



ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ

ಸಂಖ್ಯೆ:ಡಿಟಿಇ/05/ಸಿಡಿಎಸ್(1)/2024(ಕ.ನಂ.1314612)

ಆಯುಕ್ತ ಕಛೇರಿ
ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಭವನ, ಅರಮನೆ ರಸ್ತೆ,

ಬೆಂಗಳೂರು-560 001,
ದಿನಾಂಕ :19/07/2024.

ಜ್ಞಾಪನ

ವಿಷಯ: 2024-25ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಡಿಪ್ಲೊಮಾ C-20 ಪಠ್ಯಕ್ರಮದ ಪ್ರಥಮ ವರ್ಷದಲ್ಲಿರುವ Engineering Mathematics (20SC01T) ಮತ್ತು Project Management Skills (20PM01T) ಪಠ್ಯಕ್ರಮಗಳಲ್ಲಿ ಪಠ್ಯವಿಷಯಗಳನ್ನು ಕಡಿತಗೊಳಿಸಿ ಪರಿಷ್ಕರಿಸಿ ಅಳವಡಿಸಿರುವ ಬಗ್ಗೆ.
ಮೇಲ್ಕಂಡ ವಿಷಯದ ಬಗ್ಗೆ ಡಿಪ್ಲೊಮಾ C-20 ಪಠ್ಯಕ್ರಮದ ಪ್ರಥಮ ವರ್ಷದಲ್ಲಿರುವ Engineering Mathematics (20SC01T) ಮತ್ತು Project Management Skills (20PM01T) ಪಠ್ಯಕ್ರಮಗಳಲ್ಲಿರುವ ಪಠ್ಯವಿಷಯಗಳನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳ ಕಲಿಕಾ ಮಟ್ಟಕ್ಕೆ ಅನುಗುಣವಾಗಿ ಮತ್ತು ಡಿಪ್ಲೊಮಾ ವ್ಯಾಸಂಗಕ್ಕೆ ಪೂರಕವಾಗಿ ಕಡಿತಗೊಳಿಸಿ ಪರಿಷ್ಕರಿಸಿ 2024-25ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅಳವಡಿಸಲಾಗಿದೆ.

ಪಾಲಿಟೆಕ್ನಿಕ್ ಸಂಸ್ಥೆಗಳ ಸಂಬಂಧಪಟ್ಟ ಉಪನ್ಯಾಸಕರು ಇಲಾಖೆಯ ವೆಬ್ ಸೈಟ್ <https://dtek.karnataka.gov.in> ನಲ್ಲಿ ಪ್ರಕಟಿಸಿರುವ ಪರಿಷ್ಕೃತ Engineering Mathematics (20SC01T) ಮತ್ತು Project Management Skills (20PM01T) ಪಠ್ಯಕ್ರಮಗಳಲ್ಲಿ ಸೂಚಿಸಿರುವಂತೆ ಪಠ್ಯವಿಷಯಗಳ ಬೋಧನೆ, ತರಬೇತಿ ಮತ್ತು ಮಾದರಿ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ ಪ್ರಕಾರ ಪರೀಕ್ಷೆಗಳನ್ನು ನಡೆಸಲು ಸೂಚಿಸಿದೆ. ಸಂಸ್ಥೆಗಳ ಪ್ರಾಚಾರ್ಯರು ಪರಿಷ್ಕರಿಸಿದ Engineering Mathematics (20SC01T) ಮತ್ತು Project Management Skills (20PM01T) ಪಠ್ಯವಿಷಯಗಳ ಬಗ್ಗೆ ಉಪನ್ಯಾಸಕರುಗಳಿಗೆ ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಮಾಹಿತಿಯನ್ನು ನೀಡಲು ಸೂಕ್ತ ಕ್ರಮ ಕೈಗೊಳ್ಳಲು ತಿಳಿಸಿದೆ.

ಟಿಪ್ಪಣಿ ಮಾನ್ಯ ಆಯುಕ್ತರಿಂದ ಅನುಮೋದಿಸಲ್ಪಟ್ಟಿದೆ

(ಸಿಡಿಎಸ್)

ಇವರಿಗೆ:

ರಾಜ್ಯದ ಎಲ್ಲಾ ಸರ್ಕಾರಿ/ಅನುದಾನಿತ/ಖಾಸಗಿ ಪಾಲಿಟೆಕ್ನಿಕ್ ಸಂಸ್ಥೆಗಳ ಪ್ರಾಚಾರ್ಯರು- ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಅಳವಡಿಸಿ ಸೂಕ್ತ ಕ್ರಮ ಕೈಗೊಳ್ಳಲು.

ಪ್ರತಿ:

1. ಜಂಟಿ ನಿರ್ದೇಶಕರು (ಪರೀಕ್ಷೆ) ಮತ್ತು ಕಾರ್ಯದರ್ಶಿಗಳು, ತಾಂತ್ರಿಕ ಪರೀಕ್ಷಾ ಮಂಡಳಿ- ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ.
2. ಜಂಟಿ ನಿರ್ದೇಶಕರು (ತನಿಖೆ), ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ-ಸೂಕ್ತ ಕ್ರಮಕ್ಕಾಗಿ.
3. ಇ-ಗೌವರ್ನನ್ಸ್ ವಿಭಾಗ- ಇಲಾಖಾ ವೆಬ್ ಸೈಟ್ ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು.
4. ಕಡತಕ್ಕೆ


ಜಂಟಿ ನಿರ್ದೇಶಕರು

DETAILED CURRICULUM FOR
COURSE : ENGINEERING MATHEMATICS
COURSE CODE :20SC01T
(COMMON TO ALL BRANCHES C-20)

Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangaluru

Course Code	20SC01T	Semester	I/II
Course Title	ENGINEERING MATHEMATICS	Course Group	Core
No. of Credits	4	Type of Course	Lecture
Course Category	THEORY	Total Contact Hours	4 hrs per week
			52 Hrs Per Semester
Prerequisites	10 th LEVEL MATHEMATICS	Teaching Scheme	(L:T:P)-4:0:0
CIE Marks	50	SEE Marks	50

RATIONALE

Engineering Mathematics specification provides students with access to important mathematical ideas to develop the mathematical knowledge and skills that they will draw on in their personal and work lives. The course enables students to develop mathematical conceptualization, inquiry, reasoning, and communication skills and the ability to use mathematics to formulate and solve problems in everyday life, as well as in mathematical contexts. At this level, the mathematics curriculum further integrates the three content areas taught in the higher grades into three main learning areas: Algebra, Measurement of angles and Trigonometry and Calculus.

1. COURSE SKILL SET

Student will be able to:

- Solve system of linear equations arise in different engineering fields
- Incorporate the knowledge of calculus to support their concurrent and subsequent engineering studies
- Adept at solving quantitative problems
- Ability to understand both concrete and abstract problems
- Proficient in communicating mathematical ideas
- Detail-oriented

2. COURSE OUT COMES

At the end of the course, student will be able to

CO1	Determine the inverse of a square matrix using matrix algebra. Apply the concepts of matrices and determinants to solve system of linear equations and find the characteristic equation associated with the square matrix.
CO2	Find the equation of straight line in different forms. Determine the parallelism and perpendicularity of lines.
CO3	Calculate trigonometric ratios of allied angles and compound angles.
CO4	Differentiate various continuous functions and apply the concept in real life situations.
CO5	Integrate various continuous functions and apply the concept in evaluating the area and volume through definite integrals.

3. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS

UNIT NO	UNIT TITLE	TEACHING HOURS	DISTRIBUTION(THEORY)			
			4 marks questions	5 marks questions	6 marks questions	TOTAL
1	Matrices and Determinants	10	3	3	2	39
2	Straight lines	12	2	5	1	39
3	Trigonometry	08	1	4	2	36
4	Differential Calculus and applications	11	2	3	3	41
5	Integral Calculus and applications	11	2	3	2	35
	Total	52	40	90	60	190

4. DETAILS OF COURSE CONTENT

The following topics/sub-topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets.

UNIT NO	Unit skill set (In cognitive domain)	Topics/Sub-topics	Hours L-T-P
UNIT-1 MATRICES AND DETERMINANTS	<ul style="list-style-type: none"> ➤ Use algebraic skills which are essential for the study of systems of linear equations and matrix algebra 	1.1 Matrix and types 1.2 Algebra of square matrices of order 2 (addition, subtraction, scalar multiplication, transpose and multiplication) 1.3 Evaluation of determinant of a square matrix of order 2. Singular matrix 1.4 Cramer's rule for solving system of linear equations involving 2 variables only 1.5 Adjoint and Inverse of non-singular square matrices of order 2 1.6 Characteristic equation of a square matrix of order 2	10-0-0
UNIT-2 STRAIGHT LINES	<ul style="list-style-type: none"> ➤ Able to find the equation of a straight line in different forms. ➤ Determine whether the lines are parallel or perpendicular. 	2.1 Slope of a straight line 2.2 Intercepts of a straight line 2.3 Intercept form of a straight line 2.4 Slope-point form of a straight line 2.5 Two-point form of a straight line 2.6 General form of a straight line 2.7 Conditions for lines to be parallel and perpendicular 2.8 Equation of a straight line parallel to the given line 2.9 Equation of a straight line perpendicular to the given line	12-0-0
UNIT-3 TRIGONOMETRY	<ul style="list-style-type: none"> ➤ Use basic trigonometric skills in finding the trigonometric ratios of allied and compound angles. 	3.1 Concept of angles, their measurement, Radian measure and related conversions 3.2 Signs of trigonometric ratios in different quadrants (ASTC rule) 3.3 Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say $90^\circ \pm \theta$, $180^\circ \pm \theta$, $270^\circ \pm \theta$ and $360^\circ \pm \theta$) 3.4 Trigonometric ratios of compound angles (without proof). Prove the identities $\sin 2A$, $\cos 2A$, $\tan 2A$, $\sin 3A$ and $\cos 3A$ (No problems based on these proofs for CIE/SEE).	08-0-0
UNIT-4 DIFFERENTIAL CALCULUS AND APPLICATIONS	<ul style="list-style-type: none"> ➤ Able to differentiate algebraic, exponential, trigonometric and logarithmic functions ➤ Able to find higher order derivatives. 	4.1 Derivative of continuous function in an interval and List of formulae 4.2 Rules of differentiation 4.3 Successive differentiation (up to second order) 4.4 Applications of differentiation <ol style="list-style-type: none"> a) Rate measure b) Equation of tangent to the curve at a point 	11-0-0

	<ul style="list-style-type: none"> ➤ Understand and work with derivatives as rates of change in mathematical models. ➤ Equation of tangent to the curve at a point. 		
UNIT-5 INTEGRAL CALCULUS AND APPLICATIONS	<ul style="list-style-type: none"> ➤ Understand the basic rules of integration and Evaluate integrals with basic algebraic integrands. ➤ Apply the skills to evaluate integrals representing areas and volumes. 	5.1 Integral of a function 5.2 List of standard integrals with algebraic, exponential integrands 5.3 Basic rules of integration 5.4 Evaluation of integrals of algebraic, exponential and logarithmic function and its combination. 5.5 Concept of definite integrals with algebraic integrands 5.6 Applications of definite integrals with algebraic integrands <ul style="list-style-type: none"> a) Area under the curve b) Volume of solids generated by curve 	11-0-0

5. MAPPING OF CO WITH PO

CO	Course Outcome	PO Mapped	UNIT Linked	CL R/U/A	Theory in Hrs	TOTAL MARKS
CO1	Determine the inverse of a square matrix using matrix algebra. Apply the concepts of matrices and determinants to solve system of linear equations and find characteristic equation associated with the square matrix. (Only for matrices of order 2X2)	1,7	1	R/U/A	10	39
CO2	Find the equation of straight line in different forms. Determine the parallelism and perpendicularity of lines.	1,7	2	R/U/A	12	39
CO3	Calculate trigonometric ratios of allied angles and compound angles.	1,7	3	R/U	08	36
CO4	Differentiate various continuous functions and apply the concept in real life situations.	1,3,7	4	R/U/A	11	41
CO5	Integrate various continuous functions and apply the concept in evaluating the area and volume through definite integrals.	1,3,7	5	R/U/A	11	35
					52	190

Course	CO's	Programme Outcomes (PO's)						
		1	2	3	4	5	6	7
ENGINEERING MATHEMATICS	CO1	3	0	0	0	0	0	1
	CO2	3	0	0	0	0	0	1
	CO3	3	0	0	0	0	0	1
	CO4	3	0	1	0	0	0	1
	CO5	3	0	1	0	0	0	1
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped								

6 DETAILED COURSE CONTENT

UNIT /NAME	DETAILED COURSE CONTENT	CO	PO	CONTACT HOURS	TOTAL
1 MATRICES AND DETERMINANTS	Definition of a matrix and its types.(definitions not to be given in CIE and SEE).	1	1,7	1	10
	Fundamental algebra of square matrices of order 2. (addition, subtraction, scalar multiplication and Transpose of matrix).	1	1,7	1	
	Solving problems based on multiplication of square matrices of order 2.	1	1,7	1	
	Evaluation of determinant of a square matrix of order 2. Define singular matrix. Solving problems based on properties of singular matrices.	1	1,7	1	
	Cramer's rule to solve system of linear equations with 2 variables.	1	1,7	1	
	Solving more problems based on Cramer's rule to solve system of linear equations of 2 variables.	1	1,7	1	
	Determination of Minors and Cofactors of elements of square matrices of order 2 and examples.	1	1,7	1	
	Determination of adjoint of a square matrix of order 2 and examples.	1	1,7	1	
	Determination of Inverse of a non singular square matrix of order 2 and examples.	1	1,7	1	
	Deriving the characteristic equation of a square matrix of order 2 and examples.	1	1,7	1	
2 STRAIGHT LINES	Introduction to slope of straight lines.	2	1,7	1	12
	Slope of the straight line making an angle of inclination with positive x-axis and problems.	2	1,7	1	
	Slope of the straight line passing through two points.	2	1,7	1	
	Intercepts of a straight line and problems.	2	1,7	1	
	Intercept form of a straight line and problems.	2	1,7	1	
	Slope-point form of the straight line and problems.	2	1,7	1	
	Two-point form of a straight line.	2	1,7	1	
	Introduction to general form of a straight line. Determination of x	2	1,7	1	

