# Syllabus & Evaluation Scheme B.Sc. Mathematics

# II Year

**Dev Bhoomi Institute of Management Studies, Dehradun**

**Affiliated to**

**Sri Dev Suman Uttarakhand University, Badshahithol, Tehri, Uttrakhand**

| S. No. | SUBJECT | EVALUATION SCHEME II Year | | Subject Total |
|---|---|---|---|---|
| | | SESSIONAL EXAM Theory | | |
| | | Ext. | Int. | |
| 1 | Differential Equations | 65 | 00 | |
| 2 | Real Analysis | 65 | 00 | |
| 3 | Advanced Algebra | 70 | 00 | 200 |

| | **Dev Bhoomi Institute Of Management Studies** | **Year: II** |
|---|---|---|
| | **Department of PCM/CBZ** | |
| | **Total Contact Hours: 45** | **LTP -2-0-0** | **External Marks/Internal Marks: 65** |
| **Course Title: Differential Equation** | | **Course Code: BM-201** | **Duration of External Exam:2:30 Hours** |

**Objectives: Students get to know different aspects of differential equations.**

<u>**B.Sc. – II Mathematics**</u>
<u>**(Paper-I) Differential**</u>
<u>**Equations**</u>

I.     First order exact differential equations, integrating factors, rules to find an integrating factor, first order higher degree equations solvable for x, y, p. method for solving higher order differential equations

II.    Basic theory of linear differential equations, wronskian and its properties, solving a differential equations by reducing its order

III.   Linera homogenous equations with constant coefficients, linear non homogenous equations, the method of variations parameters

IV.    The Cauchy- euler equations, simultaneous differentil equations, total differential equations

V.     Order and degree of PDE, concept of linear and non- linear PDE, formation of first PDE, linear PDE of first order, Lagranges method, charpits method.

*Books Suggested:*

1.  T.M.Apostol, calculus (Vol. I), John Wiley and sons
2.  I.Sneddon, Elements of PDE, McGraw-Hill

| Course Outcome | Description |
|---|---|
| CO1 | Student will be able to solve first order differential equations utilizing standard techniques |
| CO2 | To find the complete solution of a non-homogenous differential equations as a linear combination of the complementary function and a particular solution |
| CO3 | To find the complete solution of a differential equations with constant coefficients by variation of parameters |
| CO4 | Working knowledge of basic applications problems described by second order linear differential equations with constant coefficients. |

| | **Dev Bhoomi Institute Of Management Studies** | **Year: II** |
|---|---|---|
| | **Department of PCM/CBZ** | |
| | **Total Contact Hours: 45** | **LTP -2-0-0** | **External Marks/Internal Marks: 65** |
| **Course Title: Real Analysis** | **Course Code: BM-202** | **Duration of External Exam:2:30 Hours** |

**Objectives: Students get to know different aspects of Real Analysis.**

### B.Sc. – II Mathematics
### (Paper-II) Real
### Analysis

I.   Finite and infinite sets, examples of countable and uncountable sets, real line, bounded sets, suprema and infima, completeness property of R, archmedean property of R , intervals concept of cluster points and statement of Bolzano weierstrass theorem

II.  Real sequence, bounded sequence, Cauchy convergence criterion for sequence, cauchy's theorem on limits, order preservation and squeeze theorem, monotonic convergence theorem without proof for series, positive

III. Infinite series, Cauchy convergence criterion for series, positive term series, geometric series, comparision test, convergence of p-series, root test, ratio test, alternating series, leibnitz's test, definition and examples of absolute and conditional convergence

IV.  Rolles theorem, mean value theorem, taylors theorem with lagranges and cauchys forms of remainder, taylors series, maclaurins series of sinx, cosx, ex, log(1+x), $(1+x)^m$

V.   Sequence and series of functions, point wise and uniform convergence. Mn test, M-test,  statements of the results about uniform convergence and integrability and differentiability of functions, power series and radius of convergence

*Books Suggested:*
3. T.M.Apostol, calculus (Vol. I), John Wiley and Sons.
4. R.G.Bartle and D.RSherbert

| Course Outcome | Description |
|---|---|
| CO1 | Student get to know describe the fundamental properties of the real numbers that underpin the formal development of real analysis |
| CO2 | Understanding of the theory of sequences and series, continuity, differentiation and integration |
| CO3 | Understanding of limits and how they are used in sequences, series and differentiation. |
| CO4 | Construct rigrous mathematical proofs of basic results in real analysis |

| | Dev Bhoomi Institute Of Management Studies | Year-II |
|---|---|---|
| | **Department of PCM/CBZ** | |
| | **Total Contact Hours: 45** | **LTP -2-0-0** | **External Marks-70** |
| **Course Title: ADVANCED ALGEBRA** | **Course Code: BM-203** | **Duration of External Exam: 2:30 Hours** |

**Objective**: **Students get to know different aspects of ALGEBRA**

## B.Sc. – II Mathematics

### (Paper-III) Advanced

### Algebra

I.     Calyleys theorem, normalizer and centre of a group
II.    Normal subgroups and their properties, simple group
III.   Rings, various types of rings, subrings, properties of rings
IV.    Integral domain, field , skew field: examples and its characterizations

**Books Suggested:**
1. Khanna and Bhambhari, A course in Abstract Algebra
2. Joseph A Gallian. Contemporary Abstract Algebra

| Course Outcome | Description |
|---|---|
| CO1 | Student get to know understand the importance of algebraic properties with regard to working with various number systems |
| CO2 | Extend group structure to finite permutation groups (cayleys theorem) |
| CO3 | Generate groups given specific conditions |
| CO4 | Investigate symmetry using group theory |
| CO5 | Understanding sylows theorems |