# BACHELOR OF SCIENCE
# IN
# PHYSICS

## SYLLABUS 2018-19

**(Outcome Based Education)**

**Dr. N.G.P. ARTS AND SCIENCE COLLEGE**
(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu and Accredited by NAAC with 'A' Grade (2nd Cycle)
Dr. N.G.P.- Kalapatti Road, Coimbatore-641048, Tamil Nadu, India
Web: www.drngpasc.ac.in | Email: info@drngpasc.ac.in | Phone: +91-422-2369100

# BACHELOR OF SCIENCE-PHYSICS
# REGULATIONS

## ELIGIBILITY

A pass in Higher Secondary Examination in Academic stream or Vocational stream under Higher Secondary Board of Examination, Tamil Nadu with Physics as one of the subjects and as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **Bachelor of Physics Degree Examination** of this College after a program of study of three Academic years.

## PROGRAM EDUCATIONAL OBJECTIVES

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

1. Producing graduates who are well acquainted with the fundamentals of Physics and requisite skills, in order to use their knowledge in Physics in a wide range of practical applications.
2. Developing creative thinking and the power of imagination to enable graduates work in research in academia and industry for broader applications.
3. Relating the training of Physics graduates to the employment opportunities within the country.
4. To promote societal values through Physics related activities.

## SCHEME OF EXAMINATIONS

| Course Code | Course | Hrs of Instruction | Exam Duration (Hrs) | Max Marks | | | Credit Points |
|---|---|---|---|---|---|---|---|
| | | | | CA | CE | Total | |
| **First Semester** | | | | | | | |
| **Part – I** | | | | | | | |
| 17UTL11T<br>17UHL11H<br>17UML11M<br>17UFL11F | Tamil-I<br>Hindi-I<br>Malayalam-I<br>French – I | 5 | 3 | 25 | 75 | 100 | 3 |
| **Part – II** | | | | | | | |
| 18UEG12G | English - I | 6 | 3 | 25 | 75 | 100 | 3 |
| **Part – III** | | | | | | | |
| 17UPY13A | **CORE-- I:**Mechanics, Properties of Matter and Acoustics | 6 | 3 | 25 | 75 | 100 | 5 |
| 18UPY13P | **Core Practical-I:** General Experiments | 4 | 3 | 20 | 30 | 50 | 2 |
| 17UMT1AB | **Allied- I:** Mathematics –I | 7 | 3 | 20 | 55 | 75 | 4 |
| **Part – IV** | | | | | | | |
| 17UFC1FA | Environmental Studies* | 2 | 2 | - | 50 | 50 | 2 |
| | | **30** | | | | **475** | **19** |
| **Second Semester** | | | | | | | |
| **Part – I** | | | | | | | |
| 17UTL21T<br>17UHL21H<br>17UML21M<br>17UFL21F | Tamil-II<br>Hindi-II<br>Malayalam-II<br>French – II | 5 | 3 | 25 | 75 | 100 | 3 |
| **Part – II** | | | | | | | |
| 18UEG22G | English - II | 6 | 3 | 25 | 75 | 100 | 3 |
| **Part – III** | | | | | | | |

20/12/2019

BoS Chairman/HoD
Department of Physics
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048





Academic Council * Dr.V. Rajendran CHAIRMAN * Dr. N.G.P. Arts and Science College

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 17UPY23A | **CORE-- II:** Heat and Thermodynamics | 6 | 3 | 25 | 75 | 100 | 5 |
| 18UPY23P | **Core Practical-II:** General Experiments | 4 | 3 | 20 | 30 | 50 | 2 |
| 17UMT2AB | **Allied - I:** Mathematics- II | 7 | 3 | 20 | 55 | 75 | 4 |
| **Part – IV** | | | | | | | |
| 17UFC2FA | Value Education:* Human Rights | 2 | 2 | - | 50 | 50 | 2 |
| | | **30** | | | | **475** | **19** |
| **Third Semester** | | | | | | | |
| **Part – I** | | | | | | | |
| 17UTL31T<br>17UHL31H<br>17UML31M<br>17UFL31F | Tamil-III<br>Hindi-III<br>Malayalam-III<br>French – III | 4 | 3 | 25 | 75 | 100 | 3 |
| **Part – II** | | | | | | | |
| 17UEG32G | English - III | 4 | 3 | 25 | 75 | 100 | 3 |
| **Part – III** | | | | | | | |
| 17UPY33A | **CORE-III:** Optics | 5 | 3 | 25 | 75 | 100 | 5 |
| 18UPY33P | **Core Practical-III:** General Experiments | 4 | 3 | 20 | 30 | 50 | 2 |
| 17UCY3AA | **Allied - II:** Chemistry- I | 3 | 3 | 20 | 55 | 75 | 3 |
| | Allied Practical- I | 3 | - | - | - | - | - |
| 17UPY3SA | **Skill based Course -I:** Principles of Programming Concepts and C Programming | 3 | 3 | 20 | 55 | 75 | 3 |
| **Part – IV** | | | | | | | |
| | NMEC –I: | 2 | 2 | - | 50 | 50 | 2 |
| 17UFC3FA<br>17UFC3FB<br>17UFC3FC | Basic Tamil / Advanced Tamil (OR) (Yoga for Human Excellence)/ | 2 | 2 | - | 50 | 50 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 17UFC3FD<br>17UFC3FE | Women's Rights/<br>Constitution of India | | | | | | |
| | | **30** | | | | **600** | **23** |
| **Fourth Semester** | | | | | | | |
| **Part – I** | | | | | | | |
| 17UTL41T<br>17UHL41H<br>17UML41M<br>17UFL41F | Tamil-IV<br>Hindi-IV<br>Malayalam-IV<br>French – IV | 4 | 3 | 25 | 75 | 100 | 3 |
| **Part – II** | | | | | | | |
| 17UEG42G | English - IV | 4 | 3 | 25 | 75 | 100 | 3 |
| **Part – III** | | | | | | | |
| 17UPY43A | **CORE- IV:** Atomic Physics and Spectroscopy | 5 | 3 | 25 | 75 | 100 | 5 |
| 18UPY43P | **Core Practical-IV:** General Experiments | 4 | 3 | 20 | 30 | 50 | 2 |
| 17UCY4AA | **Allied - II:** Chemistry –II | 3 | 3 | 20 | 55 | 75 | 3 |
| 17UCY4AP | **Allied Practical- I:** Chemistry | 3 | 3 | 20 | 30 | 50 | 2 |
| 17UPY4SA | **Skill based Course - II:** Object Oriented Programming with C++ | 3 | 3 | 20 | 55 | 75 | 3 |
| **Part – IV** | | | | | | | |
| | NMEC –II: | 2 | 2 | - | 50 | 50 | 2 |
| 17UFC4FA<br>17UFC4FB<br>17UFC4FC | Basic Tamil/<br>Advanced Tamil (or)<br>General Awareness | 2* | 2 | - | 50 | 50 | 2 |
| | | **30** | | | | **650** | **25** |
| **Fifth Semester** | | | | | | | |
| **Part – III** | | | | | | | |
| 17UPY53A | **CORE- V:** | 4 | 3 | 25 | 75 | 100 | 4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Mathematical Physics and Classical Mechanics | | | | | | |
| 17UPY53B | **CORE- VI:** Electricity and Magnetism | 4 | 3 | 25 | 75 | 100 | 4 |
| 17UPY53C | **CORE–VII:** Applied Electronics | 4 | 3 | 25 | 75 | 100 | 4 |
| 18UPY53P | **Core Practical-V:** General Experiments | 4 | 3 | 20 | 30 | 50 | 2 |
| 18UPY53Q | **Core Practical-VI:** Digital Electronics | 4 | 3 | 20 | 30 | 50 | 2 |
| | **Elective- I:** | 4 | 3 | 25 | 75 | 100 | 4 |
| 17UPY5SA | **Skill based Course III:** Digital Electronics and Operational Amplifier | 3 | 3 | 20 | 55 | 75 | 3 |
| 17UPY5SB | **Skill based Course - IV:** Microprocessors | 3 | 3 | 20 | 55 | 75 | 3 |
| **Part – IV** | | | | | | | |
| 17UPY53T | **Industrial Training** | Grade A to C | | | | | |
| | | **30** | | | | **650** | **26** |
| **Sixth Semester** | | | | | | | |
| **Part – III** | | | | | | | |
| 17UPY63A | **CORE–VIII:** Nuclear Physics | 4 | 3 | 25 | 75 | 100 | 4 |
| 17UPY63B | **CORE- IX:** Quantum Mechanics and Relativity | 5 | 3 | 25 | 75 | 100 | 5 |
| 17UPY63C | **CORE-X:** Solid State Physics | 5 | 3 | 25 | 75 | 100 | 5 |
| | | | | | | | |
| 18UPY63P | **Core Practical-VII:** General Experiments | 4 | 3 | 20 | 30 | 50 | 2 |
| 18UPY63Q | **Core Practical VIII:** | 4 | 3 | 20 | 30 | 50 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Special Electronics and Microprocessor | | | | | | |
| | **Elective- II:** | 4 | 3 | 25 | 75 | 100 | 4 |
| | **Elective- III:** | 4 | 3 | 25 | 75 | 100 | 4 |
| **Part – V** | | | | | | | |
| 17UEX65A | Extension Activity | **-** | **-** | **-** | **50** | **50** | **2** |
| | | **30** | | | | **650** | **28** |
| **GRAND TOTAL** | | | | | | **3500** | **140** |
| | | | | | | | |

**Note→ *Instruction hour-given to placement**

## ELECTIVE – I

(Student shall select any one of the following courses as Elective-I in Fifth semester)

| S.No | Course Code | Name of the Course |
|---|---|---|
| 1. | 17UPY5EA | Materials Science |
| 2. | 17UPY5EB | Energy Physics |
| 3. | 17UPY5EC | Agricultural Physics |

## ELECTIVE – II

(Student shall select any one of the following course s as Elective-II in Sixth semester)

| S.No | Course Code | Name of the Course |
|---|---|---|
| 1. | 17UPY6EA | Fundamentals of Nano Science |
| 2. | 17UPY6EB | Optical Fibres and Fibre Optic Communication Systems |
| 3. | 17UPY6EC | Bio-Physics |

## ELECTIVE - III

(Student shall select any one of the following courses as Elective-III in Sixth semester)

| S. No | Course Code | Name of the Course |
|---|---|---|
| 1. | 17UPY6ED | Space Physics |
| 2. | 17UPY6EE | Geophysics |
| 3. | 17UPY6EF | Medical Physics |

## NON MAJOR ELECTIVE COURSES (NMEC)

The Department offers the following two papers as Non Major Elective Course for students from other departments.

Student shall select the following Course as Non Major Elective Course during their third and fourth semester.

| S. No | Course Code | Name of the Course |
|---|---|---|
| 1 | 17UNM34V | Everyday Physics –I |
| 2 | 17UNM44V | Everyday Physics –II |

## Total Credit Distribution

| Courses | Credits | Total | | Credits | Cumulative Total |
|---|---|---|---|---|---|
| **Part I:** Tamil | 3 | 4x 100 = | 400 | 12 | 24 |
| **Part II:** English | 3 | 4x 100 = | 400 | 12 | |
| **Part III:** | | | | | |
| CORE- theory | 5 | 6x 100= | 600 | 30 | 102 |
| | 4 | 4x100= | 400 | 16 | |
| CORE- Practical | 2 | 8x 50= | 400 | 16 | |
| Allied theory | 4 | 2x75 = | 150 | 08 | |
| Allied theory | 3 | 2x75 = | 150 | 06 | |
| Allied Practical | 2 | 1X50= | 50 | 02 | |
| Elective | 4 | 3 x 100 | 300 | 12 | |
| Skill based | 3 | 4 x 75 = | 300 | 12 | |
| **PART-IV** | | | | | |
| NMEC | 2 | 2 x 50 = | 100 | 04 | 12 |
| Value Education | 2 | 2 x 50= | 100 | 04 | |
| Environmental studied | 2 | 1 x 50 = | 50 | 02 | |
| General Awareness | 2 | 1 x 50 = | 50 | 02 | |
| **Part V:** | | | | | |
| Extension | 2 | 1x50 = | 50 | 02 | 02 |
| **Total** | | | **3500** | **140** | **140** |

## FOR COURSE COMPLETION

**Students have to complete the following:**

1. Part I, II, III, IV and V as mentioned in the scheme.
2. Industrial training: Course code 16UPY53T.
    - Student must undergo Industrial training for 15 to 30 days during Summer Vacation in IV Semester. Internal and external Examiner will evaluate the report in V Semester. Based on the performance Grade will be awarded as follows:

A- 75marks and above

B- 60-74 marks

C- 40-59 marks

Below 40 marks – Re Appear

Earning Extra credits is **NOT MANDATORY** for programme completion

**Extra credits:**

| Courses | Credit | Total credits |
|---|---|---|
| BEC/ Self study courses | 1 | 1 |
| Hindi / French/ Other foreign Language approved by certified Institutions | 1 | 1 |
| Type Writing / Short Hand Course | 1 | 1 |
| Diploma/certificate/CA/ ACS/CMA Foundation | 1 | 1 |
| Representation – Academic/Sports /Social Activities/ Extra Curricular / Co-Curricular activities at University/ District/ State/ National/ International | 1 | 1 |
| **Total** | | 5 |

**Rules:**

The students can earn extra credits only if they complete the above during the programme period (I to V semester) and based on the following criteria. Proof of Completion must be submitted in the office of the Controller of Examinations before the commencement of the VI Semester. (Earning Extra credits are not mandatory for programme completion)

1. Student can opt BEC course/ Self study course to earn one credit. They have to Enroll and complete any one of the course during their programme period before fifth semester (I semester to V semester).

**Self Study Courses offered by the Department of PHYSICS**

| S. No. | Semester | Course Code | Course Title |
|---|---|---|---|
| 1. | III Sem | 17UPYSS1 | Electrical and Electronic Appliances |
| 2. | | 17UPYSS2 | Biophysics and Biomedical Instrumentation |

2. Student can opt Hindi/ French/ Other foreign Language approved by certified Institutions to earn one credit. The certificate(Hindi) must be obtained from **Dakshina Bharat Hindi Prachar Sabha** and He/ she has to enroll and complete during their programme period ( **first to fifth semester)**
3. Student can opt for Type writing /short hand course to earn one extra credit. He/she has to enroll and complete the course during their programme period to obtain certificate through **Tamil Nadu Board of Technical Education**
4. Student can opt for Diploma/certificate/CA/ACS/CMA foundation to earn one extra credit. Student who opt for Diploma/ Certificate course have to enroll any diploma/certificate course offered by

Bharathiar University through our Institution. Student who opt for CA/ ACS/CMA have to enroll and complete the foundation level during the programme period.

5. Award Winners in Academic/ Representation in Sports /Social Activities/ Extra Curricular/ Co-Curricular Activities at University/ District/ State/ National/ International level can earn one extra credit.

**PROGRAMME OUTCOMES**

On the successful completion of the **B.Sc Physics** programme, the following are the expected outcomes.

| PO Number | PO Statement |
|---|---|
| **PO1** | Demonstrate an understanding of basic scientific principles, theories, and laws in Physics as well as an awareness of the changing nature of science. |
| **PO2** | Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous methods use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics. |
| **PO3** | Demonstrate basic experimental skills by the practice of setting up and conducting experiments with minimizing measurement errors. |
| **PO4** | Demonstrate a qualitative understanding of the core physics ideas and the relationship of this physics to the humanities through both written and oral communication. |
| **PO5** | Demonstrate an ability to recognize the need for life-long learning for sustaining professional career. |

| 17UTL11T | தமிழ் - தாள் -1 | SEMESTER – I |
|---|---|---|

**Total Credits: 3**

**Hours per week: 5**

**குறிக்கோள்:**

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு, கலை மற்றும் மரபு ஆகியவற்றை அறிந்து மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

**பயனடைவுக்கல்வியின் விளைவாக ஏற்படும் பயன்பாடுகள்:**

| பாடத்திட்டப் பகுப்பு முறை | பாடத்திட்டத்தின் குறிக்கோள் | அறிவுத்திறன் வெளிப்படும் அளவு முறை |
|---|---|---|
| $CO_1$ | வாழ்க்கைத் திறன்கள் (Life Skills) - மாணவனின் செயலாக்கத்திறனைத் தாய்மொழி வாயிலாக ஊக்குவித்தல் | $K_1$, $K_2$, $K_3$ |
| $CO_2$ | மதிப்புக்கல்வி (Attitude and Value educations) | $K_2$, $K_4$ |
| $CO_3$ | பாட இணைச்செயல்பாடுகள் (Co-curricular activities) | $K_2$, $K_3$, $K_4$ |
| $CO_4$ | சூழலியல் ஆக்கம் (Ecology) | $K_4$ |
| $CO_5$ | மொழி அறிவு (Tamil knowledge) | $K_5$, $K_6$ |

$K_1$-**Remembering,** $K_2$-**Understanding,** $K_3$-**Applying,** $K_4$-**Analysing,** $K_5$-**Evaluating,** $K_6$-**Creating**

## Mapping with Programme outcomes

| COs /POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | M |
| **CO2** | S | M | M | M | M |
| **CO3** | S | M | M | M | M |
| **CO4** | S | M | M | M | M |
| **CO5** | S | M | M | M | M |

S – Strong, M – Medium, L - Low

| 17UTL11T | தமிழ் - தாள் -1 | SEMESTER - I |
|---|---|---|

**Total Credits: 3**
**Hours per week: 5**

கவிதை – சிறுகதை – இலக்கிய வரலாறு – இலக்கணம்

அலகு 1-கவிதைகள் - நாட்டுப்பற்று

பாரததேசம் .1– பாரதியார்

.2புத்தகசாலை,புதிய உலகு செய்வோம்– பாரதிதாசன்

.3ஒற்றுமையே உயிர்நிலை – கவிமணி

.4அவனும் அவளும் நாமக்கல் கவிஞர் –

அலகு – சமூகமும் 2, இயற்கையும்

.1ஒப்பில்லாத சமுதாயம்அப்துல் – ரகுமான்

.2காகிதப்பூக்கள் காமராசன்.நா -

.3கரிக்கிறது தாய்ப்பால்- ஆரூர் தமிழ்நாடன்

.4மரங்கள்– மு மேத்தா.

