

**A.G& S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE**

VUYYURU-521165, KRISHNA Dt., A.P.(Autonomous)

Accredited by NAAC with "A" Grade

2019-2020



DEPARTMENT OF MATHEMATICS

MINUTES OF BOARD OF STUDIES

EVEN SEMESTER

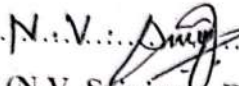
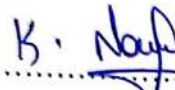
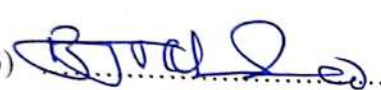
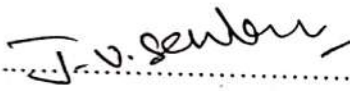
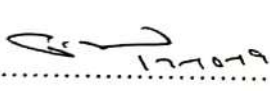
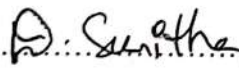
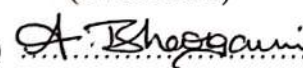
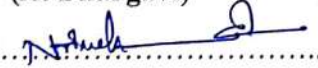

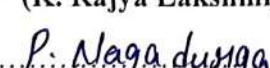
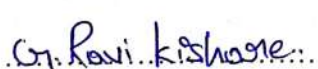
18-10-2019

Minutes of the meeting of BOS in Mathematics for B.Sc Degree Courses of AG & SG Siddhartha Degree College of Arts & Science, Vuyyuru, held at 10.30 A.M on 18-10-2019.

N.V. Srinivasa Rao

Presiding

Members Present:

- | | | |
|---|---------------------------------|---|
| 1) 
(N.V. Srinivasa Rao) | Chairman | Head, Department of Mathematics,
AG & SG S Degree College. |
| 2) 
(Dr. K. Naveen Kumar) | University Nominee | Department of Mathematics,
K.B.N Degree College,
Vijayawada. |
| 3) 
(Dr B. Jagan Mohan Rao) | Subject Expert | Prof and HOD of Mathematics,
Sir C.R.R College,
Eluru. |
| 4) 
(Dr J. Vijayasekhar) | Subject Expert | Associate. Professor,
Department of Mathematics,
School of Science, GITAM
University, Hyderabad. |
| 5) 
(Dr P. Srinivasa Rao) | Subject Expert
Alumni member | Director and Principal,
Sri Srinivasa Educational
Institutions, Vuyyuru. |
| 6) 
(D. Sunitha) | Member | Lecturer in Mathematics
AG & SG S Degree College. |
| 7) 
(A. Bhargavi) | Member | Lecturer in Mathematics
AG & SG S Degree College. |
| 8) 
(Noor Mohammad) | Member | Lecturer in Mathematics
AG & SG S Degree College. |
| 9) 
(K. Rajya Lakshmi) | Member | Lecturer in Mathematics
AG & SG S Degree College. |
| 10) 
(P. Naga Durga) | Student Member | III B.Sc M.C.Cs
AG & SG S Degree College. |
| 11) 
(G. Ravi Kishore) | Student Member | III B.Sc M.P.C (T)
AG & SG S Degree College. |

Agenda of B.O.S Meeting:

1. To discuss and recommend the Syllabi, Model Question Papers and Guidelines to be followed by question paper setters in Mathematics for 2nd Semester as per the guidelines and instructions under CBCS prescribed by Krishna University from the Academic Year 2019-20.
2. To discuss and recommend the Syllabi, Model Question Papers and Guidelines to be followed by question paper setters in Mathematics for 4th Semester as per the guidelines and instructions under CBCS prescribed by Krishna University and Foundation Course "Analytical Skills" for 4th Semester for all the second Degree students from the Academic Year 2019-20.
3. To discuss and recommend the Syllabi, Model Question Papers and Guidelines to be followed by question paper setters in Mathematics for 6th Semester as per the guidelines and instructions under CBCS prescribed by Krishna University from the Academic Year 2019-20.
4. Any other matter.

