

## H.P. University B.A. /B. Sc.(Mathematics Syllabus) Effective from Academic session 2014-2015

### Sixth Semester

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|--|---------------------------------------|
| Course Code  | BA/BSCMATH0613                        |
| Credits= 4   | L-4,T-0,P-0                           |
| Name of the Course   | Advanced Calculus                     |
| Type of the Course   | (Minor Elective -VI)                  |
| Number of hrs required for this course   | 60 hrs.                               |
| Continuous Comprehensive Assessment: Based on Minor Tests(2), Class tests, Assignments, Quiz,Seminar and Attendance (Marks Attendance: 5 marks to be given as per the regulations) | Max. Marks:50                         |
| Semester Term End Examination  | Max Marks: 50    Maximum Time: 3 hrs. |
| Lectures to be Delivered   | 60 (One Hour Each)                    |

### Instructions

**Instructions for paper setter:** The question paper will consist of five Sections of 50 marks. **Section A** will be **Compulsory** for all and shall consist of 12 questions of 18 marks (each of one and half marks) of multiple choice type, true/false type, statement of theorem or fill in the blanks type etc. This section will be distributed over the whole syllabus uniformly. Sections B, C, D and E of the question paper shall be based on units, Unit-I, Unit-II, Unit-III and UNIT-IV, respectively. In each of these sections two questions will be set and the students shall have to attempt one question from each of these sections. Each question in Sections B, C, D and E shall be of 8 marks each.

**Instructions for Candidates:** Candidates are required to attempt five questions in all. All parts of question in Section A shall be Compulsory. The students are required to select one question from the questions in each of the Sections B, C D and E of the question paper.

#### Unit - I(16 hrs.)

Limit and continuity of functions of two variables, partial differentiation change of variables, Jacobians (6 hrs)

Maxima, Minima and Saddle points of functions of two variables. Lagrange's multiplier method (10 hrs.).

#### Unit-II(16 hrs.)

Quadrature, rectification. Evaluation of area and volume by double and triple integral respectively(Cartesian and parametric forms) (8 hrs.).

Beta and Gamma functions and their properties. Problems based on Beta and Gamma functions (8 hrs.).

#### Unit-III(12 hrs.)

Partial Derivation and differentiability of real valued functions of two variables. Schwartz and young's Theorem (6 hrs.).

Implicit function Theorem (case of two variables). Euler's Theorem on Homogenous functions. Taylor's Theorem for functions of two variables (6 hrs.).

#### Unit-IV(16 hrs.)

Calculus of variations: Variational problems with fixed boundaries. Euler's equation for functional containing first order derivatives and one independent variable. Extremals (8 hrs.).

Functionals dependent on higher order derivatives. Functionals dependent on more than one independent variables. Variational problems in parametric form (8 hrs.).

### Books Recommended

1. S.C. Malik and Savita Arora, Mathematical Analysis, New Age International Pvt. Ltd. Publishers.
2. Shanti Narayana, Intergal Calculus, S. Chand and Co. New Delhi.
3. A.S. Gupta, Calculus of variations with applications, Prentice Hall of India Pvt. Ltd New Delhi.

## H.P. University B.A. /B. Sc.(Mathematics Syllabus) Effective from Academic session 2015-2016

### Sixth Semester

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| Course Code  | BA/BSCMATH0613                     |
| Credits= 4   | L-4,T-0,P-0                        |
| Name of the Course   | Advanced Calculus                  |
| Type of the Course   | (Minor Elective -VI)               |
| Number of hrs required for this course   | 60 hrs.                            |
| Continuous Comprehensive Assessment: Based on Minor Tests(1), Class tests, Assignments, Quiz,Seminar and Attendance (Marks Attendance: 5 marks to be given as per the regulations) | Max. Marks:30                      |
| Semester Term End Examination  | Max Marks: 70 Maximum Time: 3 hrs. |
| Lectures to be Delivered   | 60(One Hour Each)                  |

### Instructions

**Instructions for paper setter:** The question paper will consist of five Sections of 70 marks. **Section A** will be **Compulsory** for all and shall consist of 8 questions of 16 marks (each of two (2) marks) of multiple choice type, true/false type, statement of theorem or fill in the blanks type etc. This section will be distributed over the whole syllabus uniformly. Sections B, C, D and E of the question paper shall be based on units, Unit-I, Unit-II, Unit-III and UNIT-IV, respectively. In each of these sections two questions will be set and the students shall have to attempt one question from each of these sections. Each question in Sections B, C, D and E shall be of 13.5 marks each.

**Instructions for Candidates:** Candidates are required to attempt five questions in all. All parts of question in Section A shall be Compulsory. The students are required to select one question from the questions in each of the Sections B, C D and E of the question paper.

#### Unit - I(16 hrs.)

Limit and continuity of functions of two variables, partial differentiation change of variables, Jacobians (6 hrs)

Maxima, Minima and Saddle points of functions of two variables. Lagrange's multiplier method (10 hrs.).

#### Unit-II(16 hrs.)

Quadrature, rectification. Evaluation of area and volume by double and triple integral respectively(Cartesian and parametric forms) (8 hrs.).

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