

DEPARTMENT OF TECHNICAL EDUCATION

From	To
The Director of Technical Education, Directorate of Technical Education, Chennai – 600 025.	The Principals of Government / Government Aided / Self-Financing Polytechnic Colleges and Special Institutions.

Letter No.47391/Y3/CDC/2018, Dated: 03.10.2021

Sir/Madam,

Sub:	Technical Education – Revisit the syllabus of Engineering Mathematics I & II for first year Diploma in Engineering and Technology programmes under N-Scheme – Committee Report – Reg.
------	---


The Curriculum and Syllabi for Diploma in Engineering and Technology for various courses and special programmes have been revised under N-Scheme and implemented for the first year students admitted during the academic year 2020-2021.

It is informed that some suggestions have been received from the stakeholders that the curriculum and syllabi of Engineering Mathematics I & II are very difficult for the first year students of Diploma in Engineering and Technology programmes.

Therefore, a new Committee has been constituted to revisit the syllabus of Engineering Mathematics I and II. Based on the Committee report, the revised syllabus is framed.

All the Principals of the Government, Government Aided and Self-Financing Polytechnic Colleges are requested to follow this and the same has to be made available to the concerned HODs, Staff and the students.

Encl: Annexure.


4/10/21
for Director of Technical Education

S. S.
04/10/2021

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS
N-SCHEME

(Implemented from the Academic year 2021 - 2022 onwards)

Course Name : All branches of Diploma in Engineering and Technology and
 Special Programmes except DCP, HMCT and Film & TV.

Subject Code : 40012

Semester : I

Subject Title : ENGINEERING MATHEMATICS - I

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
ENGINEERING MATHEMATICS I	6 [#]	96	25	100*	100	3 Hrs.

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

TOPICS AND ALLOCATION OF HOURS:

Unit	Topics	Time (Hrs)
I	Algebra	18
II	Complex Number	18
III	Trigonometry	17
IV	Differential Calculus – I	18
V	Differential Calculus – II	18
Test & Model Exam		7
Total		96

40012 ENGINEERING MATHEMATICS – I

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	ALGEBRA	
	1.1 MATRICES AND DETERMINANTS: MATRICES: Definition, Concept and Types of Matrices. DETERMINANTS: Determinant of a square Matrix of order 2 X 2 and 3 X 3 – singular and non – singular Matrices - simple problems.	6
	1.2 APPLICATIONS OF MATRICES AND DETERMINANTS: Co-factor, Adjoint of Matrix, Inverse of Matrix - Rank of a matrix by Determinant method– Simple problems. Solution of simultaneous equations using Cramer's rule– simple problems.	6
	1.3 BINOMIAL THEOREM: Introduction – Factorial, Permutation and Combinations – Values of nPr and nCr (results only- not for examination) Statement of Binomial theorem for positive integral index- Applications of binomial theorem. Expansion of Binomial - Finding general term – Middle term – Coefficient of x^n and Term independent of x – Binomial Theorem for rational index up to -3.	6
II	COMPLEX NUMBERS	
	2.1 ALGEBRA OF COMPLEX NUMBERS Introduction – Complex Numbers – Conjugates – Algebra of complex numbers (without geometrical proof), Properties of complex conjugates - Modulus and Amplitude - Polar and Euler form of a complex number – Simple problems.	6
	Argand Diagram – Collinear points, four points forming square, rectangle, rhombus and parallelogram only - Simple problems.	6
	2.2 DE MOIVRE'S THEOREM De Moivre's Theorem (Statement & Applications) – related simple problems.	
	2.3 ROOTS OF COMPLEX NUMBERS	6

V	DIFFERENTIAL CALCULUS – II 5.1 SUCCESSIVE DIFFERENTIATION Successive differentiation up to second order (parametric form not included). Definition of differential equation, order and degree, formation of differential equation- Simple problems	9
	5.2 PARTIAL DIFFERENTIATION Definition - Partial Differentiation of two variables up to second order only – Simple problems.	9

Reference Books:

1. Higher Secondary +1 Mathematics volume I&II. Tamil Nadu Text book corporation.
2. Higher Secondary +2 Mathematics Volume I&II. Tamil Nadu Text book corporation.
3. Engineering Mathematics V. Sundaram, R. Balasubramanian
4. Engineering Mathematics – I C.B.Gupta ,A.K.Malik, New age international Publishers, 1st edition – 2008.
5. Differential Calculus S. Balachandra Rao, CK Shantha New age Publishers
6. Vectors and Geometry GS. Pandey, RR Sharma, New age international publishers.
7. Engineering Mathematics – I Guruprasad Samanta, New age international publishers, 2nd edition 2015.
8. Engineering Mathematics Reena Garg, Khanna publishing house, New Delhi, Revised edn. – 2018.
9. Engineering Mathematics Volume I P. Kandasamy and K. Thilagavathy, S. Chand & Company Ltd.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS
N-SCHEME

(Implemented from the Academic year 2021 -2022 onwards)

Course Name : All branches of Diploma in Engineering and Technology and
 Special Programmes except DCP, HMCT and Film & TV.

Subject Code : 40022

Semester : II

Subject Title : ENGINEERING MATHEMATICS - II

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
ENGINEERING MATHEMATICS-II	5 [#]	80	25	100*	100	3 Hrs.

