



School of Mathematics, Gangadhar Meher University, Sambalpur

Minutes of Board of Studies Meeting

Date: 16<sup>th</sup> February, 2024

The local Board of Studies Meeting of the Department of Mathematics was held offline on 16.02.2024 at 10AM at the department office to finalize the curriculum for the semesters of UG VI and PG III for the session 2022-23. The syllabus is updated with adding some elective courses and value-added courses to the UG and PG syllabus respectively. The following members including the experts were present in the meeting.

Sl. No.	Name of the BOS members	Designation	Signature
1	Dr. Ashrita Patra, HOD Mathematics (In-Charge)	Assistant Professor, Member	
2	Prof. Jayaprakash Panda (Professor in Mathematics, VSSUT, Burla)	Subject Expert and External BOS Member	
3	Dr. Yudhisthira Jamudulia (Assistant Professor in Mathematics, GMU)	Assistant Professor, Member	
4	Ms. Laxmi Majhi, (Assistant Professor in Mathematics, GMU)	Assistant Professor, Member	
5	Mr. Janamajaya Barik, (PG 4 <sup>th</sup> Semester)	Student Representative	

At the onset of the meeting, the Chairman of BOS, Dr. Ashrita Patra, welcomed the external expert member and introduced to internal members. The meeting began with curriculum and syllabus discussion for UG and PG by adding some elective courses in UG 6<sup>th</sup> semester and PG 3<sup>rd</sup> semester.

General Comments:

1. The BOS members unanimously agreed to add more discipline elective courses (DSE III(A)) in UG 6<sup>th</sup> semester with regular DSE III paper.
2. In PG syllabus, one IDSE paper will be added extra with regular elective papers which is IDSE-306(D).
3. As per the feedback received by the students, Department will be introduced 2 value added courses for UG III and IV semester students for enhancing their skills, conceptualise strong and expertise in the coding field.

The contents of the newly added courses have been verified by the experts and internal committee members with respect to its impact on students' academic and career growth.

### DSE-III(A) Vector Analysis

#### Course Objectives:

1. Define vector fields.
2. Calculate line integrals along piecewise smooth paths; interpret such quantities as work done by a force.
3. Use the fundamental theorem of line integrals.
4. Use Green's theorem to evaluate line integrals along simple closed contours on the plane.
5. Compute the curl and the divergence of vector fields.

	Course Outcome
CO 1	Define definition of directional derivative and gradient and illustrate geometric meanings with the aid of sketches.
CO 2	Memorize theorem relating directional derivative to gradient and reproduce proof and calculate directional derivatives and gradients.
CO 3	Apply gradient to solve problems involving normal vectors to level surfaces. Explain the concept of a vector integration a plane and in space.

**Unit I:** Operations with vectors. Scalar and vector product of three vectors. Product of four vectors. Reciprocal vectors.

**Unit II:** Scalar-valued functions over the plane and the space. Vector function of a scalar variable: Curves and Paths. Vector fields.

**Unit III:** Vector differentiation. Directional derivatives, the tangent plane, total differential, gradient, divergence, and curl.

**Unit IV:** Vector integration: Path, line, surface, and volume integrals. Line integrals of linear differential forms, integration of total differentials, conservative fields, conditions for line integrals to depend only on the endpoints, the fundamental theorem on exact differentials. Serret-Frenet Formulas.

#### Reference Books:-

1. Marsden, J., and Tromba, *Vector Calculus*.
2. Courant, R., and F. John, *Introduction to Calculus and Analysis, Volume II*.
3. Apoetol, T., *Calculus, Volumes I and II*.
4. Kreyszig, *Advanced Engineering Mathematics*.
5. Hildebrand, *Advanced Calculus for Applications*.

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K. R. S.*

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*Jannajaya Bank*

## PAPER-306(D): Probability and Statistics

### (4 Credits) Objectives:

To study the basics of Probability density function, Special distributions, Distributions of functions of random variables, Sampling theory and Statistical inference.

**Unit I:** The probability set function – Random variables – Probability density function – Distribution function – Mathematical expectation – Special mathematical expectations – Chebyshev's Inequality – Conditional probability – Marginal and conditional distributions – Stochastic independence.

**Unit II:** Some special distributions: The Binomial and related distributions – The Poisson distribution – The Gamma and Chi-Square Distributions – The Normal distribution- The Bivariate normal distribution.