Resolutions.

1. Discussed and recommended that no changes are required in syllabi, Model Question Papers and Guidelines for question paper setters in Mathematics for the 2nd Semester from the Academic year 2018-19 and followed same pattern for the Academic Year 2019 - 20.
2. Discussed and recommended that changes are required in Syllabi, Model Question Papers and Guidelines to be followed by the question paper setters in Mathematics for 4th Semesters from the Academic year 2019-20. The maximum marks for IA is 30 and SE is 70. Each IA written examination is of 1 Hr. 30 min duration for 20 marks. The tests will be conducted centrally. The average of two such IA is calculated for 20 marks. 5 marks will be allotted basing on Assignment and 5 marks are allotted for attendance. There is no minimum passing for IA and there is no provision for improvement in IA. Even though the candidate is absent for two IA exams/obtain zero marks the external marks are considered (if he/ she gets 40 out of 70) and the result shall be declared as 'PASS' and discussed and recommended that changes are required in Syllabi, Model Question Papers and Guidelines to be followed by the question paper setters in Foundation Course "Analytical Skills" for 4th Semester for all the second Degree students from the Academic year 2019-20.
3. Discussed and recommended that no changes are required in Syllabi, Model Question Papers and Guidelines to be followed by the question paper setters in Mathematics for 6th Semester and followed General Elective, Cluster Electives from the Academic year 2017-18 and followed same pattern for the Academic Year 2019 - 20.
4. Discussed and recommended for organizing certificate course online/offline, seminars, Guest lecturers, Online Examinations and Workshops to upgrade the knowledge of students for Competitive Examinations for the approval of the Academic Council.

N.V. Singh
Chairman

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MATHEMATICS	MAT-201	I B.Sc	w.e.f 2019-20
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SEMESTER-II	PAPER-II	Max.Marks:100
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Hours/Week: 6	<u>SOLID GEOMETRY</u>	No.of Credits: 5
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UNIT – I (10 hrs) : The Plane :

Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

UNIT – II (12 hrs) : The Line :

Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line;

UNIT – III (12 hrs) : Sphere :

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes;

UNIT – IV (14 hrs) : Sphere & Cones :

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified form of the equation of two spheres. Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; Enveloping cone of a sphere; Equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone; Condition that a cone may have three mutually perpendicular generators;

UNIT – V (12 hrs) Cones & Cylinders :

Intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex; Right circular cone; Equation of the right circular cone with a given vertex; axis and semi-vertical angle. Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius.

Reference Books :

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. 7th Edition.
2. A text book of Mathematics for BA/B.Sc Vol 1, by V Krishna Murthy & Others, Published by S. Chand & Company, New Delhi.
3. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, Published by Wiley Eastern Ltd., 1999.
4. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y. Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Application of Solid Geometry in Engineering

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EXAMINATION AT THE END OF SECOND SEMESTER (w.e.f: 2016-17)

Mathematics Paper - II Mat - 201 C Max. Marks : 75 Pass Mark : 30 Time : 3 hrs.

SECTION - A (Short Answer Questions)

5 x 5 = 25 M

Answer any FIVE questions

- Find the equation of the plane through (4, 4, 0) and perpendicular to the planes $x+2y+2z=5$ and $3x+3y+2z-8=0$
- Find the equation to the plane through the line of intersection of $x-y+3z+5=0$ and $2x+y-2z+6=0$ and passing through (-3, 1, 1).
- Find the image of the point (1, 3, 4) in the plane $2x-y+z+3=0$.
- Find the equation to the plane containing the parallel lines $\frac{x-3}{4} = \frac{y-2}{-5} = \frac{z-4}{-1}$ and $\frac{x+2}{-4} = \frac{y}{5} = \frac{z-3}{1}$.
- Find the equation of the sphere through the points (0, 0, 0), (0, 1, -1), (-1, 2, 0), (1, 2, 3).
- Find the equation of the sphere for which the circle $x^2+y^2+z^2+7y-2z+2=0$, $2x+3y+4z=8$
- Find the equation to the cone which passes through the three co-ordinate axes and the lines $\frac{x}{1} = \frac{y}{-2} = \frac{z}{3}$ & $\frac{x}{2} = \frac{y}{1} = \frac{z}{1}$.
- Find the equation to the right circular cylinder of radius 2 whose axis passes through the point (1, 2, 3) and has direction ratios (2, -3, 6)

