Government Polytechnic, Pune

'180 OB' – Scheme
I – Semester Course Curriculum
Course Title: **Communication Skills- I**
(Course Code: ..HU1101................)

Diploma program in which this course is offered	Semester in which offered
Diplôma in ET/CE/EE//ME/MT/CM/IT/DDGM 01/02/03/04/05/06/07/08/16/17/21/22/23/24/26	First

1. 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.

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:

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.

3. 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	25	25	100

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

4. SUGGESTED PRACTICALS/ EXERCISES

The practical in this section are Pr Os (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

S. No.	Performance Indicators	Weightage in %
	Total	100

5. 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	
2		5,6

6. 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 c. Reading graphic forms
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
UNIT 4 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

7. 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

8. 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

9. **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

10. **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 Pr Os, 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 CO s.

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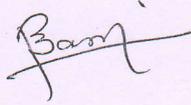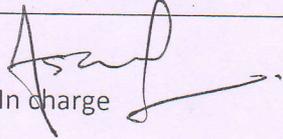
a. . Nil

11.   SUGGESTED LEARNING RESOURCES

Sr.No.	Author	Title	Publication
1	Joyeeta Bhatacharya	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.

12.   SOFTWARE/LEARNING WEBSITES

13.   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
	3	0.25	-	0.25	1.75	0.25	1

	PSO 1								PSO 2								PSO 3								PSO 4							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
CO1																																
CO2																																
CO3																																
CO4																																

14.   **Prepared by :**

Signature of Course Expert	Signature of Head of Department
Name of Course Expert MH Patil S.C.	Name of Head of Department MH Y.D. Bhide
Signature of Program Expert	Signature of CDC In charge
Name of Program Head	MH. Anant Zanpure. Name of CDC In charge

Government Polytechnic, Pune

'180 OB' – Scheme

Course Title: APPLIED MAHEMATICS I

(Course Code: SCI1101.)

Diploma programme in which this course is offered	Semester in which offered
CE/EE/ET/ME/MT/CM/IT Engineering 01/02/03/04/05/06/07/21/22/23/24/26	I

1. **RATIONALE**

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

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. 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.

3. **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	
3	2	-	5	80	20	-	25	125

4. **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

5. 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

6. 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

Units 1 : Algebra	1a. Solve the given simple problem based on laws of logarithm.
	 1b. Calculate the area of the given triangle by determinant method.
	 1c. Solve given system of linear Equations using by Cramer's rule.
	 1d. 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 3x3
		     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	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit 2: Trigonometry	2a. Apply the concept of Compound angle, allied angle, and multiple angles to solve the given simple engineering problem(s) 2b. Apply the concept of Sub-multiple angle to solve the given simple engineering related problem 2c. Employ concept of factorization and de-factorization formulae to solve the given simple engineering problem(s). 2d. 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	3a. Calculate angle between given two straight lines. 3b. Formulate equation of straight lines related to given engineering problems. 3c. Identify perpendicular distance from the given point to the line.. 3d. 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	4a. Calculate the area of given triangle and circle 4b. Determine the area of the given square, parallelogram, rhombus, trapezium. 4c. Compute surface area of given cuboids, sphere, cone and cylinder. 4d. 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.

7.   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	08	20	08	24(36)
II	Trigonometry	18	08	08	20	24(36)
III	Co ordinate geometry	09	04	08	12	16(24)
IV	Mensuration	09	04	08	12	16(24)
Total		48	24	44	52	80(120)

8. 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:

NA

9. 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. Use Flash/Animations to explain various components, operation and
   d. Teacher should ask the students to go through instruction and Technical manuals

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

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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:
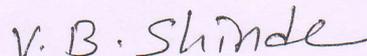
N.A.

11. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Mathematics for Polytechnic Students	Shri S.P. Deshpande	Pune Vidyarthi Griha
2	Plane Trigonometry	Shri S.L. Loney	Macmillan and London
3	Mathematics for Engineers (Vol.I)	Shri H.K. Dass	S.Chand and Comp.
4	Engg. Maths Vol.I and II	Shri Shantinarayan	S. Chand and Comp.

12. SOFTWARE/LEARNING WEBSITES

13. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	-	-	-	1
CO2	3	3	-	-	1	1	2
CO3	3	2	1	1	-	-	1
CO4	3	3	2	1	1	1	2
	3	2.50	0.75	0.50	0.50	0.50	1.5

Signature of Course Expert

V. B. Shinde

Name of Course Expert

Signature of Head of Department

Name of Head of Department

Signature of Programme Head

Name of Programme Head

Signature of CDC In-charge
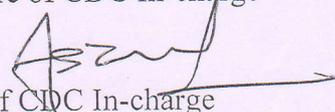
Name of CDC In-charge

	PSO1			PSO2			PSO3		
CO1									
CO2									
CO3									
CO4									
CO5									

Government Polytechnic, Pune

'180 OB' – Scheme
I – Semester Course Curriculum

New Edited

Course Title: Communication Skills -II
(Course Code: HU1102)

Diploma programme in which this course is offered	Semester in which offered
Diploma in **ET**/CE/EE//ME/MT/CM/IT/DDGM 01/02/**03**/04/05/06/07/08/16/17/21/22/23/24/26	II

1. RATIONALE

Classified under human sciences this subject is intended to introduce students with the process of communication so that they can identify conditions favorable to effective communication. They will also be taught basic and applied language skills viz. listening, speaking, reading and writing – all useful for the study of a technical course and communication. Specifically, writing and oral presentation skills are two top ranking capabilities needed for professional careers and must be developed systematically

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:

CO1: Prepare various speeches for presentation

CO2: Write application for Business purposes.

CO3: Write various technical reports.

CO4: Write business letters

3. 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	100
2	1		3	40	10	-	50	

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

4. 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	2
5	write a placing an order letter, complain letter	3	2
6	write a joining letter	4	2
7	draft a notice , circular and memorandum	3	2
8	write a fall in production report	3	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

4.   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	

5.   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) Orally introduced the Guest b) Express feelings about the occasion. c) Express feelings about the situation d) Apply communication knowledge for giving vote of thanks.	1 a. Introduction of guest 1 b. welcome speech 1 c. farewell speech 1 d. Vote of thanks
UNIT2 writing applications	a) Write job application in a proper format including resume b) Write a request application for leave. c) Write official correspondence for job application in a proper format.	2 a. Job application with resume 2 b. Leave application 2 c. Miscellaneous applications
UNIT3 Writing Reports and Notices	a) Prepare visit report b) Survey feasibility for establishing a new industry. c) Report fall in production to higher authorities. d) Write memos for different situations. e) Write Circulars (notice) for different situations.	3 a. Visit report 3 b. Survey report(feasibility report) 3 c. Fall in production report 3 d. Circular/notice 3 e. Memos
UNIT4 Business letters	a) Write enquiry letter including specification table. b) Write enquiry letter including specification table. c) Write enquiry letter including specification table. d)Write Joining letter	4 a. Enquiry letter 4 b. Placing an order letter 4 c. Complaint letter 4 d. Joining letter

6. 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

7. 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.

8. 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

9. 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:

   a.   .
   b.   .

10.   SUGGESTED LEARNING RESOURCES

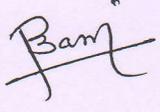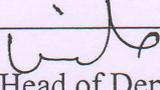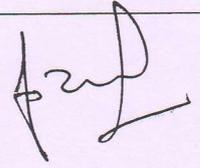| Sr.No.	Author	Title	Publication
1	Joyeeta Bhatacharya	Communication skills	Macmillan Co.
2	Sarah Freeman	Written communication in English	Orient Longman Ltd.
3	Krishna Mohan and Meera Banerji	Developing Communication skills	Macmillan India Ltd.

11.   SOFTWARE/LEARNING WEBSITES

12.   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
CO	3	2	-	0.75	2.25	0.75	2.75

	PSO 1								PSO 2								PSO 3								PSO 4							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
CO1																																
CO2																																
CO3																																
CO4																																

14. Prepared by:

Signature of Course Expert *(signature)*	Signature of Head of Department *(signature)*
Name of Course Expert Mrs Patil S.C.	Name of Head of Department *Y D Bhide*
Signature of Programme Head	Signature of CDC In-Charge *(signature)*
Name of Programme Head	Name of CDC In-Charge

Government Polytechnic, Pune

'190 OB' – Scheme

Course Title: **APPLIED MAHEMATICS II**

(Course Code: SC1102)

Diploma programme in which this course is offered	Semester in which offered
CE/EE/ET/ME/MT/CM/IT Engineering 01/02/03/04/05/06/07/21/22/23/24/26	II

1. **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

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. 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

3. **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	
3	2	-	5	80	20	-	25	125

4. **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	
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**

5. 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	1-15
2	Interactive Classroom	1-15

6. 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 : Differential Calculus	1a. Solve the given simple problems based on functions. 1b. Solve the given simple problems based on rules of differentiation. 1c. Obtain the derivatives of logarithmic, exponential functions. 1d. Apply the concept of differentiation to find given equation of tangent and normal 1e. 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 : logarithmic, exponential a) Rules of derivatives such as sum,. product, quotient of functions. b) Derivative of composite functions differentiation to find given (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	5a. Obtain the range and coefficient of range of the given grouped and. ungrouped data. 5b. Calculate mean and standard deviation of discrete and grouped data related to the given simple engineering problem. 5c. Determine the variance and coefficient of variance of given grouped and ungrouped data. 5d. Justify the consistency of given simple sets of data.	5.1 Range, coefficient of range of discrete and grouped data. 5.2 Mean deviation and standard from mean of grouped and ungrouped data, weighted means 5.3 Variance and coefficient of variance. 5.4 Comparison of two sets of observation.
Unit 4: NUMERICAL METHODS	3.1. Apply the concept of approximate to find root of algebraic equation 3.2.Apply the concept of iteration to solve the system of equations in three unknowns	3.a Solution of algebraic equations : Bisection method, Regula falsi method and Newton –Raphson method. 3.b Solution of simultaneous equations containing 3Unknowns : Gauss elimination method. Iterative methods- Gauss Seidal and Jacobi's method

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit 5: Matrices	4.a Solve given system of linear equations using matrix inversion method	4.1 Matrices, algebra of matrices, transpose, adjoint and inverse of matrices. 4.2 Solution of simultaneous equations by matrix inversion method.

7. 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	12	16	32	40(60)
II	Integration	06	02	12	--	10(15)
III	Statistics	06	04	--	12	10(15)
IV	Numerical methods	06	02	08	04	10(15)
V	Matrices	06	04	04	08	10(15)
Total		48	24	40	56	80(120)

8. 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:

NA

9. 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. Use Flash/Animations to explain various components, operation and
d. Teacher should ask the students to go through instruction and Technical manuals

10. 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:

N.A.

11. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Engineering Mathematics Vol.I	Vishwanath	, Satya Prakashan, New Delhi
2	Mathematic for polytechnic students I & II	S.P. Deshpande	Vidyarthi Griha Prakashan , Pune
3	Mathematics for Engineering Vol-I	H.K. Dass ,	S.Chand and Company
4	Engineering Mathematics vol-I and II	Shantinarayan ,	S.Chand and Company

12. SOFTWARE/LEARNING WEBSITES

13. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	-	2
CO2	3	3	1	1	1	1	2
CO3	3	3	2	2	1	1	2
CO4	3	3	2	1	1	1	2
CO5	3	3	2	1	1	1	2
	3	3	1.8	1.2	1	0.8	2

	PSO1		PSO2		PSO3	
CO1						
CO2						
CO3						
CO4						
CO5						

Government Polytechnic, Pune

'180 OB' – Scheme

Course Title: Engineering Physics

(Course Code: SC 1104) — New code (SC 1104)

Diploma programme in which this course is offered	Semester in which offered
Diplôma in EE/ET/CO/IT	01

1. RATIONALE

This course is designed with some fundamental principle, laws and information to help the diploma engineers to apply the basic concepts of physics to solve 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 principles in engineering and technology.

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. Estimate errors in measurement of physical quantities.
2. Apply laws of motion in various applications.
3. Apply Coulomb's law to calculate electrostatics force, electric field and electric potential.
4. Use basic principles of light, X-rays and Laser in related engineering problems.

3. 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	
3	-	2	5	80	20	25	25	150

4.   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: **(Any Ten).**

S. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. required
1	Observe given instrument i) mention name and range of given instrument ii) calculate least count of given instrument iii) list the use of given instrument	1	2
2	Use Vernier calliper to measure dimensions of different objects.	1	2
3	Use micrometer screw gauge to measure dimensions of given objects.	1	2
4	Determine acceleration due to gravity by simple pendulum (Concept of SHM).	1	2
5	Determine refractive index of glass slab using total internal reflection.	2	2
6	Observe and list different characteristics of laser beam using He-Ne laser.	2	2
7	Determine permittivity of free space (Concept of electrostatics).	3	2
8	Construct circuit to verify Ohm's law and determine specific resistance of given material of wire.	4	2
9	Determine resistance of given material of wire using meter bridge and calculate its specific resistance.	4	2
10	Calibration of voltmeter using potentiometer (Principle of potentiometer).	4	2
11	Compare e.m.f's of two cells using potentiometer by single cell method.	4	2
12	Use potentiometer to 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	Verify characteristics of photoelectric cell.	6	2
	Total		28

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**

5.   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

6.   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 **General Physics**	1. Describe various errors in measurements. 2. Finding relation between linear velocity and angular velocity. 3. Distinguish between centripetal and centrifugal force. 4. Explain SHM as a projection of UCM on any one diameter of circle. 5. Derive equation of Simple harmonic motion.	**1.1 Units and Measurement** Introduction, Definition of unit, Fundamental and derived units, Different System of units, Errors in measurements. **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. **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.
Unit 2 **Optics and Laser**	1. State Snell's law of refraction. 2. Explain phenomenon of total internal reflection 3. Classify optical fiber with its different types. 4. Distinguish between electrical cable and optical fiber communication	**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. **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

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	5. Working of LASER with its properties and applications.	optical fiber, Comparison of optical fiber communication with electrical cable communication. **2.3 LASER:** Definition, Properties of LASER, Spontaneous and Stimulated emission, Population inversion, Metastable state, Pumping, Life time, He-Ne laser-construction and working with energy level diagram, engineering applications of laser
Unit 3 Electrostatics	1. Calculate electrostatic force and intensity of electric field. 2. Calculate electric potential. 3. Calculate net capacitance when capacitors are connected in series and parallel.	**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. **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. **3.3 Electric Capacitor :** Capacitance Introduction, of conductor, unit, principle of condenser, parallel plate condenser, capacitances in series and parallel, analytical treatment.
Unit 4 Current Electricity	1. Comparison of Wheatstone network with meter bridge. 2. Comparison of EMF using potentiometer. 3. Calculation of electric bill for given application.	**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. **4.2 Potentiometer,** Principle of potentiometer, Potential gradient, Construction of potentiometer, Applications of potentiometer, E.M.F., Comparison of E.M.F. using potentiometer. **4.3 Electric work-** Electric power, Electric energy, Units and Calculations of electric bill.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit 5 Electromagnetism	1. State Ampere's right hand and Fleming's left hand rule. 2. Explain Biot-Savert's Law (Laplace's Law), 3. Calculate Magnetic induction of given application.	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	1. Explain production of X-Ray with neat label diagram. 2. Verify characteristics of photoelectric cell 3. List applications of photo electric cell.	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.

6.

7. **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

8. 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 Physics laboratory. Journal consists of drawing, observations, required equipment's, date of performance with teacher signature.

9. 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. Use proper equivalent analogy to explain different concepts.

e. Use Flash/Animations to explain various components, operation and

f. Teacher should ask the students to go through instruction and Technical manuals

10. 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:

a. . Nil

11. SUGGESTED LEARNING RESOURCES

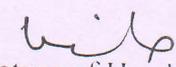| S. No.	Title of Book	Author	Publication
1	Physics Textbook Part I- Class XI	J.V.Narlikar, A.W.Joshi, et al.	National Council of Education Research and Training, New Delhi,2010, ISBN:8174505083
2	Physics Textbook Part II- Class XI	J.V.Narlikar, A.W.Joshi, et al.	National Council of Education Research 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	7th Edition John Wily (2004)
6	Engineering Physics	R.K. Gaur and S. L. Gupta	Dhanpat Rai Publications 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

12. 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
10) www.physics.org

13. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	-	1	-	-	1
CO2	3	2	-	-	-	-	1
CO3	3	3	-	1	1	-	1
CO4	3	3	-	-	1	-	1
	3	2.5	-	0.5	0.5	-	1

	PSO 1				PSO 2						PSO 3					PSO 4			
CO1																			
CO2																			
CO3																			
CO4																			

14. PREPARED BY :

Signature of Course Expert Name of Course Expert 1. Y D Bhide 2. N S Biradar 3. Dr. R B Birajadar 4. D V Saurkar	Signature of Head of Department (Y. D. Bhide) Name of Head of Department Y D Bhide
Signature of Programme Head Name of Programme Head	Signature of CDC In-Charge Name of CDC In-Charge
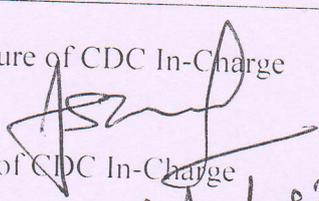
Government Polytechnic, Pune

'190 OB' – Scheme
Course Title: Basics of Information Technology
(Course Code: ...I.T.I.101.)

Diploma programme Information Technology

1. RATIONALE

IT is for fast communications, data processing and market intelligence. IT plays an integral role in every industry, helping companies improve business processes, achieve cost efficiencies, drive revenue growth and maintain a competitive advantage in the marketplace.

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. Format and setup Desktop System for personal use.
2. Set the BIOS for effective use of hardware.
3. Describe working of input output devices.
4. Classify digital computers.
5. Create and organize mail account.
6. State the need of IT act.

3. 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	
03	-	-	03	40	10	-	-	50

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

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. Algorithms and Data Representation	1a. Differentiate between algorithm and a program. 1b. Explain ASCII, EBCDIC and Unicode. 1c. Define: Bits, Bytes, Parity Bit. 1d. State the need for Binary System.	1.1 Introduction, Three Basic Operations, Procedures and Programs – Compiler, Translator, High Level Language, Machine Level Language, Low Level Language 1.2 Representing Different Symbols, Relevance to the Computer, Minimizing Errors, Representing more symbols, Generic Formula 1.3 ASCII and EBCDIC Code, Bits and Bytes, Parity Bit, writing a Character in the memory and on the disc, Unicode, Need for Binary
UNIT 2. Algorithms and Data Representation	2a. Differentiate between Load and Store operation. 2b. List and state characteristics of Primary and Secondary storage devices. 2c. Describe working of Hard Disk, Optical Disk, Pen Drive.	2.1 Introduction, Main memory, Load and Store Instructions, transferring a Data Item and a Record, Cache Memory, Memory Capacity, Memory Categories, what are memories made of? 2.2 Hard Disks and CDs - Memory Hierarchy, Hard Disks, Optical Disks, Pen Drives
UNIT 3. Main Memory and Secondary Memory	3a. List and state features of Input-Output Devices. 3b. Describe Types of Printers. 3c. State characteristic and use of RFID and Barcode Reader.	3.1 Introduction, The Keyboard, The Screen, LCD, Mouse 3.2 Laser Printer, Barcode Reader and RFID
UNIT 4. The I/O Media	4a. Draw diagram and describe classification /components of Digital Computer. 4b. Use & Configure Windows Desktop.	4.1 Introduction, Classification of Digital Computers, Anatomy of a Digital Computer, Components of a PC 4.2 Characteristics of Computers, What can Computers do?, What Computers cannot do?, Application of Computers
UNIT 5. Classification, Components and Applications of Computers	5a. List uses of Internet. 5b. State types of Internet Connections.	5.1 Introduction, History of the Internet, Uses the of Internet, Equipment Required for Internet Connection, Types of Internet Connections 5.2 Internet-Related Concepts, Web Browser, Searching the Web 5.3 Digital Images, Digital Audio and Digital Video
UNIT 6. The Internet and Multimedia	6a. Identify Use of Computers in Businesses. 6b. Describe types of Ecommerce. 6c. State the need of IT Act. 6d. Explain the clauses in IT Act.	6.1 Introduction, Types of Information Needed by Organizations, Why should we use Computers in Businesses? 6.2 E-commerce: Introduction, Business to Customer E-commerce, Business to Business E-commerce, Customer to Customer E-commerce, Advantages and

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
		Disadvantages of E-commerce, IT Act 2000

5. 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	Algorithms and Data Representation	08	4	2	2	08
II	Main Memory and Secondary Memory	08	4	4	2	10
III	The I/O Media	06	2	1	1	04
IV	Classification, Components and Applications of Computers	08	4	2	-	06
V	The Internet and Multimedia	08	3	2	1	06
VI	Business Information Systems and E-Commerce	10	3	2	1	06
	Total	48	20	13	07	40

6. 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. They have to study a given topic and explain it in the class.
   b. Teacher and student interaction in the class by asking different questions.
   c. Assignments can be given to students.

7. 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. Teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
   d. Use proper equivalent analogy to explain different concepts.
   e. Use Flash/Animations to explain various components, operation and

8. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Demystifying Computers	Achyut Godbole	McGraw Hill
2	Introduction to Information Technology	V. Rajaraman	PHI
3	Computing Essentials	Timothy J. O. Leary	TMH
4	Comdex Computer Course Kit	Vikas Gupta	Dreamtech

9. SOFTWARE/LEARNING WEBSITES

a. https://www.slimjet.com/en/lp/top-10-browsers.php
b. https://www.ecommerceceo.com/types-of-ecommerce-business-models/
c. https://www.investopedia.com/terms/b/btob.asp
d. https://drudesk.com/blog/consumer-to-comsumer-c2c-ecommerce
e. https://www.toppr.com/guides/business-laws-cs/cyber-laws/information-technology-act-2000/

10. PO - COMPETENCY- CO MAPPING

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

11. PO - COMPETENCY- PSO MAPPING

	PSO1	PSO2	PSO3
CO1	3	-	-
CO2	3	-	1
CO3	3	-	-
CO4	-	-	1
CO5	1	-	1
CO6	1	-	-
Summary	2	1	2

Signature of Course Expert
(Smt. P. N. Yewale)

Signature of Head of Department
Mrs. M. U. Kokate

Signature of Programme Head

Signature of CDC Incharge

Government Polytechnic, Pune

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Program Name	:	Diploma Programme in CM/IT
Program Code	:	06/26/07
Course Title	:	Programming in C
Course Code	:	CM2101
Class Declaration	:	NO

1. RATIONALE

In this era of high speed computing, it is necessary to program computers with the help of structured dynamic languages like 'C' to study programming is useful in solving problems/tasks related to various domains. Now days almost every setup in software engineering domain chooses 'C' as a basic tool to develop software.

