

COURSE TITLE ENGINEERING MATHEMATICS
 COURSE CODE 6G102

Diploma program in which course is offered	Semester in which course is offered
CE/ME/EE/ET/IT/CO/AE	Second Semester

1. RATIONALE:

Engineering Mathematics forms foundation to understand basic principles of Engineering Mathematics to solve engineering problems. This subject is an extension of Basic Mathematics which deals with calculus, differentiation, integration, differential equations etc. which have applications in several engineering courses of various programmes. This course aims at multi-dimensional logical thinking and reasoning capabilities of the students.

2. COMPETENCY STATEMENT:

At the end of studying this course students will be able to

"Solve engineering problems using the principles of applied mathematics."

3. COURSE OUTCOMES

Students will be able to

1. Differentiate the various function using different rules
2. Apply rules of derivatives to solve engineering problems.
3. Apply rules of integration to solve engineering problems.
4. Solve the various types of differential equations.
5. Apply principles of central tendencies for quality assurance in engineering field

4. TEACHING AND EXAMINATION SCHEME

Teaching scheme (In hours)			Total credits (L+T+P)	Examination scheme				
L	T	P	C	Theory Marks		Practical marks		Total Marks
				ESE	PT	ESE	PA	
03	01	00	04	80	20	--	--	100
Exam Duration				3 Hrs	1 Hr.			

Legends:

L-Lecture; T – Tutorial/Teacher Guided Theory Practice(batch-wise); P Practical;

C – Credit; ESE -End Semester Examination; PT - Progressive Test.



5. CORSE DETAIL.

Unit	Major Outcomes	Learning	Topics and Sub-topics
UNIT I Derivatives	1a. Differentiate various engineering functions		1.1 Definition of derivative, notation. 1.2 Derivative of standard functions. 1.3 Rules of Differentiation (without proof) such as sum, difference, product and quotient. 1.4 Derivative of composite functions. 1.5 Derivative of inverse trigonometric functions. 1.6 Derivative of implicit functions. 1.7 Derivative of parametric functions. 1.8 Logarithmic differentiation. 1.9 Second order derivatives.
UNIT II Applications of derivative	2a. Apply derivatives to find Velocity, Acceleration and Maxima & Minima		2.1 Tangent & normal. 2.2 Maxima & minima. 2.3 Radius of curvature.
UNIT III Integration	3a. Integrate various Functions using appropriate methods.		3.1 Definition of integration. 3.2 Integration of standard function. 3.3 Rules of Integration: sum, difference & multiplication. 3.4 Methods of Integration 3.4.1 Integration by substitution. 3.4.2 Integration by partial fraction. 3.4.3 Integration by parts. 3.5 Definition of Definite integral. 3.6 Simple problems on definite integral
UNIT IV Differential Equations	4a. Solve various types of differential equations.		4.1 Definition of differential equation, order & degree. 4.2 Formation of differential equation. 4.3 Solution of Diff. equation. 4.4.1 variable separable. 4.4.2 Homogeneous equation. 4.4.3 Exact diff. equation. 4.4.4 Linear diff. equation.
UNIT V Statistics	5a. Measure Central Tendencies 5b. Measure Dispersion for given data.		5.1 Graphical representation: Histogram & o-give curve to find Mode and median. 5.2 Measures of dispersion : Range, mean deviation and Standard deviation.



6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Sr. No	Title/Topic	Teaching Hours	Distribution of Theory Marks			Total
			Remembrance levels	Understanding levels	Application levels	
1	Derivative	12	2	08	08	18
2	Applications of derivative	04	00	04	08	12
3	Integration	16	06	08	12	26
4	Differential Equations	10	04	04	08	16
5	Statistics	06	02	02	04	08
TOTAL		48	14	26	36	80

7. SUGGESTED LIST OF TUTORIAL

- 1) The exercises should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency
- 2) Form a batch of 20 students and at least ten problems should be given to get necessary exercise.
- 3) Course faculty will provide programme related problems.

Sr. No.	Title/Topic	Exercises/Tutorial	Approx. hours
1	Derivative	Solve problems related to various methods/techniques of differentiations	03
2	Applications of derivative	Calculate Engineering Applications of Tangent, normal, maxima, minima and Radius of curvature from respective programmes.	03
3	Integration	Solve problems Related to Various Methods/Techniques of integration	04
4	Differential Equations	Solve problems Related to Various Methods/Techniques of Differential equation.	04
5	Statistics	Solve examples of Comparative data. Plot different types of graph.	02

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

Other than the classroom 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. Collect the mathematical derivation based on curriculum from respective programme.
- b. Identify mathematical problems related to respective programme and get them solved.
- c. Find graphical software using internet and list them.
- d. Identify problems based on applications of differential equations and solve these problems.
- e. Prepare a seminar on any relevant topic based on curriculum.



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

- Use open resources available on internet to teach Engineering Mathematics.
- Apply the mathematical concepts learnt in this course to branch specific problems.
- Use different instructional strategies in classroom teaching.

10. SUGGESTED LEARNING RESOURCES

Sr. No.	Title	Author	Publication
1.	Mathematics for polytechnic students for second Year	S. P. Deshpande	Pune vidhyarti gruh prakshan Pune
2.	Applied Mathematics	By Patel & Rawal	Nirali prakashan Mumbai
3	Mathematics for polytechnic students for second year	G.V.Kumbhojkar	Phadke prakashan Kholapur

11. Major Equipment/ Instrument with Broad Specifications

Sr. No.	Name of the Equipment	Specification
1	NA	

Software/Learning Websites

12. POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. No.	Course Outcome	Program Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	
CO1	Students will be able to differentiate the various function using different rules	2	3	1	-	-	-	-	-	-	-	-	-	-	-
CO2	Students will be able to apply the differentiation to Velocity, Acceleration and Maxima & Minima	-	-	1	-	1	-	-	-	-	-	-	-	-	-
CO3	Students will be able to so integrate the various Function using different methods	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Students will be able to solve the various types of differential equation using different methods.	1	1	3	-	-	-	-	-	-	-	-	-	-	-
CO5	Students will be able to Measure Central tendency and Measure Dispersion in given data	-	1	1	-	1	-	-	-	-	-	-	-	-	-

13. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Sr. No.	Name of the faculty member	Designation and Institute
1	Mr. M.A. Ali	Lecturer in Mathematics, Government Polytechnic, Aurangabad
2	Mr. R.B. Borulkar	Lecturer in Mathematics, Government Polytechnic, Aurangabad
3	Mrs. H.H. Bhumkar	Lecturer in Mathematics, Government Polytechnic, Aurangabad

Member Secretary PBOS

Chairman PBOS

Co-ordinator science and Humanities

