Sri Indu Institute of Engineering and Technology (Autonomous)

(Formerly RVR Institute of Engineering & Technology)

An Autonomous Institution Under UGC

NAAC Accredited. Recognized Under 2(f) of UGC Act 1956

EAMCET CODE: INDI   Approved by AICTE, New Delhi, & Affiliated to JNTUH, Hyderabad.   **JNTUH CODE: X3**

ESTD : 2007

COURSE FILE

ON

MATRICES & CALCULUS

Course Code – MA101BS

I-B. Tech Semester-I
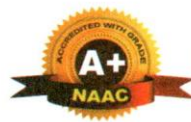### A.Y. 2022-2023

Prepared by

Mrs.CH.SARITHA

Assistant Professor

Head of the Department
Department of H&S
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V) Ibrahimpatnam (M) R.R. Dist-501 51?

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(Vill), Ibrahimpatnam
R.R. Dist. Telangana-501 510.

Main Road, Sheriguda, Ibrahimpatnam, R.R. Dist. 501 510, Telangana.
Campus Ph: 9640590999, 9347187999.

https://siiet.ac.in

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INSTITUTE VISION & MISSION

Vision:

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

Mission:

➢ **IM1:** To offer outcome-based education and enhancement of technical and practical skills.

➢ **IM2:** To Continuous assess of teaching-learning process through institute-industry collaboration.

➢ **IM3:** To be a centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students' fraternity.

➢ **IM4:** To Create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders.

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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

PROGRAM OUTCOMES

PO1: **ENGINEERING KNOWLEDGE**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **PROBLEM ANALYSIS**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **DESIGN/DEVELOPMENT OF SOLUTIONS**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: **CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **MODERN TOOL USAGE**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: **THE ENGINEER AND SOCIETY**: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **ENVIRONMENT AND SUSTAINABILITY**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **ETHICS**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **INDIVIDUAL AND TEAM WORK**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: **COMMUNICATION**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.

PO11: **PROJECT MANAGEMENT AND FINANCE**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: **LIFE-LONG LEARNING**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

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SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. in COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
COURSE STRUCTURE, I YEAR SYLLABUS (BR22 Regulations)

Applicable from Academic Year: 2022-23 Batch

I Year I Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA101BS	Matrices and Calculus	3	1	0	4
2.	CH103BS	Engineering Chemistry	3	1	0	4
3.	CS103ES	Programming for Problem Solving	3	0	0	3
4.	EE101ES	Basic Electrical Engineering	2	0	0	2
5.	ME101ES	Computer Aided Engineering Graphics	1	0	4	3
6.	CS106ES	Elements of Computer Science & Engineering	0	0	2	1
7.	CH106BS	Engineering Chemistry Laboratory	0	0	2	1
8.	CS107ES	Programming for Problem Solving Laboratory	0	0	2	1
9.	EE102ES	Basic Electrical Engineering Laboratory	0	0	2	1
		Induction Program				
		Total	**12**	**2**	**12**	**20**

I Year II Semester

S. No.	Course Code	Course	L	T	P	Credits
1.	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	AP202BS	Applied Physics	3	1	0	4
3.	ME202ES	Engineering Workshop	0	1	3	2.5
4.	EN204HS	English for Skill Enhancement	2	0	0	2
5.	EC201ES	Electronic Devices and Circuits	2	0	0	2
6.	AP205BS	Applied Physics Laboratory	0	0	3	1.5
7.	CS201ES	Python Programming Laboratory	0	1	2	2
8.	EN207HS	English Language and Communication Skills Laboratory	0	0	2	1
9.	CS203ES	IT Workshop	0	0	2	1
10.	*MC201ES	Environmental Science	3	0	0	0
		Total	**13**	**4**	**12**	**20**

MATRICES AND CALCULUS
(Course Code: MA101BS)

B.Tech. I Year I Sem.   **L T P C**
                                                                   3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications

Course outcomes: After learning the contents of this paper the student must be able to
- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
- Find the Eigenvalues and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT - I: Matrices   10 L
Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT - II: Eigen values and Eigen vectors   10 L
Linear Transformation and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT - III: Calculus   10 L
Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series.
Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT - IV: Multivariable Calculus (Partial Differentiation and applications)   10 L

Definitions of Limit and continuity.

Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration)   8 L

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications,
5th Editon, 2016.

REFERENCE BOOKS:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition,Pearson, Reprint, 2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

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Course : Matrices and Calculus(C111)   **Class: I-B.TECH CSE-DS**

Course Outcomes

After completing this course the student will be able to:

C111.1   : Analyze the solution of linear system of equations using matrices. (Analyzing)

C111.2 : Convert Quadratic form to Canonical form by orthogonal transformation. (Applying)

C111.3 : Solve the applications on the mean value theorems and Taylor's series. (Creating)

C111.4   : Evaluate Improper integrals by using Beta and Gamma functions. (Evaluation)

C111.5 : Find Extremum of function of two variables. (Remembering)

C111.6   : Evaluate the Multiple Integrals . (Evaluation)

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CO's Mapping with PO/PSO

Mapping of course outcomes with program outcomes:

High -3   Medium -2   Low-1

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C111.1	3	2	-	1	1	-	-	-	-	-	-	1
C111.2	3	2	-	1	1	-	-	-	-	-	-	1
C111.3	2	2	-	1	1	-	-	-	-	-	-	1
C111.4	2	3	-	1	1	-	-	-	-	-	-	2
C111.5	3	2	-	1	1	-	-	-	-	-	-	2
C111.6	3	2	-	1	1	-	-	-	-	-	-	2
C111	2.6	2.16	-	1	1	-	-	-	-	-	-	1.5

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CO-PO mapping Justification

PO1. ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science,engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2.PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO4. **CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **MODERN TOOL USAGE**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO12. **LIFE-LONG LEARNING**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

C111.1 : Analyze the solution of linear system of equations using matrices. (Analyzing)

	Justification
PO1	Student represent system of equations in matrix form.(level 3)
PO2	Student can analyze rank of matrix by reducing to echelon and normal form.(level 2)
PO4	Student apply knowledge of rank to find solution of system of equations. (level 1)
PO5	Student apply numerical techniques to solve linear system. (level 1)
PO12	Student can recognize importance of linear equations. (level 1)

C111.2 : Convert Quadratic form to Canonical form by orthogonal transformation. (Applying)

	Justification
PO1	Student can find Eigen values of a matrix .(level 3)
PO2	Student identify importance of Eigen values in finding Eigen vectors. (level 2)
PO4	Student use knowledge of Eigen values and Eigen Vectors to diagnolize the matrix.(level 1)
PO5	Student apply techniques of diagonalization to say nature of quadratic form.(level 1)
PO12	Student can recognize step by step procedure in diagonalization (level 1)

C111.3 : Solve the applications on the mean value theorems and Taylor's series. (Creating)

	Justification
PO1	Student know about mean value theorems.(level 2)
PO2	Student apply mean value theorems.(level 2)
PO4	Student get knowledge on Taylor's series.(level 1)
PO5	Student apply Taylor's series to approximate polynomial functions.(level 1)
PO12	Student recognize importance of mean value theorem.(level 1)

C111.4 : Evaluate Improper integrals by using Beta and Gamma functions. (Evaluation)

	Justification
PO1	Student study about beta and gamma functions. (level 2)
PO2	Student evaluate improper integrals by using beta and gamma functions. (level 3)
PO4	Student use knowledge of beta and gamma functions to get approximate value. (level 1)
PO5	Student learn techniques to evaluate surface area and volumes using definite integrals.(level 1)
PO12	Student can recognize importance of beta and gamma functions. (level 2)