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. Write procedural program with 'C' language tokens.
2. Execute programs using branching and looping.
3. Write programs using arrays, strings.
4. Develop a C program using functions.
5. Implement programs using structures.
6. Execute programs using pointers.

3. 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	
3	2	2	7	80	20	50	25	175

(*) : 10 marks of theory PA is for micro-project assessment to facilitate attainment of Cos and the remaining 10 marks for tests and assignments given by the teacher.

Legends: L- Lecture, T – Tutorial / Teacher Guided Theory Practice, P – Practical, C – Credit, ESE – End Semester Examination, PA – Progressive Assessment

4. PRACTICALS/ EXERCISES

Sr. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approximate Hours Required.
1	Write/compile/execute simple 'C' program: Develop a program using Constants, Variables for different data types.	I	02
2	Write 'C' programs based on different operators and expressions. (ex. relational, logical, arithmetic etc.)	I	02

	Write programs based on bitwise and special operators.		
3	Write simple program to take input from user at run time and display the output on the screen.	I	02
4	Programs using following control statements: If statement, Switch statements,?:operator, go to statements. Programs using following loop controls, while loop, do.. while loop, for loop.	II	04
5	Write programs based on arrays.	III	04
6	Write programs using strings operations such as comparison, concatenation, copying etc.	III	04
7	Write programs on Predefined Functions and User defined functions. Write programs based on recursion & nesting of functions.	IV	04
8	Write programs based on structure definition and initialization. Write programs based on structure within structure.	V	04
9	Write programs based on pointers.	VI	06
	TOTAL		32

Sr.No.	Performance Indicators	Weightage in %
a.	Correctness of algorithm	40
b.	Debugging ability	20
c	Quality of input and output displayed (messaging and formatting)	10
d.	Preparing assignments (write-ups, program and output).	20
e.	Submit assignment on time.	10
	Total	**100**

5.   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.

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
1.	Computer System with operating System & any compiler to execute "C" programs	1 to 9
2.	Notepad	1 to 9

6. 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.

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Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 1. **C Overview, tokens and expressions**	1a. State importance of 'C'. Describe Basic structure of 'C' Programs. 1b. Demonstrate sample C program 1c. Describe Character set. 1d. Define keywords, identifiers, constants, variables, symbolic constants. 1e. List different data types. 1f. Describe different types of operators. 1g. Demonstrate input and output Operators. 1h. Initialise and evaluate expressions.	1.1 Introduction to 'C'. 1.2 Importance of C. 1.3 Basic structure of 'C' programs, programming style, sample 'C' programs, execution of 'C' program. 1.4 Character set, C tokens, keywords & Identifiers, constants, variables, Data types, type conversion, declaration of variables, assigning values to variables. 1.5 **Operators**: Arithmetic operators and its precedence, relational, Logical, increment & decrement, conditional, bit-wise operator, special operator. 1.6 **Expressions**: Arithmetic expressions, evaluation of expressions.
UNIT 2. **Decision Making and looping**	2a. Understand Branching and looping statements. 2b. Demonstrate if statement, if-else, else-if ladder. 2c. Use of switch statement and ?: operator. 2d. Apply different types of loops.	2.1 **Branching**: decision making with if statement, if-else statement, else- if ladder. 2.2 **Looping**: switch statement, ?: operator, go-to statement, while loop, for loop, do-while loop, break and continue statement.
UNIT 3. **Arrays and Strings**	3a. List different types of Arrays. 3b. Distinguish between one-dimensional, two-dimensional and multidimensional arrays. 3c. Demonstrate initialization of arrays 3d. Declaring and initializing String variables. 3e. Describe String functions.	3.1 **Introduction to array**: array, Initialization of arrays, 3.2 **Types**: one- dimensional arrays, two-dimensional arrays, multidimensional arrays. 3.3 **Introduction to String**: declaration & initialization of string, string variables, reading string, writing string. 3.4 Concatenation & comparison of two strings, string handling functions.
UNIT 4. **Functions**	4a. Use the given Predefined function. 4b. Write User defined functions. 4c. Identify different categories of Functions. 4d. Understand nesting of functions. 4e. Implement Recursion. 4f. Demonstrate function with	4.1 Concept and need of functions 4.2 **Predefined Functions**: Library functions, Math function. 4.3 **User defined function**: Need, syntax, declaration, definition, return values and their types, calling a function. 4.4 **Category of functions**: No argument-No return value. 4.5 Nesting of functions, recursion and func-

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	arrays.	tion with arrays.
UNIT 5. Structures and Unions	5a. Define Structure. 5b. Use the structure for solving the given problem. 5c. Demonstrate arrays of structure. 5d. Execute arrays within structure. 5e. Identify use of structure in functions. 5f. Compare structure and Union.	5.1 **Structure** : definition, declaring and accessing, structure initialization, copying and comparing structure variables, operations on structure members, array of structures, array within the structure, structure within structures ,structure and functions, size of structures 5.2 **Unions**: Introduction to union, definition, syntax.
UNIT 6. Pointers	6a. Define pointer. 6b. Declaration of pointers. 6c. Initialization of pointers and pointer expressions. 6d. Demonstrate pointer as a function argument.	6.1 **Pointer :** Introduction to pointer Concept. Accessing the address of a variable, declaration of Pointers, Initialization of Pointers, Accessing a variable through its pointer, chain of pointer, pointer expressions. 6.2 **Pointer and Array :** Array of pointers, Pointer to array, pointers as a function argument. 6.3 Returning pointer and passing addresses to Functions.

7. 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	C overview, tokens, expressions	10	04	02	06	12
II	Decision making and looping	10	04	03	08	15
III	Arrays, Strings	08	04	02	06	12
IV	Functions	10	04	03	08	15
V	Structures and Unions	04	04	04	05	13
VI	Pointers	06	04	04	05	13
	Total	48	24	18	38	80

8. 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. Drawing flowchart and writing algorithms for the given problem statements.
    b. Prepare practical files with write-ups, programs and its outputs.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are strategies, which can be used to accelerate the attainment of the various outcomes in this course:

Sr. No.	Topic	Instructional Strategy
1	C overview, tokens, expressions	Class room teaching
2	Decision making and looping	Laboratory demonstration
3	Arrays, Strings	Class room teaching, laboratory demonstration
4	Functions	Class room teaching, laboratory work
5	Structures and Unions	Class room teaching, laboratory work
6	Pointers	Class room teaching, laboratory work

10. LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Programming in ANSI 'C'	E. Balaguruswamy	Mcgraw Hill
2	Let us 'C'	Yashwant Kanetkar	BPB Publication
3	C for Beginners	MadhusudhanMothe	Shroff Publishers and Distributions. Pvt. Ltd.

11. SOFTWARE/LEARNING WEBSITES

    1. http://www.nptel.ac.in
    2. https://www.tutorialspoint.com/cprogramming
    3. https://onlinecourses.nptel.ac.in

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12. PO - COMPETENCY- CO MAPPING

CO/PO	PO1 Basic and Discipline Specific knowledge	PO2 Problem Analysis	PO3 Design/Development of Solutions	PO4 Engineering Tools, Experimentations and Testing	PO5 Engineering Practices for Society ,Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning
Write procedural program with 'C' language tokens.	3	1	2	1	-	-	2
Execute programs using branching and looping.	2	1	2	2	-	-	2
Write programs using arrays, strings.	2	2	2	2			3
Develop a C program using functions.	3	2	2	2	-	-	3
Implement programs using structures.	3	2	2	2	-	-	3
Execute programs using pointers.	3	2	2	2	-	-	3
Summary	**3**	**2**	**2**	**2**		-	**3**

13. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
CO1	-	-	3
CO2	-	-	3
CO3	-	-	3
CO4	-	-	3
CO5	-	-	3
CO6	-	-	3

(Smt.K.S.Gaikwad)(Smt.G.B.Garud)
Signature of Course Expert

(Mrs.M.U.Kokate)
Signature of Head of the Department
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(Mr. U .V. Kokate)
Signature of Programme Head
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Signature of CDC In-charge

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Program Name	:	Diploma Programme in CE/EE/ET/ME/MT/CM/IT/DDGM
Program Code	:	01/02/03/04/05/06/07/08/21/22/23/24/26
Course Title	:	Fundamentals of ICT
Course Code	:	CM2102
Class Declaration	:	NO

1. RATIONALE

In any typical business setup, in order to carry out routine tasks related to create business documents, perform data analysis and its graphical representations and making electronic slide show presentations, the student need to learn various softwares as office automation tools like word processing applications, spreadsheets and presentation tools. They also need to use these tools for making their project reports and presentations. The objective of this course is to develop the basic competency in students for using these office automation tools to accomplish the job.

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. Connect Computer System and its peripherals.
2. Prepare document using word processing tool.
3. Create and design spreadsheets and data tables.
4. Prepare professional presentations.
5. Use various web services.

3. 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	
1#	-	2	3	-	-	25	25	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. 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:

Sr. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. Required
1	i) Identify various Input/output devices, connections and peripherals of computer system	1	1

	ii) Demonstration of Front Panel View ,Rear Panel View, I/O Serial and Parallel Ports iii)Demonstration of opening and closing of the Computer		
2	i) Connections inside CPU and its demonstration ii) Setting up the Cabinet. iii) Identification and Demonstration of different slots on motherboard. Mounting and Un mounting of RAM, Graphics card and Network card	1	1
3	i) Connecting various I/O Devices such as Mouse, Keyboards, Monitors, Printers, Web Cameras, Speakers, Scanners and External Hard disks etc. ii)Demonstration of RJ45 connector and its use and Bluetooth as an external interface	1	2
4	Functions and working of Secondary Storage devices i) Study of various types of Secondary Storage devices. ii) BIOS Settings for Primary and secondary Memory. iii) Installation, Configuration and Setting of Hard Disks and working of CD-ROM/DVD-ROM/ DVD-Combo/ DVD-Writer (Internal and External).	1	1
5	Execution of basic commands in command window: Ex: dir, md, copy, cd, move, rmdir, rd etc.	1	1
6	Various operations on Window based operating system part I: i) Windows Operations: Minimizing, Maximizing, Resizing. ii) Managing files and folders: Create, copy, rename, delete, move file and folder, Creating shortcuts.	1	1
7	Various operations on Window based operating system part II: i) Creating and Removing/Deleting User Accounts. ii) Using Add /Remove Programs and Hardware Utility. iii)Adding Fonts and Viewing Computer Configuration iv)Desktop settings: Display properties, Time and Date setting, Screen Saver , Appearance	1	2
8	i) Create, edit and save document : apply formatting features on the text - line, paragraph ii) Use bullets, numbering, page formatting iii) Insert and edit images and shapes, sizing, cropping, color, background, group/ungroup	2	3
9	i) Insert and apply various table formatting features on it. ii) Use mail merge with options.	2	2
10	Apply page layout features i)Themes, page background, paragraph, page setup ii)Create multicolumn page iii)Use different options to print the documents	2	2
11	Create, open and edit worksheet i)Enter data and format it, adjust row height and column width ii)Insert and delete cells, rows and columns iii) Apply wrap text, orientation feature on cell.	3	2
12	i) Insert formulas, "IF" conditions, functions and named ranges in	3	2

	worksheet.		
	ii) Apply data Sort Filter and Data Validation features.		
13	Create charts to apply various chart options.	3	2
14	Apply Page setup and print options for worksheet to print the worksheet.	3	1
15	Perform following in GUI based database software using GUI like MS-Access i) Create Database ii) Create tables and assign primary key. iii) Modify the table structure-add column, change the data type of column, delete the column from table. iv) Insert, update and delete the record from table. v) Retrieve data from the table according to condition given.	3	2
16	i)Create slide presentation ii)Apply design themes to the given presentation iii)Add new slides and insert pictures/images, shapes iv)Add tables and charts in the slides. v)Run slide presentation in different modes vi)Print slide presentation as handouts	4	2
17	i)Apply animation effects to the text and slides. ii)Add audio and video files in the given presentation	4	1
18	Configure Internet connection	5	1
19	Use internet for different web services.	5	2
20	Configure browser settings and use browsers.	5	1
	Total		**32**

Sr.No.	Performance Indicators	Weightage in %
a.	Use of Appropriate tool to solve the problem (Process)	40
b.	Quality of output achieved (Product)	30
c.	Complete the practical in stipulated time	10
d.	Observations and Recording	10
e.	Answer to sample questions	10
	Total	**100**

5. 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.

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
1	Computer system with all necessary components like; motherboard, random access memory (RAM), read-only memory (ROM), Graphics cards, sound cards, internal hard disk drives, DVD drive, Network interface card, Mouse, Keyboard, Monitors, Printers, Web Cameras, Speakers, Scanners and External Hard disks etc.	1 to 7
2	Laser printer	1,14,16
3	Hard Disks, CD-ROM/DVD-ROM/ DVD-Combo/ DVD-	3,4

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
	Writer (Internal and External).	
4	Hubs, Switches, Modems.	18,19
5	Any operating system.	5 to 20
6	Any Office Software.	8,9,10, 11,12,13,15,16,17
7	Any browser.	18,19,20

6. 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 to Computer System	1a.Explain the given block diagram of computer system. 1b. Classify the given types of software. 1c.Explain characteristics of the specified type of network. 1d.Describe Procedure to manage file/folders. 1e.Describe application of the specified type of network connecting device.	1.1 **Basics of Computer System:** Overview of Hardware and Software ,block diagram of Computer System, Input /Output unit, CPU, Control unit, Arithmetic logic unit(ALU), Memory Unit 1.2 **Internal Components:** Processor, Motherboards, random access memory(RAM), read-only memory(ROM), Video cards, Sound cards and internal hard disk drives 1.3 **External Devices:** Types of Input/ Output Devices, Types of monitors, Keyboards, Mouse, Printers: Dot Matrix, Inkjet and LaserJet, Plotter and scanner, external storage devices CD/DVD , Hard disk and pen drive 1.4 **Basic Commands in command window**: Ex: dir, md, copy, cd, move, rmdir, rd etc. 1.5 **Application Software:** Word processing , Spreadsheet, database management systems, Control software, measuring software, photo editing software , video editing software, graphics manipulation software system software compilers, linkers, device drivers, operating systems and utilities 1.6 **Network environments:** Network interface cards, hubs, switches, routers and modems, concept of LAN, MAN, WAN, WLAN, Wi-Fi and Bluetooth 1.7 **Working With Operating Systems:** Create and manage file and folders, Copy a file, renaming and deleting files and folders, searching files and folders, application installation , creating shortcut of application on the desktop

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Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 2. Word Processing	2a.Write steps to create the given text document. 2b.Explain the specified feature for document editing. 2c.Explain the given page setup features of a document. 2d.Write the specified table formatting feature.	**2.1 Word Processing:** Overview of Word processor, Basics of Font type, size, color, Effects like Bold, italic, underline, subscript and superscript, Case changing options, Previewing a document, Saving a document, Closing a document and exiting application. **2.2 Editing a Document:** Navigate through a document, Scroll through text, Insert and delete text, Select text, Undo and redo commands, Use drag and drop to move text, Copy, cut and paste, Use the clipboard, Clear formatting, Format and align text, Formatting Paragraphs, Line and paragraph spacing, using FIND and REPLACE, Setting line spacing ,add bullet and numbers in lists, add borders and shading, document views, Page settings and margins, Spelling and Grammatical checks **2.3 Changing the Layout of a Document:** Adjust page margins, Change page orientation, Create headers and footers, Set and change indentations, Insert and clear tabs **2.4 Inserting Elements to Word Documents**: Insert and delete a page break, Insert page numbers, Insert the date and time, Insert special characters(symbols),Insert a picture from a file, Resize and reposition a picture **2.5 Working with Tables:** Insert a table, Convert a table to text, Navigate and select text in a table, Resize table cells, Align text in a table, Format a table, Insert and delete columns and rows, Borders and shading, Repeat table headings on subsequent pages, Merge and split cells. **2.6 Working with Columned Layouts and Section Breaks:** Add Columns, Section breaks, Creating columns, Newsletter style columns, Changing part of a document layout or formatting, Remove section break, Add columns to remainder of a document, Column widths, Adjust column spacing, Insert manual column breaks.
UNIT 3. Spreadsheets and Database	3a.Write steps to create the given spreadsheet. 3b.Explain the specified formatting	**3.1 Working with Spreadsheets:** Overview of workbook and worksheet, Create Worksheet Entering sample data, Save, Copy Worksheet, Delete Worksheet, and Open & Close Workbook.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	feature of a worksheet. 3c.Write steps to insert formula and functions in the given worksheet. 3d.Write steps to create charts for the specified data set. 3e.Explain steps to perform advance operation on the given dataset	**3.2 Editing Worksheet:** Insert and select data, adjust row height and column width, delete, move data, insert rows and columns, Copy and Paste, Find and Replace, Spell Check, Zoom In-Out, Special Symbols, Insert Comments, Add Text Box, Undo Changes,- Freeze Panes, hiding/un hiding rows and columns. **3.3 Formatting Cells and sheet:** Setting Cell Type, Setting Fonts, Text options, Rotate Cells, Setting Colors, Text Alignments, Merge and Wrap, apply Borders and Shades, Sheet Options, Adjust Margins, Page Orientation, Header and Footer, Insert Page Breaks, Set Background. **3.4 Working with Formula:** Creating Formulas, Copying Formulas, Common spreadsheet Functions such as sum, average, min, max, date, In, And, or, mathematical functions such as sqrt, power, applying conditions using IF. **3.5 Working with Charts:** Introduction to charts, overview of different types of charts, Bar, Pie, Line charts, creating and editing charts. Using chart options: chart title, axis title, legend, data labels, Axes, grid lines, moving chart in a separate sheet. **3.6 Advanced Operations:** Conditional Formatting, Data Filtering, Data Sorting, Using Ranges, Data Validation, Adding Graphics, Printing Worksheets, print area, margins, header, footer and other page setup options **3.7 Introduction to Database Management System:** Meaning of Data, Database, DBMS, GUI based database software Creating tables and assign primary key, Modifying the table structure-add column, change the data type of column, and delete the column from table. And Insert, update and delete the record from table.
UNIT 4. Presentation Tool	4a. Write the steps to create the specified slide presentation. 4b. Write the steps to insert multiple media in the given presentation.	**4.1 Creating a Presentation:** Outline of an effective presentation, Identify the elements of the User Interface, Starting a New Presentation Files, Creating a Basic Presentation, Working with text boxes, Apply Character Formats, Format Paragraphs, View a Presentation, Saving work, creating new Slides, Changing a slide

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	4c. Write steps to apply table features in the given presentation 4d. Write steps to manage charts in the given presentation	Layout, Applying a theme, Changing Colors, fonts and effects, apply custom Color and font theme, changing the background, Arrange Slide sequence, 4.2 **Inserting Media elements:** Adding and Modifying Graphical Objects to a Presentation - Insert Images into a Presentation, insert audio clips, video/animation, Add Shapes, Add Visual Styles to Text in a Presentation, Edit Graphical Objects on a Slide, Format Graphical Objects on a Slide, Group Graphical Objects on a Slide, Apply an Animation Effect to a Graphical Object, Add Transitions, Add Speaker Notes, Print a Presentation. 4.3 **Working with Tables:** Insert a Table in a Slide, Format Tables, and Import Tables from Other Office Applications. 4.4 **Working with Charts:** Insert Charts in a Slide, Modify a Chart, Import Charts from Other Office Applications
UNIT 5. Basics of Internet	5a. Explain use of the given setting option in browsers. 5b. Explain features of the specified web service. 5c. Describe the given characteristic of cloud. 5d. Explain the specified option used for effective searching in search engine	5.1 **World Wide Web:** Introduction, Internet, Intranet, Cloud, Web Sites, Web Pages, URL, web servers, basic settings of web browsers- history, extension, default page, default search engine, creating and retrieving bookmarks, use search engines effectively for searching the content. 5.2 **Web Services:** e-Mail, Chat, Video Conferencing, e-learning, e-shopping, e-Reservation, e-Groups, Social Networking.

7. SPECIFICATION TABLE

Unit No	Unit Title	Teaching Hrs	R Level	U Level	A and above Levels	Total Marks
			Distribution of Theory Marks			
1	Introduction to Computer System	4	-	-	-	-
2	Word Processing	3	-	-	-	-
3	Spreadsheets and Database	4	-	-	-	-
4	Presentation Tool	3	-	-	-	-
5	Basics of Internet	2	-	-	-	-

8. 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 of practicals.
b. Prepare a sample document with all word processing features.(Course teacher shall allot appropriate document type to each students)
c. Prepare PowerPoint Presentation with all the presentation features.(Course teacher shall allot various topics to the groups of students)
d. Prepare Database/spreadsheets in groups, related to various Fields/Organizations
e. Undertake micro projects

9. 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

10. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	Computer Fundamentals	Goel, Anita	Pearson Education, New Delhi, 2014, ISBN-13: 978-8131733097
2	Computer Basics Absolute Beginner's Guide, Windows 10	Miller, Michael	QUE Publishing; 8th edition August 2015, ISBN: 978-0789754516
3	Microsoft Office 2010 for Windows: Visual Quick Start	Schwartz, Steve	Pearson Education, New Delhi India, 2012, ISBN:9788131766613
4	OpenOffice.org for Dummies	Leete, Gurdy, Finkelstein Ellen, Mary Leete	Wiley Publishing, New Delhi 2003 ISBN : 978-0764542220
5	Microsoft Office 2010: On Demand	Johnson, Steve	Pearson Education, New Delhi India, 2010. ISBN : 9788131770641

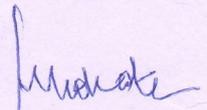| Sr. No.	Title of Book	Author	Publication
5	Microsoft Office 2010: On Demand	Johnson, Steve	Pearson Education, New Delhi India, 2010. ISBN : 9788131770641

11. SOFTWARE/LEARNING WEBSITES

    a.   http://www.nptel.ac.in

    b.   https://www.microsoft.com/en-in/learning/office-training.aspx

    c.   http://www.tutorialsforopenoffice.org

    d.   https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d

12. PO - COMPETENCY- CO MAPPING

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

13. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
CO1	1	-	-
CO2	-	-	1
CO3	-	1	1
CO4	-	-	1
CO5	1	-	1

(Smt.A.D.Kshirsagar)
(Smt.K.S.Sathawane)
Signature of Course Expert

(Mr.U.V.Kokate)
Signature of Head of the Department
(Computer Engineering)

(Smt. M.U . Kokate)
Signature of Programme Head

(Mr.A.S.Zanpure)
Signature of CDC In-charge

11. SOFTWARE/LEARNING WEBSITES
   a. http://www.nptel.ac.in
   b. https://www.microsoft.com/en-in/learning/office-training.aspx
   c. http://www.tutorialsforopenoffice.org
   d. https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d

12. PO - COMPETENCY- CO MAPPING

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

13. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2
CO1	1	-
CO2	-	1
CO3	-	1
CC4	-	1
CO5	1	1

(Smt.A.D.Kshirsagar)
(Smt.K.S.Sathawane)
Signature of Course Expert

(Smt.M.U.Kokate)
Signature of Head of the Department
(Information tech.)

