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
ESTD : 2007
EAMCET CODE: INDI
Approved by AICTE, New Delhi, & Affiliated to JNTUH, Hyderabad.
JNTUH CODE: X3

COURSE FILE

ON

MATRICES & CALCULUS

Course Code - MA101BS

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

Prepared by

Mrs.V. SUJATHA
Assistant Professor

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.

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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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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 associate, 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 Artificial Intelligence and Data Science(AI&DS)

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.	AP102BS	Applied Physics	3	1	0	4
3.	CS102ES	C Programming for Engineers	3	0	0	3
4.	ME102ES	Engineering Workshop	0	1	3	2.5
5.	EN104HS	English for Skill Enhancement	2	0	0	2
6.	EC101ES	Elements of Electronics and Communication Engineering	0	0	2	1
7.	AP105BS	Applied Physics Laboratory	0	0	3	1.5
8.	EN107HS	English Language and Communication Skills Laboratory	0	0	2	1
9.	CS105ES	C Programming for Engineers Laboratory	0	0	2	1
10.	*MC101ES	Environmental Science	3	0	0	0
11.		Induction Programme				
		Total	**14**	**3**	**12**	**20**

I Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	CH203BS	Engineering Chemistry	3	1	0	4
3.	ME201ES	Computer Aided Engineering Graphics	1	0	4	3
4.	EE201ES	Basic Electrical Engineering	2	0	0	2
5.	EC201ES	Electronic Devices and Circuits	2	0	0	2
6.	CS202ES	Applied Python Programming Laboratory	0	1	2	2
7.	CH206BS	Engineering Chemistry Laboratory	0	0	2	1
8.	EE202ES	Basic Electrical Engineering Laboratory	0	0	2	1
9.	EC202ES	Electronic Devices and Circuits Laboratory	0	0	2	1
		Total	**11**	**3**	**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 mathematicalproblems
- 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 analyze the solution of thesystem 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 Edition, 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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Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

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

Course Outcomes

After completing this course, the student will be able to:

C111.1: Write the matrix form of linear system of equations and test the consistency of the given system. (Analyzing)

C111.2: Reduce the quadratic form to canonical form using orthogonal transformations. (Applying)

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

C111.4 : Evaluate the improper integrals using Beta and Gamma functions.(Evaluating)

C111.5 : Find the Maxima and Minima of functions of two variables and three variables.(Remembering)

C111.6 : Compare the difference between double integrals and triple integrals in cartesian and polar Coordinates. (Understanding)

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

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 : Write the matrix form of linear system of equations and test the consistency of the given system.(Analyzing)

	Justification
PO1	Student construct the matrix representation using system of linear equations (level 3)
PO2	Student analyze the linear equations in several variables (level 2)
PO4	Student can use different matrix methods to get solution (level 1)
PO5	Student apply numerical techniques to solve linear system. (level 1)
PO12	Student can recognize importance of consistent concepts in linear system of equations. (level 1)

C111.2 : Reduce the quadratic form to canonical form using orthogonal transformations.(Applying)

	Justification
PO1	Student get the knowledge of diagonalization on finding eigen values and eigen vectors (level 3)
PO2	Student can identify normalization of vectors to get modal matrix in orthogonal transformation (level 2)
PO4	Student can use knowledge of eigen values and eigen vectors in diagonalizing 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 orthogonal transformation. (level 1)

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

	Justification
PO1	Student get the knowledge of continuous and derivable when using Mean value theorems(level 3)
PO 2	Student can compare the difference between Taylor's series and Maclaurin's series (level 2)
PO4	Student can use mean value theorems after satisfying continuity and differentiability of the given functions in the given intervals(level 1)
PO5	Student apply Maclaurun's series for the given function when is at origin.(level 1)
PO12	Student can recognize importance of mean value theorems(level 1)

C111.4 Evaluate the improper integrals using Beta and Gamma functions.(Evaluating)

	Justification
PO1	Student get the knowledge of Beta and Gamma functions.(level3)
PO2	Student can explain the concept of improper integrals using Beta and Gamma functions.(level2)
PO4	Student can use techniques of Beta functions can find exact value of integral function.(level 1)
PO5	Student apply formula of Beta and Gamma functions.(level 1)
PO12	Student can recognize importance of calculus formulas in Beta and Gamma functions. (level 1)

C111.5 : Find the Maxima and Minima of functions of two variables and three variables.(Remembering)

	Justification
PO1	Student get the knowledge to finding maxima and minima of functions(lavel3)
PO2	Student can differentiate the functions of two variables and three variables in finding maxima and minima of functions (lavel2)
PO4	Student can analyze the steps involving in functions of two variables and three variables. (level 1)
PO5	Student apply mean value theorems in the form of geometrical interpretation. (level 1)
PO12	Student can recognize importance of differentiation for finding Jacobian of two and three variables (level 1)

C111.6 : Compare the difference between double integrals and triple integrals in cartesian and polar coordinates(Understanding)

	Justification
PO1	Student get the knowledge to finding double and triple integrals.(level 3)
PO2	Student can differentiate integration in double and triple integrals(level 2)
PO4	Student can analyze the steps involving in cartesian and polar form for multiple integrals(level 1)
PO5	Student apply areas and volume concepts in double and triple integrals(level 1)
PO12	Student can recognize importance of multiple integrals in spherical and polar forms(level 1)