.5ஹைகூ கவிதைகள் 10)கவிதைகள்(

அலகு – பெண்ணியம் 3

1. தற்காத்தல் – பொன்மணி வைரமுத்து
2. மாங்கல்ய மரமும் தொட்டில் மரமும் – ஆண்டாள் பிரியாதர்சினி
3. அம்மா – செல்வநாயகி
4. நீரில் அலையும் முகம் வெண்ணிலா.அ -

அலகு 4 -சிறுகதைகள்

1. பொன்னகரம் புதுமைப்பித்தன் –
2. விடியுமா? – கு.ரா.ப.
3. குருபீடம் – ஜெயகாந்தன்
4. காய்ச்சமரம் ராஜநாராயணன்.கி –
5. புதியபாலம் – நா பார்த்தசாரதி .
6. பூ –.....மேலாண்மை பொன்னுசாமி
7. வேட்கை- சூர்யகாந்தன்

அலகு 5 -இலக்கிய வரலாறு , இலக்கணம்

.1தமிழ்க் கவிதையின் தோற்றமும் வளர்ச்சியும் மரபு),புதுக்கவிதைகள்(

.2தமிழ்ச் சிறுகதையின் தோற்றமும் வளர்ச்சியும்

.3வல்லினம் மிகும், மிகா இடங்கள்

.4ர,ற ; ல, ழ, ள ; ண, ந,ன, வேறுபாடு

பார்வை நூல்கள் :

.1செய்யுள் திரட்டு – தமிழ்த்துறை வெளியீடு

.2இலக்கிய வரலாறு க்யமேரிபேராசிரியர் முனைவர் பா -

| 17UHL11H | HINDI-I | SEMESTER - I |
|---|---|---|

**Total Credits: 3**

**Hours Per Week: 5**

**Preamble:**

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the fundamentals of novels and stories | **K1** |
| **CO2** | Understand the principles of translation work | **K2** |
| **CO3** | Apply the knowledge writing critical views on fiction | **K3** |
| **CO4** | Build creative ability | **K3** |
| **CO5** | Expose the power of creative reading | **K2** |

**K1-Remembering, K2- Understanding, K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | **S** | **M** | **M** | **M** | **S** |
| **CO2** | **S** | **M** | **M** | **M** | **S** |
| **CO3** | **S** | **M** | **S** | **M** | **S** |
| **CO4** | **S** | **M** | **S** | **M** | **S** |
| **CO5** | **S** | **M** | **S** | **M** | **S** |

S – Strong, M – Medium, L – Low

| 17UHL11H | HINDI-I | SEMESTER - I |
|---|---|---|

**Total Credits: 3**

**Hours Per Week: 5**

## CONTENTS

**UNIT – I**

गद्य – नूतन गद्य संग्रह (जय प्रकाश)

पाठ 1- रजिया

पाठ 2- मक्रील

पाठ 3- बहता पानी निर्मला

पाठ 4- राष्ट्रपिता महात्मा गाँधी

प्रकाशक: सुमित्र प्रकाशन

204 लीला अपार्टमेंट्स, 15 हेस्टिंग्स रोड'

अशोक नगर इलाहाबाद-211001

**UNIT – II**

कहानी कुंज- डॉ वी.पी. 'अमिताभ'(पाठ 1-4)

प्रकाशक: गोविन्द प्रकाशन

सदर बाजार, मथुरा

उत्तर प्रदेश-281001

**UNIT – III**

व्याकरण : शब्द विचार ( संज्ञा, सवनाम, कारक, विशेशण)

पुस्तक: व्याकरण प्रदीप - रामदेव

प्रकाशक: हिन्दी भवन 36

टेगोर नगर

इलाहाबाद-211024

**UNIT - IV**

अनुवाद अभ्यास-III (केवल अंग्रेजी से हिन्दी म)

(पाठ 1 to 10)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

| 17UML11M | MALAYALAM-I | SEMESTER-I |
|---|---|---|

**Total Credits: 3**
**Hours per week: 5**

**Preamble:**

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the fundamentals of novels and stories | **K1** |
| **CO2** | Understand the principles of translation work | **K2** |
| **CO3** | Apply the knowledge writing critical views on fiction | **K3** |
| **CO4** | Build creative ability | **K3** |
| **CO5** | Expose the power of creative reading | **K2** |

**K1-Remembering, K2- Understanding, K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | S | M | S |
| **CO4** | S | M | S | M | S |
| **CO5** | S | M | S | M | S |

S – Strong, M – Medium, L – Low

| 17UML11M | MALAYALAM-I | SEMESTER-I |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 5**

## CONTENTS
## Paper I Prose, Composition & Translation

This paper will have the following five units:

1. **UNIT I &II** - Novel
2. **UNIT III & IV** - Short story
3. **UNIT V** **-** Composition & Translation

**TEXT BOOKS:**

1. Unit I &II -Naalukettu – M.T. Vasudevan Nair (D.C. Books, Kottayam, Kerala)

2. Unit III & IV - Manikkianum Mattu Prathana Kathakalum – Lalithampika Antharjanam (D.C.Books, Kottayam, Kerala)

3. Unit V- Expansion of ideas, General Essay and Translation of a simple passage from English about **100** words) to Malayalam

**REFERENCE BOOKS:**

1. Kavitha Sahithya Charitram –Dr. M.Leelavathi (Kerala Sahithya Academy, Trichur)
2. Malayala Novel sahithya Charitram –K.M.Tharakan(N.B.S. Kottayam)
3. Malayala Nataka Sahithya Charitram-G.Sankarapillai(D.C.Books, Kottayam)
4. Cherukatha Innale Innu –M.Achuyuthan(D.C. Books, Kottayam)
5. Sahithya Charitram Prasthanangalilude-Dr. K.M. George,(Chief Editor) (D.C. Books, Kottayam)

| 17UFL11F | FRENCH- I | SEMESTER- I |
|---|---|---|

**Total Credit: 3**
**Hours per week: 5**

**Preamble**

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France
- To help the students to acquire Competency in translating simple French sentences into English and vice versa

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the Basic verbs, numbers and accents | **K1** |
| **CO2** | To learn the adjectives and the classroom environment in France | **K2** |
| **CO3** | Learn the Plural, Articles and the Hobbies | **K3** |
| **CO4** | To learn the Cultural Activity in France | **K3** |
| **CO5** | To learn the Sentiments, life style of the French people and the usage of the conditional tense | **K2** |

**K1-Remembering, K2- Understanding, K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | S | M | S |
| **CO4** | S | M | S | M | S |
| **CO5** | S | M | S | M | S |

S – Strong, M – Medium, L - Low

| 17UFL11F | FRENCH- I | SEMESTER- I |
|---|---|---|

**Total Credit: 3**

**Hours per week: 5**

| Compétence Culturelle | Compétence De communication | Compétence grammaticale |
|---|---|---|
| **UNITÉ 1 – Ici, en France** | | |
| • Moi et les Autres<br>• La France Express | • INTERACTION:<br>s'identifier<br>• RÉCEPTION ECRITE:<br>Comprendre une annonce d'aeroport<br>• RÉCEPTION ORALE:<br>comprendre l'ecrit de la rue (Panneaux, plaques, rues...)<br>• PRODUCTION ÉCRITE**:**<br>écrire un SMS | • Le présent des verbes:<br>Je suis, je reste,J'arrive<br>• Le lieu:<br>(je suis) à…<br>(je suis) ici<br>• L'infinitif |
| **UNITÉ 2 – Ici, en classe** | | |
| • Moi et le francais<br>• Le francais dane le monde | • INTERACTION:<br>Se présenter<br>• RÉCEPTION ORALE:<br>Comprendre des consignes Orales<br>• RÉCEPTION ÉCRITE:<br>Comprendre une fiche D''inscription<br>• PRODUCTION ÉCRITE:<br>écrire un texte à 'impératif | • Tu/vous<br>• Le present des<br>Verbes en-er et de être:je, tu,vous<br>• La forme<br>Impérative (tu ,vous)<br>Des verbes en-er |
| **UNITÉ 3 – Samedi** | | |
| • Le fil du temps | • INTERACTION:<br>S'informer<br>• RÉCEPTION ORALE:<br>Comprendre une annonce<br>• RÉCEPTION ÉCRITE:<br>Comprendre un article (titres et illustrations)<br>• PRODUCTION ÉCRITE:<br>écrire des slogans | • Les articles<br>Défines:le,la,les<br>• A,de+le,la,les:<br>Au,aux,du,des,à l', de l'<br>• Être(présent)I'heure<br>• Ll faut+nom<br>Ll faut+infinitive<br>• Pharses<br>verbe+complément,<br>Complément+verbe |

| | | |
|---|---|---|
| **UNITÉ 4 – Dimanche** | | |
| • Les activités Culturelles des Français | • INTERACTION: Acheter,demander des Informations<br>• RECEPTION ORALE: Comprendre les Titres du journal à la radio<br>• RÉCEPTION ÉCRITE: Comprendre les Informations<br>• PRODUCTION ÉCRITE: Inventer des noms de journaux | • Faire, present<br>• Avior, present<br>• Ll y a<br>• Le présent des verbes en-er: Regarder<br>• Combien?<br>• Quand?<br>• Complément de nom: Tremblement de terre, les noms de pays….<br>• Du,des,de la(reprise U2)<br>• Les adjectifs possessifs: Mon,ta,son, Ma,ta,sa Mes,tes,ses |
| **UNITÉ 5 – Dommage!** | | |
| • Un baby-boom en 2000 et 2001<br>• L'amour, toujours | • INTERACTION: exprimer la tristesse, la peur, conseiller,encourager<br>• RÉCEPTION ORALE: Comprendre une émission De radio<br>• RÉCEPTION ÉCRITE: Comprendre un sondage<br>• PRODUCTION ÉCRITE: écrire des blogs | • Est-ce que<br>• Le present des verbes pouvoir,Vouloir<br>• Le conditionnel des Verbs pouvoir, Vouloir<br>• Ne…pas |

**TEXT BOOK:**

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors I.** Goyal Publishers Pvt Ltd 86,University Block Jawahar Nagar (Kamla Nagar),New Delhi – 110007

| 18UEG12G | English –I | SEMESTER – I |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 5**

**PREAMBLE:**

To learn and teach English in a more relevant way through ecological issues and focus on environmental issues, a current problem that affects all lives.

On successful completion of the course, students will be able to

**COURSE OUTCOME**

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Identify the impact of nature on human lives | **K 3** |
| **CO2** | Experiment with ecofriendly ambience through technical advancements | **K 3** |
| **CO3** | Analyze and expose contemporary ecological issues | **K 4** |
| **CO4** | Analyze the situational conversations created based on ecological factors | **K 4** |
| **CO5** | Improve grammar and related reading of ecological issues | **K 6** |

**MAPPING WITH PROGRAMME OUTCOME**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | M | M | S | S | S |
| **CO2** | S | S | S | S | S |
| **CO3** | S | S | S | S | S |
| **CO4** | S | S | S | S | S |
| **CO5** | S | S | S | M | M |

S – Strong, M – Medium, L - Low

| 18UEG12G | English –I | SEMESTER – I |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 5**

## CONTENTS

**UNIT I – POETRY**

To Nature – S. T. Coleridge

Sonnet 18 - Shall I Compare Thee To a Summer day? – W. Shakespeare

Stopping by Woods on a Snowy Evening – Robert Frost

**UNIT II –PROSE**

The Discovery of Radium – Eve Curie

The Bihar Earthquake – Jawaharlal Nehru

The Amazon Ants – F.W. Up de Graff

**UNIT III – SHORT STORY**

The Sound Machine – Roald Dahl

The Lamp at Noon - Sinclair Ross

The Last Leaf – O. Henry

**UNIT IV – ONE ACT PLAY**

Moonshine – Arthur Hopkins

**UNIT V – FUNCTIONAL GRAMMAR AND COMPOSITION**

Sentences

Verbs – tenses and Voice

Concord

Letter Writing

Dialogue Writing

**TEXT BOOK:**

1. **Eco English**

**REFERENCE BOOKS**:

1. Shakespeare, William. *Shakespeare's Sonnets*. Ed. Stephen Booth. New Haven: Yale University Press, 1977. Print.
2. Krishnaswamy. N., Modern *English: A Book of Grammar Usage and Composition*. Chennai: Macmillan, 1975. Print.
3. Collocott. T.C., *New Radiant Readers* Book X. Chennai: Allied Pvt. Ltd, 2015. Print.
4. Dohl, Roald. *The Sound Machine*. UK: Penguin, 2012. Print.
5. Hopkins, Arthur. Moonshine. Los Angles: Hard press, 2012. Print.

| 17UPY13A | CORE- I:MECHANICS, PROPERTIES OF MATTER AND ACOUSTICS | SEMESTER I |
|---|---|---|

**Total Credits: 5**
**Hours/Week : 6**

## PREAMBLE

To enable students to learn and apply the basic principles, theory and concepts of Mechanics, Matter and Sound.

## COURSE OUTCOMES

On the successful completion of the course, students will able to demonstrate

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Basic understanding of phenomena like Work, Energy, its types and conservation laws. | K2 |
| CO2 | Application of Simple Harmonic theories through experiments in laboratories. | K3 |
| CO3 | Understanding of Gravitation and Elasticity concepts and their applications in real time examples. | K2 |
| CO4 | Comparing and understanding Viscosity and its methods. | K2 |
| CO5 | Interpreting different modes of vibrations and acoustical applications. | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | S | M | S |
| **CO2** | M | S | S | M | S |
| **CO3** | S | S | S | M | M |
| **CO4** | S | S | S | S | S |
| **CO5** | M | S | S | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY13A | CORE- I:MECHANICS, PROPERTIES OF MATTER AND ACOUSTICS | SEMESTER I |
|---|---|---|

**Total Credits: 5**

**Hours/Week : 6**

## CONTENTS

**UNIT - I**

**Kinetic Energy and Work**: Work – Kinetic energy - Work – Kinetic energy Theorem – Work done by the gravitational force – work done by the spring force – work done by an applied force – Power

**Potential Energy and Conservation of Energy:** Work and Potential energy – Conservative and Non-conservative forces – Conservation of mechanical energy – Work done on a system by an external force - Conservation of energy.

**UNIT - II**

**Moment of Inertia:** Definition – Angular Momentum of system of particles - Conservation of angular momentum – Torque - Parallel and perpendicular axes theorem – M.I. of rectangular Lamina and triangular lamina – M. I of a solid sphere.

**Simple Harmonic Motion**: Simple harmonic oscillator – Potential energy and kinetic energy and their average values – Simple pendulum – Compound pendulum: graph between time period and distance from centre of gravity-Condition for minimum time period – Torsional pendulum.

**UNIT - III**

**Gravitation:** Kepler's Law of Planetary motion – Newton's Law of gravitation – Boy's method for determining G – Gravitational potential – Gravitational field at a point due to spherical shell – Variation of 'g' with

latitude, altitude and depth – Determination of g with compound pendulum.

**Elasticity:** Elastic modules – Poisson's ratio – relation between them – Expression for bending moment – Cantilever-determination of Young's modulus by non-uniform bending- Koenig's Method - I section girders.

**UNIT - IV**

**Surface Tension:** Surface Tension –Surface Energy-Excess of Pressure over a curved surface – Angle of Contact-Variation of surface tension with temperature – Jaeger's Experiment.

**Viscosity:** Viscosity – Ostwald's Viscometer - Poiseuille's formula for the flow of a liquid through a capillary tube - Stoke's Formula and Expression – Stoke's method for viscosity - Rotation viscometer- Viscosity of gases – Meyer's Modification of Poiseuille's formula-Rankine's method.

**UNIT - V**

**Theory of vibrations:** Simple Harmonic vibration – Progressive waves – properties – Composition of two S.H.M. and beats – stationary waves – Properties- Melde's Experiment – Transverse and longitudinal modes – Frequency measurement using Sonometer.

**Acoustics:** Acoustics of buildings: Requisites of good acoustics – Sabine's reverberation formula. Ultrasonics-Production of ultrasonic waves: Magnetostriction method - Piezo electric method – Properties and application.

**TEXT BOOKS:**

1. *Murugesan R.* 2002. **Mechanics, Properties of matter and Sound.** *S.Chand and Co, New Delhi*
2. *Brij Lal and Subrahmanyam N.* 2003. **Properties of Matter**, *S.Chand and Co, New Delhi*
3. *Brij Lal and Subrahmanyam N.* 2008. **A Text Book of Sound.** *[2nd Edition], Vikas Publishing House, New Delhi*

**REFERENCE BOOKS:**

1. *Robert Resnick, David Halliday and Kenneth S.Krane.* 2001. **Physics.** *[10th Edition] Wiley India, New Delhi*
2. *Sears Semansky and Ground.* 2011. **University Physics.** *[13th Edition] Addison-Wesley, Boston*
3. *Ghosh M.* 1984. **A Text books of Sound.** *Chand and Co, New Delhi*
4. *Mathur D.S.* 2008. **Elements of Properties of Matter.** *S. Chand and Co, New Delhi*
5. *Mathur D.S.* 2006. **Mechanics.** *S. Chand and Co, New Delhi*

| 18UPY13P | CORE PRACTICAL – I: GENERAL EXPERIMENTS | SEMESTER-I |
|---|---|---|

**Total Credits:2**
**Hours/Week:4**

**LIST OF EXPERIMENTS:**

**Any 6 Experiments**

1. Young's Modulus-Non-uniform Bending (Microscopic Method)
2. Compound Pendulum – Determination of 'g' and 'K'
3. Rigidity Modulus – Static Torsion
4. Spectrometer – Refractive Index of a glass Prism
5. Viscosity – Poiseuille's Method
6. Specific Heat capacity of a Liquid – Newton's method of cooling
7. Sonometer – AC Frequency of a tuning fork
8. Post office box- Determination of Temperature Coefficient of Resistance

| 17UMT1AB | ALLIED I-MATHEMATICS – I | SEMESTER - I |
|---|---|---|

**TotalCredits:4**

**Hours /Week: 7**

**PREAMBLE**

On completion of this course the students should gain knowledge about solving equations, solving first and second order differential equations using Laplace transforms.

To know about the concept of Fourier series which will be useful in their field of study.

**COURSE OUTCOMES**

**In the successful completion of the course, student will be able to**

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO 1 | Learn about Polynomial Equations. | K1 |
| CO 2 | Learn the concept & Manipulation of Matrices | K1 |
| CO 3 | Apply trigonometric functions to solve problems. | K2 |
| CO 4 | Learn about standard form of Laplace Transforms | K2 |
| CO 5 | Application of Laplace Transform in solving Differential Equations | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | S | M | S |
| **CO2** | M | S | S | M | S |
| **CO3** | S | S | S | M | M |
| **CO4** | S | S | S | S | S |
| **CO5** | M | S | S | M | S |

**S- Strong; M-Medium ;L-Low**

| 17UMT1AB | ALLIED I-MATHEMATICS – I | SEMESTER - I |
|---|---|---|

**TotalCredits:4**

**Hours /Week: 7**

## CONTENTS

**UNIT - I**

**Theory of Equations:** Polynomial Equations with real coefficients : Imaginary and irrational roots - Transformation of equation by Diminishing or increasing its roots by a constant-Reciprocal Equation.

**UNIT - II**

**Matrices:** Eigen Values and eigen vectors, Cayley-Hamilton theorem (without proof) - Verification and computation of inverse.

**UNIT - III**

**Trigonometry:** Expansion of cos nθ and sin nθ interms of powers of cosine and sine-Expansions of $\cos^n\theta$, $\sin^n\theta$ in powers of sine and cosine - hyperbolic functions.

**UNIT - IV**

**Laplace Transforms:** Definition-Standard forms of Laplace Transform - Linearity transformation- shift theorem-Transform of tf(t),f(t)/t .

**UNIT - V**

**Inverse Laplace transforms:** Inverse of standard functions -Application to solution of differential equations – Solving of simultaneous differential equation.

**TEXT BOOK:**

1. *Abdul Rasheed ,A.* **Allied Mathematics.** 2006.*Tata McGraw-Hill Education (P) Ltd, Chennai.*

**REFERENCE BOOKS:**

1. *Manichavasagam Pillai, T.K and Narayanan,S.* 2002. **Trigonometry.** *Viswanathan Publishers and Printers Pvt.Ltd.*

2. *Narayan,S and Manicavachagam Pillai,T.K.* 2002. **Ancillary Mathematics.** *Viswanathan Publishers and Printers Pvt.Ltd.*

| 17UFC1FA | PART-IV: VALUE EDUCATION-ENVIRONMENTAL STUDIES | SEMESTER - I |
|---|---|---|

**Total Credits: 2**

**Hours per week: 2**

## CONTENTS

### UNIT- I

**The Multi Disciplinary Nature of Environmental Studies:** Definition, scope and importance-Need for public awareness-Natural resources-Natural resources and associated problems-Role of an individual in conservation of natural resources-Equitable use of resources for sustainable lifestyle.

### UNIT- II

**Eco System:** Concept of an eco system-structure and function of eco system-Producers, consumers and decomposers-Energy flow in the eco system-Ecological succession-Food chain, food webs and ecological pyramids-Forest ecosystem-Grassland eco system-Desert eco system-Aquatic eco system.

### UNIT- III

**Bio Diversity and its Conservation Introduction Definition: Genetic, Species and Eco System Diversity-Bio Geographical Classification Of India:** Value of bio diversity: conceptive use, productive use, social, ethical and option values-bio diversity at global, national and local levels-India as a mega diversity nation, hot spots-threats: habitat loss, poaching of wild life-man wild life conflicts-endangered and endemic species of India, conservation of bio diversity.

**UNIT- IV**

**Environmental Pollution:** Definition-causes, effects and control measures of air, water, soil, noise, thermal pollution-soil waste management: causes, effects and control measures of urban and industrial wastes-prevention of pollution-pollution case studies-disaster management: floods, earthquake, cyclone and landslide.

**UNIT- V**

**Social Issues and the Environment:** Sustainable development-urban problems related to energy-water conservation, rain water harvesting, watershed management-resettlement and rehabilitation of people ;its problems and concerns-environmental ethics: issues and possible solutions-climate change, global warming, ozone layer, depletion, acid rain, nuclear accidents and holo caust-consumerism and waste products-environmental protection act-air, water act-wild life protection act-forest conservation act-issues involved in enforcement of environmental legislation-public awareness-human population and the environment.