(Mr. U.V. Kokate)
Signature of Programme Head
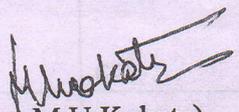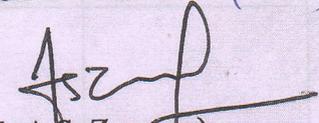
(Mr.A.S. Zanpure)
Signature of CDC In-charge

Received

Received
27/8/19

Government Polytechnic, Pune

'190 OB' – Scheme
Course Title: Linux Basics
(Course Code: CM2103)

Diploma programme in which this course is offered	
Program Code : 06/26	Program Name : Computer Engineering
Program Code : 07	Program Name : Information Technology

1.   RATIONALE

Linux Operating System is Open source and freely distributed O.S. Apart from the fact that it's freely distributed, Linux's functionality, adaptability and robustness makes it highly suitable for server platform. The course aims at providing knowledge of commands ued to work on linux operating systems. Also the course explores shell and command line essentials and scripts.

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. Install and Configure Linux O.S.
2. Execute various commands of Linux Operating System
3. Compress and archive files in Linux OS.
4. Use vi editor to handle files.
5. Write and execute programs using shell scripting

3.   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	2	2	4	--	--	50	25	75

4. 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: **Unit No is equal to Chapter No.**

S. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. required
1	• Installing Linux: Hardware, Software , Requirements, Opening Disk space for Linux partitions • Virtual Consoles • Configuring GRUB / LILO Boot Loader.	1	4
2	• Executing commands related to Login into user accounts, start up and shutdown commands, command line editing commands, man, who, who am i ,info , pwd.	2	2
3	• Executing Commands I/O redirection and pipes. • Practicing File Name Arguments: *, ?, [ ].	2	4
4	Executing various file Related commands –cat, more,ls, cd, cp, mv , rm, touch, mkdir, rmdir, find.	3	2
5	• Practicing Absolute and Relative Pathnames. • Setting/Changing file and directory related permissions chmod. • Link command.	3	6
6	Executing commands related to archive and file compression	4	2
7	• Executing various commands related to vi Editor. • Practicing editing with vi editor. • Practicing vi editing commands.	4	4
8	• Executing various Shell commands: cat, tee, head and tail. • Creating shell variables	5	2
9	• Configuring Login Shell with Special Shell Variables. • Practicing filter output : wc, spell and sort.	5	2
10	BASH Shell Programming (any 4 basic programs without looping)	5	4
		Total	**32**

S.No.	Performance Indicators	Weightage in %
a.	Debugging ability	20
b.	Quality of output achieved	40
c.	Complete the practical in stipulated time	10
d.	Answer to sample questions	20
e.	Submission of assignment in time	10
	Total	**100**

5.   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	Experiment Sr.No.
1	Computer System with any open source operating System. (RedHat, Ubuntu etc).	20

6. 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 (in cognitive domain)	Topics and Sub-topics	
1. Introduction to Linux Operating System	• Describe History of linux. • Identify different types of shells. • Compare Linux file systems.	1.1	Operating system and Linux
		1.2	History, Overview of Linux
		1.3	Shell: Bourne, Korn, Cshell.
		1.4	Linux releases, Linux File Systems(ext) and versions.
2. The Shell	• Use History command. • Use filename arguments. • Execute file related commands. • Execute commands using pipes and I/O redirection	2.1	The Command Line.
		2.2	Command Line Editing.
		2.3	Command and Filename Completion.
		2.4	History: History Events, History command, History Event Editing.
		2.5	Configuring History: HISTFILE and HISTSAVE.

Unit	Unit Outcomes (in cognitive domain)		Topics and Sub-topics
		2.6	Filename Expansion: *, ?, [ ]: Matching Multiple Characters, Matching Single Characters, Matching a Range of Characters, Matching Shell Symbols, Generating Patterns.
		2.7	Standard Input/Output and Redirection: Redirecting the Standard Output: > and >>, The Standard Input.
		2.8	Pipes: |, Redirecting the Standard Error:2>, >>.
3. Linux Files and Directories	• Describe linux file structure • Use absolute and relative pathnames. • Execute file and Directory commands. • Change file and directory permissions • Use link command.	3.1	Linux Files, The File Structure- Home Directories, Pathnames, System Directories. Listing, Displaying, and Printing Files(ls, cat, more, less, and lpr).
		3.2	Displaying Files: cat, less, and more, Printing Files: lpr, lpq, and lprm.
		3.3	Managing Directories(mkdir, rmdir, ls, cd, and pwd): Creating and Deleting Directories, Displaying Directory Contents, Moving Through Directories, Referencing the Parent Directory.
		3.4	File and Directory Operations(find, cp, mv, rm, and ln): Searching Directories: find, Searching the Working Directory, Locating Directories, Copying Files, Moving Files, Copying and Moving Directories, Erasing Files and Directories: The rm Command.
		3.5	Links: The ln Command, Symbolic Links, Hard Links.
		3.6	File and Directory Permissions: chmod.
4. Archives,	• Compress and archive files. • Create and modify files using vi editor.	4.1	Archive Files and Devices: tar Displaying Archive Contents, Creating Archives, Extracting Archives, Updating Archives, Compressing Archives.

Unit	Unit Outcomes (in cognitive domain)	Topics and Sub-topics	
Editors and Utilities	• line editing command.	4.2	File Compression: gzip, bzip2, and zip: Compression with gzip, Compressing with bzip2, Using Zip.
		4.3	The vi Editor: vi Command, Input, and Line Editing Modes.
		4.4	Creating, Saving and Quitting a File in vi, Managing Editing Modes in vi.
		4.5	vi Editing Commands: Common Operations.
5. Filters, Regular Expressions and Shell programming	• Execute Linux filters. • Execute commands using regular expressions. • Execute shell script programs	5.1	Filters and Regular Expressions: Using Redirection and Pipes with Filters: cat, tee, head and tail.
		5.2	Types of Filter Output :wc, spell and sort.
		5.3	Configuring Your Login Shell with Special Shell Variables.
		5.4	Introduction to BASH Shell Programming, Variables and Scripts.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours
I	Introduction to Linux Operating System	03
II	The Shell	04
III	Linux Files and Directories	02
IV	Archives, Editors and Utilities	03
V	Filters, Regular Expressions and Shell programming	04
	Total	**16**

7. SUGGESTED STUDENT ACTIVITIES
Following is the list of proposed student activities like:

1. Prepare journal based on practical.
2. Practice more commands and their options other than practical list.
3. Undertake Micro projects in group of students.

8. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES
1. MOOCS-NPTEL, Spoken Tutorials

9. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Linux The Complete Reference 6th Edition	Richard Petersen	McGraw Hill
2	Linux command line and shell scripting	Richard Blum	Willey India
3	Prof. DayanandAmbawade and Prof. Prof. DevenN.Shah	Linux Lab: Hands on Linux	Dreamtech publications

10. SOFTWARE/LEARNING WEBSITES

1. https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners
2. https://www.tecmint.com/linux-commands-cheat-sheet/
3. https://www.guru99.com/must-know-linux-commands.html
4. https://www.shellscript.sh/
5. https://www.tutorialspoint.com/unix/shell_scripting.htm
6. https://spoken-tutorial.org/tutorial

11. PO - COMPETENCY- CO MAPPING

CO/PO	PO1 Basic and Discipline Specific knowledge	PO2 Problem Analysis	PO3 Design/Development of Solutions	PO4 Engineering Tools, Experimentations and Testing	PO5 Engineering Practices for Society ,Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning
Install and Configure Linux O.S.	2	-	-	-	1	-	1

Execute various commands of Linux operating system.	2	-	-	-	1	-	3
Compress and archive files in Linux OS.	2	1	-	1	-	-	2
Use vi editor to handle files.	2	-	-	2	-	-	1
Write and execute programs using shell scripting.	2	2	2	-	-	-	2
Summary	**2**	**2**	**2**	**2**	**1**	**-**	**2**

Mapping Course Outcomes With Program Specific Outcomes:

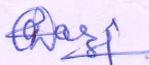| CO /PSO	Hardware and Networking	Database Technologies	Software Development
Install and Configure Linux O.S.	1	-	-
Execute various commands of Linux operating system.	-	-	2
Compress and archive files in Linux OS.	-	1	-
Use vi editor to handle files.	-	-	2
Write and execute programs using shell scripting.	-	-	3
Summary	**1**	**1**	**2**

Prepared By :

1. **Smt. H. F. Khan**

2. **Smt. H. S. Pawar**

**Head of The Department
Information Technology**

vernment Polytechnic,Pune
(An Autonomous Institute of Govt. of Maharashtra)
Scheme: 180 OB

final

Programme Name	:	**Diploma in CM/IT**
Programme Code	:	**06/07/26**
Course Name	:	**Web Designing using HTML**
Course Code	:	**CM2104**
Class Declaration	:	**NO**

1.   RATIONALE

In the Era of Web Technology it is essential for every Diploma Engineering students to understand the various steps for designing a creative and dynamic Web site and finally create good effective and customized websites. This course covers Web designing using HTML, Web site publishing, Internet related technologies and systematic way of developing a website.

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 HTML tags for information representation on webpage.
2. Create webpage using images, colors and backgrounds.
3. Design HTML forms.
4. Format web pages using CSS.
5. Host static web sites.

3.   TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	75
1	-	2	3	-	-	25	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.   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:

Sr. No.	Practical Exercises (Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. Required
1	a) Create lists of at least 10 available browsers and search engines. Use internet for acquiring this information. b) Take a string example "Government Polytechnic, Pune" and display it in all \<h1\> to \<h6\> header tags. State the output.	1	2
2	a) Design a web page with two paragraphs each of 8-10	1	2

Sr. No.	Practical Exercises (Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. Required
	lines. Assign title to web page. Practice formatting tags for bold, italics, underline, center, break, space, horizontal lines, span tag, pre tag etc.		
3	a) Write an HTML script that gives information about G.P. Pune and displays the names of various Departments as unordered list. b) Design and implement a webpage displaying list of grocery items as ordered list	1	2
4	a) Design a webpage for implementing – • Ordered list within unordered list. • Unordered list within ordered list. • Ordered list within ordered list (implement different list numbering style) • Unordered list within unordered list (Implement different bullet styles) b) Write an HTML script that displays definitions of minimum 10 terms related to a context. Use definition lists for the same.	1	2
5	a) Adding Hyperlinks and Images: Create a webpage containing two images and add a hyperlink to another webpage. Apply width and height property to one image. Align one image to center and the other one to left. Assign the second image as hyperlink to another webpage. b) Create a webpage containing an image and some paragraph. Apply following- • Create the map of image with sections of image linking to different webpage's in the same HTML where it is to be applied. • Apply this map on the image.	2	2
6	a) Applying background properties - Create a webpage with paragraphs, headers and information of your choice. Apply and practice following effects on webpage: • Set the background color of the page to linen. • Set border to h1 tag. • Set background image to a page. • Set background image to any paragraph. • Repeat the image vertically only. • Repeat the image horizontally only. • Show the background image at top right position.	2	2
7	a) Applying Border properties: Create a webpage with paragraphs, headers and information of your choice. Apply and practice following effects on webpage: • Set all top border properties of a paragraph in one declaration.	2	2

Sr. No.	Practical Exercises (Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. Required
	• Set style of bottom border for a paragraph. • Set the width of left border. • Assign different colors to four borders. Use hexadecimal color assignment. • Set rounded border for some paragraph • Apply border to the page. • Set border width to the header.		
8	a) Create a webpage that displays first year timetable. Make effective use of rowspan and colspan attributes. Make use of <th> tag too.	3	2
9	a) Use the webpage from earlier assignments with tables. Use borders, margins and padding properties on table/table rows/table cells. b) Use <div> tag to mark various divisions of webpages. Apply background, border, margin properties to different divisions	3	2
10	a) Create a webpage for creating any layout in frameset with atleast two frames. b) Design the layout first and then write appropriate scripts for defining frameset and individual frames.	3	2
11	a) Create a webpage that provides a form for filling information. The webpage must contain following elements : • Textbox • Radio buttons • Checkboxes • Buttons (Submit/REST) • Text area • Textbox for passwords Design the form properly for some task: Example- Login creation/Registration etc. Provide appropriate Labels to all form elements to guide user into filling the form.	3	2
12	a) Apply background and border style on paragraph/page/header using inline and internal cascaded styles. b) Apply different styles to various selectors i.e. elements, names, ids, class, groups. Use any web page created earlier.	4	2
13	a) Applying CSS text properties: Create a web page with number of paragraphs and headers. Apply following text properties: • Set the text color of page to "RED" and text color of <h1> to "BLUE". • Align <h1> to center. • Style text in <h1> to uppercase. • Style test in some <p> to capitalize.	4	2

Sr. No.	Practical Exercises (Outcomes in Psychomotor Domain)	Unit No.	Approx. Hrs. Required
	• Indent the first line of the paragraph to 20 px. • Set letter spacing for the paragraph • Set word-spacing in another paragraph • Set text direction from right to left • Create text-shadow effect on certain heading. • Set no wrap property for some paragraph. State the output.		
14	a) Applying CSS font properties: Create a web page with number of paragraphs and headers. Apply following font properties: • Set the font of page to "COURIER" and the font of <h1> tag to "VERDANA". • Set the font size of page to "20px" and the font size of a paragraph to "3em" • Show some <p> elements as Italic text. • Set some part of <p> element to small caps • Set font style through CSS to oblique. • Set font-weight of some part of paragraph to bold.	4	2
15	a) Applying CSS link properties: Create a web page with number of paragraphs and number of links. Apply different styles to hyperlinks: • Link changing colors when visited. • Link changing color on Mouse over • Link changing font-size on mouse over. • Link changing background color on mouse-over • Link changing font-family when visited. • Set color of some link to green. • Remove underline from the links. • Set the background color of link to TOMATO for visited and unvisited link	4	2
16	Micro project:	5	2
		Total Hours	32

S.No.	Performance Indicators	Weightage in %
a.	Debugging ability	20
b.	Quality of output achieved	40
c.	Complete the practical in stipulated time	10
d.	Answer to sample questions	20
e.	Submission of assignment in time	10
	Total	100

5. MAJOR EQUIPMENTS/ 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	Experiment Sr.No.
1	Computer with a text editor and browser	
2	Computer system with Internet connection	All
3	Web server	16
		16

6. 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 TO COMMON HTML,LINKS AND ADDRESSING**	1a. Define HTML. 1b. State the Terminologies used in Web Design. 1c. Describe Block Level Elements. 1d. Define Components of HTML Tags. 1e. Enlist Text Level Elements. 1f. Create the different List. 1g. Write a program for Linking HTML Documents.	**1.1 Introduction to HTML** **1.2 Terminologies used in Web Design:** Web, Web site, Web page, Web server, Web Browser, Search Engine **1.3 Components of HTML:** Tags – closed tags and open tags, Attributes, Elements **1.4 Structure Tags:** !DOCTYPE, HTML, HEAD, TITLE, BODY tags. **1.5 Block Level Elements:** Headings, Paragraphs, Breaks, Divisions, Centered Text, Block Quotes, Preformatted text,Address. **1.6 Text Level Elements:** Bold, Italic, Teletype, Underline, Strikethrough, Superscript, subscript. **1.7** Horizontal Rules, Special characters, Adding comments, The Meta tag. **1.8 Creating Lists:** Ordered Lists, Unordered Lists, Definition Lists, Nested Lists. **1.9 Linking HTML Documents URL**: Types of URLs, Absolute URLs, Relative URLs, The Anchor Tag. Linking: To document in the same folder, to document in the different folder, to document on the web, to specific section within the document, Inserting E-mail link.
UNIT 2. IMAGES, COLORS	2a. Find Image Formats 2b. Describe HSPACE & VSPACE. 2c. Differentiate between Server-side	**2.1 Image**: • **Image formats:** gif, jpeg, png • **The inline image:** an IMG tag,

AND BACKGROUND	image maps & Client-side image maps. 2d. Describe Text Color. 2e. Write a program for setting text color & background Color. 2f. Write a program for setting background images. 2g. Describe attribute of BODY tag	alternate text, image alignment, buffer space – HSPACE, VSPACE, wrapping text,height and width of images, Image as a link. • **Image maps:** Server-side image maps, Client-side image map **2.2 Colors and Backgrounds:** • **The text color:** color attribute of FONT tag, text attribute of BODY tag. • **Background color:** bgcolor attribute of BODY tag • **BackgroundImages:** Background attribute of BODY tag. • **Changing link colors:**link, alink, vlink attributes of BODY tag.
UNIT 3. TABLES, FRAMES AND FORMS	3a. State Basic Tables Tags. 3b. Describe how to add Captions. 3c. Define Frames. 3d. Enlist Advantages & Disadvantages of Frames. 3e. Write a program to Create Frame using Frame Tag. 3f. Define Forms. 3g. Write a program to Create basic form using different form fields. 3h. Describe Button tag.	**3.1 Tables:** • **Creating basic tables:** TABLE, TR, TH, TD tags. • **Formatting tables:** border, cellspacing, cellpadding, width, align, bgcolor attributes. Adding captions: CAPTION tag. • **Formatting contents in the table cells:** align, valign, bgcolor, height, width, nowrap attributes. Spanning rows and columns: rowspan and colspan attributes. **3.2 Frames:** • **Introduction to frames:** What is frame? Advantages and disadvantages of using frames. • **Creating frames:** FRAMESET tag – rows, cols attributes, FRAME tag – name, frame border, margin height, margin width, src, resize, scrolling Attributes,Use of NOFRAMES tag, Frame targeting. **3.3 Forms:** • **Creating basic form:** FORM tag, action and method attributes.

			• **Form fields:** Single line text field, password field, multiple line text area, radio buttons, and check boxes. Pull down menus: SELECT and OPTION tags. • **Buttons:** submit, reset and generalized buttons. Formatting technique: Using table to layout form.
UNIT 4. STYLE SHEETS	4a.Define CSS. 4b. Write a program for adding different Style to the Document. 4c. Describe Selectors. 4d. Describe Style Sheet Properties. 4e. Write a Program displaying Style Sheet Properties.	**4.1 Adding style to the document**: Linking to style sheets, embedding style sheets, using inline style. **4.2 Element Selectors**: CLASS rules, ID rules. **4.3 Style sheet properties**: font, text, box, color and background properties.	
UNIT 5. WEB SITE HOSTING	5a. Describe the procedure to configure a web server 5b. Differentiate hosting requirement on Internet and Intranet. 5c. Describe the procedure for hosting the given web site. 5d. Explain process of uploading given files on a web site.	**5.1** Concept of Internet and Intranet **5.2** Publishing web site on Intranet **5.3** Installing and configuring web server **5.4** Uploading files on Intranet site, Access intranet base web page **5.5** Publishing web site on Internet. **5.6** Access Internet based web site.	
			Total Hours

SPECIFICATION TABLE

Unit No	Unit Title	Teaching Hrs	Distribution of Theory Marks			
			R Level	U Level	A and above Levels	Total Marks
1	Introduction to common HTML, Links and addressing.	4	-	-	-	-
2	Image colors and background	4	-	-	-	-
3	Tables, frames and forms	4	-	-	-	-
4	Style Sheets	2	-	-	-	-
5	Website Hosting	2	-	-	-	-

8. STUDENT ACTIVITIES

1. Prepare journal of practical.
2. Browse and Observe features of different types of website.
3. Undertake mini projects

9. LEARNING RESOURCES

Sr.No.	Title of Book	Author	Publication
1	The Complete Reference: HTML	Thomas A.Powell	Tata McGraw Hill,5th Edition
2	Mastering HTML 4.0	Deborah S. Ray , Eric J.	BPB

		Ray	

10. SOFTWARE/LEARNING WEBSITES

- https://www.w3.org/TR/2018/SPSD-html401-20180327/struct/links.html
- http://www.html.net/
- http://webdesign.about.com
- https://www.html.am/templates/simple-website-templates/
- https://www.w3schools.com/html/

11. PO - COMPETENCY- CO MAPPING

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

12. PSO - COMPETENCY- CO MAPPING

CO /PSO	PSO1	PSO2	PSO3
CO1	-	2	2
CO2	-	2	2
CO3	-	2	2
CO4	-	2	2
CO5	-	3	3
Summary	-	3	3

(Smt.S.P.Ambavane)
(Smt.A.B.Bhusagare)
Signature of Course Expert

(Mr.U.V.Kokate)
Signature of Head of the Department
(Computer Engineering)

(Smt. M.U. Kokate)
Signature of Programme Head

(Mr.A.S. Zanpure)
Signature of CDC In-charge

Government Polytechnic, Pune

'180OB' – Scheme
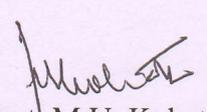
Programme	Diploma in ET/CE/EE//ME/MT/**CM/IT**/DDGM
Programme code	01/02/03/04/05/**06/07**/08/16/17/21/22/23/24/**26**
Name of Course	**Fundamental of Electronics**
Course Code	**ET2107**
Prerequisite	**Engineering Physics**

1. TEACHING AND EXAMINATION SCHEME

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

(*): Under the theory PA, Out of 20 marks, 10 marks are for micro-project assessment
Legends: L- lecture, T-Tutorial/teacher guided theory practice, P-practical, ESE-End semester examination, PA- Progressive Assessment.

2. RATIONALE

In today's world most of the consumer appliances are based on electronic circuits and devices. The foundation for working of computer or any of its peripherals are based on electronics. This course has been designed to develop skills to understand and test simple electronic components and circuits. After studying this course students will develop an insight to identify, build and troubleshoot simple electronic circuits.

