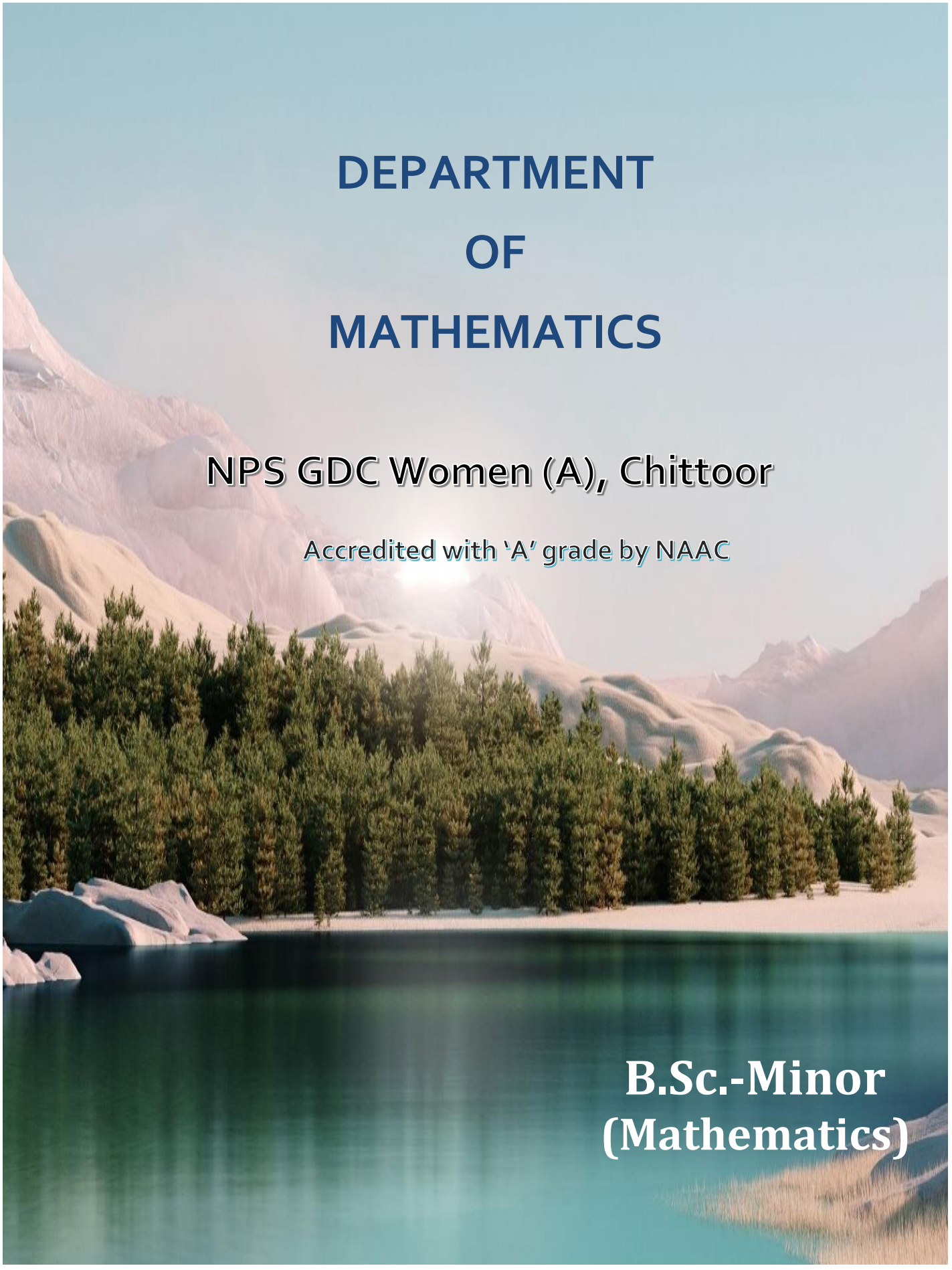


DEPARTMENT OF MATHEMATICS

NPS GDC Women (A), Chittoor

Accredited with 'A' grade by NAAC

B.Sc.-Minor (Mathematics)

ACADAMIC CELL, NPS GDC Women(A), Chittoor

Proceedings of the Principal, NPS Govt. Degree College for Women(A), Chittoor
Present: Dr. K. Manohar

Rc.No.MAT-01 /NPSGDCW/UG-BOS/2025-28 dt. 27-07-2026

Subject: NPS GDC Women(A), Chittoor – UG Board of Studies (BoS) – Nomination of Members – Orders issued.