**TEXT BOOK:**

1. *Kumaraswamy. K, A. Alagappa Moses and M. Vasanthy. 2001,* **Environmental Studies.** Thanjavur- National Offset Printers.

| 17UTL21T | தமிழ் - தாள் - 2 | SEMESTER – II |
|---|---|---|

**Total Credits: 3**

**Hours per week: 5**

**குறிக்கோள்:**

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு, கலை மற்றும் மரபு ஆகியவற்றை அறிந்து மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

**பயனடைவுக்கல்வியின் விளைவாக ஏற்படும் பயன்பாடுகள்:**

| பாடத்திட்டப் பகுப்பு முறை | பாடத்திட்டத்தின் குறிக்கோள் | அறிவுத்திறன் வெளிப்படும் அளவு முறை |
|---|---|---|
| $CO_1$ | வாழ்க்கைத் திறன்கள் (Life Skills) - மாணவனின் செயலாக்கத்திறனைத் தாய்மொழி வாயிலாக ஊக்குவித்தல் | $K_1$, $K_2$, $K_3$ |
| $CO_2$ | மதிப்புக்கல்வி (Attitude and Value educations) | $K_2$, $K_4$ |
| $CO_3$ | பாட இணைச்செயல்பாடுகள் (Co-curricular activities) | $K_2$, $K_3$, $K_4$ |
| $CO_4$ | சூழலியல் ஆக்கம் (Ecology) | $K_4$ |
| $CO_5$ | மொழி அறிவு (Tamil knowledge) | $K_5$, $K_6$ |

$K_1$-**Remembering,** $K_2$-**Understanding,** $K_3$-**Applying,** $K_4$-**Analysing,** $K_5$-**Evaluating,** $K_6$-**Creating**

## Mapping with Programme outcomes

| COs /POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | M |
| **CO2** | S | M | M | M | M |
| **CO3** | S | M | M | M | M |
| **CO4** | S | M | M | M | M |
| **CO5** | S | M | M | M | M |

S – Strong, M – Medium, L – Low

| 17UTL21T | தமிழ் - தாள் -2 | SEMESTER – II |
|---|---|---|

**Total Credits: 3**
**Hours per week: 5**

செய்யுள் – உரைநடை – இலக்கிய வரலாறும் இலக்கணமும்

அலகு – 1

.1திருக்குறள் (83 எண்.அ) கூடா நட்பு .அ -
ஆ (93 எண்.அ) கள்ளுண்ணாமை.

இ (110 எண்.அ) குறிப்பறிதல் .

ஈ (113 எண்.அ) காதல் சிறப்புரைத்தல் .

.2மூதுரை 10) ஔவையார்–பாடல்கள்6 -,7,9,10,14,16,17,23,26,30(

அலகு – 2

.1புரட்சிக்கவி பாரதிதாசன் –

அலகு – உரைநடை 3

1. சங்க நெறிகள் மாணிக்கம்.சுப.வ -
2. கர்ணனும் கும்பகர்ணனும் சேதுப்பிள.பி.ரா -ை
3. அறிவியலும் கலையும்வரதராசன்.மு -

அலகு – உரைநடை 4

1. வாழ்வியல் இயக்கம் – குன்றக்குடி அடிகளார்
2. பெரியார் உணர்த்தும் சுயமரியாதையும் சமதர்மமும் ஆனைமுத்து.வே -
3. போதைப்பொருள் – அமுதன்

அலகு 5 -இலக்கிய வரலாறும் இலக்கணமும் (பாடத்திட்டம் தழுவியது)

1. பதினெண்கீழ்க்கணக்கு நூல்கள்
2. தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்
3. வழு, வழுவமைதி,வழாநிலை
4. பிறமொழிச் சொற்களைத் தமிழில் மொழிபெயர்த்தல்

பார்வை நூல்கள் :

.1செய்யுள் திரட்டு தமிழ்த்துறை வெளியீடு –

.2இலக்கிய வரலாறு பேராசிரியர் முனைவர் பாக்யமேரி -

| 17UHL21H | HINDI-II | SEMESTER – II |
|---|---|---|

**Total Credits: 3**
**Hours per week: 5**

**Preamble:**

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the fundamentals of novels and stories | **K1** |
| **CO2** | Understand the principles of translation work | **K2** |
| **CO3** | Apply the knowledge writing critical views on fiction | **K3** |
| **CO4** | Build creative ability | **K3** |
| **CO5** | Expose the power of creative reading | **K2** |

**K1-Remembering, K2- Understanding, K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | **S** | **M** | **M** | **M** | **S** |
| **CO2** | **S** | **M** | **M** | **M** | **S** |
| **CO3** | **S** | **M** | **S** | **M** | **S** |
| **CO4** | **S** | **M** | **S** | **M** | **S** |
| **CO5** | **S** | **M** | **S** | **M** | **S** |

S – Strong, M – Medium, L – Low

| 17UHL21H | HINDI-II | SEMESTER – II |
|---|---|---|

**Total Credits: 3**

**Hours Per Week: 5**

## CONTENTS

**UNIT – I**

आधुनिक पद्य – शबरी (श्री नरेश मेहता)

प्रकाशक: लोकभारती प्रकाशन

पहली मंजिल, दरबारी बिल्डिंग,

महात्मा गाँधी मार्ग, इलाहाबाद-211001

**UNIT – II**

उपन्यास: सेवासदन-प्रेमचन्द

प्रकाशक: सुमित्र प्रकाशन

204 लोला अपार्टमेंट्स, 15 हेस्टिंग्स रोड'

अशोक नगर इलाहाबाद-211001

**UNIT – III**

अनुवाद अभ्यास-III (केवल हिन्दी से अंग्रेजी म)

(पाठ 1 to 10)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

**UNIT - IV**

पत्र लेखन: (औपचारिक या अनौपचारिक)

| 17UML21M | MALAYALAM-II | SEMESTER-II |
|---|---|---|

**Total Credits: 3**
**Hours per week: 5**

**Preamble:**

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the fundamentals of novels and stories | **K1** |
| **CO2** | Understand the principles of translation work | **K2** |
| **CO3** | Apply the knowledge writing critical views on fiction | **K3** |
| **CO4** | Build creative ability | **K3** |
| **CO5** | Expose the power of creative reading | **K2** |

**K1-Remembering, K2- Understanding, K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | S | M | S |
| **CO4** | S | M | S | M | S |
| **CO5** | S | M | S | M | S |

S – Strong, M – Medium, L – Low

| 17UML21M | MALAYALAM-II | SEMESTER- II |
|---|---|---|

**Total Credit: 3**

**Hours per week: 5**

**PAPER II PROSE: NON-FICTION**

This Paper will have the following five units:

**UNIT I & II**

Biography

**UNIT III, IV & V**

Travelogue

**TEXT BOOKS:**

1. Unit III, IV & V Kappirikalude Nattil – *S.K. Pottakkadu* (D.C. Books, Kottayam)
2. Kannerum Kinavum – *V.T. Bhatathirippadu* Autobiography (D.C. Books, Kottayam)

**REFERENCE BOOKS:**

1. **Jeevacharitrasahithyam –** *Dr. K.M. George*(N.B.S. Kottayam)
2. **Jeevacharitrasahithyam Malayalathil** - *Dr. Naduvattom Gopalakrishnan* (Kerala Bhasha Institute, Trivandrum)
3. **Athmakathasahithyam Malayalathil –** *Dr. Vijayalam Jayakumar* (N.B.S. Kottayam)
4. **Sancharasahithyam Malayalathil** - *Prof. Ramesh Chandran. V*, (Kerala Bhasha Institute, Trivandrum)

| 17UFL21F | FRENCH- II | SEMESTER- II |
|---|---|---|

**Total Credit: 3**
**Hours per week: 5**

**Preamble**

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France
- To help the students to acquire Competency in translating simple French sentences into English and vice versa

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the Basic verbs, numbers and accents | **K1** |
| **CO2** | To learn the adjectives and the classroom environment in France | **K2** |
| **CO3** | Learn the Plural, Articles and the Hobbies | **K3** |
| **CO4** | To learn the Cultural Activity in France | **K3** |
| **CO5** | To learn the Sentiments, life style of the French people and the usage of the conditional tense | **K2** |

**K1-Remembering, K2- Understanding, K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | S | M | S |
| **CO4** | S | M | S | M | S |
| **CO5** | S | M | S | M | S |

S – Strong, M – Medium, L – Low

| 17UFL21F | FRENCH-II | SEMESTER- II |
|---|---|---|

**Total Credit: 3**
**Hours per week: 5**

| Compétence Culturelle | Compétence De communication | Compétence grammaticale |
|---|---|---|
| **UNITÉ 1 – Super!** | | |
| • L'égalité homme/femme | • INTERACTION: Exprimer des sentiments, exprimer la joie, le plaisir, le bonheur<br>• RÉCEPTION ORALE: Comprendre un jeu radiophonique<br>• RÉCEPTION ÉCRITE: Comprendre des announces<br>• PRODUCTION ÉCRITE: Écrire des cartes postales | • Les noms de professions masculine/feminine<br>• Le verb finir et less Verbes du groupe en-ir<br>• Le present de l'impératif<br>• Savoir(present)<br>• Le participle passé: Fini, aimé, arrive, dit,écrit<br>• Quel(s), quelle(s)..: Interrogatifet Exclamatif<br>• À + infinitive<br>• Les articles: n,une,des |
| **UNITÉ 2 – Quoi?** | | |
| • Le 20 siécle: Petits progrés Grand progrés | • INTERACTION: Decrire quelque chose, une personne<br>• RECEPTION ORALE: Comprendre un message publicitaire<br>• RÉCEPTION ÉCRITE: Comprendre un dépliant touristique<br>• PRODUCTION ÉCRITE: Écrire des petites announces | • On<br>• Plus, moins<br>• Le verbe aller:<br>• Present, impératif<br>• Aller + infinitife<br>• Le pluriel en –x |
| **UNITÉ 3 – Et après** | | |
| • Nouvelles du jour | • INTERACTION: Raconteur,situer un récit dans le temps<br>• RÉCEPTION ORALE: Comprendre une description | • L'imparfait:: quel-Ques forms pour introduire le récit:Il faisait, il y avait, il Était<br>• Un peu, beaucoup, |

| | | |
|---|---|---|
| | • RÉCEPTION ÉCRITE: Comprendre un test<br>• PRODUCTION ÉCRITE: écrire des cartes postales | trop,Assez<br>• Trés<br>• Le verbe venir: Présent, impératif<br>• En Suisse, au Maroc, aux Etats-Unis |
| **UNITÉ 4– Mais oui!** | | |
| • La génération des 20-30 ans | • INTERACTION: Donner son opinion, Expliquer pourquoi<br>• RÉCEPTION ORALE: Comprendre des informations à la radio<br>• RÉCEPTION ÉCRITE: Comprendre un texte informatif<br>• PRODUCTION ÉCRITE: éncrire un mél de protestation | • Répondre, prendre: Présent, impératif, part Passé<br>• Parce que pourquoi<br>• Tout/tous, toute/s Tous/toutes les… (répétition action) |
| **UNITÉ 5– Mais non!** | | |
| • De la ville à la campagne | • INTERACTION: Débat:: exprimer l'accord, exprimer le Désaccord<br>• RECEPTION ORALE: Comprendre un message sur un répondeur téléphonique<br>• RÉCEPTION ÉCRITE: Comprendre un témoignage<br>• PRODUCTION ECRITE: Rediger des petites Announces immobilieres | • Le verbe devoir: Present et participe passé<br>• Le verbe vivre, present<br>• Aller + infinitive<br>• Venir+ infinitive<br>• Etre pour/contre |

**TEXT BOOK**:

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors I.** Goyal Publishers Pvt Ltd 86, University Block Jawahar Nagar (Kamla Nagar) New Delhi – 110007

| 18UEG22G | English – II | SEMESTER – II |
|---|---|---|

**Total Credits: 3**
**Hours per week: 5**

**PREAMBLE:**

To learn and teach English in a more relevant way through ecological issues and to focus on environment issues, a current problem that affect all lives.

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Take part in improving the eco system through eco literature | **K 4** |
| **CO2** | Apply conventional and new methods of learning speech and vocabulary | **K 3** |
| **CO3** | Analyze contemporary situation through current ecological issues | **K 4** |
| **CO4** | Interpret the situational Conversations created based on ecological factors | **K 2** |
| **CO5** | Develop spelling, punctuation, Grammar and related reading | **K 3** |

**MAPPING WITH PROGRAMME OUTCOME**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | M | S | S | S | M |
| **CO2** | S | S | S | S | S |
| **CO3** | S | S | S | S | S |
| **CO4** | S | S | S | S | S |
| **CO5** | M | S | S | S | M |

**S – Strong, M – Medium, L – Low**

| 18UEG22G | English – II | SEMESTER – II |
|---|---|---|

**Total Credits: 3**
**Hours per week: 5**

## CONTENTS

### UNIT I – POETRY

Nature The Gentlest Mother is – Emily Dickinson

To Autumn – John Keats

The Boat – Rabindranath Tagore

### UNIT II –PROSE

Literature and Science – John Middleton Murry

Ecology – Barry Commoner

Town by the Sea – Amitav Ghosh

### UNIT III – SHORT STORY

How the Camel Got His Hump – Rudyard Kipling

A Day in the Country – Anton Chekhov

The tale of Peter Rabbit – Beatrix Potter

### UNIT IV – ONE ACT PLAY

Riders to the sea – J. M. Synge

### UNIT V – FUNCTIONAL GRAMMAR AND COMPOSITION

Relative Pronoun

Degrees of Comparison

Reported speech

Correction of Sentences

Picture Composition

**TEXT BOOK:**

1. Eco English

**REFERENCE BOOKS:**

1. Synge J.M., *Riders to the Sea*. Delhi: Unique, 2014. Print.
2. Ross, Sinclair. *The Lamp at Noon*, Toronto: Mc Cleland and Stewart, 1968. Print.
3. Ghosh, Amitav. *The Town by the Sea*. India: Penguin, 2017. Print.
4. Faulkner, Julia. *Twelve Poems of Emily Dickinson*. Melbourne: Boston, 1820. Print.
5. Krishnaswamy. N., Modern *English: A Book of Grammar Usage and Composition*. Chennai: Macmillan, 1975. Print.

| 17UPY23A | CORE- II:<br>HEAT AND THERMODYNAMICS | SEMESTER<br>II |
|---|---|---|

**Total Credits: 5**
**Hours/Week: 6**

**PREAMBLE**

To enable students to learn and apply the basic principles, theory and concepts of Heat and Thermodynamics.

**COURSE OUTCOMES**

On the successful completion of the course, students will able to demonstrate

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Understand the phenomena of Thermometry and Calorimetry. | K2 |
| **CO2** | Study the applications of Heat transfer mechanisms in laboratories | K3 |
| **CO3** | Understand Kinetic theory of gases, its concepts and their applications. | K2 |
| **CO4** | Compare and understand Thermodynamic and Statistical Thermodynamic principles. | K2 |
| **CO5** | Interpret Third Law of Thermodynamics and concepts of Entropy. | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | S | M | S |
| **CO2** | M | S | S | M | S |
| **CO3** | S | S | S | M | M |
| **CO4** | S | S | S | S | S |
| **CO5** | M | S | S | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY23A | CORE- II:<br>HEAT AND THERMODYNAMICS | SEMESTER II |
|---|---|---|

**Total Credits: 5**

**Hours/Week: 6**

## CONTENTS

**UNIT - I**

**Thermometry:** Gas Equation - Temperature Coefficient of Resistance -- Platinum Resistance Thermometer – Thermocouple – Thomson Effect – Thomson Coefficient – Thermo Electric Thermometer – Helium Vapour Pressure Thermometer.

**Calorimetry:** Definitions – Newton's law of cooling – Specific heat of a liquid-Joule's Electrical method- Calendar and Barnes' continuous flow method – Two specific heats of a gas – Specific heat of a gas by Joly's differential steam calorimeter – Regnault's method – Dulong and Petit's law – Variation of specific heat and atomic heat with temperature.

**UNIT - II**

**Transmission of heat:** Conduction, Convection and Radiation**--** Conduction – Co-efficient of the thermal conductivity – Cylindrical flow of heat – determination of thermal conductivity of rubber and glass – Lee's disc method. Radiation – Black body radiation – Wein's Law - Rayleigh – Jean's Law – Stefan's law – Experimental Determination of Stefan's constant – Mathematical derivation of Stefan's law

**UNIT - III**

**Kinetic theory of gases:** Postulates **--** Mean free path – Degrees of freedom – Maxwell's Law of Equipartition of energy – Distribution of Velocity -- Transport phenomena – Viscosity and thermal conduction of gases – Van der waals equation – Low Temperature physics - Temperature of Inversion – Liquefaction of Gases – Liquefaction of air by Linde's Process.

**UNIT - IV**

**Thermodynamics:** First law of Thermodynamics – Isothermal and Adiabatic process –Determination of γ by Clement and Desorme's method – Second law of thermodynamics – Carnot's engine- Working efficiency – Carnot's refrigerator – Carnot's Theorem – Otto Cycle –Petrol and Diesel engines. **Statistical Thermodynamics:** Ensembles – Types – Microcanonical Ensemble – Canonical Ensemble – Grand Canonical Ensemble – Comparison of Ensembles.

**UNIT - V**

**Entropy:** Entropy Change Reversible and Irreversible process – Third law of Thermodynamics --Temperature -Entropy diagram – Entropy of a perfect gas – Increase of entropy in any irreversible process – Thermo dynamic variables – Thermodynamic potentials - Maxwell's thermodynamics relations – Claussius and Clapeyron equation from Maxwell's equation.

**TEXT BOOKS:**

1. *Brij Lal and Subrahmanyam N.* 2010. **Heat and Thermodynamics**. *S Chand and Co, New Delhi*

*2. Murugesan R. and Kiruthiga Sivaprasath*. 2002. **Thermal Physics**. *[1st Edition] S Chand and Co, New Delhi*

*3. Brij Lal, Subrahmanyam N. and Hemne P.S.* 2014. **Heat Thermodynamics and Statiatical Physics.** *S Chand and Co, New Delhi*

**REFERENCE BOOKS:**

*1. Zemansky and Dcltanann R.H.* 2012. **Heat and Thermodynamics.** *[8th Edition] McGraw-Hill, New York*

*2. Mathur D.S.* 2002. **Heat and Thermodynamics.** *S Chand and Co, New Delhi*

3. *Agarwal Singhal and Sathyaprakash*. 2009. **Heat and Thermodynamics.** *Pragati Prakashan, Meerut.*

| 18UPY23P | CORE PRACTICAL – II<br>GENERAL EXPERIMENTS | SEMESTER-II |
|---|---|---|

**Total Credits:2**
**Hours/Week:4**

**LIST OF EXPERIMENTS:**

**Any 6 Experiments**

**1.** Meter Bridge- Specific Resistance of a material

2. Spectrometer – Grating- Minimum deviation & Normal Incidence

3. Young's Modulus-Uniform Bending (Microscopic Method)

4. Post office box- Determination of Specific Resistance

5.Torsional Pendulum – Rigidity Modulus

6. Meter Bridge- Temperature Coefficient of resistance

7. Moment of a Magnet – Tan C position

8. Joule's calorimeter-Specific heat capacitance

| 17UMT2AB | ALLIED I- MATHEMATICS – II | SEMESTER - II |
|---|---|---|

**Total Credits: 4**

**Hours/Week: 7**

**PREAMBLE:**

On successful completion of course the students should have series of knowledge about the curvature, Beta, Gamma functions and its application.

To learn the partial differential equation types and integration of vectors.

**COURSE OUTCOMES**

**In the successful completion of the course, student will be able to**

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO 1 | Learn about Double Integrals. | K1 |
| CO 2 | Learn the concept Curvature and Radius of curvature | K1 |
| CO 3 | Solve second order differential equations. | K2 |
| CO 4 | Learn about the method of forming and solving Partial Differential Equations | K2 |
| CO 5 | Understand the application of Vector Calculus | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | S | M | S |
| **CO2** | M | S | S | M | S |
| **CO3** | S | S | S | M | M |
| **CO4** | S | S | S | S | S |
| **CO5** | M | S | S | M | S |

**S- Strong; M-Medium ;L-Low**

| 17UMT2AB | ALLIED I- MATHEMATICS – II | SEMESTER - II |
|---|---|---|

**Total Credits: 4**

**Hours/Week: 7**

## CONTENTS

**UNIT - I**

**Multiple Integrals:** Double Integrals - Evaluation of double integrals - Triple Integral - Applications of double and triple integration.

**UNIT - II**

**Differential Calculus**: Introduction – Curvature and Radius of curvature - Gamma and Beta Function: Gamma function – Beta Function – Relation between Gamma and Beta Function.