SECTION - B

Answer any FIVE questions

5 x 10 = 50 M

- Show that the equation $x^2+4y^2+9z^2-12yz-6zx+4xy+5x+10y-15z+6=0$ represents a pair of parallel planes and find the distance between them.
- Find the length and equation to the line of S. D between the lines $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-1}{2}$, $\frac{x-4}{4} = \frac{y-5}{5} = \frac{z-2}{3}$
- Find the equations of the spheres passing through the circle $x^2+y^2=4$, $z=0$ and is intersected by the plane $x+2y+2z=0$ in a circle of radius 3.

12. Find the limiting points of the coaxial system spheres $x^2+y^2+z^2-20x+30y-40z+29+\lambda(2x-3y+4z)=0$
13. Show that the two lines of intersection of the plane $ax+by+cz=0$ with the cone $yz+zx+xy=0$ will be perpendicular if $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$
14. Show that the general equation to a cone which touches the three co-ordinate planes is $\sqrt{ax} + \sqrt{by} + \sqrt{cz} = 0$
15. Find the equation of the cylinder whose generators are parallel to the line $\frac{x}{1} = \frac{y}{-2} = \frac{z}{3}$ and whose base curve is $x^2+2y^2=1, z=3$.
16. Find the equation to the right circular cylinder whose guiding circle is $x^2+y^2+z^2=9, x-y+z=3$.

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DEPARTMENT OF MATHEMATICS

Question Paper Guidelines for SEMESTER-END Examinations

Time: 3 Hrs

MAT- 201

Max.Marks:70

Min. Marks: 28

Note :- 1) Answer any FOUR questions out of 8 in Section-A. Each question carries 4 marks (4x5=20 Marks)

2) Answer any FIVE questions out of 8 in Section-B. Each question carries 10 marks. (5x10=50 Marks)

Questions to be set as follows:

	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5
<u>Section-A</u> (Short answer questions)	2	2	2	1	1
<u>Section-B</u> (Essay questions)	1	1	2	2	2

---The End---

MATHEMATICS	MAT-401	B.Sc(E.M,T.M, CCs& CS)	w.e.f 2019-2020
SEMESTER-IV		PAPER-IV	Max.Marks:100
Hours/ Week: 6			No.of Credits: 5

Abstract Algebra and Real Analysis – II

UNIT – 1 : (14 Hrs) HOMOMORPHISM : -

Definition of homomorphism – Image of homomorphism elementary properties of Homomorphism – Isomorphism – automorphism definitions and elementary properties– kernel of homomorphism – fundamental theorem on Homomorphism and applications.

UNIT – 2 : (12 Hrs) PERMUTATIONS AND CYCLIC GROUPS : -

Definition of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley’s theorem.

Cyclic Groups: -Definition of cyclic group – elementary properties – classification of cyclic groups.

UNIT – III (10 hrs) : LIMITS AND CONTINUITY :

Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. **No. Question is to be set from this portion.**

Continuous functions: Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV (12 hrs) : DIFFERENTIATION AND MEAN VALUE THEOREMS :

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Role’s Theorem, Lagrange’s Theorem, Cauchy’s Mean value Theorem

UNIT – V (12 hrs) : RIEMANN INTEGRATION :

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Reference Books :

1. Real Analysis by Rabert & Bartely and .D.R. Sherbart, Published by John Wiley.
2. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisingkania Published by S. Chand & Company Pvt. Ltd., New Delhi.
4. Modern Algebra by M.L. Khanna.

