1. **KURUKSHETRA UNIVERSITY KURUKSHETRA**
2. 
3. **Five Years Integrated**
4. **M. Sc. Engineering Physics (3 Years BSc+2Years M.Sc.)**
5. **Under CBCS-LOCF**
6. (Effective from the Academic Session 2021-22 in phase manner)
7. **Department of Physics**
8. **INSTITUTE OF INTEGRATED & HONORS STUDIES**
9. **Kurukshetra University**
10. **Kurukshetra - 136 119**
11. **Haryana (INDIA)**

**Scheme and Syllabi of five years integrated**

**M. Sc. ENGINEERING PHYSICS Programme**

**(From 1st to 6th semester)**

**Under CBCS-LOCF**

(w. e. f. from the Academic Session 2021-22 in phase manner)

**(After 3 Years / 6 Semesters, students may be awarded B. Sc. -Engineering Physics Degree)**

### 1st Year (1st and 2nd semesters)

### 1st Semester

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Type & No.** | **Course Code** | **Course Nomenclature** | **Credits**  **(L+T+P)** | **Teaching Hours per week** | **Maximum Marks** | | | **Duration of Examination**  **(Hrs.)** |
| Internal Assessment**\*** | End-semester Examination | Total |
| AECC Course-I  Communication Skills | EVS- 101 | Environmental Science | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-I  (Physics) | EP-101 | Mechanics-I | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-II  (Physics) | EP-102 | Mechanics-II | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-III  (Physics) | EP-103 | Physics Practical-I | 0+0+2 | 4 | ---------- | 50 | 50 | 3 |
| Core Course-I  (Mathematics) | MT-101 | Calculus | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-II  (Mathematics) | MT-102 | Algebra and Number Theory | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-III  (Mathematics) | MT-103 | Mathematics Practical-I | 0+0+2 | 4 | ------------ | 50 | 50 | 3 |
| Core Course-I  (Chemistry) | CH-101 | Inorganic chemistry-I | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-II  (Chemistry) | CH-102 | Physical chemistry-I | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-III  (Chemistry) | CH-103 | Organic chemistry-I | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-IV  (Chemistry) | CH-104 | Chemistry practical-I | 0+0+2 | 4 | ------------- | 50 | 50 | 6 |
| **Total Credits/Marks in semester-I** | | | **26** |  | | | **650** |  |

\*Internal Assessment marks

20% marks in each theory paper shall be reserved for Internal Assessment. The following parameters (with weightage of each) forming the basis of award of Internal Assessment:-

(i) One test/Seminar for each paper (one period duration) : 50%

(ii) One Assignment for each paper : 25%

(iii) Attendance : 25%

### 2nd Semester

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Type & No.** | **Course Code** | **Course Nomenclature** | **Credits**  **(L+T+P)** | **Teaching Hours per week** | **Maximum Marks** | | | **Duration of Examination**  **(Hrs.)** |
| Internal Assessment**\*** | End-semester Examination | Total |
| AECC Course-II  Communication Skills | ENG- 201 | English Communication | 2+0+0 | 2# | 10 | 40 | 50 | 3 |
| Core Course-IV  (Physics) | EP-201 | Electricity, Magnetism & E.M. Theory | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-V  (Physics) | EP-202 | Electronics | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-VI  (Physics) | EP-203 | Physics Practical-II | 0+0+2 | 4 | --------- | 50 | 50 | 3 |
| Core Course-IV  (Mathematics) | MT-201 | Advanced Calculus | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-V  (Mathematics) | MT-202 | Differential Equations | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-VI  (Mathematics) | MT-203 | Mathematics Practical-II | 0+0+2 | 4 | ----------- | 50 | 50 | 3 |
| Core Course-V  (Chemistry) | CH-201 | Inorganic chemistry-II | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-VI  (Chemistry) | CH-202 | Physical chemistry-II | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-VII  (Chemistry) | CH-203 | Organic chemistry-II | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-VIII  (Chemistry) | CH-204 | Chemistry practical-II | 0+0+2 | 4 | ------- | 50 | 50 | 6 |
| **Total Credits/Marks in semester-II** | | | **26** |  | | | **650** |  |

**#Workload for English: 1 hour for teaching theory/text and 1 hour for composition/ grammar for group of 20 (Twenty) students.**

**Scheme and Syllabi of five years integrated**

**M. Sc. ENGINEERING PHYSICS Programme**

**(From 1st to 6th semester)**

**Under CBCS-LOCF**

(w. e. f. from the Academic Session 2021-22 in phase manner)

