

**INSTITUTE OF MATHEMATICS AND APPLICATIONS**

**COURSES OF STUDY**

**B.Sc. (HONS.) IN MATHEMATICS AND COMPUTING  
(w.e.f. 2023-24)**



**UTKAL UNIVERSITY**

**BHUBANESWAR-751004**

**REVISED COURSE STRUCTURE FOR  
B.Sc. (HONS.) IN MATHEMATICS AND COMPUTING,  
INSTITUTE OF MATHEMATICS AND APPLICATIONS, BHUBANESWAR**

**Semester-I**

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|---|------------|
| 1. Core-1: Calculus   | [6-credit] |
| 2. Core-2: Algebra-I (Linear Algebra)                                 | [6-credit] |
| 3. Core-3: Computer Science-I (Programming and Data Structures + Lab) | [6-credit] |
| 4. Generic Elective-I: Combinatorics and Discrete Mathematics         | [6-credit] |
| 5. AECC-I: Communicative English & Writing Skill                      | [4-credit] |
| 6. SEC-I: Quantitative Aptitude and Logical Reasoning                 | [2-credit] |
| 7. AECC: Ethics and Values (Issues Relating to Women)                 | [1-credit] |

**Semester-II**

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|--|------------|
| 1. Core-4: Analysis-I  | [6-credit] |
| 2. Core-5: Algebra-II (Group Theory)                                     | [6-credit] |
| 3. Core-6: Computer Science-II (Design and Analysis of Algorithms + Lab) | [6-credit] |
| 4. Generic Elective-II: Probability-I                                    | [6-credit] |
| 5. AECC-II: Environmental Studies & Disaster Management                  | [4-credit] |
| 6. SEC-II: Programming using Python                                      | [2-credit] |
| 7. AECC: Ethics and Values (Values and Good Citizenship)                 | [1-credit] |

**Semester-III**

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|--|------------|
| 1. Core-7: Analysis-II   | [6-credit] |
| 2. Core-8: Algebra-III (Rings and Fields)  | [6-credit] |
| 3. Core-9: Ordinary Differential Equations   | [6-credit] |
| 4. DSE-I: Computer Science-III (Computer Systems with Lab)                         | [6-credit] |
| 5. Generic Elective-III: Statistics + Lab/ Classical Mechanics/ Classical Geometry | [6-credit] |
| 6. AECC: Ethics and Values (Issues of Drug, Tobacco and Alcohol Addiction)         | [1-credit] |

**Semester-IV**

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|--|------------|
| 1. Core-10: Number Theory-I  | [6-credit] |
| 2. Core-11: Partial Differential Equations   | [6-credit] |
| 3. Core-12: Computer Science-IV(Theory of Computation)   | [6-credit] |
| 4. Generic Elective-IV: Topology/ Optimization Theory  | [6-credit] |
| 5. AECC-III: Object Oriented Software Engineering/ Transportation and Game Theory/<br>Modelling and Simulation/ Internet of Things/ Econometrics | [4-credit] |
| 6. SEC-III: LaTeX & Web Development/ Android Programming/ Visualization using<br>Python  | [2-credit] |
| 7. AECC: Ethics and Values (Ethical Values for Student Life)   | [1-credit] |

**Semester-V**

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|--|------------|
| 1. Core-13: Complex Analysis   | [6-credit] |
| 2. DSE-II: Numerical Analysis + Lab/ Lie Algebra and Group Representations | [6-credit] |
| 3. DSE-III: Number Theory -II/ Lebesgue Measure & Integration              | [6-credit] |
| 4. DSE-IV: Functional Analysis/ Probability-II                             | [6-credit] |

5. DSE-V: Artificial Intelligence + Lab/ Soft Computing Methods + Lab/ Industrial Mathematics + Lab/ Graph Theory/ Parallel Computing [6-credit]
8. AECC: Ethics and Values (Vulnerable Sections of Society: Understanding their Issues) [1-credit]

#### Semester-VI

1. Core-14: Differential Geometry (Curves & Surfaces) [6-credit]
2. Generic Elective-V: Bio-informatics/ Data Analytics/ Wavelet Analysis/Mathematical Finance/ Natural Language Processing/ Image and Video processing [6-credit]
3. Generic Elective-VI: Algebraic Geometry/ Quantum Mechanics/ Quantum Computing/ Electrodynamics/ Relativity and Gravitation/ Discrete Dynamical System/ Fluid Dynamics/ Cyber Security [6-credit]
4. DSE-VI: Project Work [6-credit]
5. AECC: Ethics and Values (Environmental & Techno Ethics) [1-credit]

















#### **Core Courses (Marks = 100, credit = 6)**

- + Calculus
- + Analysis-I
- + Analysis-II
- + Algebra-I
- + Algebra-II
- + Algebra-III
- + Number Theory-I
- + Ordinary Differential Equations
- + Partial Differential Equations
- + Differential Geometry
- + Complex Analysis
- + Computer Science-I (Programming and Data Structures + Lab)
- + Computer Science-II (Design and Analysis of Algorithms + Lab)
- + Computer Science-IV(Theory of Computation)














#### **Discipline Specific Elective Courses (DEC) (Marks = 100, credit = 6)**

- + Computer Science-III (Computer Systems with Lab)
- + Numerical Analysis + Lab
- + Lie Algebra and Group Representations
- + Number Theory –II
- + Lebesgue Measure & Integration
- + Artificial Intelligence + Lab
- + Soft Computing Methods + Lab
- + Industrial Mathematics + Lab
- + Graph Theory
- + Functional Analysis
- + Probability-II
- + Parallel Computing






### **Generic Electives (GE) (Marks = 100, credit = 6)**

-  Combinatorics and Discrete Mathematics
-  Probability-I
-  Statistics-I + Lab
-  Classical Mechanics
-  Classical Geometry
-  Topology
-  Optimization Theory
-  Algebraic Geometry
-  Quantum Mechanics
-  Quantum Computing
-  Electrodynamics
-  Relativity and Gravitation
-  Discrete Dynamical System
-  Fluid Dynamics
-  Cyber Security
-  Image and Video processing

### **Ability Enhancement Compulsory Courses (AECC)**

<b>Marks = 100, credit = 4</b>	<b>Marks = 25, credit = 1</b>
<ul style="list-style-type: none"><li> Communicative English &amp; Writing Skill</li><li> Environmental Studies &amp; Disaster Management</li><li> Object Oriented Software Engineering</li><li> Transportation and Game Theory</li><li> Modelling and Simulation</li><li> Internet of Things</li><li> Econometrics</li></ul>	<ul style="list-style-type: none"><li> Ethics and Values: Issues Relating to Women</li><li> Ethics and Values: Values and Good Citizenship</li><li> Ethics and Value: Issues of Drug, Tobacco and Alcohol Addiction</li><li> Ethics and Values: Ethical Values for Student Life</li><li> Ethics and Values: Vulnerable Sections of Society: Understanding their Issues</li><li> Ethics and Values: Environmental &amp; Techno Ethics</li></ul>

### **Skill Enhancement Course (SEC) (Marks = 50, credit = 2)**

-  Quantitative Aptitude and Logical Reasoning
-  Programming using Python
-  LaTeX & Web Development
-  Android Programming
-  Visualization using Python