**UNIT - III**

**Differential Equations:** Linear differential equations of second order with constant coefficient whose R.H.S is of the form $ve^{mx}$, where v is any function of x - Linear equations with variable coefficients.

**UNIT - IV**

Formation of partial differential equations by elimination of arbitrary constants and functions -Definitions of general, particular and complete solutions - Solving standard forms f(p, q) = 0, f(x,p,q) = 0, f(y,p,q) = 0, f(z, p, q) = 0, f(x,p) = f(y,q) - Lagrange's Differential equations Pp+Qq = R.

**UNIT - V**

**Vector Analysis** Scalar and vector fields -Differentiation of vectors - Gradient, Divergence and Curl -Integration of vectors - Line integral - Surface integral – Volume integral.

**TEXT BOOK:**

1. *Duraipandian, P and Udhyabaskaran, S.* **Allied Mathematics Volume II**, *S.Chand and Company Ltd, New Delhi.*

**REFERENCE BOOK:**

1. *Abdul Rasheed ,A.* **Allied Mathematics**,*Vijay Nicole imprints (P) Ltd,Chennai.*

2. *Narayan,S and Manicavachagam Pillai,T.K.* 2002.**Ancillary Mathematics.** *Viswanathan Publishers and Printers Pvt. Ltd.*

3. *Kandasamy. P and Thilagavathi. K*. 2004. **Allied Mathematics II**. *S.Chand and Company Ltd, New Delhi.*

| 17UFC2FA | PART–IV:VALUE EDUCATION-HUMAN RIGHTS | SEMESTER - II |
|---|---|---|

**Total Credits: 2**
**Hours per week: 2**

**CONTENTS**

**UNIT- I**

**Concept of Human Values, Value Education Towards Personal Development**

Aim of education and value education; Evolution of value oriented education; Concept of Human values; types of values; Components of value education.

**Personal Development**: Self analysis and introspection; sensitization towards gender equality, physically challenged, intellectually challenged. Respect to - age, experience, maturity, family members, neighbours, co-workers.

**Character Formation towards Positive Personality:** Truthfulness, Constructivity, Sacrifice, Sincerity, Self Control, Altruism, Tolerance, Scientific Vision.

**UNIT - II**

**Value Education Towards National and Global Development**

**National and International Values:** Constitutional or national values - Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity.

Social Values - Pity and probity, self control, universal brotherhood.

Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith.

Religious Values - Tolerance, wisdom, character.

Aesthetic values - Love and appreciation of literature and fine arts and respect for the same.

National Integration and international understanding.

**UNIT - III**

**Impact of Global Development on Ethics and Values:** Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise.

**Modern Challenges of Adolescent Emotions and behave or; Sex and spirituality:** Comparison and competition; positive and negative thoughts.

Adolescent Emotions, arrogance, anger, sexual instability, selfishness, defiance.

**UNIT – IV**

**Therapeutic Measures**

Control of the mind through

a. Simplified physical exercise
b. Meditation – Objectives, types, effect on body, mind and soul
c. Yoga – Objectives, Types, Asanas
d. Activities:
   (i) Moralisation of Desires
   (ii) Neutralisation of Anger
   (iii) Eradication of Worries
   (iv) Benefits of Blessings

**UNIT- V**

**Human Rights**

1. Concept of Human Rights – Indian and International Perspectives
   a. Evolution of Human Rights

b. Definitions under Indian and International documents

2. Broad classification of Human Rights and Relevant Constitutional Provisions.
   a. Right to Life, Liberty and Dignity
   b. Right to Equality
   c. Right against Exploitation
   d. Cultural and Educational Rights
   e. Economic Rights
   f. Political Rights
   g. Social Rights

3. Human Rights of Women and Children
   a. Social Practice and Constitutional Safeguards
      (i) Female Foeticide and Infanticide
      (ii) Physical assault and harassment
      (iii) Domestic violence
      (iv) Conditions of Working Women

4. Institutions for Implementation
   a. Human Rights Commission
   b. Judiciary

5. Violations and Redressel
   a. Violation by State
   b. Violation by Individuals
   c. Nuclear Weapons and terrorism
   d. Safeguards.

**REFERENCE BOOKS:**

1. *Dey A. K*, 2002, **Environmental Chemistry.** New Delhi – Vile Dasaus Ltd.
2. *Gawande . E.N*. **Value Oriented Education.** Vision for better living. New Delhi, Saruptsons.
3. *Brain Trust Aliyar*, 2008, **Value Education for health, happiness and harmony.** Vethathiri publications, Erode.
4. *Ignacimuthu S. J. S*, 1999, **Values for life.** Bombay Better Yourself.

5. *Seetharam. R. (Ed),* 1998 **, Becoming a better Teacher** Madras Academic Staff College.
6. *Grose. D. N* , 2005, **A text book of Value Education.** Dominant Publishers and Distributors, New Delhi.
7. *Shrimali K. L,* 1974, **A Search for Values in Education**. Vikas Publishers, Delhi.
8. *Yogesh Kumar Singh & Ruchika Nath* , 2005, **Value Education.** P. H Publishing Corporation, New Delhi.
9. *Venkataram & Sandhiya. N,* 2001, **Research in Value Education.** APH Publishing Corporation, New Delhi.
10. *Ruhela S. P.* **Human Value and Education.** Sterling publishers, New Delhi.
11. *Brain Trust Aliyar*, 2004, **Value Education for Health, Happiness and Harmony.** Vethathiri publications , Erode.
12. *Swami Vivekananda* , 2008, **Personality Development.** Advaita Ashrama, Kolkata.
13. *Swami Jagadatmananda*, **Learn to Live.** Sri Ramakrishna Math, Chennai.

| 17UTL31T | தமிழ் – தாள் 3 | SEMESTER-III |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

## குறிக்கோள்

மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு, கலை மற்றும் மரபு ஆகியவற்றை அறிந்து மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

## பயனடைவுக்கல்வியின் விளைவாக ஏற்படும் பயன்பாடுகள்

| பாடத்திட்டப் பகுப்பு முறை | பாடத்திட்டத்தின் குறிக்கோள் | அறிவுத்திறன் வெளிப்படும் அளவு முறை |
|---|---|---|
| $CO_1$ | வாழ்க்கைத் திறன்கள் (Life Skills) - மாணவனின் செயலாக்கத்திறனைத் தாய்மொழி வாயிலாக ஊக்குவித்தல் | $K_1$, $K_2$, $K_3$ |
| $CO_2$ | மதிப்புக்கல்வி (Attitude and value educations). | $K_2$, $K_4$ |
| $CO_3$ | பாட இணைச்செயல்பாடுகள் (Co-curricular activities) | $K_2$, $K_3$, $K_4$ |
| $CO_4$ | சூழலியல் ஆக்கம் (ecology) | $K_4$ |
| $CO_5$ | மொழி அறிவு (tamil knowledge) | $K_5$, $K_6$ |

**Mapping with Programme outcomes**

| COs /POs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 |
|---|---|---|---|---|---|
| CO 1 | S | M | M | M | M |
| CO 2 | S | M | M | M | M |
| CO 3 | S | M | M | M | M |
| CO 4 | S | M | M | M | M |
| CO 5 | S | M | M | M | M |

**S-Strong, M-Medium, L-Low**

| 17UTL31T | தமிழ் – தாள் 3 | SEMESTER - III |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

காப்பியம் – சிற்றிலக்கியம் – நாடகம் – இலக்கிய வரலாறு – இலக்கணம்

அலகு 1-காப்பியங்கள்

.1சிலப்பதிகாரம் – மனையறம் படுத்த காதை

.2மணிமேகலை – வஞ்சிமாநகர் புக்க காதை

.3கம்பராமாயணம் – கும்பகர்ணன் வதைப்படலம் பா). எண் (100 – 60 :

4 . பெரிய புராணம் – அதிபத்தநாயனார் புராணம்

அலகு – சிற்றிலக்கியங்கள் 2

.1முத்தொள்ளாயிரம் (சேரனைப்பற்றியது ண்ள .பா (:20 -1

.2கலிங்கத்துப்பரணி – களம் பாடியது – போர்க்களக் காட்சி) பா(503 –472 :எண்.

.3திருக்குற்றாலக்குறவஞ்சி – வசந்தவல்லி பந்தாடிய சிறப்பு 6):( கண்ணிகள்4

அலகு – நாடகம் 3

.1குறிஞ்சிப்பாட்டு - இன்குலாப்

அலகு 4 -இலக்கிய வரலாறு

.1காப்பியங்களின் தோற்றமும் வளர்ச்சியும்

.2சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும்

.3நாடகத்தின் தோற்றமும் வளர்ச்சியும்

5 -அலகுஇலக்கணம்

1. 'பா' வகைகள் : வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பா - பொது இலக்கணம்

அணி .2– உவமையணி, உருவக அணி, இல்பொருள் உவமையணி

.3அலுவலகம் சார்ந்த கடிதம் – விண்ணப்பங்கள், வேண்டுகோள், முறையீடு

பார்வை நூல்கள்:

.1 செய்யுள் திரட்டு தமிழ்த்துறை வெளியீடு –

.2 குறிஞ்சிப்பாட்டு - இன்குலாப் – அன்னம் வெளியீடு

.3 தமிழ் இலக்கிய வரலாறு பேராசிரியர் முனைவர் பாக்யமேரி –

| 17UHL31H | Part I- HINDI-III | SEMESTER - III |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

## CONTENTS

### UNIT – I

पद्य – काव्य पराशर (भोलानाथ)

(प्राचीन- कबीर, तुलसी, सुर, मीरा, आधुनिक- गुप्त, प्रसाद, पंत, निराला, दिनकर, अज्ञेय)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तर प्रदेश-281001

### UNIT – II

हिन्दी साहित्य का इतिहास: (केवल आदिकाल और भक्तिकाल - साधारण ज्ञान)

अलंकार:अनुप्रास,यमक, श्लेष, वक्रोक्ति, उपमा,रूपक

प्रकाशक: विनोद पुस्तक मंदिर

आगरा-282002

| 17UML31M | PART I - MALAYALAM-III | SEMESTER III |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**Preamble**

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

**Course Outcomes**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| CO1 | Learn the fundamentals of novels and stories. | K1 |
| CO2 | Understand the principles of translation work. | K2 |
| CO3 | Apply the knowledge writing critical views on fiction. | K3 |
| CO4 | Build creative ability. | K3 |
| CO5 | Expose the power of creative reading. | K2 |

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| CO1 | S | M | M | M | S |
| CO2 | S | M | M | M | S |
| CO3 | S | M | S | M | S |
| CO4 | S | M | S | M | S |
| CO5 | S | M | S | M | S |

- **S: Strong M: Medium L: Low**

| 17UML31M | PART-I: MALAYALAM-III | SEMESTER III |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

## CONTENTS

## PAPER III- POETRY

This Paper will have the following five units:

Unit I, II & III

A part of Ezuthachan's Work

Unit IV & V

A Khandakavya of Vallathol

**Text Books prescribed:**

Unit I, II & III

Karnnaparvam – Ezuthachan
(Poorna Publications, Calicut)

Unit IV & V

Achanum Makalum – Vallathol (D.C. Books, Kottayam)

| 17UFL31F | FRENCH-III | SEMESTER -III |
|---|---|---|

**Total Credits: 3**

**Hours Per Week: 4**

**Preamble**

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression.
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France.
- To help the students to acquire Competency in translating simple French sentences into English and vice versa.

**Course Outcomes**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| CO1 | Learn the Basic verbs, numbers and accents. | K1 |
| CO2 | To learn the adjectives and the classroom environment in France. | K2 |
| CO3 | Learn the Plural, Articles and the Hobbies. | K3 |
| CO4 | To learn the Cultural Activity in France. | K3 |
| CO5 | To learn the Sentiments, life style of the French people and the usage of the conditional tense. | K2 |

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| CO1 | S | M | M | M | S |
| CO2 | S | M | M | M | S |
| CO3 | S | M | S | M | S |
| CO4 | S | M | S | M | S |
| CO5 | S | M | S | M | S |

- **S: Strong M: Medium L: Low**

| 17UFL31F | FRENCH-III | SEMESTER -III |
|---|---|---|

**Total Credits: 3**

**Hours Per Week: 4**

**CONTENTS**

| Compétence Culturelle | Compétence de Communication | Compétence Grammatical |
|---|---|---|
| **UNITÉ 1- Excuses et vœux** | | |
| • Convivialité (lieux et société, l'apéritif) | • INTERACTION ORALE: Accueillir quelqu'un, s'excuser,remercier<br>• RÉCEPTION ORALE: Comprendre des announces enregistrées<br>• RÉCEPTION ÉCRITE: Compremdre une affiche<br>• PRODUCTION ÉCRITE:Écrire des cartes de vœux | • Pronoms personnels toniques *moi,je…;toi…tu*<br>• Pronoms personnels objets *Me,te,le…*<br>• Lesverbsen-ercomme appeler,acheter<br>• Lesadjectives possessives *nos,vos,leurs* |
| **UNITÉ 2 – Bravo et merci** | | |
| • Communication et technologies (leportable, internet) | • INTERACTION ORALE: Interagir au téléphone , féliciter<br>• RÉCEPTION ORALE: Comperendre une emission à la radio<br>• RÉCEPTION ORALE: Comprendre une définition<br>• PRODUCTION ECRITE: Écrire des plaques commemoratives | • Oui,que<br>• Le passé composé<br>• Le participe passé *J'ai eu,ella a été*<br>• Longtemps,pendant …, de… à |
| **UNITÉ 3 – Faire et dire** | | |
| • Jeunes : enquête | • INTERACTION ORACE: Demander de l'aide, donner des instructions<br>• RÉCEPTION ORALE: | • Ce/*cet,cette,ces*<br>• Le verbe voir<br>• Envoyer,appuyer |

| | | |
|---|---|---|
| | Comprendre un message enregistré<br>• RÉCEPTION ÉCRITE :<br>Comprendre un article d'un magazine de consommateurs<br>• PRODUCTION ÉCRITE : Écrire un règlement | • Les articles partitifs *du,de la (de l)',des,de* |
| **UNITÉ 4 – Faire ci ou faire ça** | | |
| • Les vacances des Français | • INTERACTION ORALE : Proposer quelque chose,accepter,refuser<br>• RÉCEPTION ORALE : Comprendre une émission de cuisine<br>• RECEPTION ÉCRITE : Comprendre une brochure d'informations<br>• PRODUCTION ÉCRITE : Ecrire un'texte de promotion touristique | • *S'il y a du soleil* : L'hypothèse (supposition, Condition) la préposition *S i* + *indicatif*<br>• *Sinon… ou* + *indicatif*<br>• *Sortir,partir*<br>• *Quelques, plusieurs*<br>• *Le long de*<br>• *Au milieu de…*<br>• *Au sommet de…* |
| **UNITÉ 5 – Cœur et santé** | | |
| • Author du Couple | • INTERACTION ORALE: Exprimer son intérêt pour quelqu'un, exprimer l'affection<br>• RECEPTION ORALE: Comprendre une chanson<br>• RECEPTION ÉCRITE: Lire un horoscope<br>• PRODUCTION ÉCRITE: Écrire une letter au courrier du cœur | • J'étais…L'imparfait(1)<br>• Aussi brilliant que…<br>• Le plus beau, le moins cher<br>• Le verbe connaître |

## TEXT BOOK:

1. *Marcella Di Giura Jean-Claude Beacco,* Alors II . Goyal PublishersPvt Ltd 86, University Block ,Jawahar Nagar (Kamla Nagar),New Delhi – 110007.

| 17UEG32G | PART II- ENGLISH III | SEMESTER – III |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**PREAMBLE:**

To develop and enrich the language competencies of the students with the Functional English

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Develop knowledge on behavioral pattern and morale through prose | K3 |
| **CO2** | Extend focus on Ecology through poetry | K2 |
| **CO3** | Educate on Illustrating the significance of Short Stories | K2 |
| **CO4** | Build knowledge on One-Act plays | K3 |
| **CO5** | Test for descriptive Functional Grammar | K4 |

**MAPPING WITH PROGRAMME OUTCOME**

| COs/POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | S | S |
| **CO2** | S | S | M | M | S |
| **CO3** | S | S | M | S | S |
| **CO4** | M | S | S | S | S |
| **CO5** | M | S | M | S | S |

S – Strong, M – Medium, L – Low

| 17UEG32G | PART II- ENGLISH- III | SEMESTER- III |
|---|---|---|

**Total Credit: 3**
**Hours Per Week: 4**

## CONTENTS

**UNIT I –PROSE**

1. Mobile and Mixed Up – Anil Dharker
2. Good Manners – J.C. Hill
3. Chasing Celebrities – R.K. Narayan

**UNIT II - POETRY**

1. The Stolen Boat – William Wordsworth
2. Money Madness – D.H. Lawrence
3. On Killing a Tree – Gieve Patel

**UNIT III – SHORT STORIES**

1. The Scorn - Bama
2. The Dying Detective – Sir Authur Canon Doyle
3. The Refugees – Pearl.S.Buck

**UNIT IV – ONE ACT PLAY**

1. Refund – Fritz Karinthy
2. Mother's Day – J.B. Priestley

**UNIT V – FUNCTIONAL ENGLISH**

1. Agenda, Minutes & Notice
2. Report Writing
3. Electronic Correspondence

**TEXT BOOK**:

1. Board of Editors, *Melody.* Department of English. Dr. N.G.P. Arts and Science College (Autonomous), Coimbatore.

**REFERENCE BOOKS:**

1. Syamala.V., *Effective English Communication for You.,* Emerald Publishers., Chennai.
2. N. Krishnaswamy., *Modern English: A Book of Grammar, Usage And Composition*., Macmillan India Ltd-New Delhi.
3. Wren and Martin, *High School English Grammar and Composition*. S. Chand Publishing 2006, New Delhi.

| 17UPY33A | CORE- III: OPTICS | SEMESTER-III |
|---|---|---|

**Total credits:5**
**Hours/Week:5**

**PREAMBLE**

To enable students to learn the concepts in physical and geometrical optics, and to understand the behavior of light and their applications.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | (i)Classify different types of aberrations<br>(ii) Demonstrate dispersive power of prism through experiments in laboratories. | K1,K2 |
| CO2 | Differentiate different Refractometers and interference phenomena in thin films. | K2 |
| CO3 | Recall Fresnel , Fraunhofer diffraction and determine dispersive power of grating through experiments in laboratories. | K2 |
| CO4 | (i) Identify and produce plane, circularly and elliptically polarized light.<br>(ii)Compare different types of microscopes. | K1,K2 |
| CO5 | Understand basic principle of laser, fibre optics and their applications. | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | M | S |
| **CO2** | S | S | S | M | S |
| **CO3** | S | M | S | M | M |
| **CO4** | S | S | S | S | M |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY33A | CORE- III: OPTICS | SEMESTER-III |
|---|---|---|

**Total credits:5**
**Hours/Week:5**

**OBJECTIVE:**

1. To enable students understand the behavior of light, concepts in physical and geometrical optics and their applications.

**CONTENTS**

**UNIT - I**

**Geometrical Optics:** Aberrations - Spherical aberrations in lens - Coma - Astigmatism - Chromatic aberration - chromatic aberrations in a lens - achromatic lens - condition for achromatism of two thin lenses separated by a finite distances-- dispersion by a prism - Cauchy's dispersion formula - dispersive power --Achromatism in prism.

**UNIT - II**

**Interference:** Interference in thin films due to reflected light – Fringes produced by a wedge shaped thin film – Newton's rings – Refractive index of the Liquid – Michelson interferometer – Determination of a wavelength of monochromatic light – Difference -- Wavelength between two neighbouring spectral lines – Jamin's Refractometer – Rayleigh's Refractometer.

**UNIT - III**

**Diffraction:** Fresnel's assumptions – rectilinear propagation of light – half period zone – Zone Plates – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction at a Single slit, Double slit, N Slit- Diffraction grating – Determination of Wavelength -- Resolving power and Dispersive power of Grating.

**UNIT - IV**

**Polarization:** Brewster's law **--**Double Refraction – Huygen's explanation – Production and Detection of Plane, Circularly and Elliptically Polarized

light – Optical Activity – Fresnel's explanation - Specific rotation – Laurent's Half Shade Polarimeter.

**Optical Instruments:** Eye pieces – Huygens and Ramsden eyepieces – Cardinal Points –Comparison. Microscopes - Electron Microscope, SEM, TEM, STEM.