**(After 3 Years / 6 Semesters, students may be awarded B. Sc. -Engineering Physics Degree)**

### 2nd Year (3rd and 4th Semesters)

### 3rd Semester

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Type & No.** | **Course Code** | **Course Nomenclature** | **Credits**  **(L+T+P)** | **Teaching Hours per week** | **Maximum Marks** | | | **Duration of Examination (Hrs.)** |
| Internal Assessment**\*** | End-semester Examination | Total |
| **AECC Course-III** | **HIN-301** | **हिंदी भाषा और संप्रेषण कौशल** | 2+0+0 | 2# | 10 | 40 | 50 | 3 |
| **SKT-302** | **संस्कृत चयनिका एवं व्याकरण** | 2+0+0 | 2# | 10 | 40 | 50 | 3 |
| Skill Enhancement  Course-I | SEC- 301 | Programming skills with - C | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-VII  (Physics) | EP-301 | Thermal Physics | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-VIII  (Physics) | EP-302 | Statistical Mechanics | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-IX  (Physics) | EP-303 | Physics Practical-III | 0+0+2 | 4 | ---------- | 50 | 50 | 3 |
| Core Course-VII  (Mathematics) | MT-301 | Real Analysis-I | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-VIII  (Mathematics) | MT-302 | Mechanics – I | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-IX  (Mathematics) | MT-303 | Mathematics Practical-III | 0+0+2 | 4 | ----------- | 50 | 50 | 3 |
| Core Course-IX  (Chemistry) | CH-301 | Inorganic chemistry-III | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-X  (Chemistry) | CH-302 | Physical chemistry-III | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-XI  (Chemistry) | CH-303 | Organic chemistry-III | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-XII  (Chemistry) | CH-304 | Chemistry practical-III | 0+0+2 | 4 | ---------- | 50 | 50 | 6 |
| **Total Credits/Marks in semester-III** | | | **28** |  | | | **700** |  |

**#AECC-III Hindi/Sanskrit will be same as AECC approved for other UG courses (Medical & Non-Medical) by UGBOS, Department of Hindi/ UGBOS, Department of Sanskrit, Kurukshetra University, Kurukshetra.**

**\*Internal Assessment marks**

**20% marks in each theory paper shall be reserved for Internal Assessment. The following parameters (with weightage of each) forming the basis of award of Internal Assessment:-**

**(i) One test/Seminar for each paper (one period duration) : 50%**

**(ii) One Assignment for each paper : 25%**

**(iii) Attendance : 25%**

### 4th Semester

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Type & No.** | **Course Code** | **Course Nomenclature** | **Credits**  **(L+T+P)** | **Teaching Hours per week** | **Maximum Marks** | | | **Duration of Examination (Hrs.)** |
| Internal Assessment**\*** | End-semester Examination | Total |
| Skill Enhancement  Course-II (Physics) | SEC- 401 | (A) Applied Optics | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| (B) Renewable Energy & Energy Harvesting |
| Core Course-IX  (Physics) | EP-401 | Wave & Optics | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-X  (Physics) | EP-402 | Quantum Mechanics | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-XI  (Physics) | EP-403 | Physics Practical-IV | 0+0+2 | 4 | --------- | 50 | 50 | 3 |
| Core Course-IX  (Mathematics) | MT-401 | Abstract Algebra | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-X  (Mathematics) | MT-402 | Numerical Analysis | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| Core Course-XI  (Mathematics) | MT-403 | Mathematics Practical-IV | 0+0+2 | 4 | ----------- | 50 | 50 | 3 |
| Core Course-XIII  (Chemistry) | CH-401 | Inorganic chemistry-IV | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-XIV  (Chemistry) | CH-402 | Physical chemistry-IV | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-XV  (Chemistry) | CH-403 | Organic chemistry-IV | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| Core Course-XVI  (Chemistry) | CH-404 | Chemistry practical-IV | 0+0+2 | 4 | ------------ | 50 | 50 | 6 |
| **Total Credits/Marks in semester-IV** | | | **26** |  | | | **650** |  |

**Scheme and Syllabi of five years integrated**

**M. Sc. ENGINEERING PHYSICS Programme**

**(From 1st to 6th semester)**

**Under CBCS-LOCF**

(w. e. f. from the Academic Session 2021-22 in phase manner)