Suggested Activities:

Seminar/ Quiz/ Assignments/Group discussions.

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EXAMINATION AT THE END OF THE FOURTH SEMESTER (w.e.f 2019-20)

Mathematics Paper IV MAT- 401 Max. Marks: 70 Pass Mark: 28 Time: 3 hrs.

Abstract Algebra and Real Analysis – II

Section – A (short answer questions)

Answer any **Four** of the following questions.

4x5 = 20M

Choosing at least **ONE** question from each Part.

Part - I

1. The set of all automorphisms of a group G forms a group w.r.to composition of mappings.
2. If $f = (1\ 2\ 3\ 4\ 5\ 8\ 7\ 6)$, $g = (4\ 1\ 5\ 6\ 7\ 3\ 2\ 8)$ are cyclic permutations, then show that $(fg)^{-1} = g^{-1}f^{-1}$.
3. Every sub group of a cyclic group is cyclic
4. Show that $f: \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = 1$ if $x \in \mathbb{Q}$ and $f(x) = -1$ if $x \in \mathbb{R} - \mathbb{Q}$ is discontinuous for all $x \in \mathbb{R}$

Part - II

5. Show that $f(x) = |x| + |x - 1|$ is continuous at $x=0,1$ but not derivable at $x=0,1$.
6. Using Lagrange's Mean value Theorem show that $x > \log(1+x) > \frac{x}{1+x}$ if $f(x) = \log(1+x)$, $x > 0$
7. If $f(x) = x^2$ on $[0, 1]$ and $P = \{0, 1/4, 2/4, 3/4, 1\}$ find $U(p, f)$ and $L(p, f)$
8. Show that $\lim_{n \rightarrow \infty} \sum_{r=1}^n \frac{n}{n^2+r^2} = \frac{\pi}{4}$

Section – B (long answer questions)

Answer any **FIVE** of the following questions.

5x10 = 50M

Choosing at least **TWO** questions from each Part.

Part - I

9. State and prove Fundamental theorem of group homomorphism.
10. If $f: G \rightarrow G^1$ is a group homomorphism, then show that “Ker f ” is a normal subgroup of G .

11. State and prove Cayley's theorem for permutation groups.

12. If $f: [a, b] \rightarrow \mathbb{R}$ is continuous on $[a, b]$ then f is bounded on $[a, b]$

Part - II

13. State and prove Rolle's Theorem

14. Find c of Cauchy's Mean value Theorem for $f(x)=\sqrt{x}$; $g(x)=\frac{1}{\sqrt{x}}$ in $[a, b]$ where $0 < a < b$

15. State and prove Fundamental Theorem of Integral calculus

16. Prove that $\frac{1}{\pi} \leq \int_0^1 \frac{\sin \pi x}{1+x^2} dx \leq \frac{2}{\pi}$ by First mean value theorem in integral calculus.

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DEPARTMENT OF MATHEMATICS

Question Paper Guidelines for SEMESTER-END Examinations

Time: 3 Hrs MAT- 401 Max.Marks:70 Min. Mark: 28

Note :- 1) Answer any FOUR questions out of 8 in Section-A. Each question Carries 5 marks.
(4x5=20 Marks)

2) Answer any FIVE questions out of 8 in Section-B. Each question Carries 10 marks.
(5x10=50 Marks)

Questions to be set as follows:

	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5
<u>Section-A</u> (Short answer questions)	1	2	1	2	2
<u>Section-B</u> (Essay questions)	2	1	1	2	2

---The End---

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MATHEMATICS	MAT-601GE	w.e.f.2019-20	III B.Sc
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SEMESTER-VI	PAPER-VII	Max.Marks:70
Hours/ Week: 5		No.of Credits: 5

ELECTIVE–VII-(B); NUMERICAL ANALYSIS

UNIT- I:	10 hours
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Errors in Numerical computations: Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

UNIT – II:	12 hours
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Solution of Algebraic and Transcendental Equations: The bisection method, the iteration method, the method of false position, Newton Raphson method, Generalized Newton Raphson method.