	intercept, y intercept and slope from the general form.				
	Problems on finding slope , x and y intercept from the general form.	2	1,7	1	
	Conditions for the lines to be parallel, perpendicular and related problems.	2	1,7	1	
	Determination of equation of a line $ax+by+c=0$ parallel to the another given line $lx+my+n=0$ and related problems.	2	1,7	1	
	Determination of equation of a line $ax+by+c=0$ perpendicular to the another given line $lx+my+n=0$ and related problems.	2	1,7	1	
3 TRIGONOMETRY	Introduction to the concept of measurement of angles in Radians and degrees. Conversions of angles from degrees to radian and vice-versa and related problems.	3	1,7	1	8
	Signs of trigonometric functions in different quadrants(ASTC rule) and values of trigonometric functions for standard angles.	3	1,7	1	
	Definition of allied angles. Trigonometric ratios of allied angles(definition and the table of trigonometric ratios of standard allied angles say, $90^0\pm\theta$, $180^0\pm\theta$, $270^0\pm\theta$ and $360^0\pm\theta$.	3	1,7	1	
	Problems on allied angles.	3	1,7	1	
	Problems on allied angles.	3	1,7	1	
	Introduction to trigonometric ratios of compound angles(without proof). Evaluation of $\sin 15^0$, $\cos 15^0$, $\sin 75^0$ & $\cos 75^0$, $\tan 15^0$, $\tan 75^0$ and $\tan(\pi/4 + A) = \frac{1 + \tan A}{1 - \tan A}$	3	1,7	1	
	Trigonometric ratios of multiple angles proving the identities i) $\sin 2A = 2\sin A \cos A$ ii) $\cos 2A = \cos^2 A - \sin^2 A$ iii) $\cos 2A = 2\cos^2 A - 1$ iv) $\cos 2A = 1 - 2\sin^2 A$ v) $\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$ (No problems based on above proofs)	3	1,7	1	
	Proving the identities i) $\sin 3A = 3\sin A - 4\sin^3 A$ ii) $\cos 3A = 4\cos^3 A - 3\cos A$	3	1,7	1	

4 DIFFERENTIATION AND ITS APPLICATIONS	Definition of derivative of a function. Listing the derivatives of standard Algebraic, trigonometric, exponential & logarithmic functions.	4	1,3,7	1	11
	Sum rule, difference rule, scalar multiplication rule of differentiation and related problems.	4	1,3,7	1	
	Product rule of differentiation – Rule applied for product of 2 functions.	4	1,3,7	1	
	Product rule of differentiation – Rule applied for product of 3 functions.	4	1,3,7	1	
	Quotient rule of differentiation.	4	1,3,7	1	
	Problems on Quotient rule.	4	1,3,7	1	
	Introduction to Successive differentiation up to second order and related problems. (no problems stating to prove that or to show that).	4	1,3,7	1	
	Slope of the tangent to the curve $y=f(x)$ at a point on the curve.	4	1,3,7	1	
	Equation of tangent to the curve $y=f(x)$ at a point on the curve.	4	1,3,7	1	
	Rate measure: Applying the concept of first order derivative to determine the velocity of a function $y=f(x)$ at any time t and related problems.	4	1,3,7	1	
	Rate measure: Applying the concept of first and second order derivative to determine the acceleration of a function $y=f(x)$ at any time t and related problems.	4	1,3,7	1	
5 INTEGRAL CALCULUS AND APPLICATIONS	Introduction to indefinite integral. Listing the Integrals of Algebraic polynomials, exponential functions (Constant functions, x^n , $1/x^n$, e^x only).	5	1,3,7	1	11
	Rules of Integration: Sum rule, Difference rule and Scalar multiplication of integration with integrands as combination of functions listed above and related problems.	5	1,3,7	1	
	Evaluation of integrals with simple algebraic and exponential integrands.	5	1,3,7	1	
	Evaluation of integrals with simple algebraic polynomial integrands and their combinations. Example $y = x^3 + 2x^2 + 3x + 4, y = (x + 1)(x^2 - 2)$	5	1,3,7	1	
	Evaluation of integrals with simple rational algebraic integrands and their combinations. Example: $y = \frac{x^4 + x^3 + x^2}{x^5}$	5	1,3,7	1	

Introduction to integration by parts. (Applied on the integrand $x e^x$)	5	1,3,7	1
Integration by parts (Applied on the integrands $\log x, x \log x$ & $x^2 \log x$)	5	1,3,7	1
Evaluation of definite integrals with algebraic integrands.	5	1,3,7	1
Determination of area under the curve $y=f(x)$ between the ordinates $x=a$ and $x=b$. Determination of the volume of the solid generated by rotating the curve $y=f(x)$ along the axis between the ordinates $x=a$ and $x=b$.	5	1,3,7	1
Problems on area under the curve $y=f(x)$, $f(x)$ is strictly algebraic, between the ordinates $x=a$ and $x=b$.	5	1,3,7	1
Problems on volume generated by the curve $y=f(x)$, $f(x)$ is strictly algebraic, rotated about x-axis between $x=a$ and $x=b$.	5	1,3,7	1

8. INSTRUCTIONAL STRATEGY

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes

- Explicit instruction will be provided in intervention classes or by using different differentiation strategies in the main classroom.
- Lecturer method (L) does not mean only traditional lecture method, but different type of teaching method and media that are employed to develop the outcomes.
- Observing the way their more proficient peers use prior knowledge to solve current challenges and persevere in problem solving will help struggling students to improve their approach to engaging with rich contextual problems.
- Ten minutes a day in homeroom, at the end of class, or as a station in a series of math activities will help students build speed and confidence.
- Topics will be introduced in a multiple representation.
- The teacher is able to show different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
- In a perfect world, teacher would always be able to demonstrate how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. When a concept cannot be applied in that manner, we can still share how it might be applied within mathematics.

9. SUGGESTED LEARNING RESOURCES:

S.No.	Author	Title of Books	Publication/Year
1	B.S. Grewal,	Higher Engineering Mathematics	Khanna Publishers, New Delhi, 40 th Edition, 2007
2	G. B. Thomas, R. L. Finney	Calculus and Analytic Geometry	Addison Wesley, 9 th Edition, 1995
3	S.S. Sabharwal, Sunita Jain, Eagle Parkashan	Applied Mathematics, Vol. I & II	Jalandhar.