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https://siiet.ac.in/

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		Duration
		From	To	
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		Duration
		From	To	
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				

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ACE
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CONTROLLER OF EXAMINATIONS
CE
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Copy to: All the Deans & the Depts. & AO:

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Class: AI &DS **Semester: I** **W.E.F-14-11-2022** **LH:-D-210**

	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	EWS/ELCS LAB			LUNCH	AP	PPS	M&C	PPS(T)/AP(T)
TUE	ENG	ES	M&C		PPS	AP	ES	ENG(T)/M&C(T)
WED	ECSE	PPS	ES		AP	M&C	ENG	AP(T)/PPS(T)
THU	PPS LAB				ECSE	AP	ENG	M&C(T)/ENG(T)
FRI	ENG	PPS	M&C		AP LAB			ECSE(T)
SAT	PPS	AP	M&C		EWS/ELCS LAB			LIB

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
MA101BS	Matrices and Calculus	V.SUJATHA	ME102ES	Engineering Workshop	B.SRINU NAIK/A.MALLESH
AP102BS	Applied Physics	R.YADAGIRI RAO	AP105BS	Applied Physics -Lab	P.SRINIVASA CHARY /M.MANISHA/ R.YADAGIRI RAO /M.JANAIAH
CS103ES	Programming for Problem Solving	G.KALYANI	CS107ES	Programming for Problem Solving Lab	G.KALYANI /U.NARESH
EN104HS	English for Skill Enhancement	G.VENKAT REDDY	EN107HS	English Language and Communication Skills Lab	G.VENKAT REDDY/S.SWAPNA
CS106ES	Elements of Computer Science & Engineering	J.PUJITHA	MC101ES	Environmental Science	O.SUBHASHINI

Class In-Charge

Time Table Coordinator

Sri Indu Institute of Engineering & Technology SHERIGUDA 501 510

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
SRI INDU INSTITUTE OF ENGG & TEC
Sheriguda(V), Ibrahimpatnam (M), R...

Matrices and Calculus : Lesson Plan

L/H	Topic	TA/TM	Reference book
1	Unitwise 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.	Rank of the matrix	Lecture Method	R-1,W1
5.	Rank of the matrix by using Echelon form	Lecture Method	R-1
6	Rank of the matrix by using Normal form	Lecture Method	R-1
7	Problems on Rank of the matrix	Lecture Method	T-1
8	Inverse of the matrix by using Gauss Jordan method	Lecture Method	R-1
9	Problems	Problem solving Method	T-1
10	Concept to know the consistency of Linear system of equations	Lecture Method,Video	R-1
11	Homogeneous system of linear equations and problems	Lecture Method,Video	R-1,T-1
12	Non Homogeneous system of linear equations and problems	Problem solving Method,Video	R-1,T-1
13	Gauss Elimination method and Problems	Lecture Method/ Problem solving Method,Video	T-1,V-4
14	Gauss seidal Iteration methd and Problems	Lecture Method /Problem solving Method,Video	T-1,W2,V-3
15	**UNIT – II Eigen values and Eigen Vectors** Introduction of Linear transformation and Orthogonal transformation	Lecture Method,Video	R-1
16	To finding eigen values and Eigen Vectors of a Martix	Problem solving Method,Web Presentation,video	T-1,V-1
17	To finding eigen values and Eigen Vectors of a Martix	Problem solving Method,Web Presentation,video	T-1
18	Problems	Problem solving Method,Web,Video	T-1,
19	Properties of Eigen values and Eigen vectors	Lecture Method	R-1
20	To find Diagonalization of a Matrix	Lecture Method	T-1
21	Problems on Diagonalization	Problem solving Method	T-1
22	Cayely Hamilton theorem -Problems	Problem solving Method,Video	T-1,V-2
23	Cayely Hamilton theorem -Problems	Problem solving Method,Video	T-1
24	Finding Inverse and powers of a Matrix by using Cayley Hamilton theorem	Lecture Method,Video	R-1
25	Finding Inverse and powers of a Matrix by using Cayley Hamilton theorem	Lecture Method,Video	R-1,V-2
26	Quadratic form - Introduction	Lecture Method	T-1
27	Nature and Signature of Quadratic form	Lecture Method	R-1
28	Reduction of Quadtratic form to Canonical form by using Orthogonal transformation	Lecture Method	R-1