UNIT – III:	12 hours
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Finite Differences and Interpolation: Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial, Newton’s formulae for interpolation

UNIT – IV:	12 hours
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Central Differences: Central Differences, Central Difference Interpolation Formulae, Gauss’s central difference formulae, Stirling’s central difference formula, Bessel’s Formula, Everett’s Formula.

UNIT – V:	14 hours
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Interpolation – III:

Interpolation with unevenly spaced points, Lagrange’s formula, Error in Lagrange’s formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences Relation between divided differences and central differences, Newton’s general interpolation Formula, Inverse interpolation.

Reference Books:

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. SankarRao published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt. Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

Suggested Activities:

Seminar/ Quiz/ Assignments

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Accredited with “A” Grade by NAAC, Bengaluru
EXAMINATION AT THE END OF SIXTH SEMESTER (w.e.f 2019-20)

MATHEMATICS Paper VII MAT- 601GE MAX.MARKS: 70 TIME: 3 hrs

ELECTIVE–VII-(B):NUMERICAL ANALYSIS

Section – A (short answer questions)

Answer any **Four** of the following questions.

4x5 = 20M

Choosing at least **ONE** question from each Part.

PART - I

1. Evaluate the sum $S = \sqrt{3} + \sqrt{5} + \sqrt{7}$ to four significant digits and find its absolute and relative errors.
2. Find the real root of the equation $x^3 + x - 1 = 0$ by Iteration method, given that the root lies near 1
3. Find the real root of the equation $x \log_{10} x = 1.2$ by Newton – Raphson method
4. Prove that $e^x = \left(\frac{\Delta^2}{E}\right) e^x \frac{Ee^x}{\Delta^2 e^x}$ the interval of differencing being unity.

PART - II

5. If $u_0 = 3, u_1 = 12, u_2 = 81, u_3 = 200, u_4 = 100, u_5 = 8$ find the value of $\Delta^5 u_0$
6. Prove that i) $\mu^2 = 1 + \frac{1}{4} \delta^2$ ii) $\Delta = \frac{1}{2} \delta^2 + \delta \sqrt{1 + \frac{1}{4} \delta^2}$
7. Apply Gauss’s Forward formula to find the value of u_9 if $u_0 = 14, u_4 = 24, u_8 = 32, u_{12} = 35, u_{16} = 40$
8. Find the third divided difference for the function $f(x) = x^3 + x + 2$ for the arguments 1, 3, 6, 11

Section – B (long answer questions)

Answer any **FIVE** of the following questions.

5x10 = 50M

Choosing at least **TWO** question from each Part.

PART - I

9. If $U = 5xy^2 / z^3$ then find relative maximum error in U, given that $\Delta x = \Delta y = \Delta z = 0.001$ and $x = y = z = 1$
10. Find the real root of the equation $x^2 - 4x - 10 = 0$ by bisection method.
11. Find the real root of the equation $x^3 - 2x - 5 = 0$ by Regula – Falsi method.
12. State and prove Newton’s Gregory forward interpolation formula

PART - II

13. The following table gives the marks obtained by 100 students in Mathematics in a certain examination

Marks obtained: 30-40 40-50 50-60 60-70 70-80

No.of Students: 25 35 22 11 7

How many students got more than 55 marks.

14. The population of town is as follows. Find the population for the year 1956 by Gauss's Backward formula from the following table

Year : 1931 1941 1951 1961 1971

Population : 15 20 27 39 52
(in thousand)

15. State and prove Stirling's formula
16. State and prove Newton's Divided difference formula

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MATHEMATICS	MAT-602CE	w.e.f.2019-20	III B.Sc
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SEMESTER-VI

PAPER-VIII

Max.Marks:70

Hours/ Week: 5

No.of Credits: 5

Cluster Elective- VIII-A-1: INTEGRAL TRANSFORMS

UNIT-1:Application of Laplace Transform to solutions of Differential Equations 12 hrs

Solutions of ordinary Differential Equations. Solutions of Differential Equations with constants co-efficient Solutions of Differential Equations with Variable co-efficient

UNIT – 2:Application of Laplace Transform : - 12 hrs

Solution of simultaneous ordinary Differential Equations.Solutions of partial Differential Equations.