**Unit III:** Distributions of functions of random variables - Sampling theory – Transformations of variables of the discrete type – Transformations of variables of the continuous type – The  $b$ ,  $t$  and  $F$  distributions- Distributions of order statistics- The moment generating function technique.

**Unit IV:** The distributions of  $\bar{X}$  and  $nS^2/\sigma^2$  - Expectations of functions of random variables – Limiting distributions: Limiting moment generating functions – The Central limit theorem.

### Text Book:

Robert V. Hogg and Allen T. Craig, *Introduction to Mathematical Statistics* (Fifth Edition) Pearson Education, 2005.

### Reference Books:

1. Paul L. Meyer, *Introductory to Probability and Statistical Applications*, Oxford & IBH Publishers Co. Pvt. Ltd. 1969.
2. Arnold Naiman, Gene Zirkel and Robert Rosenfield, *Understanding Statistics*, McGraw-Hill, 1986.
3. William Feller, *An Introduction to Probability Theory and its Applications, Vol. I*, John Wiley, Third Edition, 2008.
4. A. Mood, F. Graybill, and D. Boes, *Introduction to the Theory of Statistics*, Tata McGraw Hill (Third Edition) 2008.

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**DETAIL STRUCTURE  
OF  
VALUE AIDED COURSE  
(2022-23)**

**SCHOOL OF MATHEMATICS  
GANGADHAR MEHER UNIVERSITY, AMRUTA VIHAR,  
SAMBALPUR, ODISHA-768004**

*Sambalpur*

*Sanjaya Barua*

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# Art of Solving Problems in Mathematics Value Added Courses

23VACSOM-01

( for the III UG students admitted from the academic year 2022-23)

Course Teacher:- Dr. B. L. Panigrahi

Duration: 30 Hours

Course Objective: -

CO1-

CO2-

CO3-

CO4-

**Unit I: Sequences and Series**

6 Hours

Sequence and Series – Convergence - Lim sup –

**Unit II: Sequences and Series**

6 Hours

Lim inf - Bolzano Weierstrass theorem - Heine Borel theorem

**Unit III : Group Theory**

6 Hours

Groups – Subgroups - Normal subgroups - Quotient groups – Homomorphism - Cyclic groups -Permutation groups.

**Unit IV : Group Theory**

6 Hours

Homomorphism - Cyclic groups -Permutation groups.

**Unit V :Complex numbers , Analytic function**

6 Hours

Power series - Analytic functions – Cauchy Riemann equations

## Text Book

UGC CSIR NET/SET -Mathematical Analysis- 'Pawan Sharma, Neha Sharma and Suraj Singh'-Arihant publications (India)Ltd.

## Reference Book

UGCCSIRNET/SET-Mathematical Analysis-'Akilesh Mmani Thirupathi and Sunil Kushwaha'- Kanika publishing company.

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Jannajaya Basik

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# Type Setting in Latex

23VACSOM-02

Course Teacher-: Dy. Y. Jamudulia

Duration: 30 Hours ✓

(for the III UG students admitted from the academic year 2022-23)

## Unit I

6 Hours

Preparing an input file, sentences and paragraphs, the document class, sectioning, display material, running Latex.

## Unit II

6 Hours

Changes the type style, producing mathematical symbols and mathematical formulae, arrays, delimiters, multiline formulae, putting one thing on other, spacing in math mode.

## Unit III

6 Hours

Defining command and environments, Producing and including graphics in a Latex file, figures and other floating bodies, lining it up in columns, table of content, cross-reference, bibliography and citation, making index and glossary, slides, overlays and notes, letters.

## Unit IV

6 Hours

Design it yourself: document class, page style, title page, customizing the style, line and page breaking, numbering, length, spaces and boxes, formatting with boxes, cantering and flushing, list making environments, changing font type size and special symbols.

## Unit V

6 Hours

Picture, picture environments, picture objects, text, boxes, straight lines, arrow, stacks, circles, oval, framing, curve, grid, repeat patterns.

## Text Book

Leslie Lamport, A Document Preparation System User's Guide and Reference Manual, Addison-Wesley Publishing Company.

## Reference Books

Stefan Kottwitz, LaTeX Beginner's Guide, Packt Publishing, UK.

## Other Sources for reading

1. Till Tantau, User Guide to the Beamer Class, <http://latex-beamer.sourceforge.net>.
2. Tobias Oetiker, The Not So Short Introduction to LATEX2E, <https://tobi.oetiker.ch/lshort/lshort.pdf>

*Sambhu*

*J. M. J.*

*Jammajaya*

*Basik*

*Apala*