4	Comprehensive Mathematics	Comprehensive Mathematics Vol. I & II	Laxmi Publications, Delhi
5	Reena Garg & Chandrika Prasad	Advanced Engineering Mathematics	Khanna Publishing House, New Delhi
6	NCERT I and II PUC text books	Mathematics	NCERT(RADHIKA)/2022

10. COURSE ASSESSMENT AND EVALUATION CHART

Sl.No	Assessment	Duration	Max marks	Conversion
1	CIE Assessment 1 (Written Test -1) At the end of 3 rd week	80 minutes	30	Average of three written tests 30
2	CIE Assessment 2 (Written Test -2) At the end of 7 th week	80 minutes	30	
3	CIE Assessment 3 (Written Test -3) At the end of 13 th week	80 minutes	30	
4	CIE Assessment 4 (MCQ/Quiz) At the end of 5 th week	60 minutes	20	Average of three 20
5	CIE Assessment 5 (Open book Test) At the end of 9 th week	60 minutes	20	
6	CIE Assessment 6 (Student activity/Assignment) At the end of 11 th week	60 minutes	20	
Total Continuous Internal Evaluation (CIE) Assessment				50
8	Semester End Examination(SEE) Assessment (Written Test)	3 Hrs	100	50
Total Marks				100

Note:

- Three CIE (written test) , each of 30 marks for a time duration of 80 minutes shall be conducted. Also, three CIE (MCQ or Quiz/Open book test/student activity or assignment) each of 20 marks for the time duration of 60 minutes shall be conducted. No fractional marks should be awarded during evaluation of CIE and averages at any stage during evaluation will be rounded off to the next higher digit.
- Assessment of assignment or student activity is evaluated through appropriate rubrics by the respective course coordinator. The secured mark in each case is rounded off to the next higher digit.
- SEE (Semester End Examination) is conducted for 100 Marks theory course for a time duration of 3 Hrs and reduced to 50 marks.

11. CIE Pattern:**CIE MODEL QUESTION PAPER**

Programme					Semester: I/II	
Course Name	Engineering Mathematics				Written Test	I/II/III
Course Code	20SC01T	Date		Duration	80 min	Marks 30
Name of the Course Coordinator:						
<p>Note: i) Answer any 2 questions from SECTION-A, each question carries 4 marks. ii) Answer any 2 questions from SECTION-B, each question carries 5 marks. iii) Answer any 2 questions from SECTION-C, each question carries 6 marks.</p>						
Q. No	Questions			Cognitive Level	Course Outcome	Marks
Section – A						
1						4
2						4
3						4
Section – B						
4						5
5						5
6						5
Section – C						
7						6
8						6
9						6
<p>Note:</p> <ul style="list-style-type: none"> • CIE paper should be set for 45 marks divided into three sections A, B and C. • Only one choice question should be given in each section. 						

Register Number

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SEE MODEL PAPER-1

**I/II Semester Examination
ENGINEERING MATHEMATICS**

Duration: 3Hours

Max. Marks:100

- Note:** i) Answer any 5 questions from SECTION-A, each question carries 4 marks.
 ii) Answer any 10 questions from SECTION-B, each question carries 5 marks.
 iii) Answer any 5 questions from SECTION-C, each question carries 6 marks.

SECTION -A

Sl no	QUESTIONS	Marks	CO-Course Outcome
1	If $A = \begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 6 \\ 1 & 3 \end{bmatrix}$, find the matrix $A + 2B$.	4	1
2	If $A = \begin{bmatrix} 3 & 2 \\ 2 & 0 \end{bmatrix}$ then find $A + A^T$ matrix.	4	1
3	If the matrix $A = \begin{pmatrix} x & 1 \\ 3 & 4 \end{pmatrix}$ is singular then find 'x'.	4	1
4	Find the slope of the line whose angle of inclination is 45° with the positive x-axis.	4	2
5	Find the slope of the straight line passing through the points (2, 3) and (3, 1).	4	2
6	Convert 120° into radian and $\frac{3\pi}{2}$ into degree.	4	3
7	If $y = x^3 + 3 \cos x + 4e^x + 2$ then find $\frac{dy}{dx}$.	4	4
8	Find the slope of the tangent to the curve $y = 2x^3 - 1$ at (1, 1)	4	4
9	Integrate $x^3 + 2x^2 + 3x + e^x$ with respect to x.	4	5
10	Evaluate $\int_1^2 x \, dx$	4	5

SECTION -B

Sl no	QUESTIONS	Marks	CO-Course Outcome
11	Verify whether $AB=BA$ for the matrices $A = \begin{bmatrix} 3 & 7 \\ 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 7 & 3 \end{bmatrix}$.	5	1
12	Find adjoint of the matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.	5	1
13	Find characteristic equation of the matrix $A = \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix}$.	5	1
14	Find equation of straight line passing through the point (1,2) which makes an angle 45° to the x - axis.	5	2
15	Find the equation of straight line passing through two points (2,3) and(5,4).	5	2
16	Find the equation of straight-line having x-intercept 2 and y-intercept 3 units respectively.	5	2
17	Show that the two lines $2x + y - 4 = 0$ and $6x + 3y + 10 = 0$ are parallel.	5	2
18	Find <i>the slope m, x</i> - intercept and <i>y</i> - intercept of line $2x + 4y + 5 = 0$.	5	2
19	Find the value of $\sin 300^\circ + \cot 225^\circ$.	5	3
20	Simplify: $\sin(90^\circ + \theta) + \cos(180^\circ - \theta) + \tan(270^\circ + \theta) + \cot(360^\circ - \theta)$	5	3
21	Write the formula of $\sin(A - B)$ and hence find the value of $\sin 15^\circ$	5	3
22	Prove that $\sin 2A=2\sin A\cos A$ using compound angle formula.	5	3
23	If $y = x^2 + \cos x + 5$ then find $\frac{d^2y}{dx^2}$.	5	4
24	If $y = x^3 \log x$ then find $\frac{dy}{dx}$.	5	4
25	If $y = \frac{1+\sin x}{1-\sin x}$ then find $\frac{dy}{dx}$.	5	4
26	Evaluate $\int (x^2(1+x))dx$.	5	5
27	Evaluate $\int_1^2 (x^2 - 1) dx$.	5	5
28	Evaluate $\int x e^x dx$.	5	5

SECTION -C

Sl no	QUESTIONS	Marks	CO-Course Outcome
29	Solve the system of linear equations by applying Cramer's rule $3x + 2y = 8$ and $2x + 5y = 9$.	6	1
30	Identify the singular matrices in the following matrices $A = \begin{bmatrix} 3 & 7 \\ 4 & 0 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 1 \\ 9 & 3 \end{bmatrix}$ $C = \begin{bmatrix} 1 & 2 \\ 7 & 3 \end{bmatrix}$.	6	1
31	Find equation of line passing through the point (2,3) and parallel to the line $5x - 4y + 4 = 0$.	6	2
32	Prove that $\sin 3A = 3 \sin A - 4 \sin^3 A$.	6	3
33	Prove that $\tan(\pi/4 + A) = \frac{1+\tan A}{1-\tan A}$	6	3
34	Apply product rule to find the derivative of the function $y = x^2 e^x \sin x$.	6	4
35	If y is the distance travelled in meters by a particle in time x sec is given $y = 4x^3 - 6x^2 + x - 7$. Find the velocity and acceleration when $x=2$ sec.	6	4
36	Find equation of tangent to the curve $y = x^2 + x$ at the point (1,2).	6	4
37	Find the area under the curve $y = x^2 + 1$ with x-axis and co-ordinates $x = 1$ & $x = 2$.	6	5
38	Find the volume of solid generated by revolving the curve $y^2 = x + 2$ about the axis between $x = 0$ & $x = 1$.	6	5

