

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	state, Pumping, Life time, He-Ne laser-construction and working with energy level diagram, engineering applications of laser
Unit 3 Electrostatics (Weightage -16, Hrs - 10)	
<p>3a. Calculate electrostatic force, electric field and electric potential difference of the given static charge.</p> <p>3b. Describe properties of electric lines of force.</p> <p>3c. Explain working of capacitor.</p> <p>3d. Calculate the equivalent capacity and energy stored in the combination of the capacitors are</p> <p>3e. Establish relation between parameters affecting capacitance of condenser.</p>	<p>3.1 Electric charge, Coulomb's law in Electrostatics, unit of charge, electric field, intensity of electric field, electric lines of forces (Properties), electric flux, flux density, analytical treatment.</p> <p>3.2 Electric potential: Explanation, Definition, Potential due to a point charge, potential due to a charged sphere, potential of earth, absolute electric potential, analytical treatment.</p> <p>3.3 Electric Capacitor :Capacitance Introduction, of conductor, unit, principle of condenser, parallel plate condenser, capacitances in series and parallel, analytical treatment.</p>
Unit 4 Current Electricity (Weightage -16, Hrs - 10)	
<p>4a. State Ohm's law</p> <p>4b. Establish relation between resistance and length , cross section area of given material of wire</p> <p>4c. Calculate the value of given resistance using the principle of Whetstone's bridge.</p> <p>4d. Explain principle of potentiometer</p> <p>4e. Calculate the emf of given cell using potentiometer.</p> <p>4f. Calculate energy consumption of different electric appliances.</p>	<p>4.1 Current, Resistance and its unit, Dependence of resistance- length, area of cross-section, temperature, Ohms law, specific resistance and its unit, Whetstone's network construction and principle, Meter bridge, Balancing condition of meter bridge, Measurement of unknown resistance using meter bridge, analytical treatment.</p> <p>4.2 Potentiometer, Principle of potentiometer, Potential gradient, Construction of potentiometer, Applications of potentiometer, E.M.F., Comparison of E.M.F. using potentiometer.</p> <p>4.3 Electric work- Electric power, Electric energy, Units and Calculations of electric bill.</p>

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit 5 Electromagnetism (Weightage -14, Hrs - 08)	
5a. State Ampere's right hand and Fleming's left hand rule. 5b. Explain Biot- Savert's Law (Laplace's Law), 5d. Calculate Magnetic induction for given conductor.	5.1 Magnetic effect of electric current , Ampere's rule, Coulombs inverse square law in magnetism, Intensity of magnetic field, Magnetic induction, Biot-Savert's Law (Laplace's Law), Fleming's left hand rule, Force experienced by current carrying straight conductor placed in magnetic field, analytical treatment.
Unit 6 Modern Physics (Weightage -10, Hrs - 06)	
6a. Explain production of X-rays. 6b. Describe properties and applications of X-ray in different field. 6c. Describe properties of photon 6d. Derive Einstein's photoelectric equation. 6e. Explain working of given photoelectric device.	6.1 X- ray: principle, production of X- rays using Coolidge tube, origin of X-rays, types of X-rays, properties of X-rays, engineering applications of X-rays, analytical treatment. 6.2 Photo electricity: photoelectric effect, Plank's quantum theory, concept of photon, properties of photon, threshold frequency, threshold wavelength, stopping potential, photoelectric work function, Einstein's photoelectric equation, photocell (circuit diagram and working), applications of photoelectric cell, analytical treatment.

9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
01	General Physics	8	2	4	6	12
02	Optics and Laser	6	2	4	6	12
03	Electrostatics	10	4	4	8	16
04	Current Electricity	10	4	4	8	16
05	Electromagnetism	8	2	4	8	14
06	Modern Physics	6	2	4	4	10
Total		48	16	24	40	80

10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Prepare journal based on practical performed in Physics laboratory. Journal consists of drawing, observations, required equipment's, date of performance with teacher signature.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- Massive open online courses (*MOOCs*) may be used to teach various topics/sub topics.
- About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for *self-directed learning* and assess the development of the COs through classroom presentations (see implementation guideline for details).
- With respect to item No.8, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
- Use proper equivalent analogy to explain different concepts.
- Use Flash/Animations to explain various components, operation and
- Teacher should ask the students to go through instruction and Technical manuals.