C111.5 : Find Extremum of function of two variables. (Remembering)

	Justification
PO1	Student know concepts of jacobian, functional dependence and independence. (level 3)
PO2	Student find maxima and minima for function of two variables with and without constraint. (level 2)
PO4	Student get knowledge on maxima and minima of functions. (level 1)
PO5	Student apply Lagrange multipliers to find maxima and minima of function of two variables. (level 1)
PO12	Student can recognize importance in finding maxima and minima. (level 2)

C111.6 : Evaluate the Multiple Integrals. (Evaluating)

	Justification
PO1	Student get knowledge on double and triple integrals. (level 3)
PO2	Student use multiple integrals in evaluating area and volume. (level 2)
PO4	Student apply knowledge of change of order of integration to evaluate double integrals.(level 1)
PO5	Student use technique of change of variables to convert Cartesian to polar coordinates to evaluate double and triple integrls. (level 1)
PO12	Student can recognize importance of multiple integrals in evaluating area and volume. (level 2)

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Lr. No. SIIET/BR22/Academic Calendar/2022/02

Date: 15.12.2022

REVISED ACADEMIC CALENDAR
I B.TECH FOR THE ACADEMIC YEAR 2022-23
(BR22-REGULATIONS)

Dr. I. Satyanarayana,

Principal.

X3

To,

All the HOD's

Sir,

Sub: SIIET (Autonomous)–Academic & Evaluation–Revised Academic Calendar for **I B.Tech - I & II Semesters** for the academic year 2022-2023-Reg.

****

The approved Academic Calendar for **I B.Tech – I & II Semesters** for the academic year 2022-23 is given below.

I-SEMESTER

S. NO	Description	Period From	Period To	Duration
1.	Commencement of I Semester class work (including Induction programme)	03.11.2022		
2.	1ˢᵗ Spell of Instructions	03.11.2022	28.12.2022	8 Weeks
3.	I Mid Examinations	'29.12.2022	04.01.2023	1 Week
4.	Submission of First Mid Term Exam Marks to the Autonomous Section on or before	10.01.2023		
5.	2ⁿᵈ Spell of Instructions	05.01.2023	02.03.2023	8 Weeks
6.	Second Mid Term Examinations	03.03.2023	09.03.2023	1 Week
7.	Preparation & Practical Examinations	10.03.2023	16.03.2023	1 Week
8.	Submission of Second Mid Term Exam Marks to the Autonomous Section on or before	16.03.2023		
9.	I Semester End Examinations	17.03.2023	01.04.2023	2 Weeks

II-SEMESTER

S. NO	Description	Period From	Period To	Duration
1.	Commencement of II Semester class work	03.04.2023		
2.	1ˢᵗ Spell of Instructions (including Summer Vacation)	03.04.2023	10.06.2023	10 Weeks
	Summer Vacation	15.05.2023	27.05.2023	2 Weeks
3.	I Mid Examinations	'12.06.2023	17.06.2023	1 Week
4.	Submission of First Mid Term Exam Marks to the Autonomous Section on or before	23.06.2023		
5.	2ⁿᵈ Spell of Instructions	19.06.2023	12.08.2023	8 Weeks
6.	II Mid Term Examinations	14.08.2023	19.08.2023	1 Week
7.	Preparation & Practical Examinations	21.08.2023	26.08.2023	1 Week
8.	Submission of Second Mid Term Exam Marks to the Autonomous Section on or before	26.08.2023		
9.	II Semester End Examinations	28.08.2023	09.09.2023	2 Weeks

Commencement of Class Work for II B.Tech I Semester – 11.09.2023

OF EXAMINATIONS

Sri Indu Institute of Engineering and Technology

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ACE

Copy to: all the Depts. & AO: Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510.

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Class: DATA SCIENCE   **Semester: I**   **W.E.F-14-11-2022**   **LH: D-208**

	I 9:40-10:30	II 10:30 - 11:20	III 11:20-12:10	12:10-12.45	IV 12.45-1.35	V 1.35-2.25	VI 2.25-3.15	VII 3.15-4.00
MON	BEE	M&C	PPS	**L U N C H**	BEE/EC LAB			LIB
TUE	PPS LAB				M&C	M&C	ECSE	EG(T)
WED	PPS	EC	BEE		EG PRACTICE			BEE(T)/M&C(T)
THU	EC	PPS	BEE		BEE/EC LAB			EC(T)/PPS(T)
FRI	EG PRACTICE				M&C	EC	BEE	PPS(T)/EC(T)
SAT	BEE	PPS	ECSE		PPS	M&C	EC	M&C(T)/BEE(T)

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
MA101BS	Matrices and Calculus	CH.SARITHA	ME101ES	ComputerAided Engineering Graphics	A.MALLESH
CH103BS	Engineering Chemistry	O.SUBHASHINI	CH106BS	Engineering Chemistry Lab	O.SUBHASHINI
CS103ES	Programming for Problem Solving	U.NARESH	CS107ES	Programming for Problem Solving Lab	U.NARESH/G.KALYANi
EE101ES	Basic Electrical Engineering	S.NISCHALA	EE102ES	Basic Electrical Engineering Lab	G.BHARGAVI /M.NAGA RAJU
CS106ES	Elements of Computer Science & Engineering	P.SRILATHA			

O.Subhashini
Class In-Charge

ch.Saritha
Time Table Coordinator

Head of The Department

Dr. R. YADAGIRI RAO
M.Sc.,B.Ed.,M.Tech(CSE).,Ph.D.
Head of the Department
Department of H&S
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Matrices and Calculus :   Lesson Plan

L/H	Topic	TA/TM	Reference book
1	Unit wise Introduction of Matrices and Calculus syllabus	Lecture Method	R-1
2	UNIT –I Matrices Types of matrices ,examples	Lecture Method	R-1
3	Properties and problems on Symmetric, skew symmetric Matrices	Lecture Method	R-1
4	Properties and problems on Hermitian,skewhermitian Matrices	Lecture Method/Black board	R-1
5	Properties and problems on Orthogonal, Unitary matrices	Lecture Method/Black board	R-1
6	Rank of the matrix by using Echelon form and Normal form and problems.	Lecture Method/Black board	R-1,T-1
7	Inverse of the matrix by using Gauss Jordan method, problems	Lecture Method, Problem solving Method	R-1
8	Concept to know the consistency of Linear system of equations	Lecture Method, Video	R-1
9	Homogeneous system of linear equations and problems	Lecture Method, Video	R-1,T-1
10	Non Homogeneous system of linear equations and problems	Problem solving Method, Video	R-1,T-1
11	Gauss Elimination method and Problems	Lecture Method/ Problem solving Method, Video	T-1,
12	Gauss seidal Iteration method and Problems	Lecture Method /Problem solving Method, Video	T-1
13	UNIT – II Eigen values and Eigen Vectors Introduction of Linear transformation and Orthogonal transformation	Lecture Method, Video	R-1
14	To finding Eigen values and Eigen Vectors of a Matrix	Problem solving Method, Web Presentation, video	T-1
15	Problems	Problem solving Method,Web,Video	T-1
16	Properties of Eigen values and Eigen vectors	Lecture Method/Black board	R-1
17	To find Diagonalization of a Matrix	Lecture Method/Black board	T-1
18	Problems on Diagonalization	Problem solving Method	T-1
19	Cayley Hamilton theorem -Problems	Problem solving Method,Video	T-1
20	Finding Inverse and powers of a Matrix	Lecture	R-1