3. 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. Plot the characteristics of semiconductor devices.
2. Interpret working of oscillators.
3. Use OP-AMP IC in circuits.
4. Operate CRO and Function generator.
5. Select appropriate transducers for relevant applications

4. 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:

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approximate Hours Required.
1.		Plot V-I characteristics of P-N junction diode.	02
2.		Plot V-I characteristics of the given Zener diode.	02
3.	1	Test performance of diode as Half wave and Full wave rectifier with and without filter.	04
4.		Plot the input and output characteristics of NPN transistor in CE configuration.	04
5.	2	Plot the characteristics of n-channel JFET.	02
6.		Calculate frequency of oscillations for Crystal Oscillator.	02
7.		Observe input-output waveforms of Inverting Amplifier.	02
8.	3	Observe input-output waveforms of Non Inverting Amplifier.	02
9.		Observe input/output waveforms of Integrator .	02
10.		Observe input/output waveforms of Differentiator	02
11.		Study of front panel of C.R.O.	02
12.	4	Study of front panel of Function generator.	02
13.		Measure amplitude, Time period of sine, triangular and square wave with the help of CRO.	02
14.	5	Test performance of inductive transducer LVDT.	02
		Total Hrs	**32**

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

5. 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.

Sr.No.	Major Equipment/ Instruments Required	Experiment Sr. No.
1	Variable DC Power supply 0-30V with display for voltage and current	3,4
2	Digital Multimeter	7,8
3	CRO	1,2,3,4,5,6,7,8,9,10,11,12,13
4	Function Generator	12,13
5	Different types of cables and connectors	All

6. 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. SEMICONDUCTOR DEVICES (Weightage-24 , Hrs- 14)	
1a. Plot V-I characteristics of PN Diode 1b. Define and Measure parameters of diode 1c. Implement Zener diode as voltage regulator. 1d. Compare salient features of the given type of rectifiers. 1e. Explain with sketches the working principle of the given transistor configuration. 1f. Analyze and differentiate between CE, CB, CC configurations 1g. Derive relation between alpha and beta.	**1.1 Rectifying diode:** Review of P - type and N - type semiconductor, PN junction, Barrier voltage, depletion region, Junction Capacitance, Forward biased & reversed biased junction. Diode symbol , forward & reversed Characteristics of PN junction diode Specifications : Forward voltage drop , Reverse saturation current, maximum forward current , power dissipation ,Package view of diodes of different power ratings (to be shown during practical hours) **1.2 Zener diode :** Construction ,Symbol ,characteristics (forward & reversed) Avalanche &Zener breakdown **Specifications :** Zener voltage , power dissipation , break over current, dynamic resistance & maximum reverse current (to be shown during practical hours) **1.3Rectifier :** Half wave, Full wave and Bridge Rectifier, working principle, circuit diagram, performance parameters PIV, ripple factor, efficiency Need for filters: circuit diagram and working of 'L', 'C' and 'π'' filter.

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	1.4 Working principle and block diagram of regulated power supply. **1.5** Symbol, construction and working principle of LED **1.6 Transistor :** construction, symbol, operating principle, characteristics, applications, rating and specifications, configurations, Regions-Cut off, Saturation and Active , comparison between CB, CE, CC. Transistor as switch and amplifier. Transistor parameters – alpha, Beta , input and output resistance and relation between alpha and beta
UNIT 2 FIELD EFFECT TRANSISTORS (Weightage- 12 , Hrs- 08)	
2a. Explain with sketches the working principle of the given transistor configuration. 2b. Determine the FET parameters from the given FET characteristics curve. 2c. Describe the specified JFET parameter. 2d. Describe the specified MOSFET parameter.	2.1 FET-Types: JFET and MOSFET 2.2 Classification of JFET 2.3 Symbol, construction and working principle of N-channel and P channel JFET, Drain and transfer characteristics of JFET 2.4 JFET parameters: DC and AC drain resistance, Transconductance, amplification factor 2.5 Symbol, construction and working principle of MOSFET.
UNIT 3 OSCILLATORS & LINEAR ICS (Weightage- 16 , Hrs- 10)	
Part A: 3a. State Barkhausen criteria for oscillator. 3b.Classify oscillators. 3c. Describe how oscillations are produced in LC tank circuit. 3d. Explain with circuit diagram working of LC oscillators. 3e. Draw circuit and explain working of Crystal oscillator. **Part B:** 3f. Draw symbol and pin diagram of IC 741. 3g. Define various parameters related to OP-AMP. 3h. Derive expression for various mathematical operation of OP-AMP.	**Part A :** 3.1 Block diagram, Barkhausen Criteria for sustained oscillations, classification of oscillator. Oscillations in LC tank circuit, Working of - Hartley, Colpitts, Clapp Oscillators Crystal oscillator : Diagram, Working principle **Part B:** 3.2 OP AMP. IC 741, symbol, pin diagram, ideal and typical characteristics, Applications such as Inverting , Non Inverting amplifier, Difference amplifier, adder substractor , Integrator, differentiator.

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 4 INSTRUMENTATION (Weightage- 12 , Hrs- 06)	
4a. Draw and explain blocks of CRT, CRO and Function generator. 4b. State applications & specifications of CRO and Function generator.	4.1 CRO: Cathode Ray Tube, Oscilloscope Block diagram, operation, oscilloscope specifications, Applications. 4.2 Function generator: Block diagram, operation, specifications, applications
UNIT 5 SENSORS & TRANSDUCERS(Weightage- 16 , Hrs- 10)	
5a. Differentiate between sensor and transducer. 5b. Define and classify transducers. 5c. State selection criteria of transducer. 5d. Differentiate between Active- Passive, Primary- Secondary, and Analog- Digital transducers. 5e. Interpret working principle and application of Resistive, Capacitive, Inductive, Transducers (LVDT), photodiode, phototransistor, Piezoelectric Transducers, proximity sensor transducers.	5.1 Definition, classification: Active, Passive, Primary, Secondary, Analog, Digital 5.2 Selection criteria for transducer 5.3 Construction, Operation, One example of -Resistive, Capacitive, Inductive, Transducers(LVDT), photodiode and phototransistor , Piezoelectric Transducers 5.4 Thermocouple, proximity sensor and its applications

7.   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	Semiconductor Devices	14	08(04)	10(04)	06(02)	24(12)
II	Field Effect Transistors	08	04(04)	04(04)	04(00)	12(06)
III	Oscillators & Linear ICs	10	04(00)	08(02)	04(06)	16(08)
IV	Instrumentation	06	04(02)	04(04)	04(00)	12(06)
V	Sensors & Transducers	10	04(02)	06(02)	06(04)	16(08)
	Total	**48**	**24(12)**	**32(16)**	**24(12)**	**80(40)**

8.   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 journals based on practical performed in laboratory.
    b. Study of datasheet of electronic components.
    c. Prepare charts of symbols of Electronic components.
    d. Search information about Ratings and specifications of Regulator, diodes, transistors, CRO, function generator.
    e. Collect information of passive transducers and prepare charts of the same.
    f. Prepare posters to illustrate the use of photoelectric sensors in remote controls.

9.   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

10.   SUGGESTED MICRO-PROJECTS
    NA

11.   SUGGESTED LEARNING RESOURCES

S.N.	Title	Author, Publisher, Edition and Year of publication	ISBN Number
1	Basic Electronics.	Albert Malvino, 8th Edition,Tata McGraw Hill,2015	ISBN10:1259200116ISBN13:9781259200113
2	Basic Electronics.	J.S.Katre. Edition 2017, Techmax Publishers	ISBN-10: 9350779641 ISBN-13: 978-9350779644
3	Basic Electronics.	B.L.Theraja, S Chand Publishing, 2007	ISBN 10: 8121925568 ISBN 13: 9788121925563
4	Linear Integrated Circuits	RamakantGaikwad,4TH EDITION, PHI Publication,	ISBN 10: 8120320581 ISBN 13: 9788120320581
5	*Modern Digital Electronics*	R P Jain, McGraw Hill Education Pvt. Ltd, 4th Edition,2012	ISBN 10: 0070669112 ISBN 13: 9780070669116

| 6 | Instrumentation | A K Sawheny, Nineteenth edition, 2017, DhanpatRai publication | ISBN | : 8177001006 |

SOFTWARE/LEARNING WEBSITES
1. www.nptel.com
2. http://www.electronics-tutorials
3. https://en.wikipedia.org/wiki/P%E2%80%93n_junction
4. https://learn.sparkfun.com/tutorials/transistors
5. http://www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf
6. http://faculty.cord.edu/luther/physics225/Handouts/transistors_handout.pdf
7. http://www.technologystudent.com/elec1
8. www.slideshare.net/manash234/classification-of-transducers
9. http://www.electrical4u.com/linear-variable-differential-transformer/

12. PO - COMPETENCY- CO MAPPING

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

	PSO1	PSO2	PSO3
CO1	3	-	-
CO2	3	-	-
CO3	3	-	-
CO4	3	-	-
CO5	3	-	-

Sign: Name: Smt.V.S.Sabnis (Course Expert /s)	Sign: Name: Shri.R.N.Shikari (Head of Department)
Sign: M.V.Kokate Name: Smt.M.U.Kokate (Program Head) (Information& Technology Dept.)	Sign: Name: Shri A.S.Zanpure (CDC)
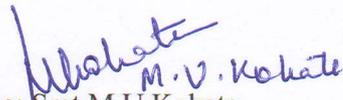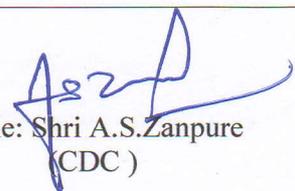
Government Polytechnic, Pune

'190 OB' – Scheme

Course Title: **ENGINEERING MAHEMATICS III**

(Course Code: SC 2102)

Diploma programme in which this course is offered	Semester in which offered
CM/IT Engineering	
06,07	

1.   RATIONALE

The student shall learn various techniques in integration and differential equations and use these techniques to their related Engineering problems.

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.   Solve the given problems of integration using suitable methods.
2.   Apply the concept of integration to find mean and RMS value.
3.   Solve the differential equation of first order and first degree using suitable methods
4.   Use basic concepts of statistics to solve engineering related problems
5.   Utilize basic concepts of probability distribution to solve elementary engineering   problems.

3.   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	
3	2	-	5	80	20	-	25	125

4.   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	Integration by substitution method	1	3
2	Integration on the type $1/ax^2+bx+c$, $1/\sqrt{ax^2+bx+c}$, $1/a\sin x+b\cos x+c$, $1/a\sin^2 x + b\cos^2 x + c$.	1	2
3	Integration using By Part Rule and integration by partial fraction method.	1	2
4	Integration by partial fraction method.	1	2
5	Examples on Definite integral and it's properties	2	2
6	Examples on Mean and R.M.S. value	2	2
7	Examples on order, degree and formation of differential equation.	3	2
8	Solution of first order first degree D.E. using various methods.	3	3
9	Solve problems based on Binomial Distribution related to engineering problems.	4	2
10	Solve problems based on Poisson Distribution related to engineering problems.	4	2
11	Solve problems based on Normal Distribution related to engineering problems.	4	2
12	Graphical representation of Mean, Median and Mode.	5	2
13	Solve problems on finding range, coefficient of range and mean deviation.	5	2
14	Solve problems on standard deviation.	5	2
15	Solve problems on coefficient of variation and comparison of two sets	5	2
	Total		16

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

5. 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	1-15
2	Interactive Classroom	1-15

6. 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
Units 1 : Integration	1.1. Obtain the given simple integral(s) using substitution method. 1.2. Integrate given simple functions using the integration by parts. 1.3. Evaluate the given simple integral by partial fractions.	Methods of Integration: a) Integration by substitution. b) Integration by parts c) Integration by partial fractions.
Unit 2: Definite integrals	2 .1. Solve given simple problems based on properties of definite integration. 2.2 Apply the concept of definite integration to find the area under the given curve(s). 2.3. Utilize the concept of definite integration to find mean value of the function 2.4. Invoke the concept of definite integration to find root mean square value of function.	2.1 Definite Integration: a) Simple examples b) Properties of definite integral (without proof) and simple examples. 2.2 Applications of integration : a) mean value. b) root mean square value.
Unit 3: Differential Equations	3.1. Find the order and degree of given differential equations 3.2. Form simple differential equation for given simple engineering problems. 3.3. Solve given differential equations using the method of variable separable 3.4 Solve the given differential equations using linear differential equations	3.a Concept of differential equation. 3.b Order, degree and formation of Differential equations 3. c Solution of differential equation Equations a. Variable separable form. b. Linear differential equation. 3.d Application of differential equations and related engineering problem(s).
Unit 4: Probability Distribution	4.1. Make use of probability distribution to identify discrete and continuous probability distribution 4.2. Solve given problems based on repeated trials using Binomial distribution 4.3. Solve given problems when number of trials are large and probability is very small. 4.4. Utilize the concept of normal distribution to solve related engineering problems	4.a Probability distribution Probability a. Discrete Probability distribution b. Continuous Probability distribution 4. b Binomial distribution. 4. C Poisson's distribution. 4. d Normal distribution.

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
Unit 5: MEASURES OF DISPERSION	5.1. Obtain the range and coefficient of range of the given grouped and ungrouped data 5.2. Calculate mean deviation and standard deviation of discrete and grouped data related to the given simple engineering 5.3. Determine the variance and coefficient of variance of given grouped and ungrouped data 5.4. Justify the consistency of given simple sets of data	5.a. Obtain the range and coefficient of range of the given grouped and ungrouped data 5.b Calculate mean and standard deviation of discrete and grouped data related to the given simple engineering 5.c. Determine the variance and coefficient of variance of given grouped and ungrouped data 5.d. Justify the consistency of given simple sets of data

7. 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	Integration	09	06	08	16	20(30)
II	Definite integration	09	--	12	12	16(24)
III	Differential equation	12	06	12	12	20(30)
IV	Probability Distribution	09	06	08	04	12(18)
V	MEASURES OF DISPERSION	09	06	04	08	12(18)
Total		48	24	44	52	80(120)

8. 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:

NA

9. 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. Use Flash/Animations to explain various components, operation and

d. Teacher should ask the students to go through instruction and Technical manuals

10. 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:
N.A.

11. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Higher Engineering Mathematics	Grewal B.S	Khanna Publishers, New Delhi
2	Engineering Mathematics Vol.II	Vishwanath	Satya Prakashan, New Delhi
3	Mathematics for Polytechnic students	S.P. Deshpande	Pune Vidyarthi Griha Prakashan
4	Engineering Mathematics Part II	H.K. Dass	S. Chand & Co. Ltd. Delhi

12. SOFTWARE/LEARNING WEBSITES

13. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	1	1	1	1
CO2	3	3	2	1	1	1	1
CO3	3	2	3	2	1	1	2
CO4	3	2	3	2	1	1	2
CO5	3	2	3	2	1	1	2
	3	2.4	2.6	1.6	1	1	1.6

	PSO1		PSO2		PSO3	
CO1						
CO2						
CO3						
CO4						
CO5						

S.N.	Name	Designation	Institute / Industry
1.		Chairman PBOS	
2.	Shri. V.B.Shinde	Faculty from Institute	Govt. Polytechnic ,Pune
3.		Faculty from Institute	
4.		Consultant from Industry	
5.		Faculty from nearby Institute	
6.		R.B.T.E.Representative .	

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	**Operating System**
Course Code	**CM3101**
Prerequisite course code and name	-

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)			Examination Scheme				Total Marks
						Theory		Practical		
L	T	P	C			ESE	PA	*ESE	PA	
04	00	02	06	**Marks**		80	20	25	25	150
				Exam Duration		3 Hrs	1 Hr	2 Hr		

(*):OE (Oral Examination)
Legends: L- lecture, T-Tutorial/teacher guided theory practice, P-practical, ESE-End semester examination, PA- Progressive Assessment.

2. RATIONALE

Operating Systems are system programs, which are very essential components of Computer system. Two primary aims of operating systems are to manage resources (e.g. CPU time, memory) and to control users and software. Operating system design goals are often contradictory and vary depending of user, software, and hardware criteria. This course describes the fundamental concepts behind operating systems, and examines the ways that design goals can be achieved and practice the concept of Operating System design.

3. **COMPETENCY**

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

- **Manage operations of Operating System.**

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. Differentiate between types of operating systems.
2. Describe services of operating system.
3. Describe process management and execute related commands.
4. Describe various processor scheduling algorithms and deadlock handling techniques.
5. Explain different approaches to memory management.
6. Describe and manage structure and organization of the file system.

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:

Sr. No.	Unit No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Relevant CO	Approx. Hrs. Required
1	1	Advanced Linux Installation: Network and Dual Boot	CO1	02
2	2	Linux Disk Management using fdisk utility to create, delete and change the partitions on the disk.	CO2	02
3		Setting/Changing file and directory related permissions chmod and umask command.	CO2,CO6	02
4		Displaying File Information : inodes, inodes and directories, cp and inodes, mv and inodes, rm and inodes, ls –l	CO2,CO6	04
5		Working with Linux-supported File Systems: Mounting and Unmounting to be tested with external drives	CO2	02
6	3	Linux Process Management : Jobs: Background, Kills and Interruptions and setting process priority Get Process status, Find Processes by Pattern or User, Display the Most Active	CO3	04

Sr. No.	Unit No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Relevant CO	Approx. Hrs. Required
		Processes,Kill processes, kill all processes(Executing commands for process management –ps, fg, bg, kill ,killall, nice, at ,jobs)		
7	5	Linux: Memory Management Practicing top, vmstat and free command	CO5	02
8	4	Scheduling jobs with crontab : cron daemon, crontab options, The format of crontab file, Environment variable settings, crontab command lines	CO4	02
9	3	System states :init Shutting down and changing Runlevels, Managing Users and Groups: Adding and Removing users with adduser,usermod and userdel commands	CO3	04
10		Adding and Removing groups with groupadd,groupmod and groupdel commands, Superuser-The root User Desktop,System Time and Date	CO3	02
11	ALL	Executing various Shell commands Creating shell variables , Writing shell scripts using decision making and various control structures., Executing various shell utilities, Using file test and string test conditions in scripts., Making use of Positional Parameters. Configuring your own login shell.Using Functions in Shell scripts.	ALL	06
		Total		**32**

Sr.No.	Performance Indicators	Weightage in %
a.	Installation/configuration of OS	40
b.	Correctness of Executing various commands	30
c.	Writing and executing programs to get desired output	10
d.	Observations and Recording	10
e.	Answer to sample questions	10
	Total	**100**

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

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

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
a	**Computer Systems (Any Computer System with basic configuration)**	ALL
b	Linux or alike OS such as Ubuntu,CentOS,RedHat etc.	ALL

7. THEORY COMPONENTS

The following topics/subtopicsshould betaught 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
SECTION I: UNIT 1: INTRODUCTION (Weightage-10 , Hrs- 10)	
1a. Explain the functioning of given component of OS. 1b.Explain characteristics of the given type of operating system. 1c. Identify type of operating system suitable for the given type of application. 1d. Execute command on command line for the given task.	1.1 Operating System: Concepts, Components of OS, And Operations of OS: Process Management, Memory Management, Storage Management, Protection and Security. 1.2 Views of OS: User View, System View 1.3 Operating System Operations: Dual Mode, Timer 1.4 Special-Purpose Systems: Real-Time Embedded Systems, Multimedia Systems,Batch OS,Time Shared OS,Distributed System,Mobile OS(Android,iOS) 1.5 Open-Source Operating System: Linux, BSD Unix
UNIT 2. OS SERVICES AND COMPONENTS(Weightage-14 , Hrs- 14)	
2a. Start, stop and restart the given service in Linux. 2b. Explain use of given system call of specified OS. 2c. Explain process that follows in managing the given resource. 2d. Explain use of the given operating system tool.	2.1 Different Services of Operating System. 2.2 System Calls-Concept, types of operating system calls 2.3 OS component-Process Management, Main memory Management, file Management, I/O system management, secondary storage management 2.4 Use of operating system tools, user management, security policy.
UNIT 3. PROCESS MANAGEMENT(Weightage-16 , Hrs- 08)	

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
3a. Explain functions carried out in the given process state. 3b. Describe the function of the given component of process stack in PCB. 3c. Explain the characteristics of the given multithreading model. 3d. Describe method of executing the given process command with example.	3.1 Process-Process states, Process Control Block (PCB). 3.2 Process Scheduling- Scheduling Queues Schedulers, Context switch. 3.3 Operations on Process:Creation, Termination 3.4 Inter-Process Communication (IPC): Introduction, shared memory system and message passing system. 3.5 Multithreading Models 3.6 Thread Libraries, Threading Issues
Section-II UNIT 4 CPU SCHEDULING AND DEADLICK(Weightage-16 , Hrs- 12)	
4a. Justify the need and objective of given job scheduling criteria with relevant example. 4b. Explain with example the procedure of allocating CPU to the given process using the specified OS. 4c. Calculate turnaround time and average waiting time of the given scheduling algorithm. 4d. Explain functioning of the given necessary condition leading to deadlock.	4.1 Scheduling types-Scheduling objective, CPU and I/O burst cycles, Pre-emptive, Non-Per-emptive. 4.2 Types of scheduling algorithms-First come first served (FCFS), shortest job first (SJF), Shortest Remaining Time (SRTN), Round Ribon(RR) Priority scheduling, multilevel queue scheduling. 4.3 Critical section problem. 4.4 Deadlock- system, Models,Necessary condition leading to Deadlocks, Deadlock Handling-Preventions, avoidance and Recovery.
UNIT 5. MEMORY MANAGEMENT(Weightage-14 , Hrs- 10)	
5a. Describe the working of specified memory management function. 5b. Explain characteristic of the given memory management techniques. 5c. Write algorithm for the	5.1 Basic Memory Management-Partitioning, Fixed and variable, 5.2 Free space management techniques-Bitmap, Linked List. 5.3 Introduction to page tables 5.4 Segmentation, Fragmentation, Page Fault 5.5 Virtual memory-Introduction to paging, Demand

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
given page replacement technique. 5d. Calculate page fault for the given page reference string.	Paging 5.6 Page replacement Algorithm-FIFO, LRU, Optimal.
UNIT 6 : FILE MANAGEMENT(Weightage-10 , Hrs- 10)	
6a. Explain the structure of the given file system with example. 6b. Describe mechanism of the given file access method. 6c. Explain procedure to create and access method.	6.1 File-concept, Attributes, Operations, types and File System Structure. 6.2 Access Methods-Sequential, Direct, Swapping, File Allocation Methods-Contiguous, Linked, Indexed. 6.3 Directory Structure-Single level, two level, tree-structured directory, Disk organization and Disk Structure-Physical structure, Logical structure, Raid structure of Disk, RAID level 0 to 6. 6.4 File System Implementation: Partitions and Mounting, Virtual File Systems

8.   SUGGESTED SPECIFICATION TABLE FORQUESTION PAPER DESIGN

Unit No	Unit Title	Teaching Hrs	Distribution of Theory Marks			
			R Level	U Level	A and above Levels	Total Marks
1	**Introduction**	10	04	04	02	10
2	**OS Services and components**	14	02	06	06	14
3	**Process Management**	08	02	04	10	16
4	**CPU Scheduling and Deadlock**	12	02	04	10	16
5	**Memory Management**	10	04	04	04	14
6	**File Management**	10	04	04	02	10
	Total	64	18	26	34	80

9.   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:

a. Prepare Journal for practical's
b. Undertake micro projects

10. 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. ***'L' in item No. 4*** does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
c. 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 LOs/COs through classroom presentations (see implementation guideline for details).
d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.
e. Guide student(s) in undertaking micro-projects.