**UNIT - V**

**Laser and Fibre Optics:** Spontaneous and Stimulated emission – Einstein's coefficient – Optical Pumping and Population Inversion – Lasing action -- He-Ne, $CO_2$, Nd:YAG laser.

**Optical fibres** –Critical Angle – Modes of Propagation –Numerical Aperture and Acceptance Angle (Expression) – Types of Optical fibres – Fibre optic communication system – Fibre optic sensors.

**TEXT BOOKS:**

1. *Brij Lal and Subrahmanyam N.* 2006. **A Text book of Optics.** *S Chand and Co, New Delhi*
2. *Murugeshan R. and Kiruthiga Sivaprasath Er.* 2008 **Modern Physics.** *S Chand and Co, New Delhi*
3. *Senthil Kumar I.G.* 2013. **Engineering Physics I.** *VRB Publications, Chennai.*

**REFERENCE BOOKS:**

1. *AjoyGhatak.* 2006. **Optics.** *[3rd Edition] Tata McGraw Hill Publishing Company Ltd, New York.*
2. *MurugesanR.* 2010. **Optics and Spectroscopy.** *S Chand and Co, New Delhi.*
3. *Thyagarajan K. and AjoyGhatak.* 2004, **Introduction To Fiber Optics.** *Cambridge University Press, New Delhi.*

| 18UPY33P | CORE PRACTICAL - III: GENERAL EXPERIMENTS | SEMESTER –III |
|---|---|---|

**Total credits:2**

**Hours/Week:4**

**LIST OF EXPERIMENTS:**

**Any 8 Experiments**

1. Air wedge – Thickness of a wire
2. Young's Modulus – Cantilever-dynamic method
3. Spectrometer – (i-d) Curve
4. Comparison of Viscosities – Capillary Flow Method
5. Characteristics of a Junction Diode
6. Potentiometer- Low range Voltmeter calibration
7. LASER- Determination of wavelength and particle size
8. Surface tension-drop weight method
9. Characteristics of transistor
10. Series resonance circuit.

| 17UCY3AA | ALLIED II– CHEMISTRY - I | SEMESTER III |
|---|---|---|

**Total Credits:3**
**Hours/Week: 3**

**PREAMBLE**

To gain knowledge in the basics of chemistry which helps bioscience students to understand chemical bonding in the biomolecules and the techniques involved in the biochemistry.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Understand bonding in molecules, crystals structures and evaluate their bonding characteristics and to gain knowledge in the basics of chemistry. | K2 |
| CO2 | Design a demonstration that enables the students to prepare laboratory solutions. | K2 |
| CO3 | Apply the concepts of bonding's in organic molecules and relate their displacement reactions with mechanism. | K2, K3 |
| CO4 | Know the fundamentals of adsorption techniques and adsorption process and to apply the concepts of chromatography in separation process. | K2, K3 |
| CO5 | Understand the preparation and uses of synthetic dyes and their application in day today life. | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | S | S |
| **CO2** | M | S | S | S | S |
| **CO3** | S | S | S | S | S |
| **CO4** | M | M | S | S | S |
| **CO5** | M | M | S | S | S |

**S-Strong; M-Medium; L-Low**

| 17UCY3AA | ALLIED II – CHEMISTRY - I | SEMESTER III |
|---|---|---|

**Total Credits:3**

**Hours/Week: 3**

**OBJECTIVES:**

On successful completion of this course the students shall gain knowledge in the basics of chemistry which helps bioscience students to understand chemical bonding in the biomolecules and the techniques involved in the biochemistry.

## CONTENTS

**UNIT – I**

**Chemical bonding**

1. Molecular Orbital Theory - bonding, antibonding and nonbonding orbitals. MO configuration of $H_2$, $N_2$, $O_2$, $F_2$- bond order – diamagnetism and paramagnetism.
2. Ionic Bond: Nature of ionic bond, structure of NaCl and CsCl, factors influencing the formation of ionic bond.
3. Covalent Bond: Nature of covalent bond, structure of $CH_4$, $NH_3$, $H_2O$, shapes of $BeCl_2$, $BF_3$, based on VSEPR theory and hybridization.

**UNIT – II**

**Solutions**

1. Normality, molarity, molality, mole fraction, mole concept.
2. Preparation of standard solutions - primary and secondary standards.
3. Principle of Volumetric analysis.
4. Strong and weak acids and bases - Ionic product of water- pH, pKa, pKb, Buffer solution, pH and pOH simple calculations.

**UNIT–III**

**Basic Organic Chemistry**

1. Electron displacement effect in organic compounds - Inductive effect – Electromeric effect - Resonance effect, Hyperconjugation and Steric effect.

2. Isomerism, Symmetry of elements (Plane, Centre and Axis of symmetry), Molecules with one chiral carbon and two adjacent chiral carbons –Optical isomerism of lactic acid and tartaric acid, Enantiomers, Diastereomers, Separation of racemic mixture (chemical, mechanical, biochemical and kinetic), Geometrical isomerism (maleic and fumaric acid).

**UNIT – IV**

**Surface Chemistry**

Adsorption – adsorbent and adsorbate, adsorption and absorption - chemisorption - physisorption - Difference between chemisorption and physisorption - applications of adsorption - Factors influencing adsorption, adsorption isobar, adsorption isostere.

**Chromatography** - Principles and applications of column, paper and thin layer Chromatography.

**UNIT – V**

**Dyes**

Terms used – chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic shift and hypochromic shift. Classification of dyes based on chemical structure and application-Preparation of azo (Methyl orange) and triphenyl methane (Malachite green) dyes.

**TEXT BOOKS**

*1. R. D. Madan. 2001.* **Modern Inorganic Chemistry**. *S. Chand & Company, New Delhi.*

2. *Puri, Sharma, Pathania. 2004.* **Principles of Physical Chemistry**, *Vishal Publishing Company, Jalandhar.*

*3. B.S.Bhal , Arun Bhal,1997.* **Advanced Organic Chemistry,** *S. Chand & Co Limited, New Delhi.*

*4. M. K. Jain, S. C. Sharma. 2001.* **Organic Chemistry**, *Shoban Lal Nayin Chand, Jalandhar.*

*5. Gopalan R. 1991.***Elements of Analytical Chemistry**, *Sultan Chand & Sons, New Delhi.*

| 17UPY3SA | SKILL BASED COURSE-I : PRINCIPLES OF PROGRAMMING CONCEPTS AND C PROGRAMMING | SEMESTER-III |
|---|---|---|

**Total credits:3**

**Hours/Week:3**

**PREAMBLE**

To enable students , learn the basic principles and concepts of C

Programming language

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Learn the fundamentals of C programming | K1 |
| **CO2** | Understand the strength of C through its rich set of operators | K2 |
| **CO3** | Apply the knowledge of control structure as decision making and looping | K3 |
| **CO4** | Build programs using arrays and functions | K3 |
| **CO5** | Expose the concepts of C programming in Physics problem solving | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | S | M |
| **CO2** | S | S | M | M | S |
| **CO3** | S | M | S | S | S |
| **CO4** | S | S | M | S | S |
| **CO5** | S | S | S | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY3SA | SKILL BASED COURSE-I : PRINCIPLES OF PROGRAMMING CONCEPTS AND C PROGRAMMING | SEMESTER-III |
|---|---|---|

**Total credits:3**

**Hours/Week:3**

**OBJECTIVES**

1. To enable students learn the basic principles and concepts of C Programming language

**CONTENTS**

**UNIT - I**

Introduction – character sets – constants – keywords – and identifiers – variables – variables – data types – declaration of variables – assigning values to variables – defining symbolic constants.

**UNIT - II**

Arithmetic operators – relational operators – logical operators – assignment operators – increment and decrement operators – conditional operators – special operators – arithmetic expression – evaluation of expression. – precedence of arithmetic operators – some computer problems – type conversion in expression – operator precedence and associativity – mathematical functions.

**UNIT - III**

Reading and writing character – formatted input and output – decision making : IF statement : Simple IF – IF ELSE – Nesting of IF.. ELSE – ELSE. IF Ladder – Switch Statement – operator – go to statement – while .. do while – For loop – Jumps in loops – simple programs.

**UNIT - IV**

Arrays : Introduction – One dimensional array – declaration of array – Initiating on two and multidimensional arrays – declaring and initializing string variables – reading strings from terminal – writing strings on the screen – Arithmetic operations on characters – simple programs.

Sorting, searching program using one dimensional array, matrix manipulation.

**UNIT - V**

Conversion of Temperature from C to F and F to C – Determination of Velocity of Light – Foucalt's Rotating Mirror method – Determination of G by Boy's Method – Young's Modulus – Uniform and Non Uniform method – Determination of Frequency: Sonometer – Spectrometer: Refractive index and Dispersive power of Prism – Newton's rings: Radius of Curve

**TEXT BOOKS:**

1. *Balagurusamy E.* 2012. **Programming in ANSI C.** [6th Edition], Tata McGraw Hill Publishing Company Ltd, New York
2. *Karthikeyan E.* 2008. **A Textbook on C.** Prentice Hall India, New Delhi
3. *Palaniswamy S.* 2004. **Physics Through C Programming.** Pragati Publication.

**REFERENCE BOOKS:**

1. *Ashok N. Kamthane*. 2011. **Programming in C. [**2nd Edition], Pearson Education, Chennai
2. *Yaswanth, Kanitkar*. 2012. **Let Us C.** [13th Edition], BPB Publication, New Delhi
3. *Gotfried B.* 2010. **Programming with C.** [3rd Edition], Tata McGraw Hill Publishing Company Ltd, New York .

| 17UNM34V | NMEC-I:<br>EVERYDAY PHYSICS –I | SEMESTER-III |
|---|---|---|

**Total Credits:2**

**Hours/Week:2**

**OBJECTIVE:**

1. To enable non-major Physics students to create interest in Physics and to make them aware with fundamental concepts of Physics

## CONTENTS

**UNIT - I**

**How things work?**

Basic principles – Televisions – Lifts – Submarines – Helicopters – Fax machines – Nuclear reactors.

**UNIT - II**

**Heat**

Transmission of heat – Variation of boiling point with pressure – Pressure cooker – Refrigerator – AC Principle and their capacities.

**UNIT - III**

**Sound and Optics**

Sound waves– Doppler effect– SONAR. Power of a lens – Long sight, Short sight – Microscope, Telescope, Binocular and Camera.

**UNIT - IV**

**Bio materials & Smart materials**

Biomaterials – Biomedical compatibility of Ti–Al-Nb alloys for implant application. Smart materials – Shape Memory Alloys – Piezoelectric materials.

**UNIT – V**

**Solar energy and its Applications**

Solar energy – Solar water heater – Solar driers – Solar cells – Solar electric power generation – Solar distillation – Solar cooking.

**TEXT BOOKS:**


1. **The Learner's series – Everyday science**, *Infinity Books, New Delhi*
2. *Brij Lal and Subrahmanyam, N.* 2008. **A Text Book of Sound.** *[2nd Edition], Vikas Publishing House, New Delhi*
3. *Brij Lal and Subrahmanyam, N.* 1994. **A Textbook of Optics**, *[4th Edition] S Chand and Co, New Delhi.*
4. *Rai G.D.* 2004. **Solar Energy Utilization.** *Khanna Publishers, New Delhi.*
5. *Senthil Kumar I.G.* 2013. **Engineering Physics I & II.** *VRB Publications, Chennai.*


**REFERENCE BOOK:**


1. *Resnick and Halliday,* **Principles of Physics.** 2015. *[9th Edition], Wiley Publication*
2. *Sukhatme. S.P.* 1997. **Solar Energy, Principles of thermal collection and storage** *[2nd edition], Tata McGraw-Hill Publishing Co. Ltd., New Delhi.*
3. *Mathur, D.S.* 2002. **Heat and Thermodynamics.** *S Chand and Co, New Delhi*
4. **Illustrated World of Science Encyclopedia**, *Vol I and Vol VIII, Creative world publication, Chicago.*

| | | |
|---|---|---|
| 17UFC3FA | பகுதி – 4 : அடிப்படைத்தமிழ் தாள் : 1 (Basic Tamil ) | **SEMESTER- III** |

இளங்கலை ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது 2018 – 2017

10)மற்றும் – 12 ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு(

( பருவத் தேர்வு உண்டு)

அலகு தமிழ் மொழியின் அடிப்படைக் .1 :கூறுகள் .

அ) எழுத்துகள் :

- உயிர் எழுத்துக்கள் - குறில் , நெடில் எழுத்துகள்
- மெய் எழுத்துக்கள் - வல்லினம், மெல்லினம், இடையினம்
- உயிர்மெய் எழுத்துக்கள்

ஆ) சொற்களின் வகைகள் : பெயர்ச்சொல், வினைச்சொல் – விளக்கம் (எ.கா.)

அலகு குறிப்பு எழுதுதல் .2 :

- பெயர், முகவரி, பாடப்பிரிவு , கல்லூரியின் முகவரி
- தமிழ் மாதங்கள்(12), வாரநாட்கள்(7), எண்கள் (ஒன்று முதல் பத்து வரை), வடிவங்கள், வண்ணங்கள்
- ஊர்வன, பறப்பன, விலங்குகள், மனிதர்களின் உறவுப்பெயர்கள்
- இந்திய மாநிலங்கள், நதிகள், தேசத் தலைவர்கள் பற்றிய குறிப்புகள்

| வினாத்தாள் அமைப்பு முறை<br>மொத்த மதிப்பெண்கள் – 50 | | | |
|---|---|---|---|
| பகுதி –அ | சரியான விடையைத் தேர்வு செய்தல் | 10x2=20 | அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும் |
| பகுதி –ஆ | அரைப்பக்க அளவில் விடையளிக்க | 5x3=15 | |
| பகுதி-இ | இரண்டு பக்க அளவில் விடையளிக்க | 1x15=15 | |

| | | |
|---|---|---|
| 17UFC3FB | பகுதி – 2 : சிறப்புத் தமிழ் தாள் : 1<br>(Advanced Tamil ) | **SEMESTER- III** |

இளங்கலை ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது 2018 – 2017
)10 மற்றும் – 12 ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு
உரியது(
( பருவத் தேர்வு உண்டு)

அலகு :1 –மரபுக் கவிதைகள்

அ பாரதியார் கவிதைகள்(

- தமிழ்நாடு
- மனதில் உறுதி வேண்டும்
- வருகின்ற பாரதம் (பா.எண்.5-8)

ஆ)பாரதிதாசன் கவிதைகள்

- இன்பத்தமிழ்
- நீங்களே சொல்லுங்கள்
- உலக ஒற்றுமை
- வாளினை எடடா!

அலகு – 2 : புதுக்கவிதைகள்

- கம்பன் கவியரங்கக் கவிதை - மு.மேத்தா
- தமிழா! நீ பேசுவது தமிழா! - காசியானந்தன்
- நட்புக் காலம் (10 கவிதைகள்) - அறிவுமதி கவிதைகள்

அலகு : 3 –இலக்கணம்

- வல்லினம் மிகும் மற்றும் மிகா இடங்கள்
- ர, ற, - ல, ழ, ள - ந, ண, ன - வேறுபாடு அறிதல்

அலகு :4 –கடிதங்கள் எழுதுதல்

- பாராட்டுக் கடிதம்
- நன்றிக் கடிதம்
- அழைப்புக் கடிதம்
- அலுவலக விண்ணப்பங்கள்

அலகு :5 –பாடம் தழுவிய வரலாறு

- பாரதியாரின் இலக்கியப் பணி
- பாரதிதாசனின் இலக்கியப்பணி
- மரபுக்கவிதை, புதுக்கவிதை - விளக்கம்

| வினாத்தாள் அமைப்பு முறை<br>மொத்த மதிப்பெண்கள் – 50 | | | |
|---|---|---|---|
| பகுதி –அ | சரியான விடையைத் தேர்வு செய்தல் | 10x1=10 | ஒவ்வொரு அலகிலும் இரண்டு வினாக்கள் |
| பகுதி –ஆ | அரைப்பக்க அளவில் விடையளிக்க | 5x3=15 | ஒவ்வொரு அலகிலும் ஒரு வினா |
| பகுதி –இ | இரண்டு பக்க அளவில் விடையளிக்க | 5x5=25 | ஒவ்வொரு அலகிலும் ஒரு வினா |
| குறிப்பு: பகுதி ஆ மற்றும் இ –க்கான வினாக்கள் இது அல்லது அது என்ற அடிப்படையில் அந்தந்த அலகுகளில் அமைதல் வேண்டும் | | | |

| 17UFC3FC | PART-IV: YOGA FOR HUMAN EXCELLENCE | SEMESTER - III |
|---|---|---|

**Total Credits: 2**
**Hours Per Week: 2**

## CONTENTS

### UNIT – I

### Yoga and Physical Health

1.1 Physical Structure-Three bodies-Five limitations

1.2 Simplified physical Exercise – Hand Exercises – Leg Exercises – Breathing Exercises – Eye Exercises –Kapalapathi

1.3 Maharasanas 1-2 Massages - puncture-Relaxation

1.4 Yogasanas – Padmasana- Vajrasanas-Chakrasanas (side) – Viruchasanas –Yoga muthra – Patchimothasanas – Ustrasanas –Vakkarasanas – Salabasanas

### UNIT - II

### Art of Nurturing the life force and Mind

2.1 Maintaing the youthfulness –Postponing the ageing process

2.2 Sex and Spirituality – Significancew of sexual vital fluid – Married life Chastity

2.3 Ten stages of Mind

2.4 Mental frequency – Methods for concentration

### UNIT - III

### Sublimation

3.1 Purpose and Philosophy of life

3.2 Introspection – Analysis of Thought

3.3 Moralization of Desires

3.4 Neutralization of Anger

**UNIT IV**

**Human Resources Development**

4.1 Eradication of worries

4.2 Benefits of Blessings

4.3 Greatness of Friendship

4.4 Individual Peace and World Peace

**UNIT V**

**Law of Nature**

5.1 Unified force – Cause and Effect system

5.2 Purity of Thought and Deed and Genetic Centre

5.3 Love and Compassion

5.4 Cultural Education – Fivefold Culture

| 17UFC3FD | PART-IV: WOMEN'S RIGHTS | SEMESTER - III |
|---|---|---|

**Total Credits: 2**
**Hours Per Week: 2**

## CONTENTS

**UNIT- I**

**Laws, Legal Systems and Change:** Definition - Constitutional law, CEDAW and International Human Rights – Laws and Norms – Laws and Social Context – Constitutional and Legal Framework.

**UNIT- II**

**Politics Of Land And Gender In India:** Introduction – Faces of Poverty – Land as Productive Resources – Locating Identities – Women's Claims to Land – Right to Property - Case Studies.

**UNIT- III**

**Women's Rights: Access to Justice:** Introduction – Criminal Law – Crime Against Women –Domestic Violence – Dowry Related Harassment and Dowry Deaths – Molestation –Sexual Abuse and Rape – Loopholes in Practice – Law Enforcement Agency.

**UNIT- IV**

**Women's Rights:** Violence Against Women – Domestic Violence - The Protection of Women from Domestic Violence Act, 2005 - The Marriage Validation Act, 1982 - The Hindu Widow Re-marriage Act, 1856 - The Dowry Prohibition Act, 1961.

**UNIT –V**

**Special Women Welfare Laws:** Sexual Harassment at Work Places – Rape and Indecent Representation – The Indecedent Representation (Prohibition) Act, 1986 - Immoral Trafficking – The Immoral Traffic (Prevention) Act, 1956 - Acts Enacted for Women Development and Empowerment - Role of Rape Crisis Centers.

**REFERENCES BOOKS:**


1. *Nitya Rao.* 2008. "**Good Women do not Inherit Land**" Social Science Press and Orient Blackswan.
2. *International Solidarity Network* , 2006 ,"**Knowing Our Rights**" An imprint of Kali for Women.
3. *Kaushik. P.D*. 2007. **"Women Rights"** Bookwell Publication.
4. *Aruna Goal.* 2004. "**Violence Protective Measures for Women Development and Empowerment.**" Deep and Deep Publications Pvt.
5. *Monica Chawla.* 2006. "**Gender Justice"**. Deep and Deep Publications Pvt Ltd.
6. *Preeti Mishra.* 2007. "**Domestic Violence Against Women**". Deep and Deep Publications Pvt.
7. *ClairM.Renzetti, Jeffrey L.Edleson*, and *Raquel Kennedy Bergen*. 2001. Source Book on "**Violence Against Women**". Sage Publications.

| 17UFC3FE | PART-IV: CONSTITUTION OF INDIA | SEMESTER - III |
|---|---|---|

**Total Credits: 2**

**Hours Per Week: 2**

## CONTENTS

**UNIT I**

Making of Constitution - Constituent Assembly- Dr.RajendraPrasath- Dr.B.R.Ambedkar - Salient features - Fundamental Rights.