29	**UNIT - IIICalculus** Introduction of Mean value theorems	Lecture Method	R-1
30	Rolle's Mean value theorem - Problems	Problem solving Method,web presentation	R-1
31	Lagrange's Mean value theorem-Problems	Problem solving Method ,web presentation	R-1,w4
32	Applications	Lecture Method	R-1
33	Cauchy's mean value theorem –Problems	Problem solving Method, web presentation	R-1,T-1
34	Taylor's Series - Problems	Problem solving Method	R-1,T-1
35	Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves	Lecture Method	R-1
36	Introduction of ImproperIntegrals Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves	Lecture Method	R-1
37	Introduction of Improper Integrals	Lecture Method	R-1
38	Beta and Gamma functions and their properties - problems	Problem solving Method	R-1,T-1
39	**UNIT - IV** **Multi variable Calculus(Partial differentiation and applications)** Introduction of Limit and Continuity	Lecture Method	R-1
40	Euler's theorem - Problems	Problem solving Method	R-1,T-1
41	Total derivative - Problems	Problem solving Method	R-1,T-1
42	Jacobian - Problems	Problem solving Method	R-1,T-1
43	Functional dependence & independence - Problems	Problem solving Method	T-1
44	Functionaldependence &independenc Problems	Problem solving Method	T-1
45	Maxima and Minima of functions of two variables - Problems	Problem solving Method,Video	T-1,V-5,W3
46	Maxima and Minima of functions of two variables - Problems	Problem solving Method,Video	T-1,V-5
47	Maxima and Minima of functions of three variables - Problems	Problem solving Method,Video	T-1,V-5
48	Maxima and Minima of functions of three variables - Problems	Problem solving Method,Video	T-1,V-5
49	**UNIT-V** **Multi variable calculus (Integration)** Introduction to multiple integration	Lecture Method	R-1
50	Evaluation of double integrals in Cartesian and polar coordinates	Lecture Method	R-1
51	Change of order of integration in Cartesian form	Lecture Method	R-1
52	Evaluation of triple integrals	Problem solving Method,Video	T-1
53	Change of variables Cartesian to polar in double integrals	Problem solving Method,Video	T-1
54	Change of variables Cartesian to spherical in triple integrals	Problem solving Method,Video	T-1
55	Change of variables Cartesian to Cylindrical in triple integrals	Lecture Method	R-1
56	Areas by double integrals	Lecture Method	R-1
57	Volumes by double and triple integrals	Lecture Method	R-1,w5

REFERENCES :

R-1 .Ramana B.V.,Higher Engineering Mathematics, Tata McGRAW Hill,New DelhiR-2

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

TEXTBOOKS :

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

2 Erwin Kreyszig,Advanced Engineering Mathematics

GAP WITHIN THE SYLLABUS – MAPPING TO CO, PO

Cramer's rule,Matrix inversion method, Importance of sequence ,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 andproblems(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	_	_	_	_	_	_	_	_	_	_

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 ensuretheir 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	–	–	–	–	–	–	–

WEB REFERENCES :

W-1 https://en.wikipedia.org/wiki/Rank_(linear_algebra) (For UNIT-I,UNIT-II)

W-2 http://mathforcollege.com/ma/book2021/gauss-seidel-method.html (For UNIT- I)

W-3 https://tutorial.math.lamar.edu/Classes/CalcIII/RelativeExtrema.aspx (For UNIT-III)

W-4 https://courses.lumenlearning.com/calculus1/chapter/the-mean-value-theorem-for-integrals (For UNIT-IV)

W-5 https://math.stackexchange.com/questions/1903927/volume-of-solid-rotated-about-y-axis(For UNIT-V)

VIDEO REFERENCES :

V-1 https://www.youtube.com/watch?v=h5urBuE4Xhg(Video for Eigen values and eigen vectors)

V-2 https://www.youtube.com/watch?v=8D3WViAyJvc (Cayley-Hamilton Theorem)

V-3 https://www.youtube.com/watch?v=ajJD0Df5CsY (For Gauss seidal iteration method)

V-4 **https://www.youtube.com/watch?v=2j5Ic2V7wq4 (For Gauss Elimination method)**

V-5 https://www.youtube.com/watch?v=gLWUrF_cOwQ (For Maxima and Minima)

V-6 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/1auDWIg9WJJ4bPUQS_Ow81nHZ4tXeAgbw/view?usp=sharing

UNIT 1: https://drive.google.com/file/d/1s4dLKyzPlIvjG4vR4XNahxS_i8QRkiLa/view?usp=sharing

UNIT 2: https://drive.google.com/file/d/1ZPKTjJgzg4CTv38ZpTUg30pxAgn6IPnX/view?usp=sharing

UNIT 3: https://drive.google.com/file/d/17-2bLhYvNqI3brTwnwojns025NGcBzD1/view?usp=sharing

UNIT 4: https://drive.google.com/file/d/11od9SSFNkeh9ixF32L4SV-RRFScL3xjT/view?usp=sharing

UNIT 5: https://drive.google.com/file/d/1NNxDuH8nQtu64EeDLCTmIvEVTkuH3syH/view?usp=sharing

POWERPOINT PRESENTATION

https://docs.google.com/presentation/d/11zrCnBITrlTD6WCBs-zN2fpaKCkUVlEK/edit?usp=sharing&ouid=106039517343501825239&rtpof=true&sd=true

https://drive.google.com/file/d/1n9y4qTU0LMLUs7J-KKA15E5EmYMMSVMk/view?usp=sharing

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

Part-B

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))**

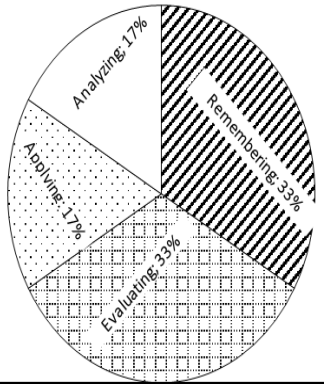
3. . Solve the system of equations $10x + y + z = 12, 2x + 10y + z = 13, 2x + 2y + 10z = 14$ by using Gauss seidel iteration method **(Applying(L3))**