11. SUGGESTED MICRO-PROJECTS
12. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	Operating System Concepts	Silberschatz Galvin, Gagne, John Wisley& Sons	Wiley and Sons, Ninth Edition, Galvin . 2015, ISBN: 978-5 1-265-5427-0 2 **ISBN-13:** 978-0470128725
2	Operating Systems	Achyut S. Godbole, Tata McGraw-Hill	Tata McGraw Hill Education, 2015, ISBN: 97800705911343
3	System Programming & Operating System	D. M. Dhamdhere,TMH	McGrawHill Education;ISBN:9780074635797
4	Operating System Concept & Design	Milan Milenkovic,TMH	McGraw Hill Education **ISBN-10:** 0074632728 **ISBN-13:** 978-0074632727

13. SOFTWARE/LEARNING WEBSITES

a) www.cs.wisc.edu/~ bart/537 lecture notes-University of Wisconsin Madison.
b) www.cs.kent.edu/osf 03/notes/index.html- ViliniusGediminas Technical University
c) http://www.howstuffworks.com/operating-system 1.htm
d) www.en.wikipedia.org/wiki/Operating system ay a

14. PO - COMPETENCY- CO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	-	-	-	1	-	1	2
CO2	1	-	-	1	-	-	1
CO3	1	1	1	1	1	1	2
CO4	1	2	2	-	-	1	3
CO5	1	1	1	-	-	2	3
C06	1	1	1	-	-	1	3

CO/PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	1	-
CO4	1	-
CO5	3	-
C06	3	-

Sign: Name: (Smt.N.P.Sarwade) (Smt.A.B.Bhusagare) (Smt.A.M.Galshetwar) (Smt.N.R.Wagh) (Course Expert /s)	Sign: Name: Smt. M.U .Kokate (Head of Department)
Sign: Name: Shri.U.V.Kokate (Program Head) (Computer Engineering Dept.)	Sign: Name: Shri A.S.Zanpure (CDC)

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	Java Programming
Course Code	**CM3102**
Prerequisite course code and name	--

1. TEACHING AND EXAMINATION SCHEME

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

(*):POE (Practical & Oral Examination)
Legends: L- lecture, T-Tutorial/teacher guided theory practice, P-practical, ESE-End semester examination, PA- Progressive Assessment.

2. RATIONALE

Java is platform independent, open-source object oriented programming language enriched with free and open source libraries. In current industrial scenario java has broad industry support and is prerequisite with many allied technologies like advanced java, java server pages, and Android Application Development. Thus current industrial trends necessitate acquiring Java knowledge for Computer engineering and Information technology graduates. This course develops necessary skills in students to apply object oriented programming techniques in java so that students will be able to develop complete applications using core java.

3. COMPETENCY

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

- **Build applications using Java.**

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:

a. Develop programs using Object Oriented methodology in Java.

b. Develop programs to apply all access modifiers, array and string.

c. Implement Interface and Develop program using multithreading.

d. Implement Exception Handling.

e. Develop program using graphics & applet.

f. Develop programs for handling I/O and file streams.

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:

Sr.No	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours required
1	1	Setup a Java Programming development environment by using: a. Command prompt. (Class path and path setup b. Any IDE (Eclipse, J creator etc.) Test the JDE setup by implementing a small program.	CO1	04
2		Develop programs to demonstrate use of different control statements.		

3		Develop programs to demonstrate use of 'for' , 'while' and 'do-while' looping Statements		
4		Develop programs for implementation of implicit and explicit type casting in JAVA.		
5		Develop programs for implementation a) Constructer b) multiple Constructers		
6		a) Develop a program to accept input using command line argument. b)Develop programs for implementation of Arrays in JAVA		
7	2	Develop programs for implementation of different function of String and StringBuffer Class.	**CO2**	
8		Develop programs for implementation of a) Vector b) HashMap c) Wrapper		**10**
9		Develop a program for implementation of a. Method overriding. b. Method overloading.		
10		Develop programs for implementation of a. Single inheritance b. multiple inheritance		
11	3	Develop programs for implementation of multilevel inheritance by applying various access controls to its data members and methods.	**CO3**	**06**
12		Develop programs for creating classes in a package, accessing a package, importing a class from other package.		

		Develop a program for implementation of Multithreading Operation.	CO3,CO4	
13				04
14	4	Develop programs for implementation of a)exception handling b) User defined exception handling.		
15	5	Develop minimum two basics Applets. Display output with applet viewer and browser. Develop a program on basic applet Develop program using control loops in applets.	CO5	04
16		Develop a Program to draw following shapes , Graphics and Applets a. Cone b. Cylinders c. Cube d. Square inside a circle e. Circle inside a Square		
17	6	Develop programs for implementation of a) I/O classes b) file stream classes	CO6	04
TOTAL HOURS :				32
MINI PROJECT: Implement mini project using all the JAVA concepts				

Sr.No.	Performance Indicators	Weightage in %
a.	Correctness of algorithm	40
b.	Debugging ability	20
c	Quality of input and output displayed (messaging and formatting)	10
d.	Preparing assignments (write-ups, program and output).	20
e.	Submit assignment on time.	10
Total		**100**

6. 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.

Sr. no.	Equipment Name with Board Specification	Pro Sr. no.
1.	Computer with JDK 1.8 or above	All
2.	Any IDE for JAVA Programming such as Eclipse , Jcreator or any other	All

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 Basics of JAVA (Weightage-09, Hrs- 06)	
1a. State Features of Java. 1b. Write Programs to create classes and object for given problem. 1c. Enlist different data types & Operators in Java. 1d.Constuct the expressions using implicit and explicit type conversions to solve the given problems. 1e.Develop the programs using relevant control structure to solve the given problems.	1. Java Features. 1.2 Defining a class, Fields declaration, Methods declaration, Creating object, Accessing class members. 1.3 Java tokens and data types, constants and symbolic Constant, variables, Dynamic initialization, Data types, array and string, Scope of Variable, typecasting and standard default value. 1.4 Operators and Expressions, Type conversions in expressions, Mathematical functions- min(), max(), sqrt(), pow(), exp(), round(), abs(). 1.5 Decision making and looping: If statement, if else statement, nested if else statement, if else if ladder, the switch statement, nested switch statement, The ?: operator,

	the while statement, the 'for' statement, break, continue and return statement, nested loops ,labeled loops, for-each version of the for loop.
UNIT 2 Derived Syntactical Constructs in JAVA (Weightage- 13 , Hrs- 08)	
2a. Use constructors for the given programming problem. 2b. State different visibility controls. 2c. Write the programs by implementing array to solve the given problems. 2d. Develop programs using vectors, wrapper and HashMap classes for the given problem.	2.1 Constructors and methods type of constructors, nesting of methods, argument passing the 'this' keyword, command line arguments, garbage collection, finalize() method, the object class. 2.2 Visibility Control Public, Private Protected, Default, friendly protected access. 2.3 Arrays and Strings: Types of arrays, creating an array, strings, string classes and string buffer, vector, wrapper classes, HashMap. Enumerated types.
UNIT 3 Inheritance , interface and package (Weightage- 19 , Hrs- 10)	
3a. Describe Inheritance. 3b. Enlist different types of Inheritance. 3c. Differentiate between overloading and overriding for given example. 3d. Develop program using the specified interface. 3e. Create user defined package for the given problems. 3f. Add class and interface to the given package.	3.1 Inheritance: concept of inheritance, Types of Inheritance. 3.2 Single Inheritance, multilevel Inheritance, Hierarchical Inheritance, method and constructors overloading and overriding. Dynamic method dispatch, final variables final methods, use of super, abstract methods and classes, static members. 3.3 Interfaces: Define Interface, implementing interface, accessing interface variables. 3.4 Package: Define package, types of package, naming and creating packages, accessing packages, import package, static imports, adding class and interfaces to a package.
UNIT 4 Exception handling and Multithreading (Weightage- 13 , Hrs- 08)	
4a. Define Exception, Errors& its types. 4b. Develop program for handling the given exception. 4c. Develop a program for throwing our own Exceptions. 4d. Explain the function of the specified phase in thread life cycle	4.1 Errors and Exception: Types of errors, exceptions, syntax of exception handling code, build-in exceptions, chained exceptions, creating own exception (throw clause). 4.2 Multithreaded Programming Creating a Thread: By extending thread class and by implementing Runnable interface, lifecycle of thread, Thread Methods: wait(), sleep(), notify(), resume(), suspend(), stop().

	using the given example.	Synchronization, inter-thread communication, deadlock.

UNIT 5 JAVA applets and Graphics Programming (Weightage- 18 , Hrs- 08)

5a. Describe the given phase of applet life cycle using a typical example. 5b. Develop programs using applet implementation for the given problem. 5c. Develop a Program for passing Parameters to Applets 5d. Develop program for implementing different font methods.	5.1 Introduction to applets: Applet, Applet life cycle (skeleton), Applet tag, Adding Applet to HTML file, passing parameter to applet, embedding <applet> tags in java code, adding controls to applets. 5.2 Graphics Programming: Graphics classes, lines, rectangles, ellipse, circle, arcs, polygons, color and fonts, font class, variable defined by font class, font methods.

UNIT 6 Managing I/O Files in JAVA (Weightage- 08 , Hrs- 08)

6a. Use I/O stream classes in a program to solve the given problem. 6b. Write Program for reading and writing character stream to and from the given files. 6c. Write Programs for reading and writing bytes to and from given files. 6d. Write program to demonstrate use of primitive data types with the specified stream.	6.1 Introduction and concept of streams. 6.2 Stream classes. 6.3 Byte Stream classes: Input stream classes, Output stream classes. 6.4 Character stream classes, using streams. 6.5 Using file class: I/O Expressions, Creation of files, Reading/Writing characters, Reading/Writing bytes, Handling primitive Data types.

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
1	Basics of JAVA	06	2	2	5	9
2	Derived Syntactical Constructs in JAVA	08	2	2	9	13

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
3	Inheritance , interface and package	10	4	5	10	19
4	Exception handling and Multithreading	08	4	3	6	13
5	JAVA applets and Graphics Programming	08	5	4	9	18
6	Managing I/O Files in JAVA	08	3	1	4	8
Total		48	20	17	43	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: 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 laboratory.
- b. Follow Coding Standards.
- c. Give seminar on relevant topic
- d. Undertake micro-projects.
- e. Develop variety of program to improve logical skills.
- f. Develop Application oriented real world programs.

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 major topics and concepts.

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

MINI PROJECT: Implement mini project using all the Java concepts studied in the above units.

(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 first four semesters, the micro-projects 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.*

12. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1.	Programming with Java	E. Balagurusamy,	Tata McGraw Hill
2.	The Complete Reference Java2	Herbert Schildt,	Tata McGraw Hill,5th Edition

S. No.	Title of Book	Author	Publication
3.	The Complete IDIOT's Guide To JAVA 2	Michael Morrison	PHI,2 edition

13. SOFTWARE/LEARNING WEBSITES

1. http://www.nptel.ac.in
2. https://www.tutorialspoint.com/javaprogramming
3. https://onlinecourses.nptel.ac.in

14. PO - COMPETENCY- CO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Develop programs using Object Oriented methodology in Java.	2	2	2	1	1	1	2
Develop programs to apply all access modifiers, array and string.	3	2	3	2	1	2	2
Implement Interface and Develop program using multithreading.	3	2	3	3	1	2	2
Implement Exception Handling.	3	2	3	3	1	2	1
Develop program using graphics & applet.	3	2	3	3	1	2	2
Develop programs for handling I/O and file streams.	3	2	3	3	1	2	2
summary	3	2	3	2	1	2	2

15. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
CO1	-	3	1
CO2	-	2	-
CO3	-	2	-
CO4	-	2	-
CO5	-	3	2
CO6	-	2	-

Sign: Name: Smt. H S Pawar Name: Smt. S P Panchakshari Name: Smt.K.S.Gaikwad (Course Expert /s)	Sign: Name: Smt.M.U.Kokate (Head of Department) (Information Technology)

Sign:	Sign:
Name: Shri. U V Kokate (Program Head) (Computer Engineering)	Name: Shri A.S.Zanpure (CDC)

Government Polytechnic, Pune
'180OB' – Scheme

Programme	**Diploma Programme in CO/IT**
Programme code	**06/07**
Name of Course	**Data Structures**
Course Code	**CM3103**
Prerequisite course code and name	**CM 2101 Programming in C**

1. **RATIONALE**
   Data structures is an important aspect of Computer engineering and Information technology. Data structures is mathematical and logical model of storing and organizing data in particular way in computer. After studying this course student will be able to understand and identify different types of data structures, use algorithms with appropriate data structures to solve real life problems.

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. Describe Data structures, Complexity and Array operations.
   2. Use algorithms for searching and sorting techniques with arrays.
   3. Implement programs for Stack, Queue and Recursion using Arrays.
   4. Write programs to perform operations on Linked List.
   5. Write algorithms to implement Tree data structure.
   6. Describe Graph and its traversing methods.

3. **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	150
4	2	2	6	80	20	25	25	

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

4. 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:

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1.	Implement Programs based on: Structures & Dynamic Memory allocation	I	02
2.	Implement Program to perform insertion and deletion operations on One Dimensional Array.	I	02
3.	Implement Program for matrix operations using Multidimensional Arrays. (Eg. Matrix Addition, Subtraction and Multiplication)	II	02
4.	Implement programs for following search technique. i. Linear search ii. Binary Search	II	04
5.	Write Programs to implement sorting algorithms. (Bubble sort, Selection sort, Insertion sort, Merge sort and Radix sort, Shell sort)	II	04
5.	Write Programs to traverse single link list.	II	02
5.	Write Programs to search in sorted and unsorted linked list.	II	04
5.	Write Programs to perform following operations on Single link list. i. To insert a node at beginning and at given location. ii. To delete a node.	II	04

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
5.	Write Program to perform Push and Pop operations on Stack using array.	II	02
5.	Write Program to perform Insert and Delete operations on Linear Queue using array.	III	02
5.	Write Program to implement Tower of Hanoi.	IV	02
5.	Write Program to create Binary Search Tree and perform Inorder, Preorder and Postorder traversal.	IV	04
			32

Following is the list of extra practical that can be given to Fast learner student.

1.	Write Program to traverse Doubly link list.		
2.	Write Program to perform Insert and Delete operations on Doubly link list.		
3.	Write Program to perform Insert and Delete operations on Linear Queue using link list.		
4.	Write Program to perform Insert and Delete operations on Circular Queue using array.		
5.	Write Program to perform Insert and Delete operations on Circular Queue using link list.		
6.	Write Programs to perform Search, Insert and Delete operations on BST.		
7.	Write Program to implement Heap Sort algorithm.		

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
	Total		**32**

Sr. No.	Performance Indicators	Weightage in %
a.	Use of Appropriate tool to solve the problem (Process)	40
b.	Quality of output achieved (Product)	30
c.	Complete the practical in stipulated time	10
d.	Observations and Recording	10
e.	Answer to sample questions	10
Total		**100**

5. 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.

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
1.	Hardware: Personal computer Pentium IV,2 GHz minimum (i3-i5 preferable), RAM minimum 2 GB.	For all experiments
2.	C/C++ Compiler.	

6. 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
SECTION-I		
UNIT I Introduction to data structures and Arrays	1a. Define data structure terminologies. 1b. Enlist various data structure Operations. 1c. Differentiate between various complexities. 1d. Use dynamic memory allocation in programs. 1e. Write algorithms to perform operations on array.	1. Introduction, Basic Terminology, Elementary data structure, Organization, Classification of data structure. 2. Operations on data structures: Traversing, Inserting, deleting, Searching, sorting, and merging. 3. Complexity: Time Complexity, Space Complexity, Big 'O' Notation. 4. Dynamic memory Allocation. 5. Arrays: Introduction, Representation of linear arrays in memory. 5. Traversing linear Arrays, Inserting and Deleting. 5. Multidimensional Arrays.
UNIT-II Searching and Sorting Techniques	2a. Write algorithm and programs for various searching and sorting techniques 2b. Apply Hashing techniques to store and retrieve element from	1. Searching: Basic search techniques, Linear Search, Binary search. 2. Hashing: Hash functions, Collision Resolution, Linear probing, Chaining. 2. Sorting: General background. 2. Sorting Techniques: Bubble sort,

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
	(in cognitive domain)	
	given data set.	Selection sort, Insertion sort, Merge sort,
	2c. Use sorting methods to sort dataset.	Radix sort, Shell sort.
UNIT III Stacks, Queues & Recursion	3a. Implement Stack and Queue data structure to carry out various data structure operation. 3b. Use stack and queues to solve various problem(likes prefix to postfix conversion, evaluation of expression, Tower of Hanoi etc). 3c. Differentiate between stack and queue.	1. Stacks: Concept, representing stacks in 'C', Applications of stacks. 2. Polish Notations (Prefix, postfix, Infix), Quick sort. 3. Recursion: Recursive definitions and processes, Recursion in 'C', writing recursive programs factorial, Fibonacci. 4. Tower of Hanoi, Implementation of recursive, procedures by means of stack. 5. Queues: The queue and its sequential representation, concept of queues, priority queues.
SECTION-II		
UNIT IV Linked Lists	4a. Implement linked list data structure to carry out various data structure operations. 4b. Use Linked list to implement other data structures.	1. Introduction Singly link list Representation of link list in memory. 2. Creating, Traversing, Searching in Sorted and Unsorted Linked List. 3. Memory allocation, garbage Collection. 4. Inserting into linked list, Deleting from a linked

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
		list.
		5. Header links list, Two-way list, Implementation of link list.
UNIT V Trees	5a. Draw binary tree for given data set. 5b. Write algorithm for binary tree traversal. 5c. Write algorithms to perform given operation on Binary Search Tree. 5d. Create Heap tree for given dataset.	1. Tree Terminologies: Degree of node, level of node, leaf node, Depth/Height of tree, In-degree and Out-degree, path, Ancestor and Descendant node. 2. Tree Types: General Trees, Binary trees, Binary Search Trees 3. Binary Tree Traversal methods: Inorder, Preorder, Postorder traversal using stack. 4. Binary search tree (BST), searching and inserting BST, deleting from BST. 5. Heap: Inserting into a Heap, Deleting the root of Heap, Heap sort.
UNIT VI Graphs	6a. Define terminologies related to Graph. 6b. Represent graph using adjacency list and adjacency matrix 6c. Solve problems to find out shortest path using Warshall's algorithm. 6d. Write algorithm to traverse the given raph.	1. Introduction o Graph Terminologies: Graph, Node(Vertices), Arcs(Edges), Directed Graph, Undirected Graph, In-degree and Out-degree, Adjacent, Successor, Predecessor, relation, path, sink. 2. Linear Representation of Graph: Adjacency List, Adjacency Matrix of directed graph. 3. Warshall's Algorithm; Shortest Paths. Linked representation of graph, traversing a graph(BFS,DFS). 4. Applications of Graph.

7. SPECIFICATION TABLE

Unit No	Unit Title	Teaching Hrs	Distribution of Theory Marks			
			R Level	U Level	A and above Levels	Total Marks
1	**Introduction to data structures and Arrays**	**08**	4	6	2	**12**
2	**Searching and Sorting Techniques**	**12**	2	4	8	**14**
3	**Stacks, Queues & Recursion**	**12**	2	4	8	**14**
4	**Linked Lists**	**12**	2	4	8	**14**
5	**Trees**	**12**	2	4	8	**14**
6	**Graphs**	**08**	2	4	6	**12**

7. 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 of practicals.

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.8, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.

d. Guide student(s) in undertaking micro-projects.

e. Use proper equivalent analogy to explain different concepts.

f. Use Flash/Animations to explain various components, operation and

g. Teacher should ask the students to go through instruction and Technical manuals

7. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1.	Data Structures Schaum Outline Series	Lipschultz	McGraw Hill Education, New Delhi.2013, ISBN-13: 978-0070701984
2.	Data Structures Using 'C'	ISRD Group	McGraw Hill Education, New Delhi.2013,ISBN-13:978-12590006401
3.	Data Structures	Dr. Rajendra Kawale	Devraj Publications

7. SOFTWARE/LEARNING WEBSITES

   a. **https://www.w3schools.in/data-structures-tutorial**
   b. **https://www.geeksforgeeks.org/data-structures/**
   c. **https://www.tutorialspoint.com/data_structures_algorithms/index.htm**

12. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Describe Data structures, Complexity and Array operations.	2	2	3	-	1	-	3
Use algorithms for searching and sorting techniques with arrays.	2	2	3	-	-	1	2
Implement programs for Stack, Queue and Recursion using Arrays.	2	3	3	-	1	1	2
Write programs to perform operations on Linked List.	2	3	3	-	1	1	2
Write algorithms to implement Tree data structure.	2	3	3	-	1	1	2

Describe Graph and its traversing methods	**2**	**3**	**3**	**-**	**1**	**1**	**2**

13. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
Describe Data structures, Complexity and Array operations.	-	1	2
Use algorithms for searching and sorting techniques with arrays.	-	2	3
Implement programs for Stack, Queue and Recursion using Arrays.	-	2	3
Write programs to perform operations on Linked List.	-	2	3
Write algorithms to implement Tree data structure.	-	2	3
Describe Graph and its traversing methods	-	2	3

(Smt.H.F.Khan)
Signature of Course Expert

(Mr.U.V.Kokate)
Signature of Head of the Department
(Computer Engineering)

(Smt. M.U. Kokate)
Signature of Programme Head

(Mr.A.S. Zanpure)
Signature of CDC In-charge

Government Polytechnic, Pune

'180 OB' Scheme

Programme	Diploma Programme in CM/IT
Programme Code	06/26/07
Name of Course	Object-Oriented Programming: C++
Course Code	CM3104
Prerequisite course code and name	--

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	
03	-	02	05	Marks	80	20	50	25	175
				Exam Duration	3Hrs	1 Hr	2Hrs	2Hrs	

(*): OE/POE (Oral Examination/Practical & Oral Examination mention whichever is applicable)
Legends: L- lecture, T-Tutorial/teacher guided theory practice, P-practical, ESE-End semester examination, PA- Progressive Assessment.