UNIT – 3:Application of Laplace Transforms to Integral Equations : - 12 hrs

Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integro Differential Equations. Application of L.T. to Integral Equations.

UNIT –4: Fourier Transforms-I : - 12 hrs

Definition of Fourier Transform – Fourier's sine Transform – Fourier cosine Transform – Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

UNIT – 5: Fourier Transform-II : - 12 hrs

Convolution Definition – Convolution Theorem for Fourier transform – parseval's Identify Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

Finte Fourier Transforms : -

Finte Fourier Sine Transform – Finte Fourier Cosine Transform – Inversion formula for sine and cosine Transforms only statement and related problems.

Reference Books :-

1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. A Course of Mathematical Analysis by ShanthiNarayana and P.K. Mittal, Published by S. Chand and Company pvt. Ltd., New Delhi.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Company Pvt. Ltd., New Delhi.
4. Lapalce and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
5. Integral Transforms by M.D. Raising hania, - H.C. Saxsena and H.K. Dass Published by S.Chand and Company pvt. Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments

A.G & S.G SIDDHARTHA DEGREE COLLEGE: VUYYURU-521165

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

Accredited with "A" Grade by NAAC, Bengaluru

MATHEMATICS	MAT-603CE	w.e.f.2019-20	III B.Sc
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SEMESTER-VI	PAPER-VIII	Max.Marks:70
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Hours/ Week: 5	No.of Credits: 5
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ELECTIVE – VIII-A-2: ADVANCED NUMERICAL ANALYSIS

Unit – I Curve Fitting:	10 Hours
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Least – Squares curve fitting procedures, fitting a straight line, Polynomial fitting, Curve fitting by a power functions and exponential function.

UNIT- II Numerical Differentiation:	12 hours
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Derivatives using Newton's forward difference formula, Newton's backward difference formula, Derivatives using central difference formula, Stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT- III Numerical Integration:	12 hours
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General quadrature formula, Trapezoidal rule, Simpson's 1/3 – rule, Simpson's 3/8 – rule, Boole's rule and Weddle's rules (only problems),

UNIT – IV Solutions of simultaneous Linear Systems of Equations:	14 hours
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Solution of linear systems – Direct methods, Matrix inversion method, Gaussian elimination methods, Gauss-Jordan Method, Method of factorization. Iterative methods – Jacobi's method, Gauss-siedal method.

UNIT – V Numerical solution of ordinary differential equations:	12 Hours
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Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods.

Reference Books :

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall India (Latest Edition).
2. Numerical Analysis by G. SankarRao, published by New Age International Publishers, Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt. Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

Suggested Activities:

Seminar/ Quiz/ Assignments

A.G & S.G SIDDHARTHA DEGREE COLLEGE: VUYYURU-521165

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MATHEMATICS	MAT-604CE	w.e.f.2019-20	III B.Sc
SEMESTER-VI	PAPER-VIII		Max.Marks:70
Hours/ Week: 5		No.of Credits: 5	

ELECTIVE – VIII-A-3: Project

Applications of advanced Numerical Analysis with 'C' Programme

EXAMINATION AT THE END OF SIXTH SEMESTER (w.e.f 2019-20)

MATHEMATICS Paper VIII MAT-602CE MAX.MARKS: 70 TIME: 3 hrs

Cluster Elective- VIII-A-1: INTEGRAL TRANSFORMS

Section – A (short answer questions)

Answer any **Four** of the following questions.

4x5 = 20M

Choosing at least **ONE** question from each Part.