**UNIT II**

Union Executive - President of India - Vice-President - Prime Minister - Cabinet - Functions

**UNIT III**

Union Legislature - Rajiya Sabha - Lok Sabha - Functions and Powers

**UNIT IV**

Union Judiciary - Supreme Court - Functions - Rule of law

**UNIT V**

State - Executive - Legislature – Judiciary – Role of Tamilnadu Public Service Commission.

**REFERENCE BOOKS:**


1. *Agharwal.R.C.* 1977, **National Moment and Constitutional Development.** New Delhi.
2. *Chapra B.R.,* 1970,**Constitution of India.** New Delhi.
3. *Rao B.V*, 1975**. Modern Indian Constitution.** Hyderabad.
4. *Nani Palkhivala* ,1970, **Constitution of India**, New Delhi.
5. *Krishna Iyer, V.R.*, 2009, **Law and Justice**. New Delhi.
6. Reference Manual from the Govt. of Tamilnadu.

| 17UPYSS1 | SELF STUDY PAPER –I: ELECTRICAL AND ELECTRONIC APPLIANCES | SEMESTER: III |
|---|---|---|

**Total credits:1**

**Objectives:**

1. This paper is designed to make the students aware of the latest type of appliances and gadgets available and to know how they work.

**UNIT - I**

**Test and Measurement**

Digital calipers – digital screw gauge – digital balance – digital clock – digital thermometer – digital multimeters – digital oscilloscopes.

**UNIT - II**

**Home appliances**

Air conditioner – refrigerator – microwave oven – induction cooker – washing machines – inverters – solar powered appliances – digital cameras.

**UNIT - III**

**Communication**

Fibre optics – cellular phones – cellular phone jammers – Bluetooth – WiFi – LiFi -- Global positioning system – RFID security systems.

**UNIT - IV**

**Robotics**

Basics – robotic arm – mobile robots – autonomous robots - Honda's ASIMO robot.

**UNIT - V**

**Computers**

Basic components – Motherboards – Memory – I/O devices – assembling – operating systems.

**BOOKS FOR STUDY:**

1. *GottapuSasibhushana Rao*, 2012. **Mobile Cellular Communication**, [1st Edition], Pearson.

2. *S K Saha,* 2008. **Introduction to Robotics**, [1st Edition], Tata McGraw-Hill Education.

3. *Alok Kumar*, 2008. **Computer General Awareness** [1st Edition], UpkarPrakashan.

| 17UPYSS2 | SELF STUDY PAPER –II: BIOPHYSICS AND BIOMEDICAL INSTRUMENTATION | SEMESTER: III |
|---|---|---|

**Total credits:1**

**OBJECTIVES:**

1. To understand the biological significance in terms of physical properties and understand the medical instrumentation based on physical concepts.

**UNIT – I**

**Fundamentals of Biophysics**

Atom – atomic structure – Chemical bonds: ionic bonds, covalent bonds, formation of covalent bonds, weaker interaction – Fundamental concepts: light, sound, pressure, heat content of food, blood pressure, pH – determination of pH – buffer solution – determination of pH by indicators – Nucleic acids: DNA, RNA.

**UNIT – II**

**Biophysical properties**

Surface tension – Diffusion: definition, factors affecting diffusion, biological signification of diffusion – Osmosis: definition, factors affecting osmosis, biological signification of osmosis – Adsorption: definition, factors affecting diffusion, biological signification of diffusion – Colloids: definition – characteristics of colloids: kinetic properties, optical properties, electrical properties, stability of colloids – biological importance of colloids – Dialysis: principle of dialysis – kinds of dialysis.

**UNIT – III**

**Fundamentals of Biomedical Instrumentation**

Sources of Biomedical signals – Basic medical instrumentation system – Intelligent medical instrumentation systems: Microprocessor based medical instruments – PC based medical instruments – Biomedical recorders: Basic electronic recording system, Electrocardiograph (ECG), Block diagram of ECG, Electroencephalograph (EEG), Block diagram of EEG.

**UNIT – IV**

**Fundamentals of Biomedical imaging systems**

X-ray Imaging system: Nature of X-rays, X-ray machine – Computed Tomography (CT scan): Principle, Components of CT scan system – Magnetic Resonance Imaging (MRI) system: Principle, basic NMR components, block diagram of the NMR detection system, biological effects of NMR imaging, advantages of NMR imaging system – Ultrasonic Imaging systems: Medical ultra sound, echocardiograph, digital scan converter, biological effects of ultra sound.

**UNIT – V**

**Radiotherapy:** Radioactive decay – alpha, beta and gamma - Isotopes – Medical linear accelerator machine – radiation detectors – GM counter, Ionization chamber.

**Laser:** principle – types of lasers: Ruby laser, Helium-neon laser, semiconductor laser – laser safety – Uses of laser in medical field.

**TEXT BOOKS:**

*1. Subramanian, M.A.* 2006. **Biophysics: Principles and Techniques**. *MJP Publishers, Chennai.*

*2. Palanichamy, S. and Shanmugavelu, M.* **Principles of Biophysics.***Palani Paramount Publications, Palani.*

3. *R.S.Khandpur,2014.***Handbook of Biomedical instrumentation**, *TMH Publication Ltd.*

*4. Murugesan, R.* 2003. **Modern Physics,** *[11th Edition] S Chand & Company Ltd, New Delhi.*

**REFERENCE BOOKS:**

*1. Thiravia* Raj, *S.***Biophysics.** *Saras Publications, Nagerkoil*

*2. Daniel, M.* 1998. **Basic Biophysics for Biologist.** *Agro-bios, Jodhpur.*

*3. Pattabhi, V. and Gowtham, N.* 2011. **Biophysics.** *[2nd Edition], Narosa Publishing House, New Delhi.*

| 17UTL41T | தமிழ் - I தாள் - 4 | SEMESTER - IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**குறிக்கோள்:**

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு, கலை மற்றும் மரபு ஆகியவற்றை அறிந்து மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

**பயனடைவுக்கல்வியின் விளைவாக ஏற்படும் பயன்பாடுகள்:**

| பாடத்திட்டப் பகுப்பு முறை | பாடத்திட்டத்தின் குறிக்கோள் | அறிவுத்திறன் வெளிப்படும் அளவு முறை |
|---|---|---|
| **$CO_1$** | வாழ்க்கைத் திறன்கள் (Life Skills) - மாணவனின் செயலாக்கத்திறனைத் தாய்மொழி வாயிலாக ஊக்குவித்தல் | **$K_1$, $K_2$, $K_3$** |
| **$CO_2$** | மதிப்புக்கல்வி (Attitude and Value educations) | **$K_2$, $K_4$** |
| **$CO_3$** | பாட இணைச்செயல்பாடுகள் (Co-curricular activities) | **$K_2$, $K_3$, $K_4$** |
| **$CO_4$** | சூழலியல் ஆக்கம் (Ecology) | **$K_4$** |
| **$CO_5$** | மொழி அறிவு (Tamil knowledge) | **$K_5$, $K_6$** |

**$K_1$-Remembering, $K_2$-Understanding, $K_3$-Applying, $K_4$-Analysing, $K_5$-Evaluating, $K_6$-Creating**

**Mapping with Programme Outcome**

| COs /POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | M |
| **CO2** | S | M | M | M | M |
| **CO3** | S | M | M | M | M |
| **CO4** | S | M | M | M | M |
| **CO5** | S | M | M | M | M |

S – Strong, M – Medium, L – Low

| 17UTL41T | தமிழ் - I தாள் - 4 | SEMESTER - IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

சங்க இலக்கியம் நாட்டுப்புற இலக்கிய - ம்– இலக்கிய வரலாறு – இலக்கணம்

அலகு எட்டுத்தொகை 1 –

.1குறுந்தொகை – நெய்தல், பாடல் எண் – 57 : சிறைக்குடி ஆந்தையார் (
மருதம்), பாடல் எண்– 61 : தும்பிசேர்கீரன் (
) முல்லை, பாடல் எண் (கூடலூர்கிழார் - 167 :
.2கலித்தொகை – பாலைக்கலி), பாடல் எண் – 17: பெருங்கடுங்கோ(
.3அகநானூறு – பாலை), பாடல் எண் (நல்லந்துவனார் - 43 :
.4புறநானூறு – )பா– 192.எண். கணியன் பூங்குன்றனார், பா – 279 : எண்.
ஒக்கூர் மாசாத்தியார், பா(பொன்முடியார் - 312 :எண்.

அலகு 2 -பத்துப்பாட்டு

.1முல்லைப்பாட்டு – நப்பூதனார்

அலகு 3 -நாட்டுப்புறவியல்

.1நாட்டுப்புறப்பாடல்கள் – அறிமுகம்
.2தாலாட்டுப் பாடல்கள் (2 பாடல்கள்)
.3தொழில் பாடல்கள் (1 பாடல்கள்)
4. ஆத்தங்கரை ஓரம் )புதினம் (- வெஇறையன்பு.

அலகு 4 -இலக்கிய வரலாறு

.1எட்டுத்தொகை
.2பத்துப்பாட்டு
.3புதினத்தின் தோற்றமும் வளர்ச்சியும்

அலகு 5 - இலக்கணம்

.1அகத்திணை – விளக்கம்
.2புறத்திணை – விளக்கம் 12)திணைகள்(

பார்வை நூல்கள்

. 1தமிழ்த்துறை வெளியீடு
.2இலக்கிய வரலாறு – பேராசிரியர் முனைவர் பாக்யமேரி
.3நாட்டுப்புற இயல் ஆய்வு – சுசக்திவேல் .

| 17UHL41H | PART I- HINDI-IV | SEMESTER - IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**Preamble:**

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the fundamentals of novels and stories. | **K1** |
| **CO2** | Understand the principles of translation work. | **K2** |
| **CO3** | Apply the knowledge writing critical views on fiction. | **K3** |
| **CO4** | Build creative ability. | **K3** |
| **CO5** | Expose the power of creative reading. | **K2** |

**K1-Remembering K2- Understanding K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | S | M | S |
| **CO4** | S | M | S | M | S |
| **CO5** | S | M | S | M | S |

S – Strong, M – Medium, L – Low

| 17UHL41H | PART I- HINDI-IV | SEMESTER - IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

## CONTENTS

**UNIT – I**

नाटक – लडाई - सवश्वरदयाल सक्सेना

प्रकाशक: वाणी प्रकाशन

21-A, दरियागंज

नई दिल्ली-110002

**UNIT – II**

एकांकी: एकांकी पंचामृत - डॉ राम कुमार

(भोर और तारा छोड़कर)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तर प्रदेश-281001

**UNIT – III**

साधारण निबंध

प्रकाशक: आदश निबंध

विनोद पुस्तक मंदिर

आगरा-282002

| 17UML41M | PART I- MALAYALAM-IV | SEMESTER- IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**Preamble:**

- To develop the writing ability and develop reading skill
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the fundamentals of novels and stories. | **K1** |
| **CO2** | Understand the principles of translation work. | **K2** |
| **CO3** | Apply the knowledge writing critical views on fiction. | **K3** |
| **CO4** | Build creative ability. | **K3** |
| **CO5** | Expose the power of creative reading. | **K2** |

**K1-Remembering K2- Understanding K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | S | M | S |
| **CO4** | S | M | S | M | S |
| **CO5** | S | M | S | M | S |

S – Strong, M – Medium, L – Low

| 17UML41M | PART I- MALAYALAM-IV | SEMESTER- IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**CONTENTS**

**Drama & Folklore Paper IV. Drama & Folklore**

**Unit I, II & III**
A Drama

**Unit IV & V**
Folklore

**TEXT BOOKS:**

1. Unit I, II & III Lankalakshmi – C. N. Sreekantan Nair (D.C. Books, Kottayam).
2. Amkapurappadu – From Vadankkanpattu Folk song. By Thikkurissi Gangadharan.

**REFERENCE BOOKS:**

1. Natyasasthram, K.P. Narayana Pisharodi, Trans. (Kerala Sahithya Akademi, Thrissur).
2. Malayala Nataka Sahithya Charithram, G. Sankara Pillai (Kerala Sahithya Akademi, Thrissur).
3. Malayala Nataka Sahithya Charithram, Vayala Vasudevan Pillai (Kerala Sahithya Akademi Thrissur).
4. Natakam – Oru Patanam (C. J. Smaraka Prasanga Samithi, Koothattukulam).
5. Natakaroopacharcha, Kattumadam Narayanan (NBS, Kottayam)
6. Folklore – Raghavan Payyanadu (Kerala Bhasha Institute, Trivandrum)

| 17UFL41F | PART I- FRENCH-IV | SEMESTER-IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**Preamble:**

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France

**Course Outcomes:**

On the successful completion of the course, students will be able to

| CO Number | CO Statements | Knowledge Level |
|---|---|---|
| **CO1** | Learn the Basic verbs, numbers and accents | **K1** |
| **CO2** | To learn the adjectives and the classroom environment in France | **K2** |
| **CO3** | Learn the Plural, Articles and the Hobbies | **K3** |
| **CO4** | To learn the Cultural Activity in France | **K3** |
| **CO5** | To learn the Sentiments, life style of the French people and the usage of the conditional tense | **K2** |

**K1-Remembering K2- Understanding K3- Applying**

**Mapping with Programme Outcomes**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | M | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | S | M | S |
| **CO4** | S | M | S | M | S |
| **CO5** | S | M | S | M | S |

S: Strong, M: Medium, L: Low

| 17UFL41F | FRENCH-IV | SEMESTER-IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

CONTENTS

| Compétence Culturelle | Compétence de Communication | Compétence Grammatical |
|---|---|---|
| **UNITÉ 6 – Problémes problems** | | |
| • Le bénvolat | • INTERACTION ORALE: Interroger sur la tristesse, I'abattement, exprimer sa sympathie, rassurer<br>• RÉCEPTION ORALE: Comprendre une interview à la radio<br>• RECEPTION ÉCRITE: Comprendre un test de magazine<br>• PRODUCTION ÉCRITE: Écrire une letter a un(e) amie | • Les pronoms indfinis rien, quelque chose<br>• Le verbe crier<br>• Du pluriel: eau, eu, al<br>• Se soigner, s'excuser, se renseigner, s'appeler<br>• La phrase ngative: ne… plus, ne… jamais, ne… rien, ne… personne |
| **UNITÉ 7 – C'est qui? C'est comment?** | | |
| • Les classes socials | • INTERACTION ORALE: Décrire quelqu'un<br>• RECEPTION ORALE: Comprendre un bulletin météo<br>• RECEPTION ÉCRITE: Comprendre une courte interview<br>• PRODUCTION ÉCRITE: Écrire des notices biographiques | • Les adjectifs qualificatifs: Formes au masculin et au féminin<br>• ll fait beau, il neige, il pleut…<br>• Le verbe décrier<br>• Les verbs en –indre<br>• Les adjectifs possessifs féminins mon, ton, son devant voyelle ou h |
| **UNITÉ 8 – Et après? Et après** | | |
| • La mémoire et l'histoire | • INTERACTION ORALE: Raconter une anecdote, une histoire, attire l'attention | • L'imparfait(2)<br>• Les verbs en – oir<br>• Les pronoms |

| | | |
|---|---|---|
| | •RÉCEPTION ORALE: Comprendre une interview à la radio<br>•RÉCEPTION ÉCRITE: Comprendre des faits divers<br>•PRODUCTION ÉCRITE: Écrire une bréve | démonstratifs ça et cela<br>• Prés de…<br>Loin de…<br>• La forme passive |
| **UNITÉ 9 – Sûr et certain** | | |
| • L'université en France | • INTERACTION ORALE<br>Expreimer un point de vue, exprimer une certitude<br>• RÉCEPTION ORALE :<br>Comprendre et apprecier un poème<br>• RÉCEPTION ÉCRITE :<br>Comprendre un appel à participer à la vie collective<br>• PRODUCTION ÉCRITE :<br>• Ecrire une letter de motivation | • Le futur des verbes *parler, Avoir,être,voir*<br>• Le verbe *valoir*<br>• Par<br>• Les pronoms démonstratifs<br>*celui-ci, cella –là* |
| **UNITÉ 10 – Peut –être…peut-être** | | |
| • Le système de santé en France | • INTERACTION ORALE :<br>Exprimer une incertitude, exprimer l'évidence<br>•RÉCEPTION ORALE :<br>Comprendre et apprecier une chanson<br>•RECEPTION ÉCRITE :<br>Comprendre un débat d'idées<br>•PRODUCTION ÉCRITE :<br>Écrire au courier des lecteurs | • Les pronoms personnels objets,indirect *lui,*<br>*leur*<br>• L'impératif affirmative + COD et COL<br>• Les verbes *en – ayer*<br>• Linterrogation à inversion |

**TEXT BOOK:**

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors II .** Goyal Publishers Pvt Ltd 86, University Block ,Jawahar Nagar (Kamla Nagar), New Delhi – 110007.

| 17UEG42G | Part II- ENGLISH- IV | SEMESTER- IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

**PREAMBLE:**
To develop and enrich English language competencies of students in Functional English

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO 1** | Infer the prose works of R.K.Narayan, Stephen Leacock and Kasturi Sreenivasan. | **K2** |
| **CO 2** | Compare Indian poetry with British Poetry. | **K4** |
| **CO 3** | Analyse the themes in similitude by understanding the short stories. | **K4** |
| **CO 4** | Organize role plays after understanding the one act plays. | **K3** |
| **CO 5** | Test for Functional Grammar, Interviews skills, Group Discussions and Presentations. | **K4** |

**MAPPING WITH PROGRAMME OUTCOMES**

| COS/POS | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | M | S | M | S | M |
| **CO2** | S | M | S | M | S |
| **CO3** | S | M | S | S | M |
| **CO4** | M | S | S | S | S |
| **CO5** | S | M | S | M | S |

S – Strong, M – Medium, L – Low

| 17UEG42G | Part II- ENGLISH- IV | SEMESTER- IV |
|---|---|---|

**Total Credits: 3**
**Hours Per Week: 4**

## CONTENTS

**UNIT I – PROSE**

**Sweets for Angels – R.K. Narayan**'s - Biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques

**How to be a Doctor – Stephen Leacock**'s - Biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques

**I prepared to go to Coimbatore – Kasthuri Srinivasan**'s - Biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques

**UNIT II – POETRY**

**The Road Not Taken – Robert Frost**'s - Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques

**Ode on a Grecian Urn – John Keats**'s - Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques

**Indian Weavers – Sarojini Naidu**'s - Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques

**UNIT III – SHORT STORIES**

**The Monkey's Paw – W.W. Jacobs**'s biography - Background- Setting- Plot overview- Characters- Themes, Symbols and Motifs - Critical analysis

**The Imp and the Crust – Leo Tolstoy**'s biography - Background- Setting- Plot overview- Characters- Themes, Symbols and Motifs - Critical analysis

**The Doll's House – Katherine Mansfield**'s biography - Background- Setting- Plot overview- Characters- Themes, Symbols and Motifs - Critical analysis

**UNIT IV – ONE ACT PLAYS**

**Never Never Nest – Cedric Mount**'s biography- Plot Summary- Detailed summary and Analysis- Themes- Important Quotations- Characters- Description- analysis- Terms- Symbols- Critical analysis

**The Bishop's Candlesticks – Norman Mckline**'s biography- Plot Summary- Detailed summary and Analysis- Themes- Important Quotations- Characters- Description- analysis- Terms- Symbols- Critical analysis

**UNIT V – FUNCTIONAL ENGLISH**

Preparing for Interviews
Preparing for group discussions
Presentations

**TEXT BOOK:**

1. Board of Editors. **Melody**. Department of English., Dr. N.G.P. Arts and Science College (Autonomous), Coimbatore.

**REFERENCE BOOKS:**

1. Syamala.V. **Effective English Communication for You.** Emerald Publishers. Chennai.
2. N. Krishnaswamy. **Modern English**: **A Book of Grammar, Usage and Composition**. Macmillan India Ltd-New Delhi.
3. Wren and Martin. **High School English Grammar and Composition.** S. Chand Publishing 2006. New Delhi.

| 17UPY43A | CORE- IV:ATOMIC PHYSICS AND SPECTROSCOPY | SEMESER-IV |
|---|---|---|

**Total credits: 5**

**Hours per Week: 5**

**PREAMBLE**

To enable students learn the basic principles, properties and laws of x-ray Spectrum.