2. **RATIONALE**

   The Object-Oriented Programming is crucial foundation of modern programming paradigm. For Software Development requires the students the basic concepts of object-oriented programming (OOP) is essential. Large programs are probably the most complicated entities ever created by humans. Because of this complexity, programs are prone to error and software errors can be expensive and even life-threatening. Object-Oriented Programming offers a new and powerful way to cope with this complexity. Its goal is clearer, more reliable, more easily maintained programs. This subject will act as backbone for all other subjects that are based on Object Oriented concept.

3. **COMPETENCY**

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

   - Understand the basics of object oriented programming languages.

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. Develop C++ program to solve real world problems using Procedural and OOP Approach.
2. Write and Execute C++ Programs using Classes and Object.
3. Implement Inheritance in C++ Programs.
4. Use Polymorphism in C++ Programs.
5. Develop programs in C++ for handling file operations.
6. Execute programs in C++ for handling exceptions.

5. PRACTICALS/ EXERCISES

Sr. No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Unit No.	Approximate Hours Required.
1	Develop minimum two program using constant variable, arithmetic expression, operator, exhibiting data type conversion.	I	02
2	Write a program to implement looping different statements	I	02
3	Write a program to demonstrate all control structures.	I	02
4	Write a program to implement concept of an array. Write a program to perform matrix operations using multi-dimensional array.	I	04
5	Write a program to implement concept of a class. Write a program to create one class which contains member functions and invoke the same using objects. Write a program to implement concept of overloading.	II	06
6	Write a program which implements all the types of constructors with destructor. Write a program which implements friend function and inline function.	II	04
7	Write a program to demonstrate operator overloading for: i) Unary operator. ii) Binary operator. Write a program to demonstrate: i)Pointer to object.	III	04

	ii)Pointer to derived class.		
8	Write a program for MULTILEVEL, MULTIPLE, HYBRID inheritance.	V	04
9	Write a program to implement: i) Class template. ii) Function template. Write a program to perform various operations on file. Write a program to perform Exception Handling.	VI	04
TOTAL			**32**

Sr.No.	Performance Indicators	Weightage in %
a.	Correctness of algorithm	40
b.	Debugging ability	20
c	Quality of input and output displayed (messaging and formatting)	10
d.	Preparing assignments (write-ups, program and output).	20
e.	Submit assignment on 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.

Sr.No.	Equipment Name with Broad Specifications	Experiment Sr. No.
1.	Computer system with Turbo C ++ compiler/CODE BLOCK IDE to execute "C++" programs	1 to 9

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)	Topics and Sub-topics
(in cognitive domain)	
UNIT 1. BASICS OF OBJECT-ORIENTED PROGRAMMING *(Weightage-13, Hrs-10)*	
a. State importance of 'C++'. b. Describe Basic structure of 'C++' Programs. c. Demonstrate sample C++ program d. Describe Character set. e. Define keywords, identifiers, constants, variables, symbolic constants. f. List different data types. g. Describe different types of Operators. h. Demonstrate input and output Operators. i. Initialise and evaluate expressions.	1. Procedural Oriented Verses Object Oriented Programming. What is Object Oriented Programming? Programming Paradigm, Benefits of OOP & Applications OOP, Structure of C++ program, A simple C++ program, creating source file, Compiling & Linking. 2. Tokens, Keywords, Identifiers, Basic Data Types, User Defined data types, Derived Data Types, Symbolic, Constants, type Compatibility, Declaration of Variables, Reference Variables 3. Operators in C++, Scope Resolution Operators, Member Dereferencing Operators, Manipulators, Type Cast Operator, Expressions & their Types, Implicit Conversions, Operator Precedence, Control Structure. 4. Introduction of arrays and its types.
UNIT 2. FUNCTION IN C++ (Weightage-15, Hrs-08)	
a. Understand Call by Reference, Inline, Function Overloading, Friend Function and Virtual Function. b. Demonstrate Class, Object, Member Function Array of Object and, Object as a Function c. Use of Nested Member Function d. Apply Various Access Specifier.	1. Introduction, The Main Function, Function Prototyping, Call By Reference, Return By, Reference, Inline Function. 2. Default Arguments, Const Arguments, Function Overloading, Friend & Virtual Functions. 3. Classes &Objects: Introduction, specifying a Class, Creating objects, Memory Allocation For objects, Arrays of Objects, Object As a Function Arguments Returning Objects. 4. Defining Member functions, Making An Outside Function Inline, Nesting Of Member Function, Private Member

Unit Outcomes (UOs)	Topics and Sub-topics
(in cognitive domain)	
	Functions 5. Static Data Member, Static Member Functions

UNIT 3. CONSTRUCTORS & DESTRUCTORS (Weightage-12, Hrs-06)

a. List different types of Constructors. b. Demonstrate Constructors, Destructor c. Demonstrate initialization of Objects.	1. Introduction, Constructors, Parameterized Constructors Multiple Constructors in a Class 2. Constructors with Default Arguments, Dynamic initialization Of Objects, Object Pointers. 3. Destructors.

UNIT 4. OPERATOR OVER LOADING AND POINTERS (Weightage-12, Hrs-06)

a. Use Operator Overloading with Unary, Binary Operator b. Demonstrate use of Manipulators c. Perform program using pointer.	1. Introductions Defining Operator Overloading, Rules For Overloading Operators Introduction, Overloading Unary Operator, Overloading Binary Operator, Overloading Binary Operators Using Friends. 2. Manipulation of Strings Using Operators, Pointers, Pointers to Objects, this pointer, Pointer to Derived classes, Virtual functions, Pure virtual function functions, Math function.

UNIT 5. INHERITANCE AND INTRODUCTION TO TEMPLATES (Weightage-12, Hrs-08)

a. Define inheritance, template, abstract class, virtual base class. b. Describe access specifies with its types. c. Classify inheritance with its types. d. Implement programs using inheritance, virtual base class, abstract class and templates.	1. Introduction, Defining Derived Classes, Access specifiers and its types, Single Inheritance 2. Making a Private Member Inheritable Multilevel Inheritance, Inheritance, Hierarchical Inheritance, Hybrid Inheritance 3. Virtual Base Classes, Abstract Classes, Constructors In Derived

Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	Classes, Member Classes: Nesting of classes. 4. Class Templates, Class Templates with Multiple Parameters, Function Templates 5. Function Templates with multiple parameters, Overloading of Templates function.

UNIT 6. WORKING WITH FILES AND EXCEPTION HANDLING (Weightage-16, Hrs-10)

a. Define exception, stream. b. Describe working of files. c. Explain mechanism of exception. d. Implement program using files and exceptions.	1. Managing console I/O Operations, C++ streams, C++ stream classes, Unformatted I/O operations, Formatted I/O operations managing output with manipulators. 2. Working with files, Introduction, Classes for file stream operations, Opening & closing a file, Detecting End-of-file, more about open (): 3. File modes, File pointers and their manipulations, Sequential Input and Output operations 4. Updating a file: Random access, Error handling during file operations, Command line arguments. 5. Exception Handling: Introduction, Basics of Exception Handling, Exception handling mechanism 6. Throwing mechanism, catching mechanism.

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	Basics of Object-Oriented Programming	10	02	03	08	13
II	Function in C++	08	03	04	08	15
III	Constructors & Destructors	06	02	02	08	12
IV	Operator over loading and Pointers	06	02	02	08	12
V	Inheritance and Introduction to Templates	08	02	02	08	12
VI	Working with files and Exception Handling	10	02	04	10	16
Total		48	13	17	50	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: 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.   Drawing flowchart and writing algorithms for the given problem statements.
   b.   Prepare practical files with write-ups, programs and its outputs.

10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are strategies, which can be used to accelerate the attainment of the various outcomes in this course:

Sr. No.	Topic	Instructional Strategy
1	Basics of Object-Oriented Programming	Class room teaching
2	Function in C++	Laboratory demonstration
3	Constructors & Destructors	Class room teaching, laboratory demonstration
4	Operator over loading and Pointers	Class room teaching, laboratory work

5	Inheritance and Introduction to Templates	Class room teaching, laboratory work
6	Working with files and Exception Handling	Class room teaching, laboratory work

11. **SUGGESTED** LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1.	Object Oriented Programming with C++	E Balagurusamy, Tata McGraw-Hill Education, 2001	9332900906, 9789332900905
2.	Beginning C++ - The complete Language	Ivor Horton, Shroff Publishers	
3.	Teach Yourself C++	Herbert Schildt, Tata McGRAW Hill	

12. SOFTWARE/LEARNING WEBSITES

1. http://www.nptel.ac.in
2. https://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm
3. www.studytonight.com/cpp/cpp-and-oops-concepts.php
4. www.aonaware.com/oop1.htm

14. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
CO1	-	1	1
CO2	-	3	1
CO3	-	3	1
CO4	-	3	1
CO5	-	3	1
CO5	-	3	1
CO6	-	3	1
Summary	**-**	**3**	**1**

(Smt.P. N. Yewale) (Smt.N. R. Wagh) Signature of Course Expert	(Mr. U. V. Kokate) Signature of Head of the Department (Computer Engineering)
(Mrs. M. U. Kokate)	

Signature of Head of the Department (Information Technology)	(Mr. A. S. Zanpure) Signature of CDC In-charge

Programme Name : **Diploma Programme in Information Technology**
Programme Code : **07**
Course Title : **Multimedia And Animation**
Course Code : **IT3101**
Class Declaration : **NO**

1. RATIONALE

Multimedia techniques and animation make connections between verbal and visual representations of content. Multimedia applications uses text, graphics, animation, images and audio. These applications can be used in entertainment, business and education which can enhance communication and learning.

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. Describe the Multimedia components and color models .
2. Create images using Graphical processing tools.
3. Design web pages with multimedia components.
4. Develop 2D and 3D animation objects.
5. Use action script and authoring tools.

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	100
2	-	2	4	40	10	25	25	

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

4. 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:

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1.	a. Convert given image into different image formats and observe the changes in image quality and file size. b. Create different types of still images using various graphical processing tools and RGB/CMY/HSB color models.	I	02
2.	a. Design banner using graphics processing tool. b. Image Editing and Merge multiple photographs using any 2D image processing software.	II	02
3.	Apply various effects (drop shadow, vignette, mirror, reflection, cross fading) on text/Image using any 2D image processing software.	II	02
4.	a. Modify existing image by adding rainy season effect on any 2D image processing software. b. Design wallpaper showing water drop effect in image.	II	02
5.	Develop a webpage which show animation with sound effect / embed video using any professional HTML editor.	III	02
6.	Develop a 2D animation using shape twinning and motion twinning.	IV	02
7.	a. Develop different types of symbols (button symbol, graphic, movie clip symbol and similar types of icons). b. Create 2D animation for bouncing and rolling ball down.	IV	02
8.	Create 2D animation using motion guide layer and masking.	IV	02
9.	Design simple 3D animation using basic shapes.	IV	02
10.	Create animation using action script.(eg. Rotating ball)	V	02
11.	Create a variable for different Data Types using Action Script.	V	02

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
12. Create Micro Project using all multimedia component.			
	Total		**32**

Following is the extra list of practical assignment can be given to students.

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1.	Apply special effects like broken mirror effect, flaming ball effect to an image.		
2.	Design poster by using different text effect(ketchup, rope, fire, fruit).		
3.	Apply lighting effect to 3D object.		
4.	Create Animation for Start/Stop Button using Script.		
5.	Create animation by applying sound effect.		
6.	Create Website using various multimedia components.		
7.	Create animation of 2D and 3Dobjects using various features		

Sr. No.	Performance Indicators	Weightage in %
a.	Use of Appropriate tool to solve the problem (Process)	40
b.	Quality of output achieved (Product)	30
c.	Complete the practical in stipulated time	10
d.	Observations and Recording	10
e.	Answer to sample questions	10
Total		**100**

5.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.

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
1.	Hardware: Personal computer Pentium IV,2 GHz minimum (i3-i5 preferable), RAM minimum 2 GB.	For all experiments
2.	Graphics and animation development tools (Like Gif animation tool, Pencil, Synfig studios, Stykz, Blender, Scilab, Macromedia Flash, Corel Draw or any other tool)	

6. 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 I Introduction to multimedia	1a. Describe characteristics of the given color model supported in graphics. 1b. Describe the working of CRT display. 1c. Describe the multimedia system architecture 1d. Explain concept of given virtual reality with example.	1. Definitions -Where to use Multimedia, Multimedia in Business, Multimedia in Schools, Multimedia in Home, Multimedia in Public Places 2. Basic Tools- I/P, O/P devices, Painting & Drawing Tools, OCR Software, Digital v/s Analog, Multimedia System Architecture, Framework for Multimedia System, CRT display System, Display Terminology, Flat Panel Display. 3. Color models- RGB, CMY, HSB, HUE,

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
	(in cognitive domain)	
		saturation and brightness.
		4. Fundamentals of virtual reality.
UNIT-II Image editing and compression.	2a.Descibe various image file formats. 2b.Identify changes occurred in the given file size and image quality after format conversion. 2c.Describe image editing operations on an image. 2d. Compare Lossy and Lossless image compression techniques. 2e. Apply given effects on images.	1. Image types: Raster Format, Bitmap (BMP), Graphics Interchange Format(GIF), Joint Photographic Experts Group (JPEG),Tagged Image File Format (TIFF),Portable Network Graphics (PNG) and their differences. 2. Basic operations on image: crop, resize, complement. 3. Image compression techniques lossy and lossless. 4. Effects and its types: Fonts and its types, text effects(Ketchup, rope, Fire, fruit). Image effect broken mirror effect, flaming ball effects, water drop effect in image. 5. 2D and 3D images
UNIT III Webpage development using multimedia	3a.Write steps to develop a webpage comprising of graphical media. 3b.Describe features	1. Design Web Pages using Hypertext and hypermedia. 2. Different audio file formats. 3. Uncompressed audio format, lossless

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	of given audio file format.	compressed audio format, Lossy compressed audio format, mp3,wav,mpeg-4, wma, pcm, MIDI Vs Digital audio.
	3c.Compare different types of audio.	
	3d.Describe features of given video file format.	
UNIT IV Video and Animation	4a. Explain digital video and standards. 4b. Write the steps to create and modify the given types of 2D and 3D objects. 4c. Write steps to create the given 2D and 3D animation effect on a text and image. 4d. Write procedure to develop given shape and motion.	4. Digital Video. 5. How video works, Broadcast video standards. 6. Study of story board. 7. Video file formats: MPEG, MPEG1, MPEG2, MPEG4, AVI. 8. Create and modify 2D elements. 2D Vs 3D 9. The Power of motion, Principles of Animation, Making Animation that Work, A Rolling Ball, A Bouncing Ball, Creating an Animated Scene. 10. Animation in 3D: Basic key frame animation, graph editor, cyclic animation, path animation.
UNIT V Action Script and Authoring tools	5a. Use action script to create animation. 5b. Describe different types of Authoring	1. Programming Concepts – Variables, Data types, conditionals, loops, arrays, Functions 2. Custom objects - Properties, Methods and

Unit	Unit Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
	tools.	Events – Display List, Timeline Control 3. Multimedia Authoring tools : Features. 4. Types of Authoring Tools: Card- and Page-Based Authoring tools, Icon-and Object Based Authoring tools, Time Based Authoring tools

7. SPECIFICATION TABLE

Unit No	Unit Title	Teaching Hrs	Distribution of Theory Marks			
			R Level	U Level	A and above Levels	Total Marks
1	Introduction to multimedia	6	2	6	-	08
2	Image editing and compression.	8	2	6	2	10
3	Webpage development using multimedia	6	2	4	2	06
4	Video and Animation	6	2	-	4	08
5	Action Script and Authoring	6	2	4	2	08

	tools					
	Total	32	10	20	10	40

8.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 of practical.

9.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. Use proper equivalent analogy to explain different concepts.
f. Use Flash/Animations to explain various components, operation and
g. Teacher should ask the students to go through instruction and Technical manuals

10.LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1.	Multimedia: Making it work,9e	Vaughan Tay	McGraw Hill Education, New Delhi 2015, ISBN:9780071832885
2.	Principles of Multimedia 2e	Parekh Ranjan	McGraw Hill Education, New Delhi.2015, ISBN-13: 978-1-2-90650-0
3.	Action Script 3.0 Bible	Roger Brounstein	Wiley Publishing, Inc ISBN: 978-0-470-52523-4
4.	Essential Action Script 3.0	Colin Moock	O'Reilly Media, Inc. ISBN: 0596526946
5.	Multimedia Systems and Design	Andleigh, Prabhat K. Thakrar, Kiran	PHI Learning, New Delhi 2013 ISBN: 81-203-2177-4

Sr. No.	Title of Book	Author	Publication
6.	Fundamentals of Multimedia	Li, Ze-Nian	PHI Learning, New Delhi 2013 ISBN:13-978-8120328174

11. SOFTWARE/LEARNING WEBSITES

a. https://helpx.adobe.com/in/animate/how-to/create-2d-animation.html (As on 12/12/2019)
b. https://www.tutorialspoint.com/multimedia/ (As on 12/12/2019)
c. https://www.adobe.com/devnet/actionscript/articles/actionscript3_overview.html (As on 12/12/2019)
d. http://edutechwiki.unige.ch/en/AS3_Tutorials_Beginner (As on 12/12/2019)

12. PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Describe the Multimedia components and color models.	2	-	2	-	-	2	1
Create images using Graphical processing tools.	1	-	2	2	1	2	1
Design web pages with multimedia components.	2	1	2	2	2	2	2
Develop 2D and 3D animation objects.	2	1	2	2	2	2	2
Use action script and authoring tools.	2	-	2	2	1	2	1

13. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
Describe the Multimedia components and color models.	-	-	-
Create images using Graphical processing tools.	-	-	1
Design web pages with multimedia components.	1	-	-
Develop 2D and 3D animation objects.	-	-	1
Use action script and authoring tools.	-	-	2

(Smt. H.F.Khan, Smt. K.S.Gaikwad)　　　　(Mr.U.V.Kokate)
Signature of Course Expert　　　　　　　Signature of Head of the Department
　　　　　　　　　　　　　　　　　　　　(Computer Engineering)

(Smt. M.U. Kokate)　　　　　　　　　　(Mr.A.S. Zanpure)
Signature of Programme Head　　　　　　Signature of CDC In-charge

Government Polytechnic, Pune

'180 OB' – Scheme

Programme	Diploma in Information Technology
Programme Code	07
Name of Course	Digital Techniques and Microprocessor
Course Code	IT3102
Prerequisite course code and name	No

1. **TEACHING AND EXAMINATION SCHEME**

Teaching Scheme	Total		Examination Scheme

(In Hours)			Credits (L+T+P)		Theory Marks		Practical Marks		Total Marks
L	T	P	C		ESE	PA	*ESE	PA	
04	-	02	06	Marks	80	20	25	25	150
				Exam Duration	3Hrs	1Hr	2Hrs	2Hrs	

(*): OE/POE (Oral Examination/Practical & Oral Examination mention whichever is applicable)

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

2. RATIONALE

It is essential to know fundamentals of digital electronics to understand the concept of microprocessor and its application. Microprocessor is challenging, to meet challenges of growing advanced microprocessor technology. The student should be conversant with microprocessor programming.

3. COMPETENCY

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

- Maintain electronic circuits comprising of discrete electronic components.

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. Perform arithmetic operations with various number systems.

2. Differentiate various logic gates and apply the logic on Boolean algebra.

3. Test combinational logic circuits of Multiplexer and De-Multiplexer.

4. Construct K-MAP using logic functions and vice versa.

5. Describe Microprocessor architecture.

6. Write and execute 8085 programs.

5. 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:

Sr. No.	Unit No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Relevant CO	Approx. Hrs. Required
1		Know your Digital Lab 1.IC Tester 2.Multimeter 3.Bread Board 4.Trainer Kit		2
2	1	Study of Basic Gates ICs (7400, 7404, 7408, 7486, 7432) and verification of Truth tables by monitoring the output of ICs on Bread Board.	CO1	2
3		To derive AND, OR, NOT gates using universal gates by forming circuits on Bread Board.		2
4		Verify De-Morgan's Theorem by forming the circuit on Bread Board.		2
5	2	To verify of Multiplexer & De-multiplexer.	CO2	2
6	3	Minimization and realization of function using K-maps and its implementation by constructing the circuit on bread board.	CO3	2
7	4	Write simple programs and execute it on 8085 kit or on TASM.	CO4	2
8	5	Addition of 8 bit numbers with carry and without carry.	CO5	2
9		Subtraction of 8 bit number with carry and without carry.		2
10		Multiplication of two numbers.		2
11		Transfer the block of data from one place to another.		2
12		Find the smallest and greatest number of series.		2
13		Arrange the given numbers in ascending and descending order.		2

Sr. No.	Unit No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Relevant CO	Approx. Hrs. Required
14		Transfer the block of data in reverse order from one place to another place.		2
15	6	Factorial of 8 bit number using subroutine.		2
16		Micro project	CO6	2
		Total		**32**

Sr. No.	Performance Indicators	Weightage in %
a.	Use of Appropriate tool to solve the problem (Process)	40
b.	Quality of output achieved (Product)	30
c.	Complete the practical in stipulated time	10
d.	Observations and Recording	10
e.	Answer to sample questions	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.

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
1.	IC Tester, Multimeter, Bread Board, Trainer Kit	1
2.	ICs(7400, 7404, 7408, 7486, 7432), Bread Board, Wires, LED, Adapter	2,3,4,5,6
3.	8085 kit/ TASM software, Online Simulation Tool	7,8,9,10,11,12,13,14,15,16

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)	Topics and Sub-topics
(in cognitive domain)	

UNIT 1. NUMBER SYSTEM, CODES & LOGIC GATES AND BOOLEAN ALGEBRA (Weightage-12, Hrs-12)

Unit Outcomes (UOs)	Topics and Sub-topics
1a. Convert codes from one number system to another. 1b. Perform arithmetic operations with number system. 1c. Differentiate various logic gates and apply the logic on Boolean algebra. 1d. Explain theorems for Boolean algebra. 1e. Create simplified logic circuits.	1. Decimal, Binary, Octal, Hex. 2. Binary addition, subtraction. 3. One's complement, Two's Complement, Signed Numbers, Codes, Error code. 4. Working principals and Truth of AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR Gates, Universal Gates. 5. Boolean Algebra: Basic Boolean Operations, Basic Laws of Boolean Algebra, Duality Theorem, De-Morgan's Theorems.