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))**

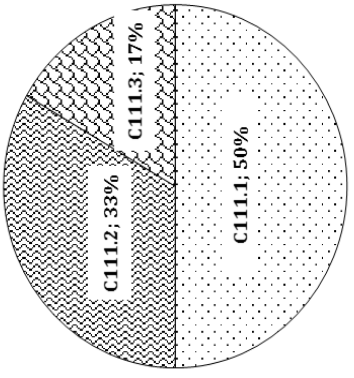
5 .Reduce the given Quadratic form to canonical form $2xy+2yz+2zx$ by orthogonal reduction and find the Nature, Index and Signature of Quadratic form. **(Analyzing(L4))**

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

QUESTION PAPER MAPPING WITH BT



QUESTION PAPER MAPPING WITH CO'S



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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

Part-B

\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) $\frac{\partial(x,y,z)}{\partial(u,v,w)}\frac{\partial(x,y,z)}{\partial(u,v,w)}$ ii) $\frac{\partial(u,v,w)\partial(u,v,w)}{\partial(x,y,z)\,\partial(x,y,z)}$

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

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

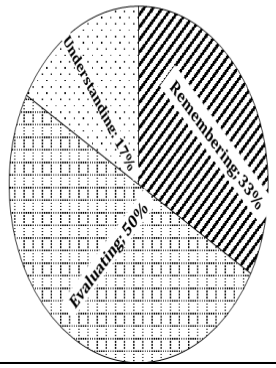
5. $Evaluate\int_0^{\pi}\int_0^{a(1+cos\theta)} r^2cos\theta drd\theta Evaluate\int_0^{\pi}\int_0^{a(1+cos\theta)} r^2cos\theta drd\theta$

   Evaluating(L5)

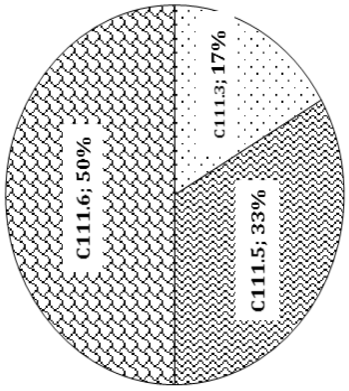
6. Find the area of the region bounded by the parabolas $y^2=4ax$ and $x^2 = 4ay$

   Remembering(L1)

QUESTION PAPER MAPPING WITH BT



QUESTION PAPER MAPPING WITH CO'S



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MID I & MID-II KEY link

https://drive.google.com/file/d/1r_tqhyATwxUgbvZDkhQ_c1jCjVvOl78k/view?usp=sharing

https://drive.google.com/file/d/1eN4juuOf9RJfEv4youhPCCEcfTAy3f6-/view?usp=sharing

MID-I & MID-II SAMPLE STUDENT SCRIPTS Link

https://drive.google.com/file/d/1vw-Ju_Rolb17qVf-foLUCvS954kLbizb/view?usp=sharing

https://drive.google.com/file/d/1M80y32ygmZWPsYvOZMLsjTd5AgPyvoVz/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

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

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

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

3. Find the value of k if the rank of the matrix A is 2 where A = $\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & k & 0 \end{bmatrix}\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & k & 0 \end{bmatrix}$ (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 = $\begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}\begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$ (Evaluating(L5))

9. If A = $\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ 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 = $\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ (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 $[\frac{\pi}{4}\frac{\pi}{4}, \frac{5\pi}{4}\frac{5\pi}{4}]$ (Evaluating(L5)

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

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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 $\frac{x^2x^2}{a^2a^2} + \frac{y^2y^2}{b^2b^2} = 1$ (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 $3ay^2 = x(x-a)^2$ is $\frac{\pi a^2 \pi a^2}{3 \quad 3}$ **Evaluating(L5)**
4. If $z = \log(e^x + e^y)$ show that $rt-s^2 = 0$ **Evaluating(L5)**
5. Using Euler's theorem , prove that $x\frac{\partial u \partial u}{\partial x \partial x} + y\frac{\partial u \partial u}{\partial y \partial y} = \sin 2u$ if $u = \tan^{-1}\left(\frac{x^3+y^3}{x+y}\right)\frac{x^3+y^3}{x+y}$ **Applying(L3)**
6. If u = f(r) and x= rcosθ, y = rsinθ then prove that $\frac{\partial^2 u \partial^2 u}{\partial x^2 \partial x^2} + \frac{\partial^2 u \partial^2 u}{\partial y^2 \partial y^2} + \frac{\partial^2 u \partial^2 u}{\partial z^2 \partial z^2} = f^{II} f^{II}(r) + \frac{1}{r} f^{I} \frac{1}{r} f^{I}(r)$ **Evaluating(L5)**
7. Find $\frac{du\,du}{dx\,dx}$ if $u = \sin(x^2 + y^2x^2 + y^2)$ where $a^2x^2 + b^2y^2 = c^2a^2x^2 + b^2y^2 = c^2$ **Remembering(L1)**
8. If x+y+z =u , y+z =uv, z = uvw then evaluate i) $\frac{\partial(x,y,z)}{\partial(u,v,w)} \frac{\partial(x,y,z)}{\partial(u,v,w)}$ ii) $\frac{\partial(u,v,w)\partial(u,v,w)}{\partial(x,y,z)\,\partial(x,y,z)}$ **Evaluating(L5)**
9. Showthat the functions u=x+y+z, v=xy+yz+zx and $w=x^2 + y^2 + z^2$ are functionally dependent and find the relation between them **Evaluating(L5)**
10. Find the maximum and minimum distances of the point of $u = x^2y^3z^4$ if 2x+3y+4z =a **Remembering(L1)**
11. Find the maxima and minima of the function $f(x,y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$ **Remembering(L1)**
12. Evaluate i) $\int_0^5 \int_0^{x^2} x(x^2+y^2) \int_0^5 \int_0^{x^2} x(x^2+y^2)\,dxdy$ **Evaluating(L5)**
    ii) $\int_0^4 \int_0^{x^2} e^{\frac{y}{x}} \int_0^4 \int_0^{x^2} e^{\frac{y}{x}}\,dxdy$ **Evaluating(L5)**
13. Solve $\int_0^{log2} \int_0^x \int_0^{x+logy} e^{x+y+z}dxdydz \int_0^{log2} \int_0^x \int_0^{x+logy} e^{x+y+z}dxdydz$ **Evaluating(L5)**
14. Find the area of the region bounded by the parabolas $y^2=4ax$ and $x^2 = 4ay$ **Remembering(L1)**
15. Evaluate the double integral $\int_0^{4a} \int_{\frac{y^2}{4a}}^{y} \left(\frac{x^2-y^2}{x^2+y^2}\right) dxdy \int_0^{4a} \int_{\frac{y^2}{4a}}^{y} \left(\frac{x^2-y^2}{x^2+y^2}\right) dxdy$ by changing into polar coordinates **Evaluating(L5)**
16. Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xydxdy \int_0^1 \int_{x^2}^{2-x} xydxdy$ and hence evaluate the double integral **Creating(L6)**