**COURSE OUTCOMES**

On successful completion of the programme, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Understand and analyze properties of positive rays, x-rays and the different types of mass spectrograph | K2 |
| CO2 | Recall basic concept of atom model and classify different atom model | K1 |
| CO3 | Discuss and explain theory of optical spectra | K2 |
| CO4 | Explain in detail the laws and the importance of x-ray spectrum. | K2 |
| CO5 | Identify molecular spectrum and discuss its experimental study | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | M | M | S | M |
| **CO3** | M | S | S | S | M |
| **CO4** | S | M | M | S | S |
| **CO5** | S | M | M | S | S |

**S-Strong; M-Medium; L-Low**

| 17UPY43A | CORE- IV:ATOMIC PHYSICS AND SPECTROSCOPY | SEMESER-IV |
|---|---|---|

**Total credits: 5**

**Hours per Week: 5**

**OBJECTIVE**:

To acquaint students with detailed study of atom, its various states and the application of observed theories.

**CONTENTS**

**UNIT - I**

**Positive Rays:** Positive rays – Discovery – Properties – Positive ray analysis – Thomson's Parabola method – action of Electric and Magnetic fields – Determination of e/m – determination of mass – discovery of stable isotopes– Limitations – Dempster's mass spectrograph –Aston's mass spectrograph- mass defect and packing fraction.

**UNIT - II**

**Structure of the Atom:** The Bohr atom model (Bohr Formula and Total energy) – Critical Potentials – Method of excitation of atoms – Experimental determination of critical potentials by Davis and Goucher's method.

Sommerfield's relativistic model– Vector atom model – Quantum numbers associated with Vector atom model – coupling schemes (LS, JJ coupling) – Pauli's exclusion principle – Periodic classification of elements.

**UNIT- III**

**Magneto Optical Properties of Spectrum:** Magnetic dipole moment due to orbital motion of the electron – Magnetic dipole moment due to spin – The Stern and Gerlach experiment –Spin-Orbit Coupling.

Optical spectra – Fine Structure of the sodium D line – Zeeman effect – Experimental arrangement– Lorentz classical theory – Expression for the Zeeman shift – Larmor's theorem – Quantum mechanical explanation of the

normal Zeeman effect – Anomalous Zeeman effect – Paschen – Back effect – Stark effect

**UNIT - IV**

**X-ray Spectra:** X-ray – Coolidge tube – Properties -- X-ray diffraction- Bragg's law- Bragg's spectrometer - Powder crystal method – Rotating crystal method– X-ray Spectra – Characteristics–Continuous X-ray spectrum – polarization of X-rays – scattering of X-rays (Thomson's formula) Moseley's law (Statement, Explanation and Importance) – Compton effect – Expression for change of wave length.

**UNIT - V**

**Molecular Spectra: O**rigin of pure rotational spectra of a molecule -- Theory of the origin of vibration-rotation – Rayleigh's scattering - Raman Effect – Experimental study - Quantum Theory of Raman Effect – Applications – Ultraviolet Spectroscopy – Quartz Spectrograph for near U.V. region - Infrared Spectroscopy – Double beam Infrared spectrometer - Raman Spectroscopy.

**TEXT BOOKS:**

1. *Murugeshan R and Kiruthiga Sivaprasath Er.* 2008. **Modern Physics**. *S Chand and Co, New Delhi*
2. *Arthur Beiser*. 2008. **Concepts of Modern Physics.** *[7th Edition] Tata McGraw Hill Publishing Company Ltd, New York*

**REFERENCE BOOKS:**

1. *Sehgal D.L, Chopra K.L and SehgalN.K.* 1983. **Modern Physics.** *S Chand and Co, New Delhi*
2. *Galsstons S.* 2014. **Source book on Atomic Energy.** *[3rd Edition], Krieger Publishing Company, Florida*
3. *Rajam J. B.* 2010. **Atomic Physics.** *S Chand and Co, New Delhi.*

| 18UPY43P | CORE PRACTICAL - IV: GENERAL EXPERIMENTS | SEMESTER –IV |
|---|---|---|

**Total credits: 2**
**Hours per Week: 4**

**LIST OF**

**EXPERIMENTS: Any**

**8 Experiments**

1.Young's Modulus – Cantilever-Static method

2. Spectrometer – (i-i') Curve

3. Newton's rings – Refractive index of a lens

4. Potentiometer- Low range Ammeter calibration

5. Lee's Disc method – Thermal conductivity of a bad conductor

6. Viscosity – Stoke's Method – Co efficient of viscosity of liquid.

7. Carey Foster's Bridge – Temperature Coefficient

8. Characteristics of Zener diode

9. Characteristics of FET

10. Surface tension-Capillary rise method

| 17UCY4AA | ALLIED II – CHEMISTRY II | SEMESTER - IV |
|---|---|---|

**Total Credits: 3**
**Hours per Week: 3**

**PREAMBLE**

To gain knowledge in the basics of chemistry which helps bioscience students to understand the periodic table, IUPAC nomenclature of organic compounds, enzyme kinetics and water technology.

**COURSE OUTCOMES**

On successful completion of the programme, students will able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Know the position of the elements in the periodic table and their properties. Compare and correlate the periodic behaviour of elements and their properties. | K1, K2, K3 |
| CO2 | Study the preparation, properties, structures and uses of Biomolecules. | K1,K2 |
| CO3 | Study and apply the concepts involved in naming organic compounds. Understand the substitution reactions of aromatic heterocyclic compounds. | K1, K2, K3 |
| CO4 | Study the spontaneity of the reaction, the nature of catalyst and reaction pathway. | K1, K2 |
| CO5 | Know the techniques involved in the purification of water. | K2, K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | S | S |
| **CO2** | M | S | S | S | S |
| **CO3** | S | S | S | S | S |
| **CO4** | M | M | S | S | S |
| **CO5** | M | M | S | S | S |

**S-Strong; M-Medium; L-Low**

| 17UCY4AA | ALLIED II – CHEMISTRY II | SEMESTER - IV |
|---|---|---|

**Total Credits: 3**
**Hours per Week: 3**

**OBJECTIVES:**

On successful completion of this course the students shall gain knowledge in the basics of chemistry which helps bioscience students to understand the periodic table, IUPAC nomenclature of organic compounds, enzyme kinetics and water technology.

## CONTENTS

**UNIT - I**

**Periodic Table**

1. Long form of periodic table – Classification of elements on the basis of electronic configuration – Periodicity in properties – Causes of periodicity- and factors affecting the magnitude of electron affinity, ionization energy, electro negativity, atomic radii and ionic radii.

**UNIT – II**

1. Carbohydrates - Classification, preparation, properties and structure of glucose, fructose, inter conversion of glucose to fructose and fructose to glucose, mutarotation.

**2.** Vitamins - Sources of vitamins, diseases caused by the deficiency of vitamins.

**UNIT – III**

1. IUPAC Nomenclature of organic compounds – alkanes, alkenes, alcohols, aldehydes, ketones, carboxylic acids (mono and dicarboxylic), benzene and naphthalene derivatives.

2. Heterocyclic Compounds – Preparation and properties (physical, chemical and electrophilic substitution reactions) of furan, pyrrole, pyridine and thiophene.

**UNIT – IV**

**Chemical Kinetics**

1. Rate of reaction, rate law, order, molecularity, first order rate law, half life period of first order equation, pseudo first order reaction, zero and second order reactions. Derivation of rate expression for I and II order kinetics.
2. Catalysis – homogenous, heterogeneous and enzyme catalysis (definition only), enzymes used in industry, characteristics of catalytic reactions.

**UNIT - V**

**Water Technology:**

1. Introduction- dissolved impurities in water – hard water – disadvantages of hard water, hardness, estimation of hardness by EDTA titration.

2. Softening methods – zeolite ,demineralization process, reverse osmosis – purification of drinking water, biological oxygen demand (BOD) and chemical oxygen demand (COD).

**TEXT BOOKS:**


1. *R. D. Madan. 2001.* **Modern Inorganic Chemistry**. *S. Chand & Company, New Delhi,.*
2. *Puri , Sharma, Pathania. 2004.***Principles of Physical Chemistry**, *Vishal Publishing Company, Jalandhar.*
3. *M. K. Jain, S. C. Sharma. 2001.* **Organic Chemistry**, *Shoban Lal Nayin Chand, Jalandhar.*
4. *Gopalan R. 1991.***Elements of Analytical Chemistry**, *Sultan Chand & Sons, New Delhi.*
5. *N Krishnamurthy, K Jeyasubramanian, P Vallinayagam.*2000. **Applied chemistry**, *Tata McGraw-Hill Publishing Company limited, New Delhi.*

| 17UCY4AP | ALLIED PRACTICAL I | SEMESTER IV |
|---|---|---|

**Total Credits: 2**
**Hours per Week: 3**

## CONTENTS

### I Volumetric analysis

1. Estimation of Sodium Hydroxide using standard Sodium Carbonate.
2. Estimation of Hydrochloric acid using standard Oxalic acid.
3. Estimation of Oxalic acid using standard Sulphuric acid.
4. Estimation of Ferrous sulphate using standard Mohr salt solution.
5. Estimation of Oxalic acid using standard Ferrous sulphate solution.
6. Estimation of Ferrous ions using Mohr salt solution.

### II Organic Analysis

1. To distinguish between aliphatic & aromatic.
2. To distinguish between saturated & unsaturated.
3. Detection of Elements (N, S, Halogens).
4. Functional group tests for phenols, acids (mono & di), aromatic primary amine, monoamide, diamide, carbohydrate.
   Functional group characterized by Confirmatory test.

### TEXT BOOK:

1. V. Venkateswaran, R. Veeraswamy& A. R. Kulandaivelu. 2004. Basic Principles of practical chemistry, Sultan Chand & Co.

| 17UPY4SA | SKILL BASED COURSE - II: OBJECT ORIENTED PROGRAMMING WITH C++ | SEMESTER-IV |
|---|---|---|

**Total credits: 3**
**Hours per Week: 3**

**PREAMBLE**

To enable students learn the basic principles and concepts of Object

Oriented Programming with C ++

**COURSE OUTCOMES**

On successful completion of the course, students will able to

| CO Number | | Level |
|---|---|---|
| CO1 | Infer OOPS concept in programming | K2 |
| CO2 | Understand Basic Data Types | K2 |
| CO3 | Apply the constructors and destructors | K3 |
| CO4 | Build skill for programming with inheritance | K3 |
| CO5 | Expose problems solving with files | K4 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | M | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | M | M | S | S |
| **CO4** | S | M | S | S | S |
| **CO5** | M | S | S | S | S |

**S-Strong; M-Medium; L-Low**

| 17UPY4SA | SKILL BASED COURSE - II: OBJECT ORIENTED PROGRAMMING WITH C++ | SEMESTER-IV |
|---|---|---|

**Total credits: 3**

**Hours per Week: 3**

**OBJECTIVES:**

1. To enable students learn the basic principles and concepts of Object Oriented Programming with C ++

## CONTENTS

**UNIT - I**

Software evolution – Procedure Oriented programming object oriented programming (OOP) – Basic concepts benefits of OOP – Object oriented languages – Application of OOP .

A simple C++ program – Structure of C++ program- Applications of C++.

**UNIT - II**

Tokens – Key words- Identifiers and constants Basic data types – User defined Data Types – Derived data types -Symbolic constants –Operators in C++ - Scope resolution operators-Expressions and their types-Control structures.

**UNIT - III**

Introduction -The main function – Function prototyping – Call by reference – Return by reference - Inline functions – Default arguments – Constant Arguments - Function overloading .

**UNIT - IV**

Introduction-Specifying a class - Defining Member Functions –C++ Program with class.

Inheritance: Introduction-Defining derived classes-single inheritance-making a private member inheritance-multilevel inheritance-hierarchical inheritance-hybrid inheritance.

**UNIT - V**

Introduction-Classes for file stream operations-opening and closing file-detecting end-of-file-more about open(): file modes-Sequential input and output operations- updating a file:random access.

**TEXT BOOKS:**

1. *Balagurusamy E.* 2013. **Object Oriented Programming with C++** *[6th Edition], Tata McGraw Hill Publishing Company Ltd, New York*
2. *John R. Hubbard.* 2000. **Programming with C++.** *[2nd Edition], Tata McGraw Hill Publishing Company Ltd, New York.*

| 17UNM44V | NMEC-II:<br>EVERYDAY PHYSICS –II | SEMESTER-IV |
|---|---|---|

**Total Credits: 2**

**Hours per Week: 2**

**OBJECTIVE:**

1. To enable non-major Physics students to create interest in Physics and to make them aware with fundamental concepts of Physics

**CONTENTS**

**UNIT - I**

**Force and Energy**

Force- Newton's laws of motion- circular motion – centripetal force – centrifugal force. Centrifuge – washing machine.

Energy – different forms of energy – Law of conservation of energy. Electric bulb-tube light-CFL, LED bulbs.

**UNIT - II**

**Mobile Technology**

Mobile Technology-GSM, CDMA – Mobile phone Features –2G, 3G, 4G and 5G networks.

**UNIT - III**

**Nano Technology**

Nano Technology – Everyday applications of Nano technology – Medicine –Electronics – Environment – Consumer products

**UNIT - IV:**

**Geo physics**

Gravitation – The Moon and Tides - Earthquake – Richter scale – Thunder and lightning – lightning arrestors

**UNIT – V:**

**Fossil Fuel Energy**

Fossil Fuels – Definition – Energy Production – How Fossil Fuels work – Oil – Coal – Natural Gas - Advantages and Disadvantages of Fossil Fuels.

**TEXT BOOKS:**


1. **The Learner's series – Everyday science**, *Infinity Books, New Delhi*
2. *Brij Lal and Subrahmanyam N.* 2003. **Properties of Matter**, *S.Chand and Co, New Delhi*
3. *Garland, G.D.* l979. **Introduction to Geophysics**, *[11th Edition], WB Saunder Company, London*
4. *Senthil Kumar I.G.* 2013. **Engineering Physics I & II.** *VRB Publications, Chennai.*


**REFERENCE BOOKS:**


1. *Resnick and Halliday,* 2015.**Principles of Physics**, *[9th Edition], Wiley Publications.*
2. **Illustrated World of Science Encyclopedia**, *Vol I and Vol VIII, Creative world publication, Chicago.*

| 17UFC4FA | BASIC TAMIL - 2 | SEMESTER - IV |
|---|---|---|

**Total Credits: 2**
**Hours Per Week: 2**

10) மற்றும் – 12 ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு(
( பருவத் தேர்வு உண்டு)

அலகு 1 :நீதி நூல்கள்

- ஆத்திசூடி முதல் "அறம் செய விரும்பு" – (பாடல்கள் 12 – முதல்) வரை "ஒளவியம் பேசேல்"
- கொன்றை வேந்தன்அன்னையும் -( பாடல்கள் 7 – முதல்) முதல் எண்ணும் எழுத்தும் கண் "பிதாவும் முன்னறி தெய்வம் வரை "எனத் தகும்
- திருக்குறள் 6) பாடல்கள் (
  .1அகர முதல (1) .....,
  .2மனத்துக் கண்(34).....
  (100)..... இனிய உளவாக .3,
  .4தீயவை தீய பயத்தலான் (202)..
  .5கற்க கசடற (391).....,
  .6கண்ணோடு கண்ணினை(1100)..

அலகு 2 :அ எளிய நீதிக்கதைகளும் வாழ்க்கை முறைகளும் (

- நீதிகாத்த மன்னன்
- சிங்கமும் முயலும்
- புத்திசாலி உழவனும் போக்கிரிப் பூதமும்
- தேனியும் புறாவும்
- முயல் கூறிய தீர்ப்பு

ஆதமிழக (ப் பண்பாடுகள்(சொற்களைத் தொடராக்குதல்) :

- தமிழர் விழாக்கள் பொங்கல்), ஆடிப்பெருக்கு(
- தமிழர் கலைகள் தெருக்கூத்து), ஓவியம், சிற்பம்,)
- தமிழர் விளையாட்டுகள் (ஏறுதழுவுதல், சடுகுடு)

| 17UFC4FB | ADVANCED TAMIL | SEMESTER - IV |
|---|---|---|

**Total Credits: 2**
**Hours Per Week: 2**

) 10 மற்றும் – 12 ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு உரியது(

( பருவத் தேர்வு உண்டு)

அலகு :1 –மரபுக் கவிதைகள்

அ பாரதியார் கவிதைகள்(

- தமிழ்நாடு
- மனதில் உறுதி வேண்டும்
- வருகின்ற பாரதம் (8-5.எண்.பா)

ஆ பாரதிதாசன் கவிதைகள்(

- இன்பத்தமிழ்
- நீங்களே சொல்லுங்கள்
- உலக ஒற்றுமை
- வாளினை எடடா!

அலகு : 2 –புதுக்கவிதைகள்

- கம்பன் கவியரங்கக் கவிதை -முமேத்தா.
- தமிழாகாசியானந்தன் - !நீ பேசுவது தமிழா !
- நட்புக் காலம் 10)கவிதைகள் அறிவுமதி கவிதைகள் - (

அலகு : 3 –இலக்கணம்

- வல்லினம் மிகும் மற்றும் மிகா இடங்கள்
- ர, ற, - ல, ழ, ள - ந, ண, ன வேறுபாடு அறிதல் -

அலகு :4 –கடிதங்கள் எழுதுதல்

- பாராட்டுக் கடிதம்
- நன்றிக் கடிதம்
- அழைப்புக் கடிதம்
- அலுவலக விண்ணப்பங்கள்

அலகு :5 –பாடம் தழுவிய வரலாறு

- பாரதியாரின் இலக்கியப் பணி
- பாரதிதாசனின் இலக்கியப்பணி
- மரபுக்கவிதை, புதுக்கவிதை விளக்கம் -

| 17UFC4FC | PART-IV: GENERAL AWARENESS | SEMESTER - IV |
|---|---|---|

**Total Credits: 2**
**Hours Per Week: 2**

## CONTENTS

Verbal Aptitude

Numerical Aptitude

Abstract Reasoning

Tamil And Other Literature

General Science And Technology And Education

Computer Science

Economics And Commerce

History And Freedom Struggle

Sports

Current Affairs

| 17UPY53A | CORE - V: MATHEMATICAL PHYSICS AND CLASSICAL MECHANICS | SEMESTER-V |
|---|---|---|

**Total Credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable students learn the basic lagrangian and Hamiltonian formulation

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Solve determinants and matrices | K1,K2, K3 |
| CO2 | Apply integral calculus and differential calculus to solve physical problems. | K3 |
| CO3 | Evaluate beta and gamma functions and the relationship between them | K3 |
| CO4 | Extend lagrangian formulation to oscillator and pendulum | K2 |
| CO5 | Apply Hamiltonian Formulation to oscillator and pendulum | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | S | M | S | S |
| **CO3** | M | M | M | S | S |
| **CO4** | S | S | M | M | S |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY53A | CORE - V: MATHEMATICAL PHYSICS and CLASSICAL MECHANICS | SEMESTER-V |
|---|---|---|

**Total Credits:4**

**Hours/Week:4**

**OBJECTIVE:**

1. To enable students acquire the problem solving ability and to apply the equations for different physical problems.

## CONTENTS

**UNIT - I**

**Matrices:** Basic ideas of matrices – addition, subtraction, scalar multiplication, Transpose of a matrix, conjugate of a matrix, diagonal matrix - Representation of vectors as column matrix – Determinants – Cramer's rule – Eigen Values and Eigen Vectors – Hermitian Matrix, Unitary Matrix.

**Vector Analysis**: Vector Operations - Vector Algebra – Component form – How vectors transform, Applications of vectors in Physics.

**UNIT – II**

**Integral Calculus:** Line integral, surface integral and volume integral – Fundamental theorem of Gradients – Gauss's Divergence Theorem (Statement only) – The fundamental theorem of curl – Stoke's theorem(Statement only). Divergence less and curl less fields. Curvilinear co-ordinates: – Spherical polar coordinates – cylindrical coordinates (Basic ideas).

**Differential Calculus:** The operator $\Delta$ - Gradient, Divergence, Curl – Physical interpretation - Product rules of $\Delta$ - Second derivatives.

**UNIT - III**

**Special Functions**

Definitions – The Beta function – Gamma function – Evaluation of Beta function – Other forms of Beta function – Evaluation of Gamma function – Other forms of Gamma function - Relation between Beta and Gamma functions – Problems.