		by using Cayley Hamilton theorem	Method, Video	
21		Quadratic form ,nature,signature of Quadratic form	Lecture Method/Black board	T-1,R-1
22		Reduction of Quadratic form to Canonical form by using Orthogonal transformation	Lecture Method/Black board	R-1
23		UNIT - III Calculus Introduction of Mean value theorems	Lecture Method	R-1
24		Rolle's Mean value theorem - Problems	Problem solving Method, web presentation	R-1
25		Lagrange's Mean value theorem-Problems	Problem solving Method ,web presentation	R-1
26		Applications	Lecture Method/Black board	R-1
27		Cauchy's mean value theorem – Problems	Problem solving Method, web presentation	R-1,T-1
28		Taylor's Series - Problems	Problem solving Method	R-1,T-1
29		Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves	Lecture Method	R-1
30		Introduction of Improper Integrals Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves	Lecture Method	R-1
31		Introduction of Improper Integrals	Lecture Method	R-1
32		Beta and Gamma functions and their properties -problems	Problem solving Method	R-1,T-1
33		UNIT - IV Multi variable Calculus (Partial differentiation and applications) Introduction of Limit and Continuity	Lecture Method/Black board	R-1
34		Euler's theorem, Total derivative - Problems	Problem solving Method	R-1,T-1
35		Jacobian, functional dependence and independence - Problems Probler	Problem solving Method	R-1,T-1
36		Maxima and Minima of functions of two variables - Problems	Problem solving Method,Video	T-1
37		Maxima and Minima of functions of two variables - Problems	Problem solving Method,Video	T-1
38		Maxima and Minima of functions of three variables - Problems-lagrangian method of multipliers	Problem solving Method,Video	T-1
39		Maxima and Minima of functions of three variables - Problems-lagrangian method of multipliers	Problem solving Method,Video	T-1
40		UNIT –V Multivariable Calculus (Integration)	Lecture Method	R-1
41		Evaluation of Double integrals-Cartesian coordinates	Lecture Method/Black board	R-1
42		Evaluation of Double integrals-Polar coordinates	Lecture Method	R-1
43		Change of order of integration(Cartesian	Problem solving	T-1

	form)	Method	
44	Evaluation of triple integrals - Introduction	Lecture Method	T-1
45	Change of variables(Cartesian to polar) for double integrals -problems	Problem solving Method	T-3
46	Cartesian to Spherical and Cylindrical polar coordinates for triple integrals - problems	Lecture Method Problem solving Method	T-1
47	Applications : Areas by double integrals -problems	Lecture Method Problem solving Method	T-3
48	Volumes by double and triple integrals -problems	Lecture Method Problem solving Method	T-3

REFERENCES :

   R-1 .Ramana B.V.,Higher Engineering Mathematics,Tata McGRAW Hill,New Delhi

   R-2 .N.P. Bali and Manish Goyal,A text book of Engineering Mathematics

TEXTBOOKS :

   T-1 B.S.Grewal,Higher Engineering Mathematics,Khanna Publishers

   T-2 Erwin Kreyszig,Advanced Engineering Mathematics

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GAP WITHIN THE SYLLABUS – MAPPING TO CO, PO

Cramer's rule, Matrix inversion method,Continuity and differentiability of a function with examples, Integration and differentiation methods.

Course Outcomes
After completing this topic, the student will be able to:
1.Student can compare methods in solving linear system of equations. (Analysis)
2.After knowing calculus concepts student can easily solve partial differential equations methods and problems(Application)
3.After knowing calculus methods student can easily define beta gamma derivations (Knowledge)

Mapping of course outcomes with program outcomes:
High -3   Medium -2   Low-1

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	2	3										
2	3	2										
3	2	2										

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GAP BEYOND THE SYLLABUS-MAPPING TO PO/PSO

1. Regular industrial visits help students to know the information useful for knowledge upgradation.
2. Students are encouraged to take part in Technical Quizzes and various co-curricular activities to ensure their overall development
3. Teaching at least a few portions giving practical demonstration to create interest among the students
4. Introducing current Scientific and Technological innovations and development
5. Computer aided learning tools are also used for better visual display for the Mathematics

Mapping to PO/PSO:

High -3   Medium -2   Low-1

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	-	-	-	2		-	-	-	-	-	-	2
2	-	-	-	-	-	-	-	-	-	2	-	-
3	-	-	-	-	-	-	-	-	-	-	3	-
4	-	-	-	-	-	-	-	-	1	-	-	-
5	-	-	-	-	2	-	-	-	-	-	-	-

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WEB REFERENCES :

W-1   http://cs229.stanford.edu/section/cs229-linalg.pdf   (For UNIT-I,UNIT-II)

W-2   https://see.stanford.edu/materials/lsoeldsee263/15-symm.pdf   (For UNIT-I,UNIT-II)

W-3   http://tutorial.math.lamar.edu/Classes/Calcll/SeriesIntro.aspx (For UNIT-III)

W-4   http://tutorial.math.lamar.edu/Classes/Calcl/MeanValueTheorem.aspx (For UNIT-IV)

W-5   http://tutorial.math.lamar.edu/Classes/CalcI/MeanValueTheorem.aspx (For mean value theorems)

VIDEO REFERENCES :

V-1   https://nptel.ac.in/courses/111105035/5 (Video for eigen values and eigen vectors)

V-2   https://**nptel.ac.in/courses/111105035/7**   (Video for Cayley Hamilton theorem)

V-3   https://nptel.ac.in/courses/111105035/4 (Video for Linear Transformation)

V-4   https://www.youtube.com/watch?v=ajJD0Df5Csy (For Gauss seidal iteration method)

V-5   https://www.youtube.com/watch?v=2j5Ic2V7wq4   (For Gauss Elimination method)

V-6   https://www.youtube.com/watch?v=73DSHyBQ8i0 (For Sequences and series convergence and Divergent)

V-7   https://www.youtube.com/watch?v=7uWXuZSxmVc   (different types of tests for convergence)

V-8   https://www.youtube.com/watch?v=gLWUrF_cOwQ (For Maxima and Minima)

V-9   https://www.youtube.com/watch?v=ry9cgNx1QV8 (For Maxima and Minima)

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M&C LECTURE NOTES

https://drive.google.com/file/d/1WrF9IP2IE-Kjkb-_DNzuuzW3P1Tn69Z2/view?usp=sharing

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POWERPOINT PRESENTATION

Mean Value Theorem

CH.SARITHA
Assistant Professor
Department of Mathematics
SRI INDU INSTITUTE OF ENGINEERING AND
TECHNOLOGY

https://docs.google.com/presentation/d/1YR6x-kR2BH9QiGbWCgtOytesFlTERZYf/edit?usp=sharing&ouid=110163643122273780191&rtpof=true&sd=true
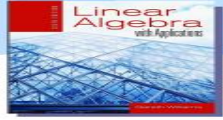
Linear Algebra

Chapter 1
Systems of Linear Equations

https://docs.google.com/presentation/d/1v1sktn8Lu5w77VdFT2HJYCr6fnV1hJOn/edit?usp=sharing&ouid=110163643122273780191&rtpof=true&sd=true

Multiple Integrals

https://docs.google.com/presentation/d/1Th1hZ_8c2T4CbqoGN0ULPWhU0q5UtZlK/edit?usp=sharing&ouid=110163643122273780191&rtpof=true&sd=true

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PREVIOUS QUESTION PAPERS

https://drive.google.com/file/d/1dIABobEjhLe0bpp0c--M1mkvHlpwhzzr/view?usp=sharing

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Set-I

I B.TECH SEM-I MID-I EXAMINATION Dec-2022/Jan-2023

Year & Branch: Common to All	Date & Session : 29-12-2022 &FN
Subject : MATRICES & CALCULUS Marks: 20	Time : 2 Hours

Answer any **FOUR** Questions. All Question Carry Equal Marks.