Ref.: 1. UGC Guidelines of for Autonomous Colleges – 2023.
2. Proc. Of the VC No: SVU/C-1II (3)/BOS/Smt. NPS. Govt. Coll/Chi/2025 dt. 09-05-2025

***

Order

The Principal, NPS GDC Women(A), Chittoor, is pleased to nominate the following members to UG Board of Studies to frame the syllabus of **Mathematics** courses in all the semesters duly following the norms of the UGC regulations for the Autonomous Colleges 2023.

S.No.	Name	Designation
1	Smt.P. Sobha Latha	Chairperson
3	Smt. S. Kiranmaiye	Subject Expert
4	Dr.B.Swaroopa	Subject Expert
5	Dr.K. Madhavi	University Nominee
6	Sri. M. Charan	Expert from Industry
7	Dr.C.Narasimha Reddy	Special Courses Expert
8	S.J Aayesha	Alumni Nominee

The above members are requested to attend the BoS meetings for the first Autonomous UG-Batch 2025-26 and share their valuable views, suggestions on the following functionaries.

a) Prepare syllabi for the subject keeping in view the objectives of the college, interest of the stakeholders and National recruitment for consideration and approval of the IQAC and Academic Cell.
b) Suggest methodologies for innovative teaching and evaluation techniques
c) Suggest the panel of names to the Academic council for appointment of Examiners
d) Coordinate research, teaching, extension and other activities in the department of the College.
e) Suggest CLO, PLO and subject experts to develop question bank in compliance with Bloom's Taxonomy.

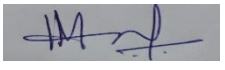
The above said members are requested to bestow their services for the successful organization of the event.

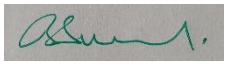
DEPARTMENT OF MATHEMATICS

COMPOSITION OF BOARD OF STUDIES FOR THE YEAR 2025-26

Sl.No.	Category	Name & Designation	Chairperson/ Member
1	Chairman	**Smt. P. Sobha Latha** Head of the Department Dept. of Mathematics Smt. N.P.S GDC for Women(A) Chittoor.	**Chairperson** Mobile: 8985882063 Email: psobhalatha@gmail.com
2.	Two Experts in the Subject from outside the Parent University to be nominated by Academic council	**1.S. Kiranmaiye** Lecturer in Mathematics GDC, Gudur Nellore Dist **2. Dr.B. Swaroopa** Lecturer in Mathematics SKR & SKR Govt. College for Women(A) Kadapa(dt)	**Subject experts outside parent University** Mobile: 9440390830 Email: kiranmaiyesarabu@gmail.com. Mobile: 9959157622 Email:bswaroopa2011@gmail.com
3.	One expert from to be nominated by the Vice-Chancellor from the panel of six recommended by Autonomous College Principal	**Dr.K. Madhavi** Lecturer in Mathematics Government Degree College, Kuppam Chittoor (dt)	**Subject experts by University** Mobile: 9441449589 Email: madhubala2369@gmail.com
4.	One Representative from the Industry/ Corporate Sector	**M Charan** Senior Consultant CA, Protiviti Member India Private Limited, Bangalore	**Industry Expert** Mobile: 8919271382 Email: cacharanreddy@gmail.com
5.	One Meritorious Alumni nominated by the Principal	**S.J Aayesha** Teacher Sri Chaitanya Techno Curriculum School	**Alumni Student** Mobile: 7330809150 Email id: ayeeshasj@gmail.com
6.	Experts from outside Autonomous College (Special Courses)	**Dr.C. Narasimha Reddy** Lecturer in Mathematics Govt. Degree College, Srikalahasti. Tirupati (dt)	**Special Courses Expert** Mobile: 9908853831 Email id: cnreddy1985@gmail.com

Signature of the Members

Dr.K. Madhavi 

Dr.B.Swaroopa 

Signature of the BOS Chairman

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DEPARTMENT OF MATHEMATICS

Board of Studies Dated: 29/07/2026

Meeting of the Board of studies is held at NRC Room for the Department of Mathematics, NPS GDC Women (A), Chittoor with the following agenda.