UNIT 2. COMBINATIONAL LOGIC DESIGN USING MSI CIRCUIT (Weightage-15, Hrs-10)

Unit Outcomes (UOs)	Topics and Sub-topics
2a. Design Multiplexer and De-Multiplexer. 2b. Implement combinational logic design with MUX. 2c. Implement combinational logic design with DEMUX.	1. Multiplexer and their use in combinational, logic design. 2. De-multiplexer/decoders and their use in combinational logic design. 3. De-multiplexer- 4 to 16-line DEMUX. Demux design using sop method. 1:4, 1:8, 1:16 DEMUX.

UNIT 3. STANDARD REPRESENTATION FOR LOGIC FUNCTION & SEQUENTIAL LOGIC DESIGN (Weightage-15, Hrs-10)

Unit Outcomes (UOs)	Topics and Sub-topics
(in cognitive domain)	
3a. Construct K-MAP using logic functions and vice versa. 3b. Simplify equations in the minterms / maxterms.	1. KARNAUGH map representation, Simplification of logic function using K-MAP. 2. Minimization of logical function specified in minterms / maxterms or truth table. 3. Minimization of logic function not specified in minterms / maxterms. Don't care condition.

UNIT 4. MICROPROCESSOR, MICROPROCESSOR ARCHITECTURE & MICROCOMPUTER SYSTEMS (Weightage-14, Hrs-12)

4a. Describe Microprocessor architecture. 4b. Understand 8085 registers and instruction format. 4c. Draw timing diagram read/write memory cycle.	1. Microprocessor architecture & its Operations. 2. Memory & I/O Devices. 3. 8085 MPU, Example of 8085 based microcomputers. 4. Classification of instruction, Instruction format. 5. How to write & execute 8085 programs. 6. 8085 instruction set & Instruction timing.

UNIT 5. 8085 PROGRAMMING (Weightage-13, Hrs-10)

5a. Write and execute 8085 programs for addition, subtraction. 5b. Write programs implementing branching.	1. Basic instruction of 8085. 2. All instructions of 8085 like Data transfer, Arithmetic Operations, Branch, Debugging Programs, etc.

UNIT 6. ADDITIONAL INSTRUCTIONS, STACK, SUBROUTINES, INTERRUPT (Weightage-11, Hrs-10)

a. Perform 16-bit arithmetic and logic	1. 2.

Unit Outcomes (UOs)	Topics and Sub-topics
(in cognitive domain)	
operations. b. Recognize 8085 interrupts. c. Write programs using looping, subroutine.	3. 4. 5. 6. 1. Looping, indexing, counting. 2. 16-bit arithmetic logic operations, rotate, compare. 3. Stack, Subroutine & 8085 interrupts.

8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hrs	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Number System, Codes & Logic Gates and Boolean Algebra	12	03	03	06	12
2	Combinational logic design using MSI circuit	10	04	04	07	15
3	Standard representation for logic function & Sequential Logic Design	10	04	04	07	15
4	Microprocessor, Microprocessor Architecture & Microcomputer Systems	12	04	04	06	14

5	8085 Programming	10	02	03	08	13
6	Additional Instructions, Stack, Subroutines, Interrupt	10	03	04	04	11
Total		**64**	**20**	**22**	**38**	**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: 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 of practicals.
  b. Prepare a simple circuit using appropriate ICs.
  c. Undertake micro projects.

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 real time world.
f. Use proper equivalent analogy to explain different concepts.
g. Teacher should ask the students to go through instruction and Technical manuals.

11. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	Modern Digital Electronics	R. P. Jain	McGraw Hill
2	8085 Microprocessor Assembly language	Awate S.P.	McGraw Hill

Sr. No.	Title of Book	Author	Publication
	Programming & Applications		
3	Microprocessor Architecture, Programming & Applications with the 8085	Ramesh Gaonkar	Penram International Publishing (India) (Third Edition)
4.	Microprocessor programming (8085)	B.Ram	
5	Microprocessor systems 8086/88 family	Liu –Gibson	Prentice Hall of India
6	Microprocessor & Interfacing	Douglous Hall	Tata -McGraw Hill

12. SOFTWARE/LEARNING WEBSITES

   a. http://www.nj7p.org/Manuals/PDFs/Intel/9800301D.pdf
   b. https://www.slideshare.net/anupamkumarpandit/list-of-8085-programs
   c. https://iemcse.files.wordpress.com/2017/07/lab-manual.pdf
   d. https://www.pantechsolutions.net/8085-trainer-kit-user-and-technical-reference-manual

13. PO - COMPETENCY- CO MAPPING

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

14. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	1	-	-

CO4	1	-	-
CO5	1	-	-
CO6	1	-	3
Summary	**1**	**-**	**3**

(Smt. P. N. Yewale) Signature of Course Expert	(Mrs. M. U. Kokate) Signature of Head of the Department (Information Technology)
(Smt. M. U. Kokate) Signature of Programme Head	(Mr. A. S. Zanpure) Signature of CDC In-charge

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	**Data Communication and Networks**
Course Code	**IT3103**
Prerequisite course code and name	--

1.TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)			Examination Scheme				Total Marks
						Theory		Practical		
L	T	P	C			ESE	PA	*ESE	PA	
					Marks	80	20	25	25	150
4	-	2	6		Exam Duration	3 Hrs	1 Hr	2 Hr		

(*):OE/POE (Oral Examination/Practical&Oral Examination mention whichever is applicable)
Legends: L- lecture,T-Tutorial/teacher guided theory practice,P-practical,ESE-End semester examination,PA- Progressive Assesment.

2.RATIONALE

Most of the instruments are now a day's computer-based or connected with network. Data communication is the transmission of digital data through a network or to a device external to the sending device. It is the basis of modern Computer networks, which is growing with rapid technological progress. Computer communication through networking becomes essential part of our life. The Information technology diploma pass outs are required to handle the data communication related problems. By considering importance of concepts and techniques related to data communication and networking enable students to have an insight in to technology involved to make the network communication possible

3.COMPETENCY

The aim of this course is to attend following industry identified competency through various teaching learning experiences:
- **Manage information flow across different communication networks.**

4.COURSE OUTCOMES (COs)

The theory, practical experiences 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. Identify process of data communication.
2. Describe various Analog and digital signal transmission.
3. Identify various Multiplexing and Switching techniques in digital communication.
4. Identify types of transmission error and error correction techniques.
5. Describe various internetworking devices and TCP/IP protocol suit.
6. Describe various IEEE wireless standards

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:

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
1.	01	Study various transmission media	CO1	02
2.	1	Observe components of network in your network laboratory and state their specifications like transmission media and network control devices	CO1	02
3.	1,2	Study of RS232 standard	CO2	04
4.	3	Prepare and Test Straight & Cross UTP Cable.	CO3	04
5.	3	Designing layout of a Network for small organization Deciding upon type of network, Floor designing/ building designing Deciding upon number/ length of components	CO3	02
6.	5	Install and Configure Network Interface Card and identify its MAC address	CO5	02
7.	5	Share File/Folder and Printer in network and access the resource from other node.	CO5	02
8.	6	Setup FTP client-server transfer the file using FTP.	CO6	02
9.	4	Configure and use Telnet Client-server.	CO4	02
10.	4	Run the following TCP/IP commands with options and record their output:Arp, rarp, ipconfig, ping, tracert.	CO4	02
11.	5	Use Wireshark Packet Sniffer Software and capture TCP,IP,UDP,ARP,ICMP,Telnet,FTP packets.	CO5	02
12.	5	Create two subnets and implement it with calculated subnet masking.	CO5	02
		Total Hrs		**32**

Sr.No.	Performance Indicators	Weightage in %
f.	Use of Appropriate tool to solve the problem (Process)	40
g.	Quality of output achieved (Product)	30
h.	Complete the practical in stipulated time	10
i.	Observations and Recording	10
j.	Answer to sample questions	10
	Total	**100**

6.MAJOR EQUIPMENT/ INSTRUMENTSREQUIRED

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**.**

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
1.	**Modular Crimping Tool**	4
2.	Wireshark Free Tool	11
3.	CAT-6 Cable	4
4.	Desktop System	4-12

7. THEORY COMPONENTS

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

SECTION-I	
Unit Outcomes (UOs) *(in cognitive domain)*	*Topics and Sub-topics*
UNIT 1. INTRODUCTION TO DATA COMMUNICATION AND NETWORKING (Weightage-10 , Hrs- 10)	
1a. Describe data communication process and its components 1b. Enlist various categories of networks. 1c. Describe different modes of data transmission 1d. Describe various Network Models	1.1 Data communication process and its components: Transmitter, Receiver, Medium, Message, Protocol 1.2 Data Representation: Text,Image,Numbers,Video 1.3 Networks: Distributed Processing, Network Criteria, Physical Structures, Categories of Networks 1.4 Network Models:LAN,MAN,WAN 1.5 Communication Media: Guided Transmission Media, Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable 1.6 Unguided Transmission Media: Radio Waves, Microwaves, Infrared, Satellite 1.7 Line-of-Sight Transmission, Point to Point, Broadcast 1.8 Modes of Communication :Simplex, Half duplex, Full Duplex 1.9 Protocols, Standards, Standard organizations
UNIT 2.Signal Transmission & Conversion (Weightage-14 , Hrs- 14)	
2e. Explain Various	2.5 Analog and Digital Data**:** Analog Signal and Digital

	Signal, Periodic and non periodic signals,
Transmission Impairment 2f. Describe various coding schemes 2g. State various network performance criteria 2h. Compare ASK,FSK,PSK . 2i. Define analog and digital signals	2.6 Analog Signals: Sine Wave, Phase, Wavelength, Time and Frequency domain, Composite Signals, Bandwidth. 2.7 Digital Signals: Bit Rate, Bit Length, Digital Signal as a composite analog signal. 2.8 Transmission Impairment: Attenuation, Distortion, Noise 2.9 Performance: Bandwidth, Throughput, Latency, Bandwidth-Delay product 2.10 Analog-To-Digital Conversion: Pulse Code Modulation 2.11 Transmission Modes: Parallel transmission, Serial transmission 2.12 Digital-to-Analog Conversion: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying

UNIT 3. Multiplexing & Switching (Weightage-16,Hrs- 08)

3e. Describe types of Multiplexing 3f. Describe Spread Spectrum Technique 3g. Compare various Switching techniques.	3.7 Multiplexing: Introduction, 3.8 Categories of Multiplexing: Frequency-Division Multiplexing, Wavelength-Division Multiplexing, Synchronous Time-Division Multiplexing, Statistical Time-Division Multiplexing 3.9 Spread Spectrum: Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS) 3.10 Switching: Circuit-switched networks, Datagram networks, Virtual-circuit networks

UNIT 4 Error Detection, Correction and OSI Model (Weightage-12,Hrs-16)

4e. Identify the major functions of OSI Reference Model. 4f. Describe Error detection and correction methods with example. 4g. Describe the process of fixed and variable type of Framing. 4h. Identify characteristics of flow control technique.	4.5 Types of Errors, Forward Error Correction Versus Retransmission 4.6 Error Detection: Repetition codes, Parity bits, Checksums, CRC 4.7 Error Correction: Automatic repeat request (ARQ), Error-correcting code 4.8 Framing: Fixed-Size Framing, Variable-Size Framing 4.9 Flow and error control techniques: stop and wait, sliding window, **Go-back-n ARQ, Selective Reject ARQ** 4.10 THE OSI MODEL: Layered Architecture, Layers in OSI Model.

UNIT 5. Networking Protocol and Internetworking Basics (Weightage-16, Hrs- 12)

5e. Describe TCP/IP protocol suite.	5.7 TCP/IP PROTOCOL SUITE, **IPv4,IPv6**
5f. Describe IPV4 and IPV6 packet format.	5.8 Addressing: physical addresses, logical addresses, port addresses, and specific **Addresses**
5g. List and explain classes of IP address.	5.9 **IPv4 Addresses: Addresses, Notations, Classless, Classful, NAT.**
5h. Identify problems in internetworking.	5.10 **IPv6 Addresses: Structure, Address Space**
5i. Describe given networking devices.	5.11 Internetworking, Problems in Internetworking, Dealing with Incompatibility, Virtual Network, internetworking Devices, Repeaters, Bridges, Routers, Gateways
5j. Explain ways of accessing Internet.	5.12 Ways of Accessing the Internet : Introduction, Dial Up access for an Individual User, Leased Lines, DSL and Cable Modems

<table>
<tr><td colspan="2" align="center">UNIT 6 Wireless Communication (Weightage-10, Hrs-10)</td></tr>
<tr>
<td>
6d. Illustrate the given IEEE standard of communication.
6e. Identify the Characteristics of given layer in IEEE 802.11 Architecture
6f. Identify the Characteristics of given layer in Bluetooth architecture
6g. Compare Functional/Operating parameters and Different Generations of Mobile Telephone System
</td>
<td>
6.5 IEEE Standards
6.6 Wireless LANs: 802.11 Architecture, MAC Sublayer,Addressing Mechanism
6.7Bluetooth Architecture, Bluetooth Layers
      Radio Layer, Baseband Layer
   The Logical Link Control and Adaptation Layer Protocol (L2CAP)
6.8 The Mobile Telephone System
      First-Generation: Analog Voice
      Second-Generation: Digital Voice
      Third-Generation: Digital Voice and Data
6.9 4G & VoLTE: Introduction to 4G and VoLTE, Features of 4G and VoLTE
</td>
</tr>
</table>

8.SUGGESTED SPECIFICATION TABLE FORQUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to Data Communication and Networking	10	04	04	02	10
II	Signal Transmission & Conversion	14	02	06	06	14

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
III	Multiplexing & Switching	08	02	04	10	16
IV	Error Detection, Correction and OSI Model	12	02	04	10	16
V	Networking Protocol and Internetworking Basics	10	04	04	04	14
	Wireless Communication	10	04	04	02	10
	Total	**64**	**18**	**26**	**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:

c. Prepare Comparison table for Multiplexing techniques.
d. Prepare charts for Guided and Unguided Transmission media.
e. Draw OSI Reference model on chart.
f. Prepare a journal for multiple accesses using CSMA/CD.
g. Library / Internet survey on Wired and Wireless devices.
h. Prepare power point presentation or animation for error detection and correction methods.

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. *'L' in item No. 4* does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.
c. 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 LOs/COs through classroom presentations (see implementation guideline for details).
d. With respect to item No.10, teachers need to ensure to create opportunities and provisions for *co-curricular activities*.
e. Use Flash/Animations to explain various concepts in networking

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 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.

12.SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	Data communications and networking.	Forouzan Behrouz A.	Tata McGraw Hill, New Delhi, 2006 ISBN : 9780-07-296775-3
2	Computer Networks	Andrew s. Tanenbaum	PRENTICE HALL ISBN-13: 978-0-13-212695-3
3	Data and Computer Communications	Stallings William	Pearson Prentice Hall Pearson Education,Inc.,NJ 07458 ISBN: 0-13-243310-9
4	Data Communication and Networks	Godbole Achyut	Tata McGraw Hill, New Delhi, 2006 ISBN : 0070472971
5	Data Communication and Computer Networks	Gupta Prakash C.	Prentice Hall of India, Pvt Ltd. New Delhi, 2006 ISBN: 81-203-2846-9

13.SOFTWARE/LEARNING WEBSITES

    a. www.nptelvideos.in/2012/11/data-communication.html
    b. http://www.tutorial-reports.com/wireless/wlanwifi/wifi_architecture.php
    c. http://standards.ieee.org/about/get/802/802.11.html
    d. www.tutorialspoint.com/data_communication_computer_network/

e. http://iit.qau.edu.pk/books/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf
f. http://www.studytonight.com/computer-networks/overview-of-computer-networks
g. https://abmpk.files.wordpress.com/2013/04/data-and-computer-comm-8e-william-stallings.pdf
h. https://gradeup.co/flow-and-error-control-techniques-i-28750a29-ba8d-11e5-b537-dcac2f2dd7d1

14.PO - COMPETENCY- CO MAPPING

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

CO/PSO	PSO1	PSO2	PSO3
CO1	1	-	-
CO2	1	-	-
CO3	2	-	-
CO4	3	-	1
CO5	3	-	-
CO6	3	-	-

Sign: Name: Smt.H.F.Khan 　　　Smt.N.P.Sarwade 　　　　　(Course Expert /s)	Sign: 　　Name: (Mr.U.V.Kokate) Signature of Head of the Department (Information Technology)

<table>
<tr><td>Sign:

Name: Smt.M.U.Kokate
                (Program Head)
(Information& Technology Dept.)</td><td>Sign:

Name: Shri A.S.Zanpure

           (CDC)</td></tr>
</table>

Program Name	:	**Diploma Programme in Information Technology**
Program Code	:	**07**
Course Title	:	**Database Management System**
Course Code	:	**IT3104**
Class Declaration	:	**YES**

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	150
3	1	2	6	80	20	25	25	

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

2. RATIONALE

In software industry the relational database management system is being used predominantly to manage the data stored in database. The major objective of this course is to provide a strong formal foundation in Database Concepts, Technology and practice to the students to create and manage database using SQL. After learning this subject, the

students will be able to understand the database normalization techniques, and can use any RDBMS package as a backend for developing database applications.

3. **COMPETENCY**
- Apply Database Management concepts using SQL

4. **COURSE OUTCOMES (COs)**

The theory, practical experiences and relevant Technical 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. Describe the Database Management System with its advantages and applications.
2. Design the database structure with normalisation concept and Draw ER diagram.
3. Create the database Tables with constraints and perform various operations on database.
4. Create and Manage views, Sequences and Indexes.
5. Write PL/SQL code using cursor, control structure ,procedures and functions
6. Describe the concept of NoSQL, Big Data and Hadoop

5. **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:

Sr. No.	Unit No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Relevant CO	Approx. Hrs. Required
1.	1	Create database ,table structure, insert records and filter the records based on criteria in any GUI based database (Ex.MS-Access)	CO1	01
2.	1	Write MS Access Code to Apply Given Validation on Table and Set Error Messages, Set Default Value for Column, Set and Remove Database Password.	CO1	02
3.	1	Design ER Diagram and Normalize Database	CO2	02
4.	3	Write and Execute DCL Commands for Creating Users, Granting Privileges to Users and Revoking Privileges From Users.	CO3	01
5.	3	Execute SQL Queries with data constraints using DDL Commands.	CO3	02

Sr. No.	Unit No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Relevant CO	Approx. Hrs. Required
6.	3	Manage and Display the database Records using DML and DQL commands(Ex. Insert, Update, Delete and select command)	CO3	02
7.	3	Write and Execute SQL Queries Using Arithmetic, Relational, Logical, Set, Between and Like Operators.	CO3	01
8.	3	Write and Execute SQL Queries Using String, Arithmetic, Date and Time and Aggregate Functions.	CO3	01
9.	3	Write and Execute Queries Using the Select Command with where, Having, Group by and Order by Clauses.	CO3	02
10.	3	Write and Execute Queries Using Inner, Outer and Cross Join.	CO3	02
11.	4	Create Views and perform Insertion ,Modification and deletion of table data through Views	CO4	02
12	4	Create, Alter and Drop the Simple and Composite Index Also Check and Write time required for execution of queries before and after Index.	CO4	01
13.	4	Create, Alter and Drop the Sequence Also Insert sequence values in tables.	CO4	01
14.	5	Write and Execute basic PL/SQL Programs Using General data and Table data.	CO5	02
15.	5	Write and Execute PL/SQL Programs Using Different Control Structures like if then Else, for, While and Nested Loop	CO5	02
16.	5	Write and Execute PL/SQL Programs Based on Implicit and Explicit Cursors	CO5	01

Sr. No.	Unit No.	Practical Exercises (Learning Outcomes in Psychomotor Domain)	Relevant CO	Approx. Hrs. Required
17.	5	Write and Execute PL/SQL Programs Using Exception Handling both Predefined and User-defined exceptions.	CO5	01
18.	5	Write and Execute PL/SQL Code to Creating Procedures and Functions.	CO5	02
19.	5	Write and Execute PL/SQL Code to Create Triggers on Given Database	CO5	02
20.	6	Implement basic operations in MongoDB.	CO5	02
		Total		**32**

Sr.No.	Performance Indicators	Weightage in %
a.	Coding of SQL queries and PL/SQL programming	60
b.	Database Integrity.	10
c.	Quality of result displayed by SQL queries and PL/SQL Programming	10
d.	Answer to sample Questions	10
e.	Submit 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.

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
1.	Computer System.	All

Sr. No.	Equipment Name with Broad Specifications	Experiment Sr.No.
2.	Microsoft Word and Microsoft Access or any open office suite	1,20
3.	Any Database Software.	3-20

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. Introduction to Database system (Weightage-10, Hrs- 04)		
1a.Define the database Management system. 1b. Identify the advantages of database approach over the file-based data storage system 1c. Describe the architecture of DBMS and Data Models	1.1	Basic Database concepts: Data, database, Database system, DBMS, and Drawbacks of file system, Advantages of DBMS, Applications of DBMS, data abstraction, Data independence, Schema, The Dr. E.F. Codd's Rules for RDBMS.
	1.2	Architecture: Overall Architecture of DBMS.
	1.3	Data Models: Three classical Data Models-Hierarchical, Networking, Relational Data Models.
Unit 2. Relational Model(Weightage-10 , Hrs- 07)		
2a Create Normalized Database structure On given data. 2b. Draw the ER Diagrams on given Database. 2c.Define various RDBMS terminologies.	2.1	Database Design: Relational database Design, Normalization based on functional dependencies, Normal forms: 1NF, 2NF, 3NF.
	2.2	Conceptual Design: Entity Relationship Model, Strong Entity set, Weak Entity set, Attribute,Types of Attributes, E-R Diagrams.
	2.3	Relational Database Design: Concept of Relational Database Design, Different types of RDBMS Software.