Register Number

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SEE MODEL PAPER-2

**I/II Semester Examination
ENGINEERING MATHEMATICS**

Duration: 3Hours

Max. Marks:100

- Note:**
- i) Answer any 5 questions from SECTION-A, each question carries 4 marks.
 - ii) Answer any 10 questions from SECTION-B, each question carries 5 marks.
 - iii) Answer any 5 questions from SECTION-C, each question carries 6 marks.
-

SECTION -A

Sl no	QUESTIONS	Marks	CO-Course Outcome
1	If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$, then find $3A + B$.	4	1
2	If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, find $A + A^T$.	4	1
3	If $\begin{vmatrix} 2 & 1 \\ 4 & x \end{vmatrix} = 0$, then find the value of 'x'.	4	1
4	Find the slope and x-intercept of the line $3x+4y+7=0$.	4	2
5	Find the slope of the straight line passing through the points (2, 3) and (4, 6).	4	2
6	Convert 150° into radian and $\frac{3\pi}{4}$ in to degree.	4	3
7	If $y = x + \sin x + e^x + 3$, then find $\frac{dy}{dx}$.	4	4
8	Find the slope of the tangent to the curve $y = \cos x$ at (0, 1).	4	4
9	Integrate $2x^2 + \frac{1}{x} + e^x + 2$ with respect to x.	4	5
10	Evaluate $\int_0^\pi e^x dx$.	4	5

SECTION -B

Sl no	QUESTIONS	Marks	Course Outcome
11	If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$, find AB matrix and also find $(AB)^T$ matrix.	5	1
12	Find the inverse of the matrix $A = \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$.	5	1
13	Find the characteristic equation of the matrix $A = \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix}$.	5	1
14	Find equation of the straight line passing through the point (3,2) and having slope 5.	5	2
15	Find the equation of the straight line passing through the points (4,2) and (6,4).	5	2
16	Show that the two lines $2x + 3y + 1 = 0$ and $4x + 6y + 3 = 0$ are parallel.	5	2
17	Find equation of straight line whose x-intercept and y-intercepts are 5 and 6 respectively.	5	2
18	Find the x-intercept, y-intercept and the slope of the line $6x+5y+10=0$	5	2
19	Find the value of $\sin 150^\circ + \cos 120^\circ$.	5	3
20	Write the formula of $\sin(A + B)$ then find the value of $\sin 75^\circ$.	5	3
21	Prove that $\cos 2A = \cos^2 A - \sin^2 A$.	5	3
22	Simplify: $\cos\left(\frac{\pi}{2} - \theta\right) + \sin(\pi + \theta) + \tan(\pi + \theta) + \cot\left(\frac{3\pi}{2} + \theta\right)$	5	3
23	If $y = x^3 + x^2 + x + 9$, then find $\frac{d^2y}{dx^2}$ at $x = 0$.	5	4
24	If $y = xe^x$, then find $\frac{dy}{dx}$.	5	4
25	If $y = \frac{1+x^2}{1-x^2}$, then find $\frac{dy}{dx}$.	5	4
26	Evaluate $\int (x + 1)(x - 1)dx$.	5	5
27	Evaluate $\int_0^1 (3x^2 + 1)dx$.	5	5
28	Evaluate $\int (x \log x)dx$.	5	5

SECTION -C

Sl no	QUESTIONS	Marks	Course Outcome
29	Solve the system of linear equations $3x + y = 4$ & $x + 3y = 4$ by using Cramer's rule.	6	1
30	Show that $A^2 - 5A - 2I = 0$ for the matrix $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$.	6	1
31	Find equation of line passing through the point (3,2) and perpendicular to the line $3x + 4y + 7 = 0$.	6	2
32	Prove that $\cos 3A = 4 \cos^3 A - 3 \cos A$.	6	3
33	Find the value of $\tan(15^\circ)$ and $\tan(75^\circ)$.	6	3
34	Apply product rule to find the derivative of the function $y = e^x \log x \cos x$.	6	4
35	If y is the distance traversed in meters by a particle in time x sec is given by $y = 2x^3 - x^2 + 5x + 3$, then find the velocity and acceleration when $x=2$ sec.	6	4
36	Find equation of tangent to the curve $y = 2x^2$ at the point (1, 2).	6	4
37	Find the area under the curve $y = 2x + 1$ with x-axis and ordinates $x = 0$ & $x = 2$.	6	5
38	Find the volume of solid generated by revolving the curve $y^2 = 3x^2 + 1$ about the axis between $x = 0$ & $x = 2$.	6	5



**Government of Karnataka
Department of Technical Education**

**PROJECT MANAGEMENT SKILLS
(REVISED C-20 SYLLABUS)
2024-25**



Government of Karnataka
DEPARTMENT OF COLLEGIATE & TECHNICAL EDUCATION

Program	Common to All Programs	Semester	II
Course Name	Project Management Skills	Type of Course	Activity based study
Course Code	20PM01T	Contact Hours	6 Hrs Per Week (2 Theory + 4hrs of class room activities)
			78 Hrs Per Semester
Teaching Scheme	L: T: P - 26-00-52	Credits	4
CIE Marks	50	SEE Marks	100

1. Rationale:

Project Management is a confluence of Management principles and Engineering subject area. This course enables the students to develop conceptualization of Engineering Management principles and apply the same for their engineering projects, in their domains, example, Software Development project or Construction Project and so on. The course integrates three core areas of Planning, Execution and Auditing of Projects.

2. Course Skill Set

Student will be able to:

1. Understand what constitutes a project, Plan for the execution of the project by breaking into manageable work units, and Prepare necessary project artifacts.
2. Track and control the Project while preparing verifiable records for Project Inspections and Audits
3. Inspect and Audit projects for Milestone or other project completion criteria and other metrics, Defects and remediation, Project learnings
4. Gain knowledge and develop curiosity on latest technology trends in Project management

3. Course Outcomes: *At the end of the Course, the student will be able to:*

CO1	Apply the concepts of Project Management to real projects which are expressed in the form of the Project reports or Engineering drawings
CO2	Estimate Project resources needed–Time, Material and Effort, and Plan for execution
CO3	Understand, analyze and assess the risks involved in a project and plan for managing them
CO4	Use Project Management Tools and processes to track and control Projects

CO5	Conduct inspection of Projects and audit progress and bills
CO6	Understand the Digital Technology trends in Project management and concepts like Smart cities