1. Define the Rank of the Matrix and find the rank of the following matrix using Echelon form

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ -2 & -3 & 1 & 2 \\ -3 & -4 & 5 & 8 \\ 1 & 3 & 10 & 14 \end{bmatrix}$$ **(Remembering(L1))**

2. Show that the equations $x -4y +7z =14, 3x + 8y -2z = 13, 7x – 8y +26z = 5$ are inconsistent

   (Evaluating(L5))

3. . Solve the system of equations $10x + y + z =12, 2x + 10y + z =13, 2x + 2y + 10z =14$ by using Gauss seidel iteration method   **(Applying(L3))**

4. If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ find the value of the matrix $A^8 – 5A^7 + 7A^6 - 3A^5 + A^4 – 5A^3 + 8A^2 – 2A+ I$

   using Cayley Hamilton theorem   **(Remembering(L1))**

5. Reduce the given Quadratic form to canonical form $2xy+2yz+2zx$ by orthogonal reduction and find the

   Nature, Index and Signature of Quadratic form. **(Analyzing(L4))**

6. Verify Rolle's theorem for $f(x) = e^x(sinx – cosx)$ in $[\frac{\pi}{4}, \frac{5\pi}{4}]$ **(Evaluating(L5))**

QUESTION PAPER MAPPING WITH BT
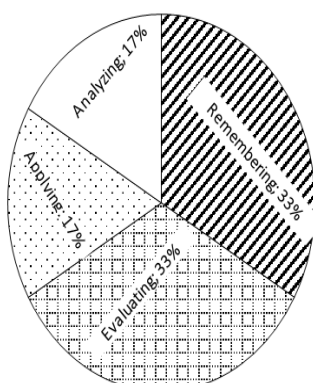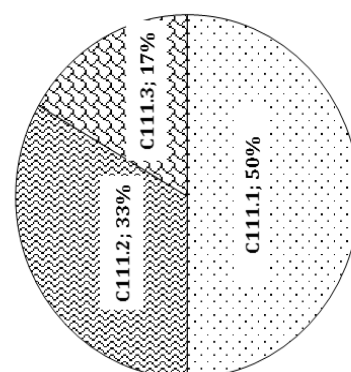
QUESTION PAPER MAPPING WITH CO'S

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#### Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

Set-II

I B.TECH SEM-I MID-II EXAMINATION March-2023

Year & Branch: Common to All   Date & Session : 03-03-2023 &FN

Subject : MATRICES & CALCULUS   Marks: 20   Time   : 2 Hours

Answer any **FOUR** Questions. All Question Carry Equal Marks.

1. a) Express f(x) = logcosx as Taylor's series about x = π/3 **Understanding(L2)**

   b) Obtain the Maclaurin's series expansion of f(x) = cosx **Understanding(L2)**

2. If x+y+z =u , y+z =uv, z = uvw then evaluate i) $\frac{\partial(x,y,z)}{\partial(u,v,w)}$ ii) $\frac{\partial(u,v,w)}{\partial(x,y,z)}$

   Evaluating(L5)

3. Find the maximum and minimum distances of the point of u = $x^2y^3z^4$ if

   2x+3y+4z =a **Remembering(L1)**

4. Evaluate i) $\int_0^5 \int_0^{x^2} x(x^2 + y^2)dxdy$ **Evaluating(L5)**

   ii) $\int_0^4 \int_0^{x^2} e^{\frac{y}{x}} dxdy$ **Evaluating(L5)**

5. Evaluate $\int_0^\pi \int_0^{a(1+cos\theta)} r^2 cos\theta drd\theta$ **Evaluating(L5)**

6. Find the area of the region bounded by the parabolas $y^2=4ax$ and $x^2 = 4ay$

   Remembering(L1)

QUESTION PAPER MAPPING WITH BT

QUESTION PAPER MAPPING WITH CO'S
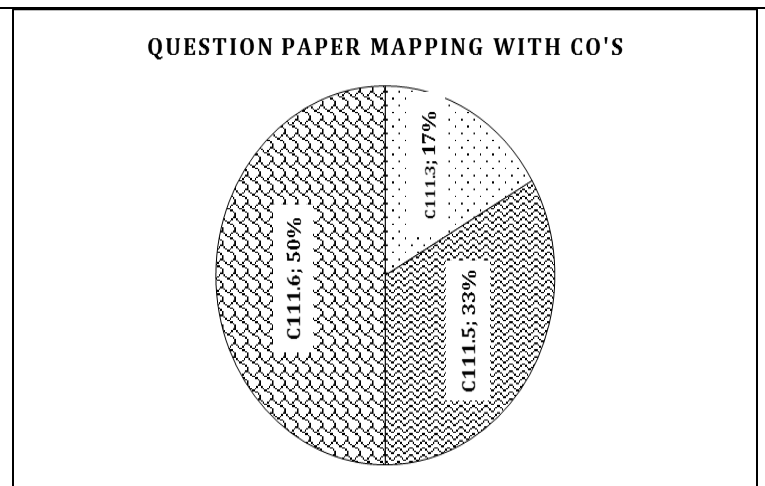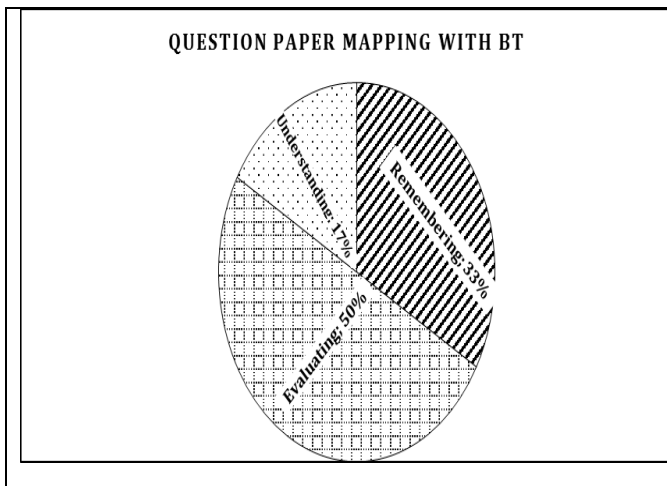
MID I & MID-II KEY link

https://drive.google.com/file/d/1pPgcpOemx_mu7vWduESLBeYINF64r893/view?usp=sharing

MID-I & MID-II SAMPLE STUDENT SCRIPTS Link

https://drive.google.com/file/d/1yjBf2pdhhCGI-vf_ayoVAhTon86-Nqc4/view?usp=sharing
https://drive.google.com/file/d/19GlGkfyBoiNQIks1jRlkGGmTZ1AE_dSo/view?usp=sharing

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I-MID M&C ASSIGNMENT

1. Define the Rank of the Matrix and find the rank of the following matrix using Echelon form

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ -2 & -3 & 1 & 2 \\ -3 & -4 & 5 & 8 \\ 1 & 3 & 10 & 14 \end{bmatrix}$$

2. Define the Rank of the Matrix and find the rank of the following matrix using Normal form

$$\begin{bmatrix} 2 & 1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$$ (Remembering(L1))

3. Find the value of k if the rank of the matrix A is 2 where $A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & k & 0 \end{bmatrix}$ (Remembering(L1))

4. Find the inverse of the matrix A using Gauss Jordan Method(Elementary row operations)

$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$ (Remembering(L1))