**(After 3 Years / 6 Semesters, students may be awarded B. Sc. -Engineering Physics Degree)**

### 3rd Year (5th and 6th semesters)

### 5th Semester

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Type & No.** | **Course Code** | **Course Nomenclature** | | **Credits**  **(L+T+P)** | **Teaching Hours per week** | **Maximum Marks** | | | **Duration of Examination (Hrs.)** |
| Internal Assessment**\*** | End-semester Examination | Total |
| Skill Enhancement  Course-III (Mathematics) | SEC- 501 | (A) Vector Calculus | | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| (B) Special Functions | |
| Discipline Specific Elective-I  (Physics) | EP-501 | (A) Nuclear Physics | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Mathematical Physics | |
| Discipline Specific Elective-II  (Physics) | EP-502 | (A) Solid State Physics | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Medical Physics | |
| Discipline Specific Elective III  (Physics ) | EP-503 | (A) | Physics Practical-V | 0+0+2 | 4 | ---------- | 50 | 50 | 3 |
| (B) |
| Discipline Specific Elective-I  (Mathematics) | MT-501 | (A) Linear Algebra | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Partial Differential Equations and Integral Transforms | |
| Discipline Specific Elective-II  (Mathematics) | MT-502 | (A) Analytical Geometry | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Mechanics – II | |
| Discipline Specific Elective III  (Mathematics ) | MT-503 | Mathematics Practical-V | | 0+0+2 | 4 | ----------- | 50 | 50 | 3 |
| Discipline Specific Elective-I  (Chemistry) | CH-501 | (A) Heterocyclic and photochemistry | | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| (B) Bio-organic Chemistry | |
| Discipline Specific Elective II  (Chemistry ) | CH-502 | (A) Organometallic chemistry, Inorganic polymers and Quantum mechanics | | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| (B) Applied chemistry | |
| Discipline Specific Elective-III  (Chemistry) | CH-503 | Chemistry practical-V | | 0+0+2 | 4 | ----------- | 50 | 50 | 6 |
| **Total Credits/Marks in semester-V** | | | | **24** |  | | | **600** |  |

\*Internal Assessment marks

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(i) One test/Seminar for each paper (one period duration) : 50%

(ii) One Assignment for each paper : 25%

(iii) Attendance : 25%

### 6th Semester

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Type & No.** | **Course Code** | **Course Nomenclature** | | **Credits**  **(L+T+P)** | **Teaching Hours per week** | **Maximum Marks** | | |  |
| Internal Assessment**\*** | End-semester Examination | Total |
| Skill Enhancement  Course-IV (Chemistry) | SEC- 601 | (A) Clinical chemistry | | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| (B) Chemistry lab- maintenance and handling | |
| Discipline Specific Elective-IV  (Physics) | EP-601 | (A) Atomic & Molecular Spectroscopy | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Elements of Modern Physics | |
| Discipline Specific Elective-V  (Physics) | EP-602 | (A) Digital and Analog circuits & Instrumentation | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Embedded System: Introduction to Microcontroller | |
| Discipline Specific Elective VI  (Physics ) | EP-603 | (A) | Physics Practical-VI | 0+0+2 | 4 | ----------- | 50 | 50 | 3 |
| (B) |
| Discipline Specific Elective-IV  (Mathematics) | MT-601 | (A) Real Analysis–II | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Complex Analysis | |
| Discipline Specific Elective-V  (Mathematics) | MT-602 | (A) Linear Programming | | 3+0+0 | 3 | 15 | 60 | 75 | 3 |
| (B) Probability and Statistics | |
| Discipline Specific Elective VI  (Mathematics ) | MT-603 | Mathematics Practical-VI | | 0+0+2 | 4 | ----------- | 50 | 50 | 3 |
| Discipline Specific Elective-IV  (Chemistry) | CH-601 | (A)Applied physical Chemistry | | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| (B)Green Chemistry, organosulphur compounds and organic polymers | |
| Discipline Specific Elective V  (Chemistry ) | CH-602 | (A) Analytical chemistry | | 2+0+0 | 2 | 10 | 40 | 50 | 3 |
| (B)Nuclear chemistry, organosulphur compounds and catalysis | |
| Discipline Specific Elective-VI  (Chemistry) | CH-603 | Chemistry practical-VI | | 0+0+2 | 4 | ------------ | 50 | 50 | 6 |
| **Total Credits/Marks in semester-VI** | | | | **24** |  | | | **600** |  |