4. Suggested specification table with Hours & Marks

UNIT NO	UNIT TITLE	TEACHING HOURS (L-T-P)	TOTAL
1	Introduction	02-00-04	15
2	Project Administration	06-00-12	30
3	Project Life cycle	04-00-08	25
4	Project Planning, Scheduling and Monitoring	06-00-12	30
5	Project Control, Review and Audit	06-00-12	30
6	Digital Project Management	02-00-04	15
Total		26-00-52=78	145

5. Course Content: - The following topics / sub topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets.

UNIT NO	UNIT TITLE	Unit skill set (In cognitive domain)	Topics/ Subtopics	Hours L-T-P
1	Introduction	Use Basic Science, Maths skills to understand Project management and project planning, execution and control.	Introduction and definition, Features of a Project, Types of Projects, Benefits and Obstacles in Project Management, Role of Project manager, Consultants, Project and Operation, Project Management Process, Project Scope and objectives	02-00-04
2	Project Administration	Able to develop WBS, PEP and PM processes for Project with given inputs	Project Administration, Project Team, Project Design, Work Break down Structure (WBS), Project Execution Plan (PEP), Project Procedure Manual and Project Dairy, Project Execution system, Prerequisites of successful project implementation (Listing) Case Study 1	06-00-12
3	Project Life cycle	Use project administration and project life cycle knowledge to Assess and plan for project risk	Project Life Cycle – Project Initiation, Project Planning, Project Execution, Project Closure, Project Risks, Time Overrun and Cost over runs. Case Study 2	04-00-08

4	Project Planning, Scheduling and Monitoring	Able to develop a detailed project plan given the inputs on manpower, funds availability and time availability	Project Planning Function, Structure, Project Scheduling, Project monitoring and Project evaluation. Case Study 3	06-00-12
5	Project Control, Review and Audit	Use Project Management life cycle knowledge to Control project parameters, review and audit project performance	Project Control, Problems of Project Control, Gantt Charts, Milestone Charts, Critical Path Method (CPM), Network Technique in Project Scheduling, Project Review, Initial Review, Project Audit. Case Study 4	06-00-12
6	Digital Project Management	Understand latest trends of digital technologies impacting the domain of project management and application of the same in multiple scenario	Digital Technology trends in Project management, Cloud Technology, IoT, Smart cities. Case study 5	02-00-04

6. Detailed Course Content: -

UNIT NO	UNIT TITLE	DETAILED COURSE CONTENT	CONTACT HRS
1	Introduction	1.1 Introduction 1.2 Meaning of Project 1.3 Definition of Project 1.4 Features of a Project 1.5 Types of Projects 1.6 Benefits of Project Management 1.7 Obstacles in Project Management 1.8 Project Manager and His Role 1.9 Project Consultants 1.10 Meaning of Operation 1.11 Difference between Project and Operation 1.13 Process in Project Management 1.14 Project Scope and project objectives	02-00-04
2	Project Administration	2.1 Essentials of Project Administration 2.2 Project Team 2.3 Project Design 2.4 Work Breakdown Structure(WBS) 2.5 Project Execution Plan(PEP) 2.6 Contracting Plan	06-00-12

		<p>2.7 Work Packing Plan</p> <p>2.8 Organization Plan</p> <p>2.9 Systems and Procedure Plan</p> <p>2.10 Project Procedure Manual</p> <p>2.11 Project Diary</p> <p>2.12 Project Execution System – List its forms</p> <p>2.13 List the Pre-requisites for Successful Project Implementation</p> <p>2.14 Case Studies</p>	
3	Project Life cycle	<p>3.1 Introduction</p> <p>3.2 Project Life Cycle – General</p> <p>3.3 Project Initiation and list the parameters</p> <p>3.4 Project Planning and list the parameters</p> <p>3.5 Project Execution and list the parameters</p> <p>3.6 Project Closure and list the parameters</p> <p>3.7 Project Risks</p> <p>3.8 Types of Risks: Illustrations</p> <p>3.9 Cost Overruns</p> <p>3.10 Time Overruns</p> <p>3.11 Case Studies</p>	04-00-08
4	Project Planning, Scheduling and Monitoring	<p>4.1 Introduction</p> <p>4.2 Need for Project Planning</p> <p>4.3 Functions of Project Planning</p> <p>4.4 Steps in Project Planning</p> <p>4.5 Project Planning Structure</p> <p>4.6 Tools of Project Planning</p> <p>4.7 Project Scheduling</p> <p>4.8 Problems in Scheduling Real-life Projects</p> <p>4.9 Introduction to project monitoring</p> <p>4.10 Setting Goals and Objectives</p> <p>4.11 Introduction to Implementation</p> <p>4.12 Project Evaluation and its importance</p> <p>4.13 Challenges in Monitoring and Evaluation.</p> <p>4.14 Case Studies</p>	06-00-12
5	Project Control, Review and Audit	<p>5.1 Introduction to Project control</p> <p>5.2 Projected Control Purposes</p> <p>5.3 Problems of Project Control</p> <p>5.4 Gantt Charts 5.5 Milestone Charts</p> <p>5.6 Critical Path Method (CPM)</p> <p>5.7 Construction of a Network</p> <p>5.8 Network Technique in Project Scheduling (PERT)</p>	06-00-12

		5.9 Project Review 5.10 Initial Review and its types 5.11 Objectives of Project Audit 5.12 Functions of Project Auditor 5.13 Case Studies	
6	Digital Project Management	6.1 Digital Technology trends in Project management 6.2 Cloud Technology, IoT, AR and VR applications in Project management, Smart Cities 6.3 Case Studies	02-00-04

7. Suggested Reference Books:

Sl. No.	Author	Title of Books	Publication/Year
1.	Dr. Lalitha Balakrishnan & Dr. Gowri Ramachandran	Project Management	Himalaya Publishing,2019
2.	Shailesh Kumar Shivakumar	Complete Guide to Digital Project Management	Apress,2019
3.	Prasanna Chandra	Project planning, analysis, selection, implementation and review	Tata McGraw Hill
4.	Gopala Krishnan	Project Management	Mcmillan India Ltd.

8. CIE and SEE Assessment Methodologies- (Theory)

Sl. No	Assessment	Duration (minutes)	Max marks	Conversion
1.	CIE Assessment -1 (Written Test-1) At the end of 3 rd week	80	30	Average of all CIE =30 Marks
2.	CIE Assessment- 2 (Written Test-2) At the end of 7 th week	80	30	
3	CIE Assessment - 3 (Written Test-3) At the end of 13 th week	80	30	
4	CIE Assessment 4 (Group Assignment-1) At the end of 5 th week	60	20	Average of all CIE =20 Marks
5	CIE Assessment 5 (Group Assignment 2) At the end of 9 th week	60	20	
6	CIE Assessment 6 (Individual Student activity/ Assignment) At the end of 11 th week	60	20	
Total Continuous Internal Evaluation (CIE)				50 Marks
Semester End Examination (SEE) -Theory		180	100	50 marks
Total				100 Marks

Note:

- SEE (Semester End Examination) is conducted for 100 Marks theory course for a time duration of 3 Hrs
- Three CIE (written test), each of 30marks for a time duration of 80 minutes shall be conducted. Also, three CIE (MCQ or Quiz/Group Assignment/ Individual student activity or assignment) each of 20marks for the time duration of 60 minutes shall be conducted. Any fraction at any stage during evaluation will be rounded off to the next higher digit.