Agenda

- Curriculum Design for all the III & IV Semesters for B.Sc. (Minor)-Mathematics
- Designing of Course Outcomes and Course Objectives
- Identifying /inclusion of components of Skill Development, Employability and Entrepreneurship in the curriculum
- Additional inputs into the curriculum
- Designing Model Question Papers and identifying potential paper setters
- Innovative Teaching – Learning Methodology (Learner Centric)
- Curriculum for the Certificate Courses
- Academic activities of the Department
- Any other proposal with the permission of the chair

P Sobha Latha

(Smt. P. Sobha Latha)
CHAIRPERSON
BOARD OF STUDIES

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Minutes and Resolutions

The BOS Team have given the following inputs on the BOS Meeting-1:

- The Course-1 "Differential Equations (26MAT3M1T)" of semester-3 should include titles for Units I to V.
- In Course-1 "Differential Equations (26MAT3M1T)" of semester-3, it was suggested to change Problems on Method of Variation of parameters to find solutions of linear differential equations with "Variable coefficients" to Problems on Method of Variation of parameters to find solutions of linear differential equations with "Constant coefficients" in Unit V.
- The Course-2 "Group Theory (26MAT4M1T)" of semester-4 should include titles for Units I to V.
- In Course-2 "Group Theory (26MAT4M1T)" of semester-4, it is proposed to clarify that the topic "Properties of Cosets" (Statements Only) will be covered in the Unit II curriculum.
- In Course-2 "Group Theory (26MAT4M1T)" of semester-4, it is suggested to remove the topic "Hamilton Group" from in the Unit III curriculum.
- In Course-2 "Group Theory (26MAT4M1T)" of semester-4, It is recommended to eliminate "Applications from Fundamental Theorem of Homomorphism and its Applications" from the Unit IV curriculum.

The above suggestions are agreed by all the BOS members also incorporated while framing the UG syllabus for the B.Sc., Mathematics(Minor) for the A.Y 2026-27.

Signature of the Members **Signature of the BOS Chairman**

Dr.K. Madhavi

Dr.B.Swaroopa

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CONSOLIDATED REPORT OF BOARD OF STUDIES FOR THE YEAR 2026-27

The Meeting Board of Studies of Mathematics department was convened on 29-August-2026 under the Chairmanship of Smt. P Sobha Latha, Head / Lecturer-in-charge of Department of Mathematics. The following members are present

S.No.	Name	Designation	Signature
1	Dr.K. Madhavi	University Nominee	
2	Smt.S. Kiranmaiye	Local Nominee	
3	Dr.B. Swaroopa	Local Nominee	
4	Sri M. Charan	Industrial Nominee	
5	Dr. C. Narasimha Reddy	Subject/Special Courses Expert	
6	S.J Aayesha	Alumni	
7	V. Sasikala	Student	

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Board of Studies Meeting on _____

DEPARTMENT OF MATHEMATICS

List of Paper Setters

S No	Name of the Lecturer/Reader/Professor	Papers	College	City
1	Dr.K. Madhavi	ALL	GDC Kuppam Dept of Mathematics	Kuppam, SV University, Chittoor Dt.
2	Dr. S. Nagendra	ALL	GDC Kadapa Autonomous Dept of Mathematics	YVU, Kadapa Dist
3	Dr. C. Narasimha Reddy	ALL	GDC Srikalahasti Dept of Mathematics	Srikalahasti, SV University, Tirupati Dt.
4	Dr.B. Swaroopa	ALL	GDCW Kadapa Autonomous Dept of Mathematics	YVU, Kadapa Dist.
5	Sri. V.K. Deenadayal	ALL	GDCW Srikalahasti Dept of Mathematics	Srikalahasti SV University Tirupati Dt.
6	Smt. K. Madhavi	ALL	GDCW Srikalahasti Dept of Mathematics	Srikalahasti SV University Tirupati Dt.
7	Smt. S. Kiranmaiye	ALL	GDC Gudur Dept of Mathematics	Gudur VSU, Nellore Dt.
8	Dr P. Gayathri	ALL	GDC Srikalahasti Dept of Mathematics	Srikalahasti, SV University Tirupati Dt.
9	Dr.J.Ramadevi	ALL	GDC Puttur Dept of Mathematics	Puttur SV University Tirupati Dt.
10	Dr J. Gireesh Kumar	ALL	GDC Nagari Dept of Mathematics	Nagari Autonomous Chittoor Dt.
11	Dr Jayachandra	ALL	GDC Puttur Dept of Mathematics	Puttur, SV University Tirupati Dt.
12	Dr. Rushma	ALL	GDC Vedurukuppam Dept of Mathematics	SV University Tirupati Dt.