5. Discuss for what values of a , b the simultaneous equations x+y+z = 6, x+2y+3z = 10,x+2y+az=b have i) no solution ii) a unique solution iii)an infinite number of solutions (Creating(L6))

6. Show that the system of equations x+2y+z = 3, 2x + 3y +2z = 5,3x-5y+5z = 2, 3x+9y-z = 4 are Consistent and solve them. (Evaluating(L5))

7. Solve the system of equations 10x + y + z =12, 2x + 10y + z =13,2x + 2y + 10z =14 by using Gauss seidel iteration method (Applying(L3))

8. Verify Cayley Hamilton theorem and find A^{-1} and A^4 for the matrix $A = \begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$

(Evaluating(L5))

9. If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ find the value of the matrix $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$

using Cayley Hamilton theorem (Remembering(L1))

10. Prove that the sum of eigen values of the matrix A is equal to its trace of A and product of eigen values to its determinant. (Evaluating(L5))

11. Diagonalize the matrix $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ (Analyzing(L4))

12. Reduce the Quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to the canonical form by orthogonal Reduction and find the Nature,,rank, index and signature of the Quadratic form (Analyzing(L4))

13. .Reduce the given Quadratic form to canonical form 2xy+2yz+2zx by orthogonal reduction and find the Nature, Index and Signature of Quadratic form. (Analyzing(L4))

14. Verify Rolle's theorem for $f(x) = e^x(\sin x - \cos x)$ in $[\frac{\pi}{4}, \frac{5\pi}{4}]$ (Evaluating(L5))

15. State Rolle's theorem and verify for $f(x) = x^3 - 6x^2 + 11x - 6$ in [1,3] (Understanding(L2))

II-MID M&C ASSIGNMENT

1. a) Express f(x) = logcosx as Taylor's series about x = π/3 **Understanding(L2)**

   b) Obtain the Maclaurin's series expansion of f(x) = cosx **Understanding(L2)**

2. Find the volume of the solid generated by revolving the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (o<b<a)

   rotates about major axis **Remembering(L1)**

3. Show that the area of the surface generated by the revolution about the x-axis of the loop of

   the curve 3ay² = x(x-a)² is $\frac{\pi a^2}{3}$ **Evaluating(L5)**

4. If z = log(eˣ + eʸ) show that rt-s² = 0 **Evaluating(L5)**

5. Using Euler's theorem, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \sin2u$ if u = tan⁻¹$\left(\frac{x^3+y^3}{x+y}\right)$ **Applying(L3)**

6. If u = f(r) and x= rcosθ, y = rsinθ then prove that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = f^{II}(r) + \frac{1}{r}f^I(r)$

   Evaluating(L5)

7. Find $\frac{du}{dx}$ if u = $\sin(x^2 + y^2)$ where $a^2x^2 + b^2y^2 = c^2$ **Remembering(L1)**

8. If x+y+z =u , y+z =uv, z = uvw then evaluate i) $\frac{\partial(x,y,z)}{\partial(u,v,w)}$ ii) $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ **Evaluating(L5)**

9. Showthat the functions u=x+y+z, v=xy+yz+zx and w=x² + y² +z² are functionally

   dependent and find the relation between them **Evaluating(L5)**

10. Find the maximum and minimum distances of the point of u = x²y³z⁴ if 2x+3y+4z =a

    Remembering(L1)

11. Find the maxima and minima of the function f(x,y) = x³ +3xy² -15x²-15y²+72x

    Remembering(L1)

12. Evaluate i) $\int_0^5 \int_0^{x^2} x(x^2 + y^2)dxdy$ **Evaluating(L5)**

    ii) $\int_0^4 \int_0^{x^2} e^{\frac{y}{x}} dxdy$ **Evaluating(L5)**

13. Solve $\int_0^{log2} \int_0^x \int_0^{x+logy} e^{x+y+z}dxdydz$ **Evaluating(L5)**

14. Find the area of the region bounded by the parabolas y²=4ax and x² = 4ay

    Remembering(L1)

15. Evaluate the double integral $\int_0^{4a} \int_{\frac{y^2}{4a}}^y \left(\frac{x^2-y^2}{x^2+y^2}\right) dxdy$ by changing into polar

    coordinates **Evaluating(L5)**

16. Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xydxdy$ and hence evaluate the double

    integral **Creating(L6)**

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I-MID & II-MID M&C ASSIGNMENT PROOFS

https://drive.google.com/file/d/1cC8IBAxpC3oGwhBNS6KXcgC9JLK-Is6S/view?usp=sharing

https://drive.google.com/file/d/1nUhCb6lRPpeSDdux9PLrKlL0GqJNq2fR/view?usp=sharing

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SCHEME OF EVALUATION WITH CO and BTL MAPPING

SCHEME OF EVALUATION-MATRICES & CALCULUS(MID-I)(Set-I)		
Instructions:		
a) Any answer by alternate method should be valued and suitably awarded. b) All answers (including extra, stuck off and repeated) should be valued. Answers with maximum marks must be considered.		
Qn No	**Description of Answer**	**Marks**
1.	Using row1 and column1 operations (C111.1) (Analyzing)	1
	Using row2 and column2 operations (C111.1) (Analyzing)	1
	Using row3 and column3 operations & get rank (C111.1) (Analyzing)	3
2.	To write matrix form (C111.1) (Analyzing)	1
	To write augmented form and getting rank using echelon form anf rank of A not equal to rank of [A;B](C111.1) (Analyzing)	2
	To compare consistency and to get solution(C111.1) (Analyzing)	2
3.	To check diagonal dominant (C111.1) (Analyzing)	1
	To find iterations until get solution (C111.1) (Analyzing)	4
4.	To find characteristic equation of A (C111.2) (Applying)	2
	Using Cayley Hamilton theorem and Calculations(C111.2) (Applying)	3
5.	To form matrix for the given quadratic form(C111.2) (Applying)	1
	To find eigen values and eigen vectors (C111.2) (Applying)	2
	To get $P^{T}AP = D$ and writing canonical form, rank, index and signature(C111.2) (Applying)	2
6.	To check continuous and derivable and f(a)=f(b) of f(x) (C111.3) (Creating)	3
	To apply Rolle's theorem and get value of c (C111.3) (Creating)	2
	TOTAL	**20**

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	SCHEME OF EVALUATION-MATRICES & CALCULUS(MID-II)(Set-2)	
	Instructions:	
	a) Any answer by alternate method should be valued and suitably awarded. b) All answers (including extra, stuck off and repeated) should be valued. Answers with maximum marks must be considered.	
Qn No	**Description of Answer**	**Marks**
1 a)	To write Taylor's series expansion (C111.3) (Creating)	1
	To calculate value of f(x) = logcosx at x = $\pi/3$(C111.3) (Creating)	1
b)	To write Maclaurin's series expansion(C111.3) (Creating)	1
	To calculate value of f(x) = cosx at x = 0(C111.3) (Creating)	2
2.	To find Jacobian of x,y,z with respect to u,v,w (C111.5) .(Remembering)	3
	To find Jacobian of u,v,w with respect to x,y,z .(C111.5)(Remembering)	2
3.	Using Lagrange's method of multipliers formula .(C111.5)(Remembering)	1
	To calculate maximum and minimum values .(C111.5)(Remembering)	4
4.	To evaluate $\int_0^5 \int_0^{x^2} x(x^2 + y^2)dxdy$ (C111.6) (Understanding)	2
	To evaluate $\int_0^4 \int_0^{x^2} e^{\frac{y}{x}} dxdy$ (C111.6) (Understanding)	3
5.	To $Evaluate \int_0^{\pi} \int_0^{a(1+cos\theta)} r^2 cos\theta dr d\theta$ (C111.6) (Understanding)	5
6.	To take limits of x and y (C111.6) (Understanding)	2
	To find area of the region bounded by the parabolas (C111.6) (Understanding)	3
	TOTAL	**20**