- Assessment of assignment and student activity is evaluated through appropriate rubrics by the respective course coordinator. This secured mark in each case is rounded off to the next higher digit.

9. Instructional Strategy

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes

- Explicit instruction will be provided in intervention classes or by using different differentiation strategies in the main classroom.
- Lecturer method (L) does not mean only traditional lecture method, but different type of teaching method and media that are employed to develop the outcomes.
- Observing the way their more proficient peers use prior knowledge to solve current challenges and persevere in problem solving will help struggling students to improve their approach to engaging with rich contextual problems.
- Topics be introduced always with a real life example and then answering what, how, why and when.
- The teacher is able to show different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
- In a perfect world, teacher would always be able to demonstrate how every concept can be applied to the real world-and when that's possible, it help to improve the students 'understanding. When a concept cannot be applied in that manner, we can still share how it might be applied within mathematics.

10. Mapping of CO with PO

CO	Course Outcome	PO Mapped	UNIT Linked	CL R/U/A	Sessions in Hrs	Total Marks
CO1	Understand the concepts of Project Management in relation to real projects which are expressed in the form of the Project reports or Engineering drawings	1,2,5,7	1, 2	R/U/A	06	15
CO2	Estimate Project resources needed -Time, Material and Effort, and Plan for execution Case study-1	1,2,3,7	2,3	R/U/A	18	30
CO3	Evaluate the risks involved in a project and Plan for managing them Case Study -2	1,2,3,7	2,3	R/U/A	12	25
CO4	Use Project Management methods with Tools and/or processes to track and control Projects Case Study - 3	1,4,6,7	4	R/U/A	18	30

C05	Conduct inspection of Projects and audit progress and bills Case Study- 4	1,2,5,7	5	R/U/A	18	20
C06	Understand the Digital Technology trends in Project management, and Engineering Industries Case Study - 5	1,5,7	6	R/U/A	06	15
					78	145

COURSE	CO's	(PO Programme Outcomes)						
		1	2	3	4	5	6	7
Project Management Skills	C01	3	3	0	0	2	0	1
	C02	3	3	3	0	0	0	1
	C03	3	0	0	3	0	3	1
	C04	3	0	0	3	0	3	1
	C05	3	2	0	0	2	0	1
	C06	3	0	0	0	2	0	2
Level 3- Highly Mapped, Level 2- Moderately Mapped, Level 1- Low Mapped, Level 0- Not Mapped								

Case Studies:

Note:

- The Course coordinator can either use the following Case studies and activities or design on their own, with the overall learning outcomes being met.
- The Course coordinator should use general case studies.

Case Study 1: Assume you are a member of student association. You are given the responsibilities to organize the college fest.

Requirements:

1. There are 500 students in the college and 50 staffs.
2. There are some activities to be conducted such as Cultural, Sports, Exhibition etc...
3. Food arrangements for the students and staff.
4. Stage has to be setup.
5. Prize distribution on college fest day.

Tasks:

- Split the class into groups of three or five.
- Prepare the detailed WBS.
- Prepare the detailed Project execution plan.
- Estimate the budget for the entire activity.
- Present it in a seminar, with each group getting 5-10 minutes to present their idea.

Note: For case study 1 other similar topics can be used, such as

1. Ayudha Pooja celebration – Program wise.
2. Computer Laboratory setup for your programme. Etc..

Case Study 2: Assume you are organizing a 5-day educational trip.

Requirements:

1. There are 30 students in the trip and 2 staffs accompanying them.
2. Mode of transport to be decided.
3. Food arrangements has to be made for the students and staff.
4. Accommodation has to be made for the students and staff.
5. Emergency (First-Aid) Medical arrangements has to be made.

Tasks:

- Prepare the detailed WBS.
- Prepare various phases of the project according to the project life cycle and duration.
- Prepare the project dairy template.
- Prepare the project plan with risks involved and management of the risk.

- Estimate the budget for the entire activity.
- Discuss the reasons of Cost and Time overrun if project is delayed.
- Present it in a seminar, with each group getting 5-10 minutes to present their idea.

Case Study 3: Assume that you are organizing a one-day intercollege student Debate competition at your institution.

Requirements:

1. 2 participants and 1 staff member from about 50 colleges across state.
2. Judges are to be identified.
3. Budget plan for Food, Accommodation and Prizes has to be made.
4. Stage and seating arrangement should be considered.

Task:

- Estimate (**Plan**) the budget for the entire activity
- Prepare the **schedule** chart for the entire activity (any planning tools can be used).
- Give a detailed **monitoring** report as per the scheduled chart.
- Present it in a seminar, with each group getting 5-10 minutes to present their idea.

Case Study 4: A company is started a new project with several activities. The project involves 5 activities.

Activity Identification and Sequencing:

- Activity A: (Duration: 5 days)
- Activity B: (Duration: 10 days, follows Activity A)
- Activity C: (Duration: 15 days, follows Activity B)
- Activity D: (Duration: 12 days, follows Activity C)
- Activity E: (Duration: 8 days, follows Activity D)

Dependencies:

- Activity A must precede Activity B (Finish to Start dependency).
- Activity B must precede Activity C.
- Activity C must precede Activity D.
- Activity D must precede Activity E.

Construct a network diagram, Identify the critical path and determine the Total project duration.

Case Study 5: Suggested list of case studies/activities are -

1. Take a **case study** on how AR been implemented in educational institution to enhance learning experiences. Provide a specific example of a case where AR improved student engagement and

understanding and prepare 3-page article.

2. Describe a case where VR technology has been used for medical field. List the outcomes and benefits observed and report the findings.
3. **Case study** – A Smart city project impacts social aspects such as education, healthcare, or community well-being. Provide specific examples of initiatives that addressed social challenges and report the findings.
4. **Case study** - XYZ Farm is a 100-acre farm specializing in various agricultural production methods. Facing challenges with unpredictable weather patterns and resource management, the farm planning to integrate IoT technologies to improve operational efficiency and sustainability. Report the challenges, IoT technologies and expected outcomes for the given case study.

CIE Theory Test – Model Question Paper

Program					Semester II	
Course Name		PROJECT MANAGEMENT SKILLS			Test	
Course Code		20PM01T	Duration	80 Min	Marks	25
Name of the Course Coordinator:						
Note: Answer any one full question from each section. Each full question carries equal marks.						
Q. No	Questions	Cognitive Level	Course Outcome		Marks	
Section - 1						
1	a. List the characteristics of project manager b. Differentiate between Project and Operation	R A	CO1		5 5	
2	a. List the features of Project. b. Differentiate between Project scope and project Objectives	R A		5 5		
Section - 2						
3	a. Explain project dairy with advantages b. Discuss the factors to be considered while selecting the group member.	U A	CO2		5 5	
4	a. List and explain Project teams b. Differentiate between Effective team and Ineffective team	U A		5 5		
Section - 3						
5	Develop a Work breakdown structure for the College fest celebration.	A	CO2		10	
6	Develop a Work breakdown structure for the College sports meet.	A		10		
Note for the Course coordinator: Each question may have one, two or three subdivisions. Optional questions in each section carry the same weightage of marks, cognitive level and course outcomes.						