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Board of Studies Meeting on _____

DEPARTMENT OF MATHEMATICS

List of Paper Examiners

S No	Name of the Lecturer/Reader/Professor	Papers	College	City
1	Dr.K. Madhavi	ALL	GDC Kuppam Dept of Mathematics	Kuppam, SV University, Chittoor Dt.
2	Dr. S. Nagendra	ALL	GDC Kadapa Autonomous Dept of Mathematics	YVU, Kadapa Dist
3	Dr. C. Narasimha Reddy	ALL	GDC Srikalahasti Dept of Mathematics	Srikalahasti, SV University, Tirupati Dt.
4	Dr P. Gayathri	ALL	GDC Srikalahasti Dept of Mathematics	Srikalahasti, SV University Tirupati Dt.
5	Dr. J. Ramadevi	ALL	GDC Puttur Dept of Mathematics	Puttur SV University Tirupati Dt.
6	Dr J. Gireesh Kumar	ALL	GDC Nagari Dept of Mathematics	Nagari Autonomous Chittoor Dt.
7	Dr Jayachandra	ALL	GDC Puttur Dept of Mathematics	Puttur, SV University Tirupati Dt.
8	Sri. V.K. Deenadayal	ALL	GDCW Srikalahasti Dept of Mathematics	Srikalahasti SV University Tirupati Dt.
9	Smt. K. Madhavi	ALL	GDCW Srikalahasti Dept of Mathematics	Srikalahasti SV University Tirupati Dt.
10	Dr. Rushma	ALL	GDC Vedurukuppam Dept of Mathematics	SV University Tirupati Dt.

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DEPARTMENT OF MATHEMATICS

SCHEME OF EVALUATION

MODEL OF SEMESTER END EXAMINATION QUESTION PAPER
(THEORY)
(As Approved in the BOS meeting held on _____)

EVALUATION SCHEME

Standard Operating Procedure for Continuous Internal Assessment (Internal Marks – 30). The Internal marks in all the courses/subjects will be awarded based on continuous internal assessment made during the semester concerned. For each Courses/subject 30 marks are allotted for internal assessment and 70 marks are allotted for the End Semester Examination.

Continuous Internal Evaluation (CIE):

It has been decided to introduce Continuous Internal assessment marks for a total of 60 marks, which are to be distributed as follows:

S.No.	Component			Distribution of Marks
1	CIE I (after completion of 50% of syllabus)			20
2	CIE II (Online Exam)			20
3	ATTENDANCE	Above 95%	5	5
		91% to 95%	4	
		86% to 90%	3	
		81% to 85%	2	
		75% to 80%	1	
		Below 75%	0	
Pedagogical Strategies				
4	Assignment			5
5	Participation or Paper Presentation in Student Seminars/Workshops/Group Discussions/ Quiz/ Student Study Project/Field Visit/Survey			5
6	Swatch Bharat (Clean & Green)			5
TOTAL				**60**

The total 60 Marks is scaled down to 30 Marks

Component I: CIE I & CIE II (20+20 = 40 Marks)

Two Internal Examinations, out of which one is Mandatorily Online examination, for each Course shall be conducted for assessment. These examinations will be conducted during August/September (CIE –I) and January/February (CIE-II). CIE-I carries 20 marks and CIE-II carries 20 marks. CIE- I will be conducted after completion of 50% of syllabus. The second internal examination, i.e., CIE – II, which will cover the remaining second half of the syllabus. The sum of both the CIEs will be considered for awarding marks for CIA.

Suggestive Question Paper Pattern for CIE I & CIE II (Based on Blooms Taxonomy):

Though the faculty concerned is empowered to adopt their own pattern for question paper, a general and suggestive model for question paper is given below based on Blooms Taxonomy.

Q No	Learning Objective	Marks
1	Memory based (Remember)	3
2	Understand (Comprehension)	4
3	Application	4
4	Analysis	3
5	Evaluation	3
6	Creativity	3
	TOTAL	20 marks

The active verbs used to frame the question based on Blooms Taxonomy is given below for the convenience.