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

MID-I & MID-II link

Mid1 https://drive.google.com/file/d/1SOsZYU6o96BFfAuqYj_gOgXpiBLn7RGG/view?usp=sharing

Mid2 https://drive.google.com/file/d/1w8SQ7x6PSzcj816RRqvUhc0vrZj_BJog/view?usp=sharing

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 $P^TAP = D$ 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**

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 = π/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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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,V-1
5	Non Homogeneous system of linear equations and problems	Problem solving Method,Video	1	R-1,T-1,V-1
6	Gauss Elimination method and Problems	Lecture Method/ Problem solving Method,Video	1	T-1,V-5
7	Gauss seidal Iteration methd and Problems	Lecture Method /Problem solving Method,Video	1	T-1,V-4
8	To finding eigen values and Eigen Vectors of a Martix	Problem solving Method,Web Presentation,video	1	T-1,W-2,V-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,V-2
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,W-5
13	Lagrange′s Mean value theorem- Problems	Problem solving Method ,web presentation	1	R-1,W-5
14	Cauchy′s mean value theorem –Problems	Problem solving Method, web presentation	1	R-1,T-1,W-5
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,V-8
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,V-9

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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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

Result Analysis: AI&DS

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

Weak Students:

S No	Roll no	Intermediate Marks	Internal-I Status (35)	Internal-II Status (40)
1	22X31A7207	64%	28	26
2	22X31A7212	67.5%	22	40
3	22X31A7214	72.5%	34	29
4	22X31A7220	70%	32	40
5	22X31A7229	69%	33	34
6	22X31A7230	63%	24	30
7	22X31A7234	66%	33	39
8	22X31A7256	72%	35	34

Advanced learners:

S No	Roll No	Intermediate Marks	Gate Material
1	22X31A7217	96%	Probability, Discrete Mathematics, Graph theory, Differential Equations
2	22X31A7218	94.1%	
3	22X31A7219	97.5%	
4	22X31A7233	97.5%	
5	22X31A7242	95.2%	
6	22X31A7250	93.8%	
7	22X31A7257	92.4%	

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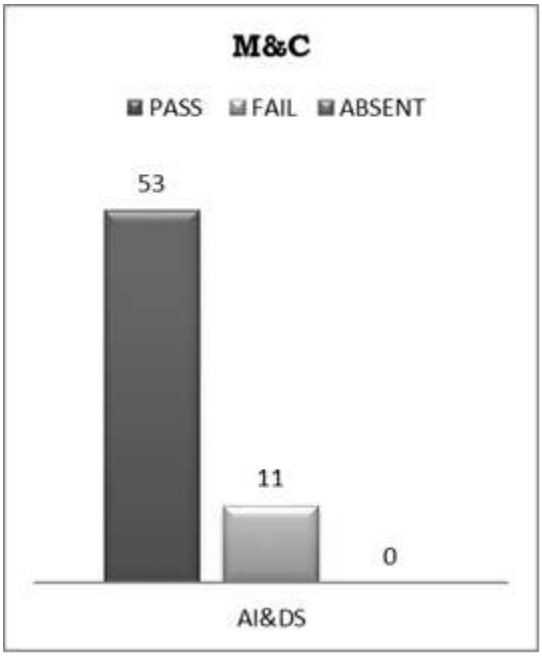
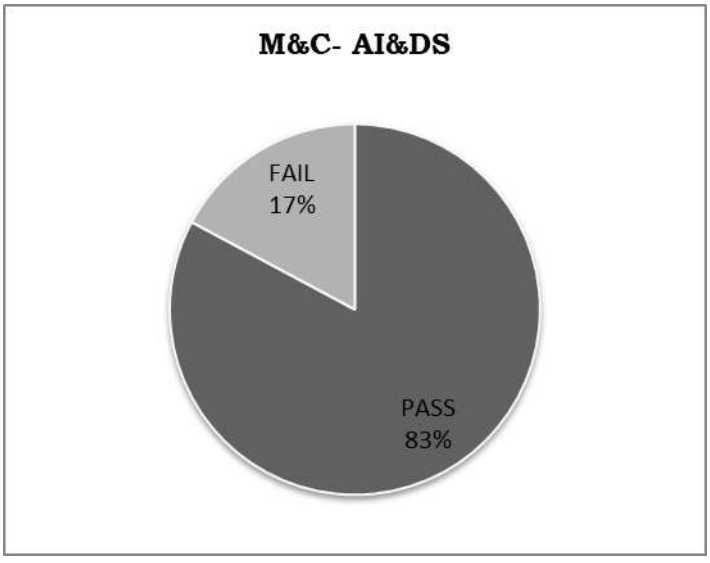
Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana – 501510