Unit Outcomes (UOs) (in cognitive domain)		Topics and Sub-topics
	2.4	RDBMS Terminology: Relation, Domain, Tuple, Cardinality, Degree.
Unit 3. Interactive SQL(Weightage-20 , Hrs- 14)		
3a. Create Tables by applying constraints.	3.1	Introduction to SQL: Data types in SQL, Purpose of DDL, DML, DCL
3b.Perform various operations on given data using DDL, DML and DCL Commands.	3.2	DDL Commands: Create, Alter, Drop, Truncate, Desc, Rename.
	3.3	Data Constraints: Use of Data Constraints, Types of Data Constraints- Primary key constraint, Foreign key constraint, Unique key constraint, Not Null Constraint, Check constraint, Default Value Concept
3c.Write and execute Database Queries on given data by using different operators ,functions and clauses	3.4	DML commands: Insert, Delete, and update
	3.5	DQL Command: Select
3d.Retrieve data from single or multiple tables	3.6	SQL Operators: Arithmetic Operators, Logical Operators, Set Operators, Range Searching Operators-Between , Pattern matching operators-Like, The Oracle Dual table
	3.7	In built Functions: Aggregate functions, Date and time Functions, String functions. Conversion functions, Special Date formats using To_Char () function.
	3.8	Clauses & Join: Different types of clauses in SQL, Joins, Types of Joins, Nested queries.
Unit 4. Advanced database Features(Weightage-10 , Hrs- 04)		
4a.Create and Manage views	4.1	Views: Concept of View, Types of Views: Read Only View and Updatable Views, Creating Views, Updating Views, Dropping Views
4b.Create and Manage Sequences	4.2	Sequences: Creating Sequences, Altering Sequences, Dropping Sequences.
4b. Create Indexes using SQL query to solve given Problem.	4.3	Indexes: Index Types, Creating of an Index: Simple Unique, and Composite Index, Dropping Indexes.
Unit 5. PL/SQL Programming(Weightage-20 , Hrs- 14)		
5a.Describe the advantages of PL/SQL	5.1	PL/SQL Programming: Introduction of PL/SQL, Advantages of PL/SQL, PL/SQL execution environment, PL/SQL data

Unit Outcomes (UOs) (in cognitive domain)		Topics and Sub-topics
5b.Write basic PL/SQL Programs.		Types, Variables, Constants.
5b.Write PL/SQL program using Control structure.	5.2	Control Structure: Conditional Control, Iterative Control, Sequential Control.
	5.3	Exception handling: Predefined Exception, User defined Exception.
5c. Write the PL/SQL Code to create cursor for retrieving multiple records for the given Problem.	5.4	Cursors: Implicit and Explicit Cursors, Declaring, Opening and Closing a Cursor, Fetching a Record from Cursor, Cursor for loops, Parameterized Cursors.
	5.5	Procedures: Advantages, Creating, Executing and Deleting a Stored Procedure.
5d. program for handling Exceptions.	5.6	Functions: Advantages, Creating, Executing and Deleting a Function.
5e. Create stored Procedures , Functions and Triggers	5.4	Database Triggers: Use of Database Triggers, Types of Triggers, Syntax for Creating Trigger, Deleting Trigger.
Unit 6. Advanced Database Technologies(Weightage-10 , Hrs- 05)		
6a. Use NoSQL database to solve given queries. 6b.Differentiate SQL and NoSQL database.	6.1	Advanced Database Techniques: NoSQL database concept, Types of NoSQL databases, NoSQL data modelling, Benefits of NoSQL, Comparison between SQL and NoSQL database system.
6c. Use MongoDB to solve given queries.	6.2	Introduction to Hadoop Framework
6d. Implement basic operations on MongoDB shell.	6.2	NoSQL using MongoDB: Introduction to MongoDB Shell, Running the MongoDB Shell, Basic operations with MongoDB Shell.
6e. Define Data Warehousing and Data Mining.	6.3	Introduction to Data Warehousing and Data Mining.
6f.Define Big Data. 6g.Explain Hadoop Architecture.	6.4	Introduction to Big data

8. 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 to Database system	04	6	4	-	10
II	Relational Model	07	4	6	2	10
III	Interactive SQL	14	4	4	12	20
IV	Advanced database Features	04	2	4	4	10
V	PL/SQL Programming	14	4	6	12	20
VI	Advanced Database Technologies	05	2	4	4	10
Total		48	18	20	32	80

9. 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 of practicals.
- b. Undertake micro projects

9. 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. Guide student(s) in undertaking micro-projects.
- d. Use proper equivalent analogy to explain different concepts.
- e. Use Flash/Animations to explain various components, operation and
- f. Teacher should ask the students to go through instruction and Technical manuals.

9. **MICRO-PROJECTS**
   NA

9. **LEARNING RESOURCES**

Sr. No.	Title of Book	Author	Publication
1.	Introduction to Database	ISRD Group	McGraw Hill Education,2005,New Delhi,ISBN-13:9780070591196
2.	SQL,PL/SQL ,The Programming Language of ORACLE	Bayross, Ivan	BPB Publications, New Delhi 3rd Edition ,ISBN-13:978-9332901384
3.	Database System Concepts	Korth, Henery Abraham,Silberschatz Sudarshan ,S	McGraw Hill Education,2005,New Delhi,ISBN-13:978-9332901384
4.	Complete Reference :Mysql	Vaswani Vikram	McGraw Hill Education,2005,New Delhi,ISBN-13:9780070586840

13.SOFTWARE/LEARNING WEBSITES

   a. http://www.nptel.ac.in
   b. http://www.tutorialspoint.com/NoSQL-Databases
   c. wielyIndia.com
   d. http://docs.mongodb.org/manual/

14.PO - COMPETENCY- CO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO/PO	Basic and Discipline Specific knowledge	Problem Analysis	Design/ Development of Solutions	Engineering Tools, Experimentations and Testing	Engineering Practices for Society , Sustainability and Environment	Project Management	Life Long Learning

Describe the Database Management System with its advantages and applications	*1*	*-*	*-*	*-*	*-*	*-*	
Design the Relational database structure with normalisation concept and Draw the ER diagrams	*1*	*2*	*1*	*1*	*1*	*-*	*1*
Create the database Tables with constraints and perform various operations on	*1*	*2*	*2*	*2*	*2*	*-*	*1*

database.							
Create and Manage views, Sequences and Indexes.	*1*	*1*	*1*	*1*	*1*	-	*1*
Write PL/SQL code using cursor, control structure ,procedures and function	*1*	*1*	*1*	*1*	*1*	-	*1*
Describe the concept of NoSQL, Big Data and Hadoop	*1*	-	-	*1*	-	-	-
Summary	**1**	**2**	**1**	**1**	**1**	**-**	**1**

15.PSO - COMPETENCY- CO MAPPING

CO /PSO	Hardware and Networking	Database Technologies	Software Development
Describe the Database Management System with its advantages and applications	-	3	-

Design the Relational database structure with normalisation concept and Draw the ER diagrams	-	3	-
Create the database Tables with constraints and perform various operations on database.	-	3	-
Create and Manage views, Sequences and Indexes.	-	3	-
Write PL/SQL code using cursor, control structure ,procedures and function	-	3	-
Describe the concept of NoSQL, Big Data and Hadoop	-	3	-
Summary	-	3	-

(Smt.A.D.Kshirsagar)
Signature of Course Expert

(Smt. M.U. Kokate)   (Mr. A.S. Zanpure)
Signature of Programme Head   Signature of CDC In-charge

Government Polytechnic, Pune
'18OB' – Scheme

Programme	Diploma in Computer Engineering and Information Technology
Programme code	06, 26, 07
Name of Course	Digital Marketing
Course Code	AU4105
Prerequisite course code and name	(NA)

1. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)			Examination Scheme				Total Marks
						Theory		Practical		
L	T	P	C			ESE	PA	*ESE	PA	50
				Marks	00	00	25	25	
00	00	02	02	Exam Duration	--	--	--	--	

(*): OE/POE (Oral Examination/Practical & Oral Examination mention whichever is applicable)

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

Note: ESE for the course will be based on oral examinations

2. RATIONALE

Digital marketing is advertising or promotions of products and services using digital platforms. Digital Marketing is rapidly evolving technology. And social media is ever growing marketing platform for users. The course will help students to improve skills to market their product or service in the digital media. The course will enable students to explore and create something new who wants to be a good entrepreneur or good professional in design and development.

3. COMPETENCY

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

- Enhance business using various digital media channels

4. COURSE OUTCOMES (COs)

The 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. Identify advertisement sections of web pages in a website.
2. Install Google analytics on a website.
3. Use Google analytics for reading analytics data.
4. Generate reports for sample web-site
5. Use e-mail marketing tool

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:

Sr. No	PRO	Practical Exercises (Outcomes in Psychomotor Domain)	Relevant CO	Approximate Hours Required.
1	Study a sample web-site	Study and prepare a report of a sample web-site with strategic flow for e-commerce/publication etc. with the use of: HTML, CSS, and JavaScript.	1, 2	2
2	Install Google Analytics for a sample web-site	Set up and create account on Google Analytics and install it on a web-site. Study of Google Analytics GUI/IDE for: • Inbound and outbound marketing • Content marketing • Website Content optimization	2	2
3	Use 'Monster Insight' plug-in for sample web-site	(A) Demonstrate and install Google Analytics plug-in 'Monster Insight' for the web-site. (B) Study of Search Engine Optimization (SEO) using Digital marketing platform.	2	2
4	Track links for sample web-site	(A) Create the tracking id for web-site and track links. (B) Analyze website traffic and leads using DM platform/tool.	2	2
5	Use Google analytics for reading analytics data.	Read Analytics data. Read audience acquisition and behavior	3	2
6		Analyze data using Google Analytics	3	2
7	Generate reports for sample web-site	Generate different types of reports through Google Analytics	4	2
8	Use e-mail marketing tool for sample web-site	Study of any email marketing tool (Freeware)	5	2
			Total Hrs	**16**

Sr.No.	Performance Indicators	Weightage in %
a.	Study of web pages and web site	30
b.	Installing and setting up the tool for web site	30
c.	Observations and Recording	10
d.	Interpretation of reports, result and Conclusion	10
e.	Answer to sample questions	10
f.	Submission of term work journal in time	10
	Total	100

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

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

Sr.No.	Major tools Required	PrO. No.
1	Web browser	1,2
2	Any Web Server (e.g. Glassfish, Tomcat)	3,4,7
3	Google Analytics	5,6

7. THEORY COMPONENTS
(Not applicable)

8. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN
(Not applicable)

9. SUGGESTED STUDENT ACTIVITIES
Other than the 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 each activity.

a. Prepare journals based on practical performed in laboratory.
b. Study of different types of web-sites (ecommerce/ publication/ social media) and advertisements on these web-sites.

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. Self-learning through Online tutorials to more analyze business data
b. Use of freeware marketing tools to check for the effectiveness for particular type of websites

11. SUGGESTED MICRO-PROJECTS
(Not applicable)
(Only for Class Declaration Courses)

12. SUGGESTED LEARNING RESOURCES

S.N.	Title	Author, Publisher, Edition and Year of publication	ISBN Number
1	Fundamentals of Digital Marketing	Puneet Singh Bhatia, PEARSON INDIA, 2nd Edition (June 2019)	9789353435141
2	The Art of SEO	Eric Enge, Stephan Spencer, Jessie Stricchiola, O'Reilly; 3 edition (August 2015)	1491948965, 978-1491948965

13. SOFTWARE/LEARNING WEBSITES

1. www.nptel.com
2. https://youtu.be/mXcQ7rVn3ro
3. https://youtu.be/gQe7gGGuzeQ
4. https://www.tutorialspoint.com/digital_marketing/

14. PO - COMPETENCY- CO MAPPING

CO/PO	PO1 Basic and Discipline Specific knowledge	PO2 Problem Analysis	PO3 Design/Development of Solutions	PO4 Engineering Tools, Experimentations and Testing	PO5 Engineering Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning
Identify advertisement sections of web pages in a website.	-	1	3	2	-	1	-
Install Google analytics on a website.	-	2	1	2	-	-	1
Use Google analytics for reading analytics data.	1	2	3	3	-	1	1
Generate reports for sample web-site	-	1	2	3	-	1	1
Use e-mail marketing tool	-	3	3	3	1	1	2
Summary	1	2	2	3	1	1	1

PSO - COMPETENCY- CO MAPPING

IT:

	PSO1	PSO2	PSO3
Identify advertisement sections of web pages in a website.	1	-	3
Install Google analytics on a website.	1	-	2

Use Google analytics for reading analytics data.	-	3	1
Generate reports for sample web-site	-	3	2
Use e-mail marketing tool	1	3	2

Comp:

	PSO1	PSO2	PSO3
Identify advertisement sections of web pages in a website.	1	2	
Install Google analytics on a website.	1	3	
Use Google analytics for reading analytics data.	-	3	
Generate reports for sample web-site	-	3	
Use e-mail marketing tool	1	3	

Sign: Name: 1) Smt M.G.Yawalkar 2) Smt. A.S. Paike 3) Smt. K.S.Gaikwad (Course Expert /s)	Sign: Name: (Mr. U. V.Kokate) Signature of Head of the Department (Computer Engineering)
Sign: Name: (Mrs. M. U. Kokate) M. V Kokate Signature of Head of the Department (Information Technology)	Sign: Name: Shri A.S.Zanpure (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	Introduction to E-Commerce
Course Code	MA4105
Prerequisite course code and name	NA

1. **TEACHING AND EXAMINATION SCHEME**

Teaching Scheme (In Hours)			Total Credits (L+T+P)		Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
L	T	P	C		ESE	PA	*ESE	PA	
				Marks	40	10	-	-	50
02	-	-	02	Exam Duration	2Hrs	1 Hr	-	-	

(*): OE/POE (Oral Examination/Practical & Oral Examination mention whichever is applicable)

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

2. **RATIONALE**

This course is aimed at providing the students with modules on the use of the Internet and e-commerce. It also includes all aspects of deploying e-business and e-commerce within an organization. It also provides theories and concepts and questions the validity of these models in the light of the differences between the Internet and other media.

3. **COMPETENCY**

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

- Understand real time problem solving and relevant soft skills.

4. **COURSE OUTCOMES (COs)**

The theory, real time problem solving 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. Define E-commerce and various business models.
2. Describe fundamental sales process.
3. Recognise the variants of the process of B2C and B2B.
4. Identify ethical aspects of ICT.

G P Pune

5. **PRACTICALS/ EXERCISES**
NA

6. **MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED**
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 Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 1. INTRODUCTION TO E-COMMERCE (Weightage-06, Hrs- 04)	
1a. Define E-commerce. 1b. Differentiate between various business models. 1c. Explain technical challenges. 1d. Explain economic challenges.	1.1 Basics and definitions – E-Commerce. 1.2 Business models related to E-Commerce. 1.3 Technical and economic challenges.
UNIT 2. FRAMEWORKS AND ARCHITECTURES (Weightage-10, Hrs- 08)	
2a. Explain fundamental sales process. 2b. List out Technological elements.	2.1 Actors and Stakeholders. 2.2 Fundamental sales process. 2.3 Technological elements.
UNIT 3. B2C BUSINESS (Weightage-10, Hrs- 08)	
3a. Explain the variants of the process of B2C. 3b. Differentiate between various challenges. 3c. Understand CRM.	3.1 The process model and its variants. 3.2 The pricing challenge. 3.3 The fulfilment challenge. 3.4 The payment challenge. 3.5 B2C-business and CRM. 3.6 B2C software systems.
UNIT 4. B2B BUSINESS (Weightage-08, Hrs- 06)	
4a. Explain the variants of the process of B2B. 4b. Identify B2B software systems.	4.1 The process model and its variants. 4.2 B2B software systems.
UNIT 5. IMPACT OF E-COMMERCE (Weightage-06, Hrs- 06)	
5a. Identify ethical aspects of ICT. 5b. List out different impacts of E-Commerce.	5.1 Ethics, morale and technology. 5.2 Ethical aspects of ICT. 5.3 Overall impacts of E-Commerce. 5.4 Specific impacts of E-Commerce.

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 To E-Commerce	04	02	02	02	06
II	Frameworks and Architectures	08	02	04	04	10
III	B2C Business	08	02	04	04	10

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Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
IV	B2B Business	06	02	02	02	08
V	Impact of E-Commerce	06	02	04	02	06
	Total	32	12	12	16	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: -

Student can study and prepare report on any application in which e-commerce they used.

10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are strategies, which can be used to accelerate the attainment of the various outcomes in this course:

Sr. No.	Topic	Instructional Strategy
1	Introduction To E-Commerce	Class room teaching
2	Frameworks and Architectures	Class room teaching
3	B2C Business	Class room teaching
4	B2B Business	Class room teaching
5	Impact of E-Commerce	Class room teaching

11. SUGGESTED MICRO-PROJECTS
NA

12. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Introduction to E-Commerce: Combining Business and Information Technology 1st Edition	Prof. Dr. Martin Kutz	
2			
3			

13. SOFTWARE/LEARNING WEBSITES
NA

14. PO - COMPETENCY- CO MAPPING

CO/PO →	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Define E-commerce and various business models.	-	-	-	1	1	-	2
Describe fundamental sales process.	1	1	-	-	1	-	1
Recognise the variants of the process of B2C and B2B.	1	-	-	1	1	-	1
Identify ethical aspects of ICT.	1	1	-	1	1	-	1
Summary	1	1	-	1	1	-	2

15. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
CO1	-	1	-
CO2	-	1	-
CO3	-	-	-
CO4	-	1	-
Summary	-	-	-

1. P. N. Yewale
2. H. S. Pawar
3. N. R. Wagh
Signature of Course Expert

(Mrs. M. U. Kokate)
Signature of Head of the Department
(Information Technology)

(Mr. U. V. Kokate)
Signature of Programme Head
(Computer Engineering)

(Mr. A. S. Zanpure)
Signature of CDC In-charge

Government Polytechnic, Pune

'180 OB' – Scheme

Programme	Diploma Program in Computer Engineering / Information Technology
Programme Code	06/07
Name of Course	Information Management
Course Code	MA4106
Prerequisite course code and name	No

1. **TEACHING AND EXAMINATION SCHEME**

Teaching Scheme (In Hours)			Total Credits (L+T+P)		Examination Scheme				Total Marks
					Theory Marks		Practical Marks		
L	T	P	C		ESE	PA	*ESE	PA	
02	-	-	02	Marks	40	10	-	-	50
				Exam Duration	2Hrs	1 Hr	-	-	

(*): OE/POE (Oral Examination/Practical & Oral Examination mention whichever is applicable)

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

2. **RATIONALE**

Organizations of all sizes generate and work on information. Collection and management of Information becomes an important aspect in each and every field. This course is aimed at providing the students with the basics of Information Management.

3. **COMPETENCY**

The aim of this course is to attend following industry identified competency through various teaching learning experiences:
- Understand the Indian economy how it works through information management.

4. **COURSE OUTCOMES (COs)**

The theory, real time problem solving 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. Recognize information system in any organization.
2. Enlist types of Information Systems.
3. Identify the competitive environment of business.
4. Identifying challenges in Information management.
5. State Social and Ethical issues with Information Management.

5. **PRACTICALS/ EXERCISES**
   NA

6. **MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED**
   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 Outcomes (UOs) (in cognitive domain)	Topics and Sub-topics
UNIT 1. ORGANISATIONS AND INFORMATION SYSTEMS (Weightage-08, Hrs-06)	
1a. List different types of modern organisations. 1b. Explain IT interaction model. 1c. Identify challenges for the manager.	1.1 Modern Organisation- IT enabled, Networked, Dispersed, Knowledge 1.2 Information Systems in Organisations. 1.3 Managing Information Systems in Organisations. 1.4 Challenges for the manager. 1.5 The Role of Internet. 1.6 Managing the Internet era.
UNIT 2. CONCEPTS OF MANAGEMENT INFORMATION SYSTEMS (Weightage-08, Hrs-06)	
2a. Enlist types of Information Technology. 2b. Enlist types of Information Systems. 2c. Differentiate between various decisions. 2d. Explain communication in organisations.	2.1 Data and Information, Information as a resource. 2.2 Information in organisational functions. 2.3 Types of Information Technology, Types of Information Systems. 2.4 Decision making with MIS. 2.5 Communication in organization.
UNIT 3. INFORMATION SYSTEMS AND MANAGEMENT STRATEGY (Weightage-10, Hrs-08)	
3a. Identify the competitive environment of business. 3b. Find out the properties of Information Goods. 3c. Explain value chain.	3.1 The competitive environment of business. 3.2 Using IT for competing. 3.3 Information Goods. 3.4 Information Systems and Competitive Strategy.
UNIT 4. MANAGING INFORMATION SYSTEMS (Weightage-08, Hrs-06)	
4a. Understand the challenges of managing the IT function. 4b. Identify vendor. 4c. Explain the role of CIO.	4.1 Challenges of managing the IT function. 4.2 Vendor Management. 4.3 The Role of CIO.
UNIT 5. ETHICAL AND SOCIAL ISSUES (Weightage-06, Hrs-06)	
5a. Explain Ethical issues. 5b. Explain Social issues.	5.1 Ethical issues- Privacy, Workplace Monitoring, Power over Users. 5.2 Social issues- Workplace Behaviour and Health, De-skilling and Alienation, Telecommuting, E-Waste.

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	Organisations and Information Systems	06	04	02	02	08
II	Concepts of Management Information Systems	06	04	02	02	08
III	Information Systems and Management Strategy	08	04	04	02	10
IV	Managing Information Systems	06	02	04	02	08
V	Ethical and Social Issues	06	02	02	02	06
	Total	32	16	14	10	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: -

Student can study and prepare report on information management as done in any small setup like cyber café, canteen, medical or grocery shops etc.

10. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are strategies, which can be used to accelerate the attainment of the various outcomes in this course:

Sr. No.	Topic	Instructional Strategy
1	Organisations and Information Systems	Class room teaching
2	Concepts of Management Information Systems	Class room teaching
3	Information Systems and Management Strategy	Class room teaching
4	Managing Information Systems	Class room teaching
5	Ethical and Social Issues	Class room teaching
6	Organisations and Information Systems	Class room teaching

11. SUGGESTED MICRO-PROJECTS
NA

12. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Indian Economy	Rahul Rai	

13. SOFTWARE/LEARNING WEBSITES
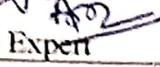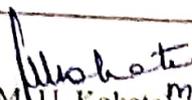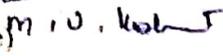1. https://en.wikipedia.org/wiki/Information_system

14. PO - COMPETENCY- CO MAPPING

CO/PO	PO1 Basic and Discipline Specific knowledge	PO2 Problem Analysis	PO3 Design/Development of Solutions	PO4 Engineering Tools, Experimentations and Testing	PO5 Engineering Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning
Recognize information system in any organization.	1	-	-	1	-	-	1
Enlist types of Information Systems.	1	-	-	-	1	-	1
Identify the competitive environment of business.	1	1	-	2	2	-	1
Identifying challenges in Information management.	1	-	-	2	2	-	1
State Social and Ethical issues with Information Management.	1	1	-	-	-	-	1
Summary	1	1	-	2	2	-	1

15. PSO - COMPETENCY- CO MAPPING

	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-
Summary	-	-	-

1. Smt. P. N. Yewale 2. Smt. G. B. Garud 3. Smt. A. S. Paike Signature of Course Expert	(Mrs. M. U. Kokate) Signature of Head of the Department (Information Technology)
(Mr. U. V. Kokate) Signature of Programme Head (Computer Engineering)	(Mr. A. S. Zanpure) Signature of CDC In-charge