PART – I

1. Solve $(D^2 - 2D + 2)y = 0$, $y = Dy = 1$, when $t = 0$.
2. Solve $(D^2 - 3D + 2)y = 1 - e^{2t}$, if $y = 1$, $Dy = 0$, when $t = 0$.
3. Solve $(D - 2)x + 3y = 0$, $2x + (D - 1)y = 0$ if $x(0) = 8$ and $y(0) = 3$.
4. Solve $\frac{\partial y}{\partial x} = 2\frac{\partial y}{\partial t} + y$, $y(x, 0) = 6e^{-3x}$ which is bounded for $x > 0$, $t > 0$.

PART – II

5. Convert $y''(t) - 3y'(t) + 2y(t) = 4 \sin t$, $y(0) = 1$, $y'(0) = -2$ into integral equation.
6. Solve the integral equation $F(t) = t + 2\int_0^t \cos(t - u) F(u) du$.
7. Find the Fourier sine and cosine transform of $f(x) = x$
8. Show that $\int_0^\infty \frac{\cos \lambda x}{\lambda^2 + 1} d\lambda = \frac{\pi}{2} e^{-x}$, $x \geq 0$.

Section – B (long answer questions)

Answer any **FIVE** of the following questions.

5x10 = 50M

Choosing at least **TWO** question from each Part.

PART – I

9. Solve $(D + 1)^2 = t$, given that $y = -3$, when $t = 0$ and $y = -1$ when $t = 1$.
10. Solve $y'' - t y' + y = 1$ if $y(0) = 1$, $y'(0) = 2$.
11. Solve $(D^2 - 3)x - 4y = 0$, $x + (D^2 + 1)y = 0$, $t > 0$ if $x = y = Dy = 0$, $Dx = 2$.
12. Solve $\frac{\partial y}{\partial t} = \frac{\partial^2 y}{\partial x^2}$, $y(\frac{\pi}{2}, t) = 0$, $(\frac{\partial y}{\partial x})_{x=0} = 0$ and $y(x, 0) = \cos 3x$.

PART – II

13. Solve the integral equation $F(t) = 1 + \int_0^t F(u) \sin(t - u) du$ and verify your solution.

14. Solve the integral equation $\int_0^t \frac{F(u) du}{\sqrt{(t-u)}} = 1 + t + t^2$.

15. Find the Fourier transform of $f(x)$ defined by $f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a \end{cases}$ and hence evaluate

$$i \int_{-\infty}^{\infty} \frac{\sin pa \cos px}{p} dp \text{ ii) } \int_0^{\infty} \frac{\sin p}{p} dp.$$

16. Find the finite Fourier sine and cosine transforms of the function $f(x) = 2x, 0 < x < 4$.

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EXAMINATION AT THE END OF SIXTH SEMESTER (w.e.f 2019-20)

MATHEMATICS Paper VIII MAT-603CE MAX.MARKS: 70 TIME: 3 hrs

Cluster Elective VIII-A-2: ADVANCED NUMERICAL ANALYSIS

Section – A (short answer questions)

Answer any **Four** of the following questions.

4x5 = 20M

Choosing at least **ONE** question from each Part.

PART – I

1. Find the least square line $y = a + bx$ for the data

Xi: -2 -1 0 1 2

Yi: 1 2 3 3 4

2. Find $f^{-1}(5)$ from the following table

x: 1 2 4 8 10

f(x): 0 1 5 21 27

3. Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ by Trapezoidal rule

4. Evaluate $\int_0^4 e^x dx$ by Simpson's $\frac{1}{3}$ rule

PART – II

5. Solve $3x + y + 2z = 3$, $2x - 3y - z = -3$, $x + 2y + z = 4$ by Matrix inversion method

6. Solve $x + y + z = 9$, $2x + 5y + 7z = 52$, $2x + y - z = 0$ by Cramer's rule

7. Given D.E is $\frac{dy}{dx} = 1 + xy$ with $y = 1$ when $x = 0$ compute $y(0.1)$

8. Solve the equation $y' = -y$ with $y(0) = 1$ for $x = 0.04$ in four steps

Section – B (long answer questions)

Answer any **FIVE** of the following questions.