RESULT ANALYSIS AT THE END OF SEMISTER

Branch: AI&DS **Subject: MATRICES & CALCULUS**





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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 facu	V.SUJATHA	Academic Year:	2022-2023
Branch & Sectior	AI&DS	Examination:	I Internal
Course Name:	MATRICES AND CALCULUS	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	22X31A7201	5						5			5						5			9	**5**
2	22X31A7202	3						5			3						5			7	**5**
3	22X31A7203				5			5						5			5			10	**5**
4	22X31A7204	4						5			1						4			7	**5**
5	22X31A7205	5						5			5						5			10	**5**
6	22X31A7206	5			2			5									5			9	**5**
7	22X31A7207	5			5						3						1			9	**5**
8	22X31A7208	5			5			5			5									9	**5**
9	22X31A7209	5						5			5						5			8	**5**
10	22X31A7210				5			5			5						5			8	**5**
11	22X31A7211	5						5			5						5			9	**5**
12	22X31A7212	3			4						1						1			8	**5**
13	22X31A7213	5			5			5			5									9	**5**
14	22X31A7214	5						4			5						5			10	**5**
15	22X31A7215	5						5			5			5			5			10	**5**
16	22X31A7216	5						5			2						4			9	**5**
17	22X31A7217	5						5			5						5			10	**5**
18	22X31A7218				5			5			5						5			9	**5**
19	22X31A7219				5			5			5						5			7	**5**
20	22X31A7220	5						5			4						5			8	**5**
21	22X31A7221	5			1			3												9	**5**
22	22X31A7222				5			5			5						5			8	**5**
23	22X31A7223	5			5			5			5									10	**5**
24	22X31A7224	5						4			5						5			8	**a**
25	22X31A7225	5			5									5			5			10	**5**
26	22X31A7226	5						5			5			5						9	**5**
27	22X31A7227	5						4			5						5			7	**5**
28	22X31A7228	3			3			5									5			9	**5**
29	22X31A7229	5			5						5						5			8	**5**
30	22X31A7230	2			1						4						5			7	**5**
31	22X31A7231	4									3			4			4			6	**5**
32	22X31A7232	5			4			5			5						5			5	**5**
33	22X31A7233	5			5			5									5			7	**5**
34	22X31A7234				4			5			5						5			9	**5**
35	22X31A7235							5			5			5			5			10	**5**
36	22X31A7236	5			5						5						5			10	**5**
37	22X31A7237	5						5			5						5			9	**5**
38	22X31A7238	4			3			1			2									8	**5**
39	22X31A7239	5			5			5			5						3			10	**5**
40	22X31A7240	5						1												8	**5**
41	22X31A7241				5			5			5						4			10	**5**
42	22X31A7242	5			5						5						5			10	**5**
43	22X31A7243	5						5			5						5			9	**5**
44	22X31A7244	5						5			5						5			10	**5**
45	22X31A7245	5			5						5						5			9	**5**
46	22X31A7246	5			5						5						5			10	**5**
47	22X31A7247							5			4						4			10	**5**
48	22X31A7248				5			5			5						4			7	**5**
49	22X31A7249	5						5			5						5			10	**5**
50	22X31A7250	5			3						5						4			9	**5**
51	22X31A7251	5			5			5			4									8	**5**
52	22X31A7252				5			5			5						5			10	**5**
53	22X31A7253	5						5			5						5			8	**5**
54	22X31A7254	2									5			1			5			9	**5**
55	22X31A7255	5			5			5									5			8	**5**
56	22X31A7256	5			3						4						1			8	**5**
57	22X31A7257							5			5			5			5			9	**5**
58	22X31A7258	5			5			5						5						8	**5**
59	22X31A7259	5						5												10	**5**
60	22X31A7260				5			5			5						5			9	**5**
61	22X31A7261	5			5						5						5			10	**5**
62	22X31A7262	5						5			5						5			9	**5**
63	22X31A7263	2			2			1			2									8	**5**
64	22X31A7264	5						1												6	**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	48	0	0	32	0	0	46	0	0	48	0	0	8	0	0	49	0	0	63	63
Number of students attempted	51	0	0	36	0	0	50	0	0	53	0	0	9	0	0	52	0	0	64	64
Percentage of students scored more than target	94%			89%			92%			91%			89%			94%			98%	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 %	94%			89%			92%			91%			89%			94%			98%	98%