Active verbs developed based on Bloom's Taxonomy

Knowledge	Understand	Apply	Analyze	Evaluate	Create
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	Identify	Manipulate	survey	grade	produce
discover	indicate	Paint	advertise	measure	rearrange
duplicate	Infer	Prepare	appraise	predict	rewrite
enumerate	relate	produce	Break down	rank	role-play

\

Important Note:

Students who absent themselves from any CIE will lose the marks for the respective test. However, if a student is not able to write the CIE I / II because of his/her participation in an important event related to NSS/NCC or Games/Sports representing the College/University/health grounds, the student has to get the prior permission of the Principal through the proper channel and submit the same to the Office of the Controller of Examinations. Deadline is 7 days after the CIE. Applications submitted after the deadline will not be considered for the retest.

Component III: Attendance (5 Marks)

Attendance mark will be awarded to the students based on their attendance percentage on a particular course. Faculty of each course has to award the attendance mark based on their subject attendance.

The marks split-up is given below

Above 95%	5
91% to 95%	4
86% to 90%	3
81% to 85%	2
75% to 80%	1
Below 75%	0

Component IV: Assignment (5 Marks)

One Assignment for each course must be submitted by a student in each semester. The marks allotted to this component will be awarded based on the performance of the student. The assignment topic may be assigned either individually or group. Assignment should be submitted by the student in the first half of the semester. Also maximum of 7 days should be given to students to submit the assignment. Assignments should be evaluated by the faculty concerned and the same to be verified by the student. The assignment should be kept in department for the Academic Audit by IQAC and also for external academic audit conducted by office of Commissionerate of Collegiate Education. The marks should be awarded by the faculty.

Component V (Pedagogical Strategies):

Participation /Paper Presentation in Student Seminars/Workshops/Group Discussions/ Quiz/ Student Study Project/Field Visit/Survey (5 Marks)

For this component, the marks will be provided to student, if he/she participate/win in the external college technical events. To score marks, the student has to participate / present papers related to subject in the technical events organized in the other colleges/other departments in the college.

	Participation	Second Prize	First Prize / Best Paper
Workshop / Seminar / Technical Symposium	2	3	5
National / International Conference	3	4	5

In case of Classroom seminar, one seminar for each course must be presented by a student in each semester. Each student should be given individual topic for seminar; the student has to submit the seminar topic as assignment and the same will be presented minimum of 10 minutes in the class through ICT. The seminar presented by the student should be evaluated by the subject faculty and based on the performance of the presentation, the marks will be awarded.

Similarly, reports on field visits, educational tours, study projects in prescribed format will be considered for awarding marks in this component.
For a student who has not participated in any events in that semester, the student will be awarded "0" for this component. If a student participates more than one event and win prize, the best would be considered for the subject.

In case of Quiz, offline/online quiz, it should be conducted after the CIE II and well before the SEE. Faculty concerned has to announce the schedule for the quiz and conduct the quiz.

Semester End Examinations (SEE)

The question paper is of 2 ½ duration for 70 marks. The suggestive question paper model is given that may be used for framing the question. This kind of question paper will be helpful in CO-PO Mapping and thereby graduate attributes.

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Curriculum 2025-28 [R25] Version: 2.0

B.Sc. Mathematics (Minor)

Program Specific Outcomes

After completion of the program, the student is able to

PSO1: Mathematical Foundations: Develop a strong foundation in core areas of mathematics, including algebra, calculus, differential equations, real analysis, linear algebra, and discrete mathematics.

PSO2: Mathematical Modelling and Applications: Apply mathematical concepts and analytical techniques to model, analyze, and solve scientific, technological, and societal problems.

PSO3: Abstract Reasoning and Proof Techniques: Construct mathematical arguments, verify proofs, and understand abstract mathematical structures such as groups, vector spaces, and functions.

PSO4: Computational and Statistical Skills: Utilize computational methods, statistical techniques, and mathematical software to perform data analysis, problem-solving, and mathematical investigations.

PSO5: Higher Education and Employability: Acquire the knowledge and analytical skills necessary for higher studies, competitive examinations, research, teaching, and careers in quantitative and analytical fields.