12. SUGGESTED MICRO-PROJECTS

NA

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Physics Textbook Part I- Class XI	J.V.Narlikar, A.W.Joshi, et al.	National Council of Education Research and Training, New Delhi,2010, ISBN:8174505083
2	Physics Textbook Part II- Class XI	J.V.Narlikar, A.W.Joshi, et al.	National Council of Education Research and Training, New Delhi,2015, ISBN:8174505660
3	Physics Textbook Part I- Class XII	J.V.Narlikar, A.W.Joshi, et al.	National Council of Education Research and Training, New Delhi,2013, ISBN:8174506314
4	Physics Textbook Part II- Class XII	J.V.Narlikar, A.W.Joshi, et al.	National Council of Education Research and Training, New Delhi,2013, ISBN:8174506713
5	Fundamentals of Physics	David Halliday, Robert Resnick and Jearl Walker	7 th Edition John Wily (2004)
6	Engineering	R.K. Gaur and S. L. Gupta	Dhanpat Rai Publications

S. No.	Title of Book	Author	Publication
	Physics		ISBN 9788189928223
7	Applied Physics	Prakash Manikpure	S. Chand Publishing ISBN 9788121919548
8	Applied Physics	Arthur Beiser	Schaum's Outline Series McGraw-HILL
9	Engineering Physics	Avadhanulu, Kshirsagar	S Chand ISBN 9788121908177

14. SOFTWARE/LEARNING WEBSITES

- 1) https://en.wikipedia.org/wiki/Engineering_physics
- 2) <https://www.laser.com.ve>
- 3) www.nanowerk.com
- 4) www.brainscape.com
- 5) <https://www.open2study.com/courses/basic-physics>
- 6) <http://nptel.ac.in/course.php?disciplineId=115>
- 7) <http://nptel.ac.in/course.php?disciplineId=104>
- 8) <http://hperphysics.phy-astr.gsu.edu/hbase/hph.html>
- 9) www.physicsclassroom.com

15. PO - COMPETENCY- CO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	1	1	1	2
CO2	2	2	2	1	1	1	2
CO3	2	2	1	1	1	1	2
CO4	2	1	1	2	1	1	2
Average	3	2	2	2	1	1	2

CO-PSO MATRICES OF COURSE

Branch	CO	
	PSO1	PSO2
1	1	1
2	1	1
3	1	1
4	1	1
Average	1	1

*Correlation levels 1, 2 or 3 as defined below:

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

PREPARED BY :

<p>Name and Signature of Course Expert</p> <ol style="list-style-type: none">1. Dr. R. B. Birajadar2. Mrs. D. V. Saurkar	<p>Name and Signature of Head of Department</p>
<p>Name and Signature of Programme Head</p>	<p>Name and Signature of CDC In-Charge</p>

Government Polytechnic, Pune

'180OB' – Scheme

Programme	Diploma in ET/CE/EE//ME/MT/CM/IT/DDGM
Programme code	01/02/03/04/05/ 06/07 /08/16/17/21/22/23/24/ 26
Name of Course	Computing Essentials
Course Code	CM1101
Prerequisite course code and name	-
Class Declaration	No

1. RATIONALE

In this world of high speed computing, it is essential for diploma in Computer Engineering students to know about basics of computer. This course is designed for basic perspective for first year diploma students.

2. COURSE OUTCOMES (COs)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency:

1. Use of computer system and its peripherals.
2. Understand different Number systems.
3. Understand different storage devices.
4. Understand various computer architectures based on levels
5. Prepare algorithms for given problems.
6. Understand Programming Language paradigm.

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
L	T	P		Theory Marks		Practical Marks		Total Marks
			C	ESE	PA	ESE	PA	
03	-	-	03	40	10	-	-	50

Legends: *L*-Lecture; *T* – Tutorial, *P* - Practical; *C* –Credit, *ESE* - End Semester Examination; *PA* - Progressive Assessment; # –No theory exam , \$ –online examination , * – oral examination

4. THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop UOs for achieving the COs to attain the identified competency.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 1. Classification and Components of Computer System	1a. To identify components of the PC 1b. To identify characteristics of computer system 1c. To identify the applications of computer system	1.1 What can Computer do 1.2 Applications of Computer 1.3 Components of PC ,Characteristics of Computer 1.4 Generations of Computer System
UNIT 2. Data Representation	2a. To identify various number systems 2b. To understand different codes	2.1 Different Symbols, A Generic Formula. 2.2 Codes :BCD ,EBCDIC, ASCII, Unicode 2.3 Number Systems and representation: Decimal, Binary, Octal, Hexadecimal ,Converting from One Number System to Another Number System
UNIT 3. Main Memory and Secondary Storage Devices	3a. To classify types of memory 3b. To describe various secondary storage devices	3.1 Main memory , Load and store instructions 3.2 Transferring data items and records, Cache memory, memory capacity, memory categorization. 3.3 Secondary storage devices: Magnetic tape, magnetic disks, optical disks, memory storage devices
UNIT 4. Computer Architecture	4a. To understand the architecture based on levels 4b. To understand various levels of program 4c. To classify types of software	4.1 A 4GL (User level) program , A 3GL (High Level) Program 4.2 A 2GL (Assembly level) Program , A 1GL (Machine level) Program , 0GL (Hardware level)Program 4.3 Classify various types of Software – System Software : Operating System, Language processors, Utility tools Application Software: Word Processing Software, Electronic Spread-sheet, Database Management System etc.
UNIT 5. I/O Media and Algorithms	5a .To differentiate between Hardware and Software 5b .To prepare algorithm and Flowchart for given problem	5.1 The keyboard, The Screen, LCD, Mouse, Laser Printer ,Barcode Reader and RFID 5.2 Algorithms: Introduction, Three basic operations, Procedures and Programs. 5.3 Flowchart: Use of Flowchart, Flowchart Symbols

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 6. Internet and Programming Language	6a .To understand the term Internet and Computer Network 6b .To classify different programming languages	6.1 History of Internet, Its basic services, The WWW, Browsers, Define term : Computer Network and its types 6.2 Introduction to Programming Language: Classification: Analogy with Natural Languages, Machine Language, Assembly Language, High Level Languages 6.3 Basic Concepts: Character set, Constants, Variables, Keywords. Data Types, Modules and Separate Compilation

5. SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Classification and Components of Computer System	4	2	2	0	4
II	Data Representation	8	5	3	0	8
III	Main Memory and Secondary Storage Devices	10	3	3	2	8
IV	Computer Architecture	10	4	2	2	8
V	I/O Media and Algorithms	8	2	2	2	6
VI	Internet and Programming Language	8	2	2	2	6
Total		48	18	14	8	40

6. STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Prepare journal based on practical performed in ----- laboratory. Journal consists of drawing, observations, required equipment's, date of performance with teacher signature. –**Not Applicable**–
- Prepare algorithms and draw flowcharts on any problem given by teacher.
- Convert the one number system to another number system.

7. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a. Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b. About **15-20% of the topics/sub-topics** which is relatively simpler or descriptive in nature is to be given to the students for **self-directed learning** and assess the development of the COs through classroom presentations (see implementation guideline for details).
- c. With respect to item No.7, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- d. Guide student(s) in undertaking micro-projects.
- e. Correlate subtopics with power plant system and equipments.
- f. Use proper equivalent analogy to explain different concepts.
- g. Use Flash/Animations to explain various components, operation and
- h. Teacher should ask the students to go through instruction and Technical manuals

8. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Demystifying computer	Achyut Godbole	Tata McGraw Hill
2	Computer Fundamentals	Pradeep K.Sinha	BPB

9. SOFTWARE/LEARNING WEBSITES

1. <http://www.nptel.ac.in>
2. https://www.tutorialspoint.com/basics_of_computers/basics_of_computers_number_system.htm
3. <https://www.computerhope.com/jargon/s/stordevi.htm>

10. PO - COMPETENCY- CO MAPPING

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

	PSO1	PSO2
CO1	1	-
CO2	-	1
CO3	1	-
CO4	1	1
CO5	-	1
CO6	-	1

Sign: Name:Smt. V. G. Palatse/Shri. S. B. Nikam (Course Expert /s)	Sign: Name: Shri. U.V. Kokate (Head of Department)
Sign: Name: Shri. U.V. Kokate (Program Head) (Computer Engineering Dept.)	Sign: Name: Shri A.S.Zanpure (CDC)