5x10 = 50M

Choosing at least **TWO** question from each Part.

PART – I

9. Find the least square power function of the form $y = ax^b$ for the data
- X_i : 1 2 3 4
 Y_i : 3 12 21 35
10. Using the given table find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.2$
- x : 1.0 1.2 1.4 1.6 1.8 2.0 2.2
 y : 2.7183 3.3201 4.0552 4.9530 6.0496 7.3891 9.0250
11. Find the value of $\int_0^1 \frac{1}{1+x^2} dx$ by using Simpson's 3/8 rule and hence find the value of " π "
12. Evaluate $\int_4^{5.2} \log x dx$ by using Weddle's rule.

PART – II

13. Solve $2x + y + z = 10$, $3x + 2y + 3z = 18$, $x + 4y + 9z = 16$ by Gauss elimination method
14. Solve $3x + 2y + 4z = 7$, $2x + y + z = 7$, $x + 3y + 5z = 2$ by Factorization method
15. Solve the D.E $\frac{dy}{dx} = 1 + y^2$, $y(0) = 0$ by Picard's method
16. Given $\frac{dy}{dx} = y - x$ with $y(0) = 2$ find $y(0.1)$ and $y(0.2)$ correct to four decimal places by RK method.

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EXAMINATION AT THE END OF SIXTH SEMESTER (w.e.f 2019-20)**

MATHEMATICS Paper VIII MAT-604CE MAX.MARKS: 70 TIME: 3 hrs

**Cluster Elective- VIII-A-3: PROJECT
Applications of advanced Numerical Analysis with ‘C’ Programme**

A.G & S.G SIDDHARTHA DEGREE COLLEGE, VUYYURU
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DEPARTMENT OF MATHEMATICS

Guidelines of III B.Sc for Question Paper Setters VI Semester-End Exams: 2019-20

Time: 3 Hrs **Elective.MAT- 601GE** Max.Marks:70

Paper Title : Numerical analysis

Note :- 1). Answer any FOUR questions out of 8 in Section-A.
Each question carries 5 marks. (4x5=20 Marks)

2). Answer any FIVE questions out of 8 in Section-B.
Each question carries 10 marks. (5x10 =50 marks)

Questions to be set as follows:

	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5
<u>Section-A</u> (Short Answer Questions)	1	2	2	2	1
<u>Section-B</u> (Essay Questions)	1	2	2	2	1

-The End -

DEPARTMENT OF MATHEMATICS

Guidelines of III B.Sc for Question Paper Setters VI Semester-End Exams: 2019-20

Time: 3 Hrs **Cluster.MAT- 602CE**

Max.Marks:70

Paper Title: Integral Transforms

Note :- 1). Answer any FOUR questions out of 8 in Section-A.

Each question carries 5 marks.

(4x5=20 Marks)

2). Answer any FIVE questions out of 8 in Section-B.

Each question carries 10 marks.

(5x10 =50 marks)

Questions to be set as follows:

	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5
<u>Section-A</u> (Short Answer Questions)	2	2	2	1	1
<u>Section-B</u> (Essay Questions)	2	2	2	1	1

-The End -

DEPARTMENT OF MATHEMATICS

Guidelines of III B.Sc for Question Paper Setters VI Semester-End Exams: 2019-20

Time: 3 Hrs **Cluster.MAT- 603CE**

Max.Marks:70

Paper Title: Advanced Numerical Analysis

Note :- 1). Answer any FOUR questions out of 8 in Section-A.

Each question carries 5 marks.

(4x5=20 Marks)

2). Answer any FIVE questions out of 8 in Section-B.

Each question carries 10 marks.

(5x10 =50 marks)

Questions to be set as follows:

	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5
<u>Section-A</u> (Short Answer Questions)	1	1	2	2	2
<u>Section-B</u> (Essay Questions)	1	1	2	2	2

-The End -