B.Sc. Mathematics (Minor)

Programme Outcomes

Sl. No.	Program Outcomes (POs) -A student will be able to:
PO1:	Demonstrate a sound understanding of fundamental mathematical concepts, principles, and techniques across algebra, calculus, differential equations, geometry, and statistics.
PO2:	Apply mathematical methods and logical reasoning to analyze and solve theoretical as well as real-life problems effectively.
PO3:	Develop analytical, critical, and quantitative thinking skills to interpret mathematical results and formulate valid conclusions.
PO4:	Communicate mathematical concepts, proofs, computations, and interpretations clearly and effectively in both written and oral forms.
PO5:	Use appropriate computational techniques, mathematical software, and digital tools to solve mathematical problems and analyze data.
PO6:	Apply mathematical knowledge in interdisciplinary areas such as computer science, economics, physics, engineering, data science, finance, and social sciences.
PO7:	Demonstrate ethical values, academic integrity, and professional responsibility while applying mathematical knowledge in academic and workplace settings.
PO8:	Recognize the importance of continuous learning and adapt to emerging developments in mathematics and related disciplines for higher studies and career advancement.

R25 CIRRICULUM FRAMEWORK

CURRICULAR FRAMEWORK B.Sc HONOURS FROM THE A.Y. 2025-26 (Major + Minor with CSP & VI Semester Internship)								
2nd Year - Semester III								
Sl. No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Core	VI	3	2	5	3	1	4
2	Major - Core	VII	3	2	5	3	1	4
3	Major - Core	VIII	3	2	5	3	1	4
4	Minor	I	3	2	5	3	1	4
5	AECC (Creative Writing/Business Writing in English)	III	4	0	4	3	0	3
6	AECC (Creative Writing/Journalistic Writing in MIL - Telugu/Hindi/Sanskrit)	III	4	0	4	3	0	3
	Multidisciplinary Course	II	2	0	2	2	0	2
7	Skill Enhancement Course (SEC) Design Thinking/Problem Solving / Others	III	2	0	2	2	0	2
End of Semester III of 2nd Year		**8**	**24**	**8**	**32**	**22**	**4**	**26**
2nd Year - Semester IV								
Sl. No	Category	Course No	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
			Theory	Practical		Theory	Practical	
1	Major - Core	IX	3	2	5	3	1	4
2	Major - Core	X	3	2	5	3	1	4
3	Major - Core	XI	3	2	5	3	1	4
4	Minor	II	3	2	5	3	1	4
	Multidisciplinary Course	IV	2	0	2	2	0	2
7	Skill Enhancement Course (SEC) Design Thinking/Problem Solving / Others	IV	2	0	2	2	0	2
End of Semester IV of 2nd Year		**6**	**16**	**8**	**24**	**16**	**4**	**20**

Curriculum 2025-28 [R25] Version: 2.0

COURSE STRUCTURE

	ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

Model Syllabus for Mathematics (Minor) in consonance with Curriculum framework w.e.f. AY 2025-26

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	III	1	Differential Equations	4	5
	IV	2	Group Theory	4	5
III	V	3	Ring Theory	4	5
		4	Elementary Real Analysis	4	5
	VI	5	Linear Algebra	4	5
		6	Advanced Real Analysis	4	5

SEMESTER-III

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Course Code	Title of the Course	L	S/M	P	C
26MAT3M1T	**DIFFERENTIAL EQUATIONS**	4			4

COURSE OBJECTIVES	
1	To introduce the concepts and methods for solving first-order differential equations, including exact, linear, and Bernoulli equations.
2	To understand special types of first-order differential equations such as Clairaut's equations and those solvable for p, or y.
3	To develop techniques for solving higher-order linear differential equations with constant coefficients.
4	To apply the operator method for finding particular integrals of non-homogeneous differential equations with various types of right-hand side functions.
5	To learn the method of variation of parameters for solving non-homogeneous differential equations.

COURSE OUTCOMES		**BTL**
Upon successful completion of the course, the student will be able to:		
CO1	Solve exact differential equations, linear equations, Bernoulli's equations, and equations reducible to exact form using integrating factors.	Understanding
CO2	Analyze and solve first-order differential equations that are solvable for p, x and y, including Clairaut's equations.	Analyzing
CO3	Solve homogeneous and non-homogeneous linear differential equations of higher order with constant coefficients using operator methods.	Applying
CO4	Compute particular integrals for non-homogeneous equations when the right-hand side is a polynomial, exponential, or trigonometric function.	Applying
CO5	Solve non-homogeneous differential equations using the method of variation of parameters and other applicable techniques.	Analyzing