CO Attainment based on Exam Questions:

CO - 1	94%			89%														98%	98%
CO - 2							92%			92%						92%		98%	98%
CO - 3													92%					98%	98%
CO - 4																			
CO - 5																			
CO - 6																			

CO	**Subj**	obj		Asgn	Overall	Level
CO-1	92%	94%		98%	95%	3.00
CO-2	92%	94%		98%	95%	3.00
CO-3	92%	95%		98%	95%	3.00
CO-4						
CO-5						
CO-6						

ttainment Lev	
1	40%
2	50%
3	60%

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 facu V.SUJATHA | Academic Year: | 2022-2023

Branch & Sectio AI& DS | Examination: | I Internal

Course Name: MATRICES AND CALCULUS | 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	22X31A7201	3	2		5			5									5			9	5	5
2	22X31A7202	3	2		5						3						2			8	5	5
3	22X31A7203	1	2		5			5			3	2								9	5	5
4	22X31A7204	3	2		5			5			3	2								9	5	5
5	22X31A7205	3	2		5			5			3	2								10	5	5
6	22X31A7206	3	1		5									2			3			9	5	5
7	22X31A7207				5						2									9	5	5
8	22X31A7208	3	2					5			3	2					5			8	5	5
9	22X31A7209				5			5			3	2					5			9	5	5
10	22X31A7210	3	2					5			3	2								10	5	5
11	22X31A7211	3	2		5			5									5			10	5	5
12	22X31A7212	3	2		5			5			3	2								10	5	5
13	22X31A7213	1	2		5			5									5			10	5	5
14	22X31A7214	3						3			2	1								10	5	5
15	22X31A7215	3	2		5			5			3	2								9	5	5
16	22X31A7216	1	1					5			1	2					5			9	5	5
17	22X31A7217	3	2		5			5			3	2								10	5	5
18	22X31A7218	3	2		5			5			3	2								10	5	5
19	22X31A7219	3	2		5			5			3	2								10	5	5
20	22X31A7220	3	2		5			5			3	2								10	5	5
21	22X31A7221	3	2		5			2												9	5	5
22	22X31A7222	3	2		5			5			2									10	5	5
23	22X31A7223	3	2		5			5			3	2								10	5	5
24	22X31A7224	3	2		5			5			3	2								10	5	5
25	22X31A7225	3	2		5			5			3	2								10	5	5
26	22X31A7226	3	2		5			5									5			10	5	5
27	22X31A7227	3	2		5			5			3	2								10	5	5
28	22X31A7228	3	2		5						3						5			9	5	5
29	22X31A7229				5			5			3	2								9	5	5
30	22X31A7230				2			5			2	2								9	5	5
31	22X31A7231	3	2		5						3	2					5			10	5	5
32	22X31A7232	3	2		5						3	2					5			8	5	5
33	22X31A7233	3	2		5			5									5			10	5	5
34	22X31A7234	3	2		5			5			3	2								9	5	5
35	22X31A7235	3	2					5			3	2					5			9	5	5
36	22X31A7236	3	2					5			3	2					5			10	5	5
37	22X31A7237	3	2		5						3	2					1			9	5	5
38	22X31A7238	3	2		1							2		1						9	5	5
39	22X31A7239	2	1		5						3	2								8	5	5
40	22X31A7240	3	2		5							2								8	5	5
41	22X31A7241	3	2		5			5			3	2								10	5	5
42	22X31A7242	3	2		5			5			3	2								10	5	5
43	22X31A7243	3	2		5			5									5			10	5	5
44	22X31A7244	3	2		5			5			3	2								10	5	5
45	22X31A7245	3	2					5			3	2					5			10	5	5
46	22X31A7246				5						3	2					5			9	5	5
47	22X31A7247				5							2					5			9	5	5
48	22X31A7248	3	2		5						3	2					5			10	5	5
49	22X31A7249	3	2		5			5									5			10	5	5
50	22X31A7250	3	2		5			5									5			9	5	5
51	22X31A7251	3	2		5			5			3									9	5	5
52	22X31A7252	3	2		5			5									5			10	5	5
53	22X31A7253	3	2		5			5									5			9	5	5
54	22X31A7254	3	2		5			5			3	2								9	5	5
55	22X31A7255				5			5			3	2								9	5	5
56	22X31A7256				5						3	2		1			5			8	5	5
57	22X31A7257	3	2		5			5			3	2								10	5	5
58	22X31A7258	3	2		5			5			3	2								10	5	5
59	22X31A7259	3	2		5			5									5			10	5	5
60	22X31A7260				5			5			3	2					5			10	5	5
61	22X31A7261	3	2		5			5			3	2					5			9	5	5
62	22X31A7262	3	2		5			5			3	2								9	5	5
63	22X31A7263	2	2								2	1		3			1			8	5	5
64	22X31A7264	3						1						3						9	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	0.00	3.00	0.00	0.00	6.00	3.00	3.00
Number of students performed above the target	52	50	0	52	0	0	46	0	0	46	43	0	2	0	0	26	0	0	63	64	64
Number of students attempted	55	53	0	54	0	0	48	0	0	47	45	0	5	0	0	29	0	0	63	64	64
Percentage of students scored more than target	95%	94%		96%			96%			98%	96%		40%			90%			100%	100%	100%