Signature of the Course Coordinator

Signature of the HOD

Signature of the IQAC Chairman

SEE –Model Theory Question Paper - 1

CODE: 20PM01T

II Semester Diploma Examinations PROJECT MANAGEMENT SKILLS

Time: 3 Hours]

[Max Marks: 100

<i>Note: i) Answer any SIX questions from Section – 1. Each question carries 5 marks. ii) Answer any SEVEN full questions from Section- 2. Each question carries 10 marks.</i>		
Q No	Questions	Marks
Section -1		
1	Differentiate between Project and Operation.	5
2	List the types of project and explain any one type of projects.	5
3	List any five prerequisites for successful project implementation.	5
4	Define Project team. List any 3 types of a project team.	5
5	Explain Project Management Life cycle.	5
6	Write any five functions of Project planning.	5
7	Explain SMART tool in goals and objectives in Monitoring.	5
8	What is Project Review? List its objectives.	5
9	Discuss any 5 applications of IoT.	5
Section -2		
10	a. Describe the need and functions of project consultants.	5
	b. Write any 5 differences between PERT and CPM	5
11	a. Write a note on Project Execution Plan (PEP)? List its 4 Sub-plans	6
	b. Mention any 4 advantages of project dairy.	4
12	a. Develop a Work breakdown structure for the construction of a college building	7
	b. What do you mean by Work Breakdown structure? List any 2 advantages of WBS	3
13	a. Define Risk. Explain any 3 types of Risks.	7
	b. List any 3 roles of Project manager to minimize risk in the project	3
14	a. A family trip was planned for 3 days with a budget of Rs. 20,000 / - However the actual expenditure was Rs 30,000/-. State the possible reasons for increase in the cost of expenditure.	7
	b. Write a short note on Time Overrun	3
15	a. John is managing a project which is to be completed in 18 months. During the planning phase, he created a detailed project plan that included the schedule, budget, resource allocation, and quality management plan. John used Gantt charts to visualize the timeline and dependencies of various tasks. He also set up regular status meetings to track progress and make	6

	<p>adjustments as needed. Answer the following Questions: Q1: What tools did John use to visualize the project timeline and dependencies? Q2: Why are regular status meetings important in project management? Q3: What key components were included in John's detailed project plan?</p> <p>b. List any four Tools used in Project Planning</p>	4																																			
16	<p>a. Determine the expected time for the following activities</p> <table border="1" data-bbox="427 517 1125 786"> <thead> <tr> <th rowspan="2">Activity</th> <th colspan="3">Estimated duration in days</th> </tr> <tr> <th>Optimistic</th> <th>Most Likely</th> <th>Pessimistic</th> </tr> </thead> <tbody> <tr> <td>1 - 2</td> <td>2</td> <td>5</td> <td>8</td> </tr> <tr> <td>1 - 3</td> <td>4</td> <td>10</td> <td>16</td> </tr> <tr> <td>1 - 4</td> <td>1</td> <td>7</td> <td>13</td> </tr> <tr> <td>2 - 5</td> <td>5</td> <td>8</td> <td>11</td> </tr> <tr> <td>3 - 5</td> <td>2</td> <td>8</td> <td>14</td> </tr> <tr> <td>4 - 6</td> <td>6</td> <td>9</td> <td>12</td> </tr> <tr> <td>5 - 6</td> <td>4</td> <td>7</td> <td>10</td> </tr> </tbody> </table> <p>b. Write the importance of Project Evaluation</p>	Activity	Estimated duration in days			Optimistic	Most Likely	Pessimistic	1 - 2	2	5	8	1 - 3	4	10	16	1 - 4	1	7	13	2 - 5	5	8	11	3 - 5	2	8	14	4 - 6	6	9	12	5 - 6	4	7	10	7 3
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17	<p>Develop a network diagram for a project whose activities and preceding activities with duration are given below</p> <table border="1" data-bbox="541 954 1070 1406"> <thead> <tr> <th>Activity</th> <th>Predecessor</th> <th>Duration (Days)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>–</td> <td>3</td> </tr> <tr> <td>B</td> <td>A</td> <td>4</td> </tr> <tr> <td>C</td> <td>A</td> <td>2</td> </tr> <tr> <td>D</td> <td>B</td> <td>5</td> </tr> <tr> <td>E</td> <td>C</td> <td>1</td> </tr> <tr> <td>F</td> <td>C</td> <td>2</td> </tr> <tr> <td>G</td> <td>D, E</td> <td>4</td> </tr> <tr> <td>H</td> <td>F, G</td> <td>3</td> </tr> </tbody> </table>	Activity	Predecessor	Duration (Days)	A	–	3	B	A	4	C	A	2	D	B	5	E	C	1	F	C	2	G	D, E	4	H	F, G	3	10								
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18	<p>a. State any 5 purpose of project control b. Write any 5 functions of project auditor.</p>	5 5																																			
19	<p>a. List any 5 the differences between Augmented Reality (AR) and Virtual Reality (VR) b. Write the applications of Cloud Technology in Project Management.</p>	5 5																																			

SEE –Model Theory Question Paper - 2**CODE: 20PM01T****II Semester Diploma Examinations
PROJECT MANAGEMENT SKILLS****Time: 3 Hours]****[Max Marks: 100**

<i>Note: i) Answer any SIX questions from Section – 1. Each question carries 5 marks. ii) Answer any SEVEN full questions from Section- 2. Each question carries 10 marks.</i>		
Q No	Questions	Marks
Section -1		
1	Define Project. List any 3 features of a project.	5
2	List and explain the types of consultants.	5
3	Identify any five advantages of effective team.	5
4	Define project administration and list any 3 tools used in project administration.	5
5	Explain Project Life Cycle curve with neat diagram	5
6	Write any 3 advantages and 2 disadvantages of Network techniques	5
7	Explain three time estimates used for project planning.	5
8	What is CPM? Write any 3 objectives of CPM	5
9	Write a note on smart city project.	5
Section -2		
10	a. List any 5 Obstacles in Project management. b. Write a note on Initial review in a project.	5 5
11	List the types of project teams. Explain any 3 project teams	10
12	a. Develop a Work breakdown structure for the birthday celebration using the following first level activities as Invitation, Food, Shopping. b. Write a short note on Project Procedure Manual	6 4
13	a. XYZ company is supposed to develop a customized two wheelers for a customer. Identify and explain different types of risks involved in the project. b. Discuss the Project closure phase in Project Life Cycle.	7 3
14	a. A Logistic company was planned to deliver the goods within 3 days. However, it took 5 days. State the possible reasons for delaying the delivery of goods b. Write a short note on Cost Overrun.	7 3
15	a. Construct Gantt chart for the following.	6

	Jobs	Start time	Duration	Manpower																																												
	1	0	5	8																																												
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