Syllabus

COURSE CONTENT	
UNIT I	**Differential Equations of first order and first degree**
	Exact Differential Equations - Integrating factors - Equations reducible to Exact Equations by Integrating Factors (i) $\frac{1}{Mx+Ny}$ (ii) $\frac{1}{Mx-Ny}$ Linear Differential Equations–Bernoulli's Equations.
UNIT II	**Differential Equations of first order and but not of first degree**
	Equations solvable for p, Equations solvable for y, Equations solvable for x – Clairaut's equation.
UNIT III	**Higher Order Linear Differential Equations – I**
	Solutions of homogeneous linear differential equations of second and higher order with constant coefficients $f(D)y = 0$ -Solutions of non-homogeneous linear differential equations $f(D)y = Q(x)$ of second order with constant coefficients by means of polynomial operators (i) $Q(x) = be^{ax}$ where b is a real constant - (ii) $Q(x)$=$Sin\ ax$ (or) $Cos\ ax$ where a is a real constant.
UNIT IV	**Higher Order Linear Differential Equations – II**
	Solution to a non-homogeneous linear differential equation of second order with constant coefficients by means of polynomial operators $Q(x) = b\ x^k$, $Q(x) = e^{ax}V$, where V is a function of x.
UNIT V	**Higher Order Linear Differential Equations – III**
	Solution of the non-homogeneous linear differential equations of second order with constant coefficients by means of polynomial operators $Q(x) = x\ V$, where V is a function of x – Problems on Method of Variation of parameters to find solutions of linear differential equations with constant coefficients.

Activities:

The activities planned throughout the Differential Equations course include a variety of interactive and evaluative methods such as quizzes, assignments, seminars, and student presentations. Students will also engage in a mini project, prepare concept flowcharts, and participate in operator method chart activities. Peer teaching sessions, LMS-based online quizzes, and board work challenges will foster collaborative and digital learning. Additionally, poster presentations on applications and visual aids like chalk talks will be incorporated to support diverse learning styles and deepen conceptual clarity.

TEXT BOOK

A Textbook of B.Sc. Mathematics Differential Equations - Andhra Pradesh By V. Venkateswara Rao, N. Krishnamurthy, B.V.S.S. Sharma S. Anjaneya Sastry & S. Ranganatham published by S-Chand And Company Ltd.

REFERENCE BOOKS	
1.	Ordinary and Partial Differential Equations by Dr. M.D. Raisinghania, published by S. Chand & Company, New Delhi.
2.	Differential Equations with applications and programs –S. Balachandra Rao & HR Anuradha-Universities Press.
3.	Differential Equations -Srinivas Vangala & Madhu Rajesh, published by Spectrum University.
4.	Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Pvt. Ltd, New Delhi-Second edition.

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CO-PO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	2	0	0	0	0	0	0	3	2	0	0
CO2	3	3	2	0	0	0	0	0	3	3	2	0
CO3	2	3	3	2	1	0	0	1	2	3	3	0
CO4	3	3	3	3	2	0	0	1	3	3	3	2
CO5	3	3	2	1	2	1	1	2	3	1	0	2

Model Blue print for the question paper setter

S.No.	**UNIT-**	**Essay 10M**	**Short 4 M**	**Weightage**
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
5	V	2	2	20%
		100	**40**	**100%**

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II B.Sc. (Minor) Mathematics Semester-III

Recommended Format of Question Paper for all Courses

Time: 3 Hours **Max. Marks: 70**

Section-A

Answer any FIVE of the following questions. **5X4=20**

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions. **5X10=50**

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

13. A) From Contents of Unit -III

OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit –V

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SEMESTER-IV

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Curriculum 2025-28 [R25] Version: 2.0

Course Code	Title of the Course	L	S/M	P	C
26MAT4M1T	**GROUP THEORY**	4			4

COURSE OBJECTIVES	
1	To introduce students to the foundational concepts of algebraic structures with a focus on groups.
2	To develop an understanding of subgroups, cosets, and their relevance in group theory.
3	To explore the properties and significance of normal subgroups and their role in constructing quotient groups.
4	To study and apply the concepts of group homomorphisms, isomorphisms, and the fundamental theorem of homomorphism.
5	To examine the structure and properties of permutation and cyclic groups, including their role in group classification.