CO Mapping with Exam Questions:

CO - 1																				
CO - 2																				
CO - 3	**Y**																		Y	Y	**Y**
CO - 4							**Y**												Y	Y	**Y**
CO - 5										**Y**			**Y**						Y	Y	**Y**
CO - 6				**Y**												**Y**			Y	Y	**Y**
% Students Scored >Target %	95%	94%		96%			96%			98%	96%		40%			90%			100%	100%	100%

CO Attainment based on Exam Questions:

CO - 1																				
CO - 2																				
CO - 3	95%																		100%	100%	100%
CO - 4							95%												100%	100%	100%
CO - 5										95%			95%						100%	100%	100%
CO - 6				95%												95%			100%	100%	100%

CO	Subj	obj	aasgn	ppt	Overall	Level
CO-1						
CO-2						
CO-3	95%	100%	100%	100%	99%	3
CO-4	95%	100%	100%	100%	99%	3.00
CO-5	95%	100%	100%	100%	99%	3.00
CO-6	95%	100%	100%	100%	99%	3.00

Attainment (Internal Examination-2) **3.00**

Attainment Level	
1	40%
2	50%
3	60%

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Humanities & Sciences

Course Outcome Attainment (University Examinations)

Name of the faculty: V.SUJATHA | Academic Year: 2022-2023

Branch & Section: AI&DS | Year / Semester: I / I

Course Name: MATRICES AND CALCULUS

S.No	Roll Number	Marks Secured	S.No	Roll Number	Marks Secured
1	22X31A7201	40	36	22X31A7236	37
2	22X31A7202	23	37	22X31A7237	48
3	22X31A7203	31	38	22X31A7238	12
4	22X31A7204	22	39	22X31A7239	23
5	22X31A7205	40	40	22X31A7240	0
6	22X31A7206	22	41	22X31A7241	39
7	22X31A7207	30	42	22X31A7242	37
8	22X31A7208	39	43	22X31A7243	33
9	22X31A7209	30	44	22X31A7244	25
10	22X31A7210	38	45	22X31A7245	43
11	22X31A7211	42	46	22X31A7246	7
12	22X31A7212	28	47	22X31A7247	14
13	22X31A7213	30	48	22X31A7248	27
14	22X31A7214	13	49	22X31A7249	35
15	22X31A7215	37	50	22X31A7250	27
16	22X31A7216	10	51	22X31A7251	21
17	22X31A7217	39	52	22X31A7252	25
18	22X31A7218	31	53	22X31A7253	23
19	22X31A7219	33	54	22X31A7254	6
20	22X31A7220	27	55	22X31A7255	25
21	22X31A7221	23	56	22X31A7256	16
22	22X31A7222	26	57	22X31A7257	45
23	22X31A7223	26	58	22X31A7258	39
24	22X31A7224	30	59	22X31A7259	46
25	22X31A7225	31	60	22X31A7260	43
26	22X31A7226	43	61	22X31A7261	33
27	22X31A7227	32	62	22X31A7262	28
28	22X31A7228	30	63	22X31A7263	5
29	22X31A7229	32	64	22X31A7264	4
30	22X31A7230	11	65		
31	22X31A7231	21	66		
32	22X31A7232	23	67		
33	22X31A7233	43	68		
34	22X31A7234	26	69		
35	22X31A7235	32	70		
Max Marks		60			

Class Average mark	28
Number of students performed above the target	33
Number of successful students	64
Percentage of students scored more than target	52%
Attainment level	**3**

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	V.SUJATHA	Academic Year:	2022-2023
Branch & Section:	AI&DS	Examination:	I Internal
Course Name:	MATRICES AND CALCULUS	Year:	I
		Semester:	I

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00		3.00	3.00	3.00
CO2	3.00		3.00	3.00	3.00
CO3	3.00	3.00	3.00	3.00	3.00
CO4		3.00	3.00	3.00	3.00
CO5		3.00	3.00	3.00	3.00
CO6		3.00	3.00	3.00	3.00
Internal & University Attainment:			3.00	3.00	
Weightage			30%	70%	
CO Attainment for the course (Internal, University)			0.90	2.10	
CO Attainment for the course (Direct Method)			3.00		

Overall course attainment level **3.00**

SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Humanities & Sciences

Program Outcome Attainment (from Course)

Name of Faculty:	V.SUJATHA	Academic Year:	2022-2023
Branch & Section:	AI&DS	Year:	I
Course Name:	MATRICES AND CALCULUS	Semester:	I

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3		1	1							1		
CO2	2	3		1	1							1		
CO3	1	2		1	1							1		
CO4	2	2		1	1							2		
CO5	3	2		1	1							2		
CO6	2	1		1	1							2		
Course	**2.00**	**2.17**		**1.00**	**1.00**							**1.50**		

CO	**Course Outcome Attainment**
CO1	3.00
CO2	3.00
CO3	3.00
CO4	3.00
CO5	3.00
CO6	3.00
Overall course attainment level	**3.00**

PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO Attainment	**2.00**	**2.17**		**1.00**	**1.00**							**1.50**

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

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY
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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

Attendance Link :
https://drive.google.com/file/d/1THrbsScmPi0IFKeHEX2tcBWniA18vNV6/view?usp=sharing