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

TOPICS AND ALLOCATION OF HOURS:

Unit	Topics	Time (Hrs)
I	Analytical Geometry	14
II	Vector Algebra	14
III	Integral Calculus - I	15
IV	Integral Calculus - II	15
V	Application of Integration	15
Test & Model Exam		7
Total		80

40022 ENGINEERING MATHEMATICS – II
DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	ANALYTICAL GEOMETRY 1.1 ANALYTICAL GEOMETRY II: Circles – General equation of a circle – Family of circles-Concentric circles – Orthogonal circles (condition only) – contact of circles - simple problems.	6
	1.2 CONICS Definition of a Conic, Focus, Directrix and Eccentricity. General equation of a conic $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ (statement only). Condition for conic (i) for circle: $a=b$ and $h=0$ (ii) for pair of straight line: $\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = 0$ (iii) for parabola $h^2 - ab = 0$ (iv) for ellipse: $h^2 - ab < 0$ and (V) for hyperbola: $h^2 - ab > 0$ Simple Problems.	8

II	<p>VECTOR ALGEBRA</p> <p>2.1 VECTOR – INTRODUCTION</p> <p>Definition of vector – types, addition, subtraction and scalar multiplication of vector, properties of addition and subtraction. Position vector. Resolution of vector in three dimensions, distance between two points, Direction cosines and direction ratios – Simple problems.</p> <p>2.2 PRODUCT OF TWO VECTORS</p> <p>Scalar product – Vector product – condition for parallel and perpendicular vectors, properties, angle between two vectors, unit vector perpendicular to two vectors –simple problems. Application of Scalar and Vector product.</p>	7
----	--	---

III	<p>INTEGRAL CALCULUS - I</p> <p>3.1 INTEGRATION - DECOMPOSITON METHOD</p> <p>Historical approach for integration - Anti derivative - Definition of the integral as an anti-derivative - Fundamental rules for integration - Integration using decomposition method - simple problems based on Engineering Applications.</p> <p>3.2 METHODS OF INTEGRATION - INTEGRATION BY SUBSTITUION</p> <p>Integrals of the form $\int [f(x)]^n f'(x) dx$, where $n \neq -1$, $\int \frac{f'(x)}{f(x)} dx$ and $\int F[f(x)] f'(x) dx$ - simple problems.</p> <p>3.3 STANDARD INTEGRALS</p> <p>Integrals of the form $\int \frac{dx}{a^2 \pm x^2}$, $\int \frac{dx}{x^2 - a^2}$, $\int \frac{dx}{\sqrt{a^2 - x^2}}$, $\int \sqrt{a^2 - x^2} dx$, $\int \sqrt{x^2 \pm a^2} dx$ - Simple problems.</p>	5
-----	--	---

IV	<p>INTEGRAL CALCULUS – II</p> <p>4.1 METHODS OF INTEGRATION - INTEGRATION BY PARTS</p> <p>Integrals of the form $\int x \sin mx \, dx$, $\int x \cos mx \, dx$, $\int x e^{mx} \, dx$, $\int x^n \log x \, dx$, and $\int \log x \, dx$ Simple problems.</p> <p>4.2 BERNOULLI'S FORMULA</p> <p>Evaluation for the integrals $\int x^m \sin mx \, dx$, $\int x^m \cos mx \, dx$ and $\int x^m e^{mx} \, dx$ Where $m \leq 3$ using Bernoulli's formula - Simple problems.</p> <p>4.3 DEFINITE INTEGRALS</p> <p>Definition of definite integral – Properties of definite integrals - Simple problems.</p>	<p>4</p> <p>5</p> <p>6</p>
V	<p>Application of Integration</p> <p>5.1 Area and Volume</p> <p>Area and Volume – Area of Circle-volume of Sphere and Cone- Simple problems.</p> <p>5.2 First Order Differential Equation</p> <p>Solution of first order variable separable type differential equation- Simple problems.</p> <p>5.3 Linear type Differential Equation</p> <p>Solution of Linear differential equation-Simple problems.</p>	<p>5</p> <p>5</p> <p>5</p>

Reference Books:

1. Higher Secondary +1 Mathematics volume I&II. Tamilnadu Text book corporation.
2. Higher Secondary +2 Mathematics Volume I&II. Tamilnadu Text book corporation.
3. Engineering Mathematics V. Sundaram, R. Balasubramanian
4. Engineering Mathematics – I C.B.Gupta, A.K.Malik, New age international Publishers, 1st edition – 2008.
5. Differential Calculus S. Balachandra Rao, CK Shantha New age Publishers
6. Probability Theory and Stochastic Process B.Prabhakara Rao, TSR Murthy, BS Publishers.
7. Vectors and Geometry GS.Pondey, RR.Sharma, New age international publishers.
8. Engineering Mathematics – I Guruprasad Samanta, New age international publishers, 2nd edition 2015.
9. Engineering Mathematics Reena Garg, Khanna publishing House, New Delhi, Revised edn. – 2018.
10. Engineering Mathematics Volume I P. Kandasamyand K. Thilagavathy, S. Chand & Company Ltd.

An additional hour may be taken from 'Physical Education'. The hour already allotted for Physical Education is two. Now it has been reduced to an hour.