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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

TUTORIAL TOPICS

S. No	Topic	Teahind Method/Teaching Aid	No.of Sessions Planned	Reference book
1	Rank of the matrix by using Echelon form	Lecture Method	1	R-1
2	Rank of the matrix by using Normal form	Lecture Method	1	R-1
3	Inverse of the matrix by using Gauss Jordan method	Lecture Method	1	R-1
4	Homogeneous system of linear equations and problems	Lecture Method,Video	1	R-1,T-1
5	Non Homogeneous system of linear equations and problems	Problem solving Method,Video	1	R-1,T-1
6	Gauss Elimination method and Problems	Lecture Method/ Problem solving Method,Video	1	T-1
7	Gauss seidal Iteration methd and Problems	Lecture Method /Problem solving Method,Video	1	T-1
8	To finding eigen values and Eigen Vectors of a Martix	Problem solving Method,Web Presentation,video	1	T-1
9	To find Diagonalization of a Matrix	Lecture Method	1	T-1
10	Cayely Hamilton theorem -Problems	Problem solving Method,Video	1	T-1
11	Reduction of Quadtratic form to Canonical form by using Orthogonal transformation	Lecture Method	1	R-1
12	Rolle's Mean value theorem - Problems	Problem solving Method,web presentation	1	R-1
13	Lagrange's Mean value theorem- Problems	Problem solving Method ,web presentation	1	R-1
14	Cauchy's mean value theorem –Problems	Problem solving Method, web presentation	1	R-1,T-1
15	Taylor's Series - Problems	Problem solving Method	1	R-1,T-1
16	Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves	Lecture Method	1	R-1
17	Euler's theorem - Problems	Problem solving Method	1	R-1,T-1
18	Total derivative - Problems	Problem solving Method	1	R-1,T-1
19	Jacobian - Problems	Problem solving Method	1	R-1,T-1
20	Functional dependence & independence - Problems	Problem solving Method	1	T-1
21	Maxima and Minima of functions of two variables - Problems	Problem solving Method,Video	1	T-1
22	Evaluation of double integrals in Cartesian and polar coordinates	Lecture Method	1	R-1
23	Change of order of integration in Cartesian form	Lecture Method	1	R-1
24	Evaluation of triple integrals	Problem solving Method,Video	1	T-1

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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 50151

Result Analysis: DATA SCIENCE

Course Title	**MATRICES AND CALCULUS**
Course Code	**MA101BS**
Programme	B.Tech
Year & Semester	I year I- semester
Regulation	BR22
Course Faculty	CH.Saritha, Assistant Professor , H&S

Weak Students:

S No	Roll no	Intermediate Marks	Internal-I Status (35)	Internal-II Status (35)
1	22X31A6705	65%	27	28
2	22X31A6706	60%	23	19
3	22X31A6712	60%	21	20
4	22X31A6713	60%	27	18
5	22X31A6729	60%	21	19
6	22X31A6753	65%	19	24

Advanced learners:

S No	Roll No	Intermediate Marks	Gate Material
1	22X31A6704	91%	Metric spaces,Applications of multiple integrals, Applications on Beta and Gamma functions
2	22X31A6709	94%	
3	22X31A6718	96%	
4	22X31A6719	95%	
5	22X31A6724	94%	
6.	22X31A6726	92%	

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RESULT ANALYSIS AT THE END OF SEMISTER

Branch : DS   **Subject: MATRICES & CALCULUS**
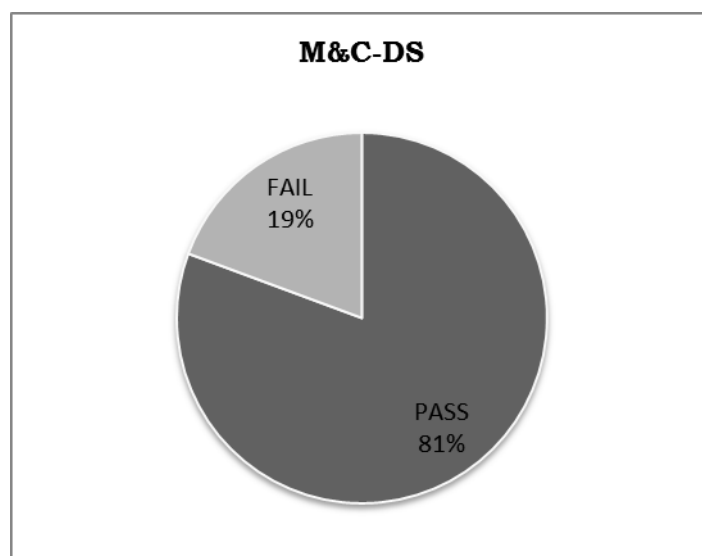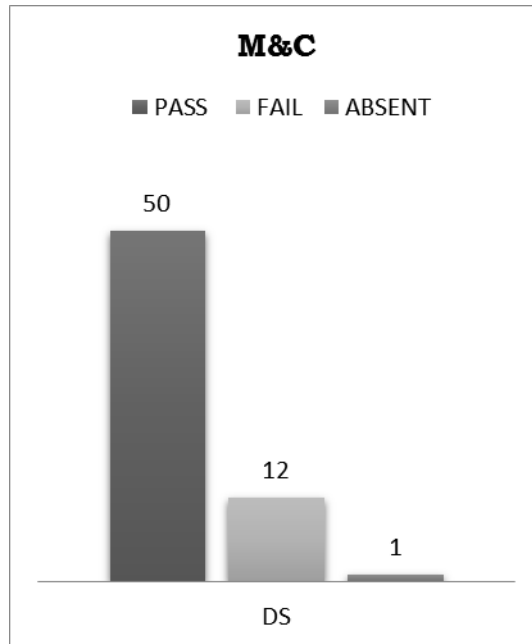
M&C

M&C-DS

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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

DEPARTMENT OF HUMANITIES AND SCIENCE
REMEDIAL CLASSES TIME TABLE

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
CSE-A	M&C	PPS	BEE	EG	EC	M&C
CSE-B	BEE	M&C	EG	PPS	EC	BEE
CSE-C	EC	EG	BEE	M&C	PPS	EC

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
DS	M&C	EC	BEE	PPS	EG	EC
CYBER	PPS	M&C	EC	EG	BEE	M&C

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
AIML-A	AP	PPS	M&C	ENG	AP	M&C
AIML-B	M&C	EG	PPS	AP	M&C	EG

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
AI&DS	M&C	ENG	AP	PPS	AP	PPS
IOT	PPS	AP	M&C	EG	M&C	EG

DAY/ PERIOD	MON 4.00-5.00	TUE 4.00-5.00	WED 4.00-5.00	THUR 4.00-5.00	FRI 4.00-5.00	SAT 4.00-5.00
ECE	AP	ENG	M&C	PPS	AP	PPS
CIVIL	EG	AP	M&C	PPS	M&C	EG

Head of the Department
Department of H&S
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V) Ibrahimpatnam (M) R.R. Dist-501 510

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(Vill), Ibrahimpatnam
R.R. Dist. Telangana-501 510.