COURSE OUTCOMES		**BTL**
Upon successful completion of the course, the student will be able to:		
CO1	Understand the definition and basic properties of groups, including finite and infinite groups, and construct composition tables.	Understand
CO2	Analyze subgroups and cosets, apply Lagrange's Theorem and understand the structure of a group through its subgroups.	Analyzing
CO3	Identify and verify normal subgroups and understand their role in forming quotient groups.	Applying
CO4	Understand and apply homomorphisms and isomorphisms, including the fundamental homomorphism theorem and its applications.	Understand
CO5	Work with permutations, transpositions, cyclic groups and understand their properties and significance in group theory, including Cayley's Theorem.	Applying

Syllabus

COURSE CONTENT	
UNIT I	**Groups**
	Binary Operation – Algebraic structure – **S**emi group - Monoid – Group definition and its elementary properties -Finite and Infinite groups – examples – order of a group - Composition tables with examples.
UNIT II	**Sub Groups**
	Definition of Complex – Multiplication of two complexes- Inverse of a complex- Definition of Subgroup - examples-Criterion for a complex to be a subgroup- Criterion for the product of two subgroups to be a subgroup-Union and Intersection of subgroups – Definition of Cosets – Properties of Cosets (Statements only)– Index of a subgroup of a finite group – Lagrange's Theorem.
UNIT III	**Normal Subgroups**
	Normal Subgroups - Definition of normal subgroup – Proper and improper normal subgroups - Criterion for a subgroup to be a normal subgroup – Intersection of two normal subgroups - Sub group of index 2 is a normal sub group.
UNIT IV	**Quotient Groups and Homomorphism of Groups**
	Quotient groups -Definition of homomorphism – Image of a homomorphism- Elementary properties of homomorphisms – Isomorphism – Automorphism- Definitions and elementary properties–Kernel of a homomorphism – Fundamental theorem of Homomorphism.
	Permutations and Cyclic Groups
UNIT V	Definition of permutation –Multiplication of Permutations– Inverse of a permutation – Cyclic permutations – Transposition – Even and odd permutations – Cayley's theorem - Cyclic Groups - Definition of cyclic group – Elementary properties.

Activities:

The activities include quizzes, assignments, seminars, and student presentations. Additional tasks involve mini projects, concept flowcharts, operator method charts, peer teaching, LMS-based quizzes, board work challenges, poster presentations, and visual aids like chalk talks to enhance learning and engagement.

TEXT BOOK	
A Textbook of B.Sc. Mathematics Group Theory**: For B.A./B.Sc. Mathematics 2nd Year 1st Semester - Andhra Pradesh Universities** Published by S-Chand And Company Ltd.	
REFERENCE BOOKS	
1.	Abstract Algebra by J.B. Fraleigh, Published by Narosa publishing house.
2.	Modern Algebra by M.L. Khanna, Jai Prakashand Co.Printing Press, Meerut
3.	Rings and Linear Algebra by Pundir & Pundir, published by Pragathi Prakashan

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	1	1	0	1	1	1	1	1	1	1	1	0
CO2	3	3	0	1	1	1	1	1	2	1	0	0
CO3	2	3	0	1	1	1	1	1	1	1	0	0
CO4	2	3	0	1	1	1	1	1	1	1	0	0
CO5	3	3	0	2	1	1	2	1	1	1	1	0

Model Blue print for the question paper setter

Sl. No.	UNIT-	Essay 10M	Short 4 M	Weightage
1	I	2	2	20%
2	II	2	2	20%
3	III	2	2	20%
4	IV	2	2	20%
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		100	**40**	**100%**

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II B.Sc. (Minor) Mathematics Semester-IV

Recommended Format of Question Paper for all Courses

Time: 3 Hours **Max. Marks: 70**

Section-A

Answer any FIVE of the following questions. **5X4=20**

1. From Contents of Unit-I
2. From Contents of Unit-I
3. From Contents of Unit -II
4. From Contents of Unit -II
5. From Contents of Unit -III
6. From Contents of Unit -III
7. From Contents of Unit -IV
8. From Contents of Unit -IV
9. From Contents of Unit -V
10. From Contents of Unit -V

Section-B

Answer FIVE questions. **5X10=50**

11. A) From Contents of Unit-I

OR

B) From Contents of Unit-I

12. A) From Contents of Unit-II

OR

B) From Contents of Unit -II

13. A) From Contents of Unit -III

OR

B) From Contents of Unit -III

14. A) From Contents of Unit -IV

OR

B) From Contents of Unit -IV

15. A) From Contents of Unit -V

OR

B) From Contents of Unit –V

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