जननायक चन्द्रशेखर विश्वविद्यालय, बलिया-277001 (उ.प्र.)
Jananayak Chandrashekhar University, Ballia-277001 (U. P.)

# FACULTY OF SCIENCE

## Course structure and Syllabus

## Ph.D. Course work system

Mathematics

UNDER SEMESTER SYSTEM TO COME INTO FORCE FROM

ACADEMIC SESSION -2020-21


# Ph.D. (Doctor of Philosophy)

## MATHEMATICS

## FACULTY OF SCIENCE

## SEMESTER SYSTEM

# FACULTY OF SCIENCE

# SEMESTER SYSTEM

# Ph.D. course work and Syllabus for

# MATHEMATICS

**Eligibility:** Qualifying Examination of Master's degree in Mathematics

# Ph.D. MATHEMATICS

**COURSE WORK SYSTEM**
**COURSE STRUCTURE, SYLLABUS/Ph.D. COURSE WORK**

1. PAPER-1-Research Methodology and Computer Application — Credits-4, MM-100
2. PAPER-2- Research and Publication Ethics — Credits-2, M.M.-100
3. PAPER-3- Fluid Mechanics — Credits-4, M.M.-100
4. Structures on Differentiable Manifolds, — Credits-4, M.M.-100

**Total-14 Credits and Maximum Marks-400**

**After the completion of course work**

1. SYNOPSIS SEMINAR — Satisfactory
2. ORAL COMPREHENSIVE — Satisfactory
3. COURSE SEMINAR — Satisfactory
4. THESIS PRE SUBMISSION SEMINAR — Satisfactory
5. THESIS (DOCTORAL RESEARCH WORK) — Satisfactory
6. THESIS VIVA-VOCE — Satisfactory

**PROPOSED REGULATIONS**

| Semesters/Papers | Title of the papers | **Theory** | |
|---|---|---|---|
| | | Max. Marks | Min. Marks |
| Paper 1 | (Theory Paper) | 100 | 40 |
| Paper 2 | (Theory Paper) | 100 | 40 |
| Paper 3 | (Theory Paper) | 100 | 40 |
| Paper 4 | (Theory Paper) | 100 | 40 |
| **Total aggregate of First Semester will be 50 %** | | | **Max. Marks – 400**<br>**Min. Marks – 200** |

| | |
|---|---|
| SYNOPSIS SEMINAR | Satisfactory |
| ORAL COMPREHENSIVE | Satisfactory |
| COURSE SEMINAR | Satisfactory |
| THESIS PRE-SUBMISSION SEMINAR | Satisfactory |
| THESIS (DOCTORAL RESEARCH WORK) | Satisfactory |
| THESIS VIVA-VOCE | Satisfactory |

**Note-**

1. The research work may be initiated as per Ph.D. ordinance.
2. The evaluation of seminar presentation and oral comprehensive examination shall be done by the departmental committee which shall be constituted by the Head of Department /Principal of College.
3. The minimum passing marks of every paper at least will be 40 % in theory and total aggregate of the semester will be 50 % minimum.

# Ph.D.in Mathematics

## COURSE WORK SYSTEM

### COURSE STRUCTURE–SYLLABUS of Ph.D. COURSE WORK

## PAPER I: RESEARCH METHODOLOGY AND COMPUTER APPLICATION,

**4 Credit, M.M.100**

**(Common for all)**

**PAPER-II RESEARCH AND PUBLICATION ETHICS** **Credits-2, M.M.-100**

(As per UGC Recommendation)

**(Common for all)**

## PAPER -III: Fluid Mechanics 4 Credits, M.M.100

**UNIT I**

Wave motion in a fluid, speed of sound, supersonic flows, Two phase flow. Normal and oblique shocks. Plano-Poissouille and Coutte flows between parallel plates. Magnetic fluid.

**UNIT II**

Curvilinear coordinates, Characteristic method, Similarity methods, Self- similar solution , numerical methods.

**UNIT III**

Practical on unit one, assignment and their presentation

**UNIT IV**

Practical on unit two, assignment and their presentation

**Reference Books**


1. L.D.Landau and E.M.Lifshitz, Fluid Mechnics, Butterworth –Heinmann 2nd Edition,1987.
2. R.K.Rajput, Text Book of fluid Mechnaics and Hydraulic Mechnacis,S.Chand and company.
3. L.I.Sedov, Similarity and Dimensional method in Mechnacis, Mir Publishers


## PAPER- IV Structures on Differentiable Manifolds, 4 Credits, M.M.100

### UNIT-I

Almost Hermite Manifolds, Almost analytic vector fields, curvature tensor, F-connection, Kahler Manifolds, Nearly Kahler Manifold, Almost Kahler manifold: Definitions and its some properties with curvature tensors.

### UNIT-II

Almost contact metric manifold, Cosympletic manifold, Sasakian manifold, Kenmotsu manifold: definition and its some properties with curvature tensors, Semi-symmetric and non-metric connection.

**UNIT- III**

Practical on unit one, assignment and their presentation

**UNIT- IV**

Practical on unit two, assignment and their presentation

### Reference Books


1. R.S.Mishra, Structures on a differentiable manifold and their applications, Chandrama Publication, Allahabad,1984.
2. K.Yano, Differential Geometry of complex and almost complex Spaces.
3. U.C.De and A.A.Shaikh, Complex manifolds and Contact manifolds, Narosa Publishing House Pvt. Ltd., 2009.

□□□