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences

Course Outcome Attainment (Internal Examination-1)

Name of the faculty: CH.SARITHA Academic Year: 2022-2023
Branch & Section: DATA SCIENCE Examination: I Internal
Course Name: M&C Year: I Semester: I

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Q5a	Q5b	Q5c	Q6a	Q6b	Q6c	Obj1	A1
Max. Marks ==>		5			5			5			5			5			5			10	5
1	22X31A6701	4						5			5			5						6	5
2	22X31A6702	5						5			5						3			6	5
3	22X31A6703				5			5						5			5			7	5
4	22X31A6704				5						5			5			5			7	5
5	22X31A6705	4						5			3			4						6	5
6	22X31A6706	3			4									1			2			8	5
7	22X31A6707	4						5			5			5						5	5
8	22X31A6708	2						3						2			2			5	5
9	22X31A6709	3			2									2			3			7	5
10	22X31A6710	5						4			3						1			7	5
11	22X31A6711	3						5			5						1			6	5
12	22X31A6712	4									4						2			6	5
13	22X31A6713	4						5			3						3			7	5
14	22X31A6714	3			2			1			3									9	5
15	22X31A6715	5						5			5						5			8	5
16	22X31A6716	A																		0	5
17	22X31A6717	1						5			3						1			6	5
18	22X31A6718				5			5			5			5						8	5
19	22X31A6719	4			5									3			4			6	5
20	22X31A6720							4			5			3			5			5	5
21	22X31A6721	2						5			5						5			10	5
22	22X31A6722	4						4			3			5						6	5
23	22X31A6723	4						2			5			3						8	5
24	22X31A6724				5			5			5						5			9	5
25	22X31A6725	5						5			4									8	5
26	22X31A6726				5			5			5			5						8	5
27	22X31A6727	5						5			5						5			8	5
28	22X31A6728	5			4			5			5									8	5
29	22X31A6729	4			2			2			2									6	5
30	22X31A6730	4			4			3			3									10	5
31	22X31A6731	4			4			4			4									5	5
32	22X31A6732																			0	0
33	22X31A6733	4			5						5			5						8	5
34	22X31A6734				4			5			4			5						7	5
35	22X31A6736	5						5						5			5			8	5
36	22X31A6737	4			4						4			4						7	5
37	22X31A6738	4						4			4			5						8	5
38	22X31A6739				4			5			4			4						7	5
39	22X31A6740	4			3			3			4									5	5
40	22X31A6741	3			3			3			3									5	5
41	22X31A6742	5			5			5			4									8	5
42	22X31A6743	5			4			5			5									8	5
43	22X31A6744	5			3						3						3			6	5
44	22X31A6745	5						5			5						5			10	5
45	22X31A6746	4			4			4			4									8	5
46	22X31A6747				5						5			5			5			8	5
47	22X31A6748	5						5						5			5			7	5
48	22X31A6749				4			4			4						4			9	5
49	22X31A6750				4			5			4						4			8	5
50	22X31A6751	5						5			5						5			10	5
51	22X31A6752				2			2			2						2			7	5
52	22X31A6753	2						2			1						2			7	5
53	22X31A6754				5						5			5			5			10	5
54	22X31A6755				2			2			2			2						7	5
55	22X31A6756	3			2			2						3						9	5
56	22X31A6757	4			4			5						5						8	5
57	22X31A6758				3			3			2						2			8	5
58	22X31A6759	5									5			5			5			8	5
59	22X31A6760	5						5			5			4						8	5
60	22X31A6761	2			2			2			2									8	5
61	22X31A6762	4			4			4						3						5	5
62	22X31A6763	5						5			5			5						8	5
63	22X31A6764	4			3			4			3									10	5

Target set by the faculty / HoD	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	6.00	3.00
Number of students performed above	41	0	0	28	0	0	42	0	0	45	0	0	26	0	0	21	0	0	54	62
Number of students attempted	47	0	0	35	0	0	50	0	0	51	0	0	30	0	0	30	0	0	63	63
Percentage of students scored more than target	87%			80%			84%			88%			87%			70%			86%	98%

CO Mapping with Exam Questions:

CO - 1	Y			Y															Y	Y
CO - 2							Y			Y						Y			Y	Y
CO - 3													Y						Y	Y
CO - 4																				
CO - 5																				
CO - 6																				

Scored >Target %	87%			80%			84%			88%			87%			70%			86%	98%

CO Attainment based on Exam Questions:

CO - 1	87%			80%															86%	98%
CO - 2							84%			84%						84%			86%	98%
CO - 3													84%						86%	98%
CO - 4																				
CO - 5																				
CO - 6																				

CO	Subj	obj	Asgn	Overall	Level					ttainment Lev	
CO-1	84%	86%	98%	89%	3.00					1	40%
CO-2	84%	84%	98%	89%	3.00					2	50%
CO-3	84%	85%	98%	89%	3.00					3	60%
CO-4											
CO-5											
CO-6											

Attainment (Internal 1 Examination)   **3.00**

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences
Course Outcome Attainment (Internal Examination-2)

Name of the faculty: CH.SARITHA	Academic Year:	2022-2023
Branch & Section: DATA SCIENCE	Examination:	II Internal
Course Name: M&C	Year: I	Semester: I

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Q5a	Q5b	Q5c	Q6a	Q6b	Q6c	Obj	A2	viva/ppt
	Max. Marks ==>	3	2		5			5			3	2		5			5			10	5	5
1	22X31A6701	3	2		5			2									3			7	5	5
2	22X31A6702	2	2		4			4			2	1								7	5	5
3	22X31A6703	3	2		5			5			3	2								7	5	5
4	22X31A6704				5			5			3	2					5			7	5	5
5	22X31A6705	2	2		5			5			3	1								5	5	5
6	22X31A6706	1	1		3			1												8	5	5
7	22X31A6707	2	2		5						2	1					3			7	5	5
8	22X31A6708	1	1		4						2									8	5	5
9	22X31A6709	3	2		5						3	2								7	5	5
10	22X31A6710	3	2		4			3									3			5	5	5
11	22X31A6711				5			5			3	2					4			8	5	5
12	22X31A6712	2	3														1			9	5	5
13	22X31A6713	1	1		2															9	5	5
14	22X31A6714				4							2								8	5	5
15	22X31A6715	3	2		5			5									5			8	5	5
16	22X31A6716				5			5			3	2					5			10	5	5
17	22X31A6717	2	2		4						2									5	5	5
18	22X31A6718	2	2		5			5									5			9	5	5
19	22X31A6719	2	2		2						2	1								8	5	5
20	22X31A6720	3	2		5			5			3	1								6	5	5
21	22X31A6721	2	1		2			4												6	5	5
22	22X31A6722	2	2		3						2	2		5						6	5	5
23	22X31A6723	2	1		5						2	2								4	5	5
24	22X31A6724							5			3	2		5			5			8	5	5
25	22X31A6725				5			5			3	2					4			7	5	5
26	22X31A6726				5			5			3	1					1			8	5	5
27	22X31A6727	3	2					5			3	2					5			6	5	5
28	22X31A6728	3	2		5			5			2	2					5			10	5	5
29	22X31A6729	1	1		1			1			2	1								7	5	5
30	22X31A6730	2	2		3												1			6	5	5
31	22X31A6731				5			5			3	2					5			8	5	5
32	22X31A6732																				0	0
33	22X31A6733	3	2		5			5			3	1								6	5	5
34	22X31A6734				5			5			3	2					4			7	5	5
35	22X31A6736				5			5			3	2					5			8	5	5
36	22X31A6737	2	1					1			1	1		1						8	5	5
37	22X31A6738	1	1		5			2									4			7	5	5
38	22X31A6739	2	1		3						2	2					2			8	5	5
39	22X31A6740	1									1	1					2			9	5	5
40	22X31A6741	2	1		5			4			1	1								6	5	5
41	22X31A6742	2	2		5			5									5			9	5	5
42	22X31A6743				5			5			3	2					5			10	5	5
43	22X31A6744				5			3			2	1					5			9	5	5
44	22X31A6745				5			5						5			5			10	5	5
45	22X31A6746	2	2		5			5			3	1								9	5	5
46	22X31A6747				5			5			3	2					5			10	5	5
47	22X31A6748	2	2		5						3	2					3			8	5	5
48	22X31A6749	2	2								3	1								9	5	5
49	22X31A6750	2	1		5			5			3	2								9	5	5
50	22X31A6751				5			4			3	2					5			9	5	5
51	22X31A6752				1			1			1			1						10	5	5
52	22X31A6753	1			1			1			1									10	5	5
53	22X31A6754				5			5			3	2					5			10	5	5
54	22X31A6755	1	1		2			1			1									10	5	5
55	22X31A6756	1	1		2						1									9	5	5
56	22X31A6757	1	2		1						2	2								9	5	5
57	22X31A6758	1									3	1								10	5	5
58	22X31A6759	3	2		5			5			3	2								10	5	5
59	22X31A6760				5			5			3	2					5			10	5	5
60	22X31A6761	3	2		4			5												8	5	5
61	22X31A6762	3	1		5			5									5			9	5	5
62	22X31A6763				5			5			3	2					5			10	5	5
63	22X31A6764				4			3			2	1					3			8	5	5

Target set by the faculty / HoD	1.80	1.20	0.00	3.00	0.00	0.00	3.00	0.00	0.00	1.80	1.20	0.00	3.00	###	0.00	3.00	0.00	0.00	6.00	3.00	3.00
Number of students performed above the target	31	25	0	46	0	0	36	0	0	40	25	0	3	0	0	28	0	0	58	62	62
Number of students attempted	42	39	0	55	0	0	44	0	0	47	41	0	6	0	0	33	0	0	62	63	63
Percentage of students scored more than target	74%	64%		84%			82%			85%	61%		50%			85%			94%	98%	98%

CO Mapping with Exam Questions:

CO - 1																					
CO - 2																					
CO - 3	Y	Y																	Y	Y	y
CO - 4							Y												Y	Y	y
CO - 5										Y	Y		y						Y	Y	y
CO - 6				Y												y			Y	Y	y

% Students Scored >Target %	74%	64%		84%			82%			85%	61%		50%			85%			94%	98%	98%

CO Attainment based on Exam Questions:

CO - 1																					
CO - 2																					
CO - 3	74%	74%																	94%	98%	98%
CO - 4							74%												94%	98%	98%
CO - 5										74%	74%		74%						94%	98%	98%
CO - 6				74%												74%			94%	98%	98%

CO	Subj	obj	aasg	ppt	Overall	Level									Attainment Level	
CO-1															1	40%
CO-2															2	50%
CO-3	74%	94%	98%	98%	91%	3									3	60%
CO-4	74%	94%	98%	98%	91%	3.00										
CO-5	74%	94%	98%	98%	91%	3.00										
CO-6	74%	94%	98%	98%	91%	3.00										

Attainment (Internal Examination-2   **3.00**

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences

Course Outcome Attainment (University Examinations)

Name of the faculty	CH.SARITHA		Academic Year:		2022-2023
Branch & Section:	DATA SCIENCE		Year / Semester:		I / I
Course Name:	M&C				

S.No	Roll Number	Marks Secured		S.No	Roll Number	Marks Secured
1	22X31A6701	23		36	22X31A6736	37
2	22X31A6702	22		37	22X31A6737	21
3	22X31A6703	33		38	22X31A6738	23
4	22X31A6704	46		39	22X31A6739	22
5	22X31A6705	30		40	22X31A6740	39
6	22X31A6706	10		41	22X31A6741	28
7	22X31A6707	27		42	22X31A6742	44
8	22X31A6708	10		43	22X31A6743	33
9	22X31A6709	21		44	22X31A6744	42
10	22X31A6710	23		45	22X31A6745	57
11	22X31A6711	27		46	22X31A6746	33
12	22X31A6712	14		47	22X31A6747	56
13	22X31A6713	12		48	22X31A6748	45
14	22X31A6714	9		49	22X31A6749	21
15	22X31A6715	37		50	22X31A6750	36
16	22X31A6716	22		51	22X31A6751	37
17	22X31A6717	26		52	22X31A6752	14
18	22X31A6718	54		53	22X31A6753	12
19	22X31A6719	35		54	22X31A6754	57
20	22X31A6720	26		55	22X31A6755	
21	22X31A6721	26		56	22X31A6756	13
22	22X31A6722	21		57	22X31A6757	21
23	22X31A6723	13		58	22X31A6758	22
24	22X31A6724	46		59	22X31A6759	53
25	22X31A6725	28		60	22X31A6760	37
26	22X31A6726	32		61	22X31A6761	22
27	22X31A6727	21		62	22X31A6762	34
28	22X31A6728	16		63	22X31A6763	38
29	22X31A6729	0		64	22X31A6764	24
30	22X31A6730	21		65	0	
31	22X31A6731	21		66		
32	22X31A6732			67		
33	22X31A6733	36		68		
34	22X31A6734	26		69		
35				70		

Max Marks	60	
Class Average mark	28	
Number of students performed above the target	25	
Number of successful students	61	
Percentage of students scored more than target	41%	
Attainment level	**2**	

Attainment Level	% students
1	40%
2	50%
3	>60%

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences
Course Outcome Attainment

Name of the faculty	CH.SARITHA		Academic Year:	2022-2023
Branch & Section:	DATA SCIENCE		Examination:	I Internal
Course Name:	M&C		Year:	I
			Semester:	I

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00		3.00	2.00	2.40
CO2	3.00		3.00	2.00	2.40
CO3	3.00	3.00	3.00	2.00	2.40
CO4		3.00	3.00	2.00	2.40
CO5		3.00	3.00	2.00	2.40
CO6		3.00	3.00	2.00	2.40
Internal & University Attainment:			3.00	2.00	
Weightage			40%	60%	
CO Attainment for the course (Internal, University			1.20	1.20	
CO Attainment for the course (Direct Method)			2.40		

Overall course attainment level | **2.40**

SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Humanities & Sciences

Program Outcome Attainment (from Course)

Name of Faculty:	CH.SARITHA		Academic Year:	2022-2023
Branch & Section:	DATA SCIENCE		Year:	I
Course Name:	M&C		Semester:	I

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	1	1	-	-	-	-	-	-	1		
CO2	3	2	-	1	1	-	-	-	-	-	-	1		
CO3	2	2	-	1	1	-	-	-	-	-	-	1		
CO4	2	3	-	1	1	-	-	-	-	-	-	2		
CO5	3	2	-	1	1	-	-	-	-	-	-	2		
CO6	3	2	-	1	1	-	-	-	-	-	-	2		
Course	**2.67**	**2.17**		**1.00**	**1.00**							**1.50**		

CO	Course Outcome Attainment	
CO1	2.40	
CO2	2.40	
CO3	2.40	
CO4	2.40	
CO5	2.40	
CO6	2.40	
Overall course attainment level	**2.40**	

PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
CO Attainment	2.13	1.73		0.80	0.80							1.20		

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

(UGC AUTONOMOUS INSTITUTION)

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(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

ATTENDANCE REGISTER

https://drive.google.com/file/d/1vCtkqPnM_FUpvTc0SD4iLtd_KmrQtXZh/view?usp=sharing