**UNIT - IV**

**Lagrangian Formulation**

Constraints and Degrees of Freedom – Generalized coordinates – Generalized displacement – Velocity – Acceleration – Momentum – Force – Potential Energy – D'Alembert's Principle – Lagrangians equation from D'Alembert's principle – Application of Lagrange's equation of motion to Linear Harmonic Oscillator, Simple Pendulum and Compound Pendulum.

**UNIT - V**

**Hamiltonian Formulation**

Phase Space – Hamiltonian function – Hamiltonian Principle – Hamilton's canonical equations of motion- Physical significance of H – Applications of Hamiltonian equations of motion to Simple Pendulum, Compound Pendulum and Linear Harmonic Oscillator – Principle of Least Action – Canonical Transformations – Generating Functions – Advantages and Examples of Canonical Transformations.

**TEXT BOOKS:**

1. *Gupta B.D.* 2004. **Mathematical Physics**. [3rd Edition], Vikas Publishing House, New Delhi

2. *Sathiya Prakash.* 2014. **Mathematical Physics.** *[6th Edition] S Chand and Co, New Delhi*
3. *David J. Griffiths.* **Introduction to Electrodynamics –**, *Prentice Hall India Pvt. Ltd.,*
4. *Gupta, Kumar and Sharma*. 2012. **Classical Mechanics.** *Pragati Prakashan, Meerut*

**REFERENCE BOOKS:**

1. *Rajput B.S.* 2011. **Mathematical Physics.** *[23rd Edition], Pragati Prakashan.*
2. *Meerut Dass H.K. 2010*. **Mathematical Physics.** *S Chand and Co, New Delhi.*

| 17UPY53B | CORE- VI:ELECTRICITY AND MAGNETISM | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable students learn the basic principles, theories and concepts of electricity and magnetism.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Analyze fundamental properties of the electric charge and simplify technical problems associated with the electrostatic force using calculus. | K1 |
| CO2 | Understand the fundamental problem in creating efficient thermoelectric materials. | K2 |
| CO3 | Evaluate technical problems associated with LR circuits and coils. | K3 |
| CO4 | Solve technical problems associated with the uniform and non-uniform magnetic fields on moving charges. | K2,K3 |
| CO5 | Classify magnetic materials, their properties and applications in industry. | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | S | M | M | S |
| **CO3** | S | S | S | M | S |
| **CO4** | S | S | S | M | M |
| **CO5** | M | S | M | S | S |

**S-Strong; M-Medium; L-Low**

| 17UPY53B | CORE- VI:<br>ELECTRICITY AND MAGNETISM | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**OBJECTIVE**:

1. To enable students learn the basic principles, theories and concepts of electricity and magnetism.

**CONTENTS**

**UNIT - I**

**Gauss theorem and its applications:** Gauss Law – Applications – Field due to a uniformly charged sphere – Field due to an infinite plane sheet of charge - Field due to two parallel sheets of charge - Coulomb's Theorem – Mechanical force experienced by unit area of a charged conductor—Energy stored per unit volume in the medium surrounding the charged conductor – Deduction of Coulomb's inverse square law from Gauss's law.

**UNIT - II**

**Thermo-electricity :** Seebeck effect – Laws of thermo e.m.f – Peltier effect; determination of Peltier Coefficient Starling Method – thermo dynamical consideration of Peltier effect – Thomson effect – Thomson co-efficient – Thermodynamics of Thermocouple – Expressions for Peltier and Thomson coefficients –Thermoelectric diagrams and their uses.

**UNIT - III**

**Varying currents:** Growth and decay of currents in L-R circuit - charging and discharging of capacitor in C-R circuit - Decay of charge in LCR circuit – Importance in wireless Telegraphy.

**Alternating current:** Mean and RMS values of current and emf with sinusoidal wave form - LR, CR and series LCR circuits – reactance – impedance - phase-angle - power factor - vector diagram - resonance in a series LCR circuit - Q-factor - Vector diagram - Parallel Resonant Circuit – Comparison between series and parallel resonant circuits.

**UNIT - IV**

**Magnetic Effects of Electric current:** Biot-Savart Law - Force on a current carrying conductor – Force between two parallel current carrying conductors – Force experienced by an electron moving in a magnetic field – Torque on a current loop in a uniform magnetic field - Moving Coil Ballistic Galvanometer – Correction for damping – Dead beat – Comparison of two capacitances using BG. Ampere's circuital law (statement only) - Magnetic field due to a straight conductor, circular coil, solenoid, endless solenoid, Magnetic field due to a small current loop .

**UNIT - V**

**Magnetic Properties of materials:** Basic definitions – Magnetic field B - Magnetization M -- Magnetic field intensity H -- Magnetic Susceptibility and Magnetic Permeability -- dia, para, ferromagnetism and their properties – Antiferromagnetism and Antiferromagnetism – The Electron theory of Magnetism. Magnetic hysterisis – area of the hysteresis loop – energy loss -- Determination of susceptibility- Curie Balance method – Magnetic circuits – Circuits comparison of magnetic application with electrical circuits.

**TEXT BOOKS:**

1. *Murugesan R.* 2011. **Electricity and Magnetism**. *[9th Edition], S Chand and Co, New Delhi.*

2. *Brijlal and Subramaniam.* **Electricity and Magnetism.** *S Chand and Co, New Delhi*

**REFERENCE BOOKS:**

1. *Vasudeva D.N.* 2011. **Fundamentals of Magnetism and Electricity.** *S Chand and Co, New Delhi*
2. *Duggal B.D. and Chhabra C.L.***Fundamental of Electricity and Magnetism** *Vishal Publishing Co, Jalandhar.*
3. *Robert Resnick, David Halliday and Kenneth S.Krane.* 2001.**Physics.***[5th Edition] Wiley India, New Delhi*
4. *Griffiths. D.J.* 2006. **Introduction to Electrodynamics**. *Pearson Prentice Hall, New Delhi.*

| 17UPY53C | CORE- VII:<br>APPLIED ELECTRONICS | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable students, learn the basic principles and working of oscillators, transistors and amplifiers.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Understand the basic concept of semiconductors, types of solids, rectifiers and diodes | K1,K2 |
| **CO2** | Analyze different actions of transistors through experiments in laboratories | K3 |
| **CO3** | Construct different oscillators and amplifiers through laboratory experiment | K3 |
| **CO4** | Compare and study modulators, demodulators with different types. | K2,K3 |
| **CO5** | Differentiate FET,JFET,MOSFET and UJT | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | S | S | M | M |
| **CO3** | S | S | M | S | S |
| **CO4** | M | M | S | S | M |
| **CO5** | S | S | M | S | M |

**S-Strong; M-Medium; L-Low**

| 17UPY53C | CORE- VII:<br>APPLIED ELECTRONICS | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**OBJECTIVES:**

1. To make students learn fundamentals of electronics and apply in their everyday life

**CONTENTS**

**UNIT - I**

**Semiconductor Fundamentals and devices:**

Energy band in solids – Types of semiconductor P type , N type –Intrinsic and extrinsic semiconductor.

**Diodes, Rectifiers and Filters** Characteristics of PN Junction—Zener diode – Zener diode as voltage regulator – Half wave and Full wave rectifier – Bridge rectifier and ripple factor -- Filter circuits.

**Special purpose diodes:** LED, Photodiode and Tunnel diode, SCR.

**UNIT - II**

**Transistor and Transistor biasing:** Transistor action – Common Emitter and Common base connections – Relation between α and β – Characteristics of CE connection – Transistor load line analysis – DC load line – Operating point.

Need for transistor biasing – Stabilization – Essentials of transistor biasing circuit – Stability factor – Base resistor method for transistor biasing – Voltage driver biasing

**UNIT - III**

**Amplifiers**: Voltage and power amplifiers – Classification of amplifiers – RC coupled Amplifier – Transformer coupled amplifier – Power amplifiers – Class A, Band C amplifiers – Push-Pull amplifiers.

**Oscillators:** Introduction - Types of oscillators - Fundamental principle of oscillators- Barkhausen criteria -Hartley oscillators - Colpitts oscillators – Phase shift oscillators - Wien bridge oscillators- Crystal oscillators.

**UNIT - IV**

**Power Electronics:** JFET – Difference between JFET and BJT – Principle and working of JFET – Characteristics and Parameters of JFET.

MOSFET – Working, characteristics of Depletion and Enhancement MOSFET

Uni junction transistor – Constructions – Operations - equivalent circuit of UJT – Characteristics of UJT - advantages of UJT – UJT relaxation Oscillator.

**UNIT - V**

Multivibrator – Types of multivibrator – Astable – Monostable – Bistable multivibrators.

**Modulation and Demodulation:** Modulation -- Types – Amplitude Modulation – Modulation factor – Analysis of AM wave –Side band frequencies in AM wave – Transistor AM modulator – Power – Limitations of AM-- Frequency modulation – Demodulation – AM diode detector – AM radio receivers – super heterodyne receiver – FM detection.

## TEXT BOOKS:


1. *Metha V.K. and Mehta R.* 2010, **Principles of Electronics**, *[11th Edition], S Chand and Co, New Delhi*
2. *B L Theraja.* 2006. **Basic Electronics.** *S Chand and Co, New Delhi*.
3. *Millman J. Halkias C. and Chetan Parikh.* 2009, **Integrated Electronics**, *[2nd Edition] Tata McGraw Hill Publishing Company Ltd, New York.*
4. *Sedha R.S.* 2008. **A Text Book of Applied Electronics**. *[3rd Edition], S Chand and Co, New Delhi*


## REFERENCE BOOKS:


1. *Chattopadhyaya D. and Rakshit P.C.* 2014. **Foundation of Electronics.** *New Age International, New Delhi*
2. *Murugeshan R and Kiruthiga Sivaprasath Er.* 2008. **Modern Physics**. *S Chand and Co, New Delhi*
3. *Millman and Halkias.* 1967. **Electronics Devices and Circuits.** *Tata McGraw Hill Publishing Company Ltd, New York*

| 18UPY53P | CORE PRACTICAL –V: GENERAL EXPERIMENTS | SEMESTER –V |
|---|---|---|

**Total credits:2**

**Hours/Week:4**

**LIST OF EXPERIMENTS :**

**Any 8 Experiments**

1. Young's Modulus – Non uniform bending -Koenig's method.
2. Spectrometer –grating---Minimum deviation-Mercury vapor lamp
3. Resistivity of Semiconductors – Four Probe method
4. M and H Determination-Deflection Magnetometer
5. Ballistic Galvanometer – Comparison of Mutual Inductance
6. Characteristics of UJT
7. IC regulated power supply
8. Hartley Oscillator
9. Polarimeter- Optical activity of liquid
10. Spectrometer-Biprism

| 18UPY53Q | CORE PRACTICAL - VI: DIGITAL ELECTRONICS | SEMESTER –V |
|---|---|---|

**Total credits:2**

**Hours/Week:4**

**LIST OF EXPERIMENTS:**

**Any 8 Experiments**

1. Sine wave generator using 741 IC
2. Square wave generator using 555 IC
3. Verification of Truth tables of IC gates: OR, AND, NOT, XOR, NOR and NAND.
4. NAND as universal building block- AND, OR, NOT,NOR
5. NOR as universal building block- AND, OR, NOT,NAND
6. De Morgan's theorems verification.
7. Study of RS Flip-Flop.
8. Study of Shift –Registers –Serial in Parallel out.
9. Half Adder and Full Adder
10. Half Subtractor and Full Subtractor

| 17UPY5EA | ELECTIVE- I:<br>MATERIALS SCIENCE | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable students learn the properties of magnetic materials and new engineering materials

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Understand engineering materials with their bonding nature. | K2 |
| CO2 | Recall mechanical behaviours of engineering materials | K1 |
| CO3 | Explain properties of magnetic materials and dielectric materials with their domain structure | K2 |
| CO4 | Understand smart materials and their applications in modern trend. | K2 |
| CO5 | Apply the concepts of different testing methods such as NDT,SEM for various properties. | K2,K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | S | S |
| **CO2** | S | M | M | M | S |
| **CO3** | S | S | M | S | M |
| **CO4** | S | S | S | M | S |
| **CO5** | S | S | M | M | M |

**S-Strong; M-Medium; L-Low**

| 17UPY5EA | ELECTIVE- I:<br>MATERIALS SCIENCE | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**OBJECTIVES:**

1. To enable students to acquire the fundamental knowledge in Mechanical behaviour of materials and dielectrics.

**CONTENTS**

**UNIT - I**

**Chemical bonding and Engineering materials**

Bond energy – bond type and bond length – ionic and covalent bonding – Stability and metastability- variation in bonding character and properties–– Classification of engineering materials – levels of structure – structure-property relationship in materials.

**UNIT - II**

**Mechanical behaviour of materials**

Elastic behaviour – atomic model of elastic behaviour – Young's modulus – Poisson's ratio – shear modulus – bulk modulus – the modulus as a parameter of design – rubber like elasticity – plastic deformation – tensile stress - strain curve.

**UNIT - III**

**Magnetic materials and dielectric materials**

Terminology and classification – magnetic moment due to electron spin – ferromagnetism and the domain structure – soft and hard magnetic materials. Polarization – electronic, ionic, orientation and space charge polarization – temperature and frequency effects – electric breakdown – ferroelectric materials.

## UNIT - IV

### Smart Materials

Definition of smart materials - Types- Piezoelectric materials-Materials for MEMS and NEMS- Ferrofluid- Magnetic shape-memory alloys (MSMAs)- Shape memory alloy (SMA)- One way and Two way memory effect- Dielectric elastomers (DEs)- Light sensitive materials- Smart catalysts

## UNIT - V

### Non-destructive testing

Radiographic methods – photo-elastic methods – magnetic methods – electrical method – ultrasonic method. Equipments used for NDT – metallurgical microscope - electron microscope – scanning electron microscope (SEM).

**TEXT BOOKS:**

1. Raghavan, V. 1990. **Materials Science and Engineering – A first course.** [3rd Edition] Prentice Hall, New Delhi
2. Arumugam. 1990. **Materials Science.** Anuradha agencies & publishers.
3. Gandhi, M.V. and Thompson, B.S. 1992. **Smart Materials and Structures.** Chapman & Hall.

**REFERENCE BOOKS:**

**1.** Kittel C. 2012. **Introduction to Solid State Physics.** [8th Edition], Wiley India, New Delhi
**2.** Manchandra V.K. 1992. **A Text Book of Materials Science.** New India Publishing House.
**3.** Myer Kutz, 2006. **Mechanical Engineers' Handbook**: **Materials and Mechanical Design**. [3rd Edition], John Wiley & Sons, Inc.
4. Culshaw B Smart, 1996. **Structures & Materials.** Artech House.

| 17UPY5EB | ELECTIVE- I:<br>ENERGY PHYSICS | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/WeeK:4**

**PREAMBLE**

To enable students, learn the basic principles and fundamentals of energy sources and its applications.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Make use of electrical energy in home appliances | K1 |
| CO2 | Discuss non- conventional energy sources | K1 |
| CO3 | Explain bio gas and the generation of bio gas. | K2 |
| CO4 | Understand thermal energy their laws and types of pyroheliometers | K2 |
| CO5 | Outline on solar energy and their applications. | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | S | S |
| **CO2** | S | S | M | S | M |
| **CO3** | S | S | S | M | M |
| **CO4** | S | S | M | S | M |
| **CO5** | S | M | S | S | M |

**S-Strong; M-Medium; L-Low**

| 17UPY5EB | ELECTIVE- I:<br>ENERGY PHYSICS | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/WeeK:4**

**OBJECTIVES**:

1. To enable students learn fundamentals of energy sources and its applications.

## CONTENTS

**UNIT - I**

**Electrical Energy**

Heat developed in current carrying conductor – Application of heating effect – Electric heater or stove – Electric radiation and Electric Iron – Electric welding and electric furnace – Carbon arc – Electric Lamp – Efficiency of a Lamp – Measurement of Electric Power.

**UNIT – II**

**Wind Energy**: Power in the wind – Types of wind energy systems – Horizontal axis wind Turbine – Vertical axis wind Turbine- Merits and Demerits.

**Ocean Energy**: Tidal Energy – Ocean Thermal Energy Conversion (OTEC) – Closed Cycle OTEC system – Open Cycle OTEC System.

**UNIT – III**

**Biomass and Biogas**

Energy from biomass, biomass conversion technologies-wet and dry process-photosynthesis biogas generation: introduction –basic processes and energetic-advantages of anaerobic digestion-factors affecting bio-digestion and generation of gas.

**UNIT – IV**

**Thermal energy**

Definition of Total thermal Energy density - Spectral Energy density – Spectral Emissive power – Emissivity – Emissive power – Absorptive power – Reflective power – Kirchoff's Law of radiation and its proof – verification of Kirchoff's Results: Ritche's Experiment. Distribution of Energy in the thermal spectrum – Lummer and Pringsheim Experiment and its Results – Wien's Displacement Law and Radiation Law – Rayleigh Jean's Law Planck's Radiation Law – Deduction of Wien's Law and Rayleigh – Jean's Law from Planck's law.

**UNIT – V**

**Solar energy**: Solar radiation – Solar radiation outside the earth's atmosphere Solar radiation at the earth's surface – Solar Thermal Energy – Solar Thermal devices and systems: Solar water heater – Sub components of solar water heater – Solar Cooker and its merits and demerits. Solar constant – Temperature of sun – Disappearing filament optical Pyrometer - Pyroheliometers: Angstrom Pyroheliometer – Water flow Pyroheliometer.

**TEXT BOOKS:**

1. *Rai G.D.* 2004. **Solar Energy Utilization.** *Khanna Publishers, New Delhi.*
2. *Brij Lal and Subrahmanyam N.* 2010. **Heat and Thermodynamics**. *S Chand and Co, New Delhi*
3. *MaheshwarDayal*. 1991. **Renewable Energy Environment and Development.** *Konark Publication, New Delhi*
4. *Suhatme S.P. and Nayak J. K.* 2009. **Solar Energy.** *[3rd Edition], Tata McGraw Hill Publishing Company Ltd, New York*

**REFERENCE BOOKS:**


1. *Brijlal and SubramanyamN.* 2001. **Electricity and Magnetism.** *S Chand and Co, New Delhi*
2. *Senthil Kumar I.G.* 2013. **Engineering Physics.** *VRB Publications, Chennai*
3. *Singhal, Agarwal and Prakash*. 2009. **Thermodynamics and Statistical Physics.** *Pragati Prakashan, Meerut*
4. *Mathur D.S.* 2002. **Heat and Thermodynamics.** *S Chand and Co, New Delhi*
5. *Rajam J.B. and Arora C.L.* 1981. **A Text Book of Heat and Thermodynamics.** *S Chand and Co, New Delhi*.

| 17UPY5EC | ELECTIVE- I:<br>AGRICULTURAL PHYSICS | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable students learn the different concepts of Physics in Agriculture and its applications.

**COURSE OUTCOMES**

On successful completion of the course, students will able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Classify and explain significance of soil | K2 |
| **CO2** | Explain importance of ground water | K2 |
| **CO3** | Learn basic principle of alternating current | K1 |
| **CO4** | Analyze hygrometry and water pumps | K2 |
| **CO5** | Make use of solar energy in everyday life | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | S | S |
| **CO2** | M | S | M | S | S |
| **CO3** | S | S | S | M | M |
| **CO4** | S | S | M | M | S |
| **CO5** | S | S | S | S | S |

**S-Strong; M-Medium; L-Low**

| 17UPY5EC | ELECTIVE- I:<br>AGRICULTURAL PHYSICS | SEMESTER-V |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**OBJECTIVES:**

1. To make students aware of the different concepts of Physics in Agriculture and its varied applications.

**CONTENTS**

**UNIT – I**

**Soil Physics**

Mechanical composition of soil – physical properties of soil, pore space, bulk density, particle density – classification – significance of clays – plasticity, shrinkage, flocculation and deflocculation – Soil structure – soil colour – Thermal properties of soil and soil temperatures types of soil water – its retention, movement – viscosity, swelling – soil moisture losses – Elementary ideas of soil water conservation.

**UNIT – II**

**Water Physics**

Water qualities – Rain fall – Ground water – Find Ground water – surface water pollution – instrumentation and sampling – water quality monitoring

**UNIT – III**

**AC Power system**

Principle of production of A.C. – Average value of A.C. voltage or current – R.M.S. value of alternating voltage or current – power consumed in A.C. Circuits – kilo watt hour – A.C. generator – Three phase A.C. – Distribution of three phase A.C. Three phase four system – The choke- The transformer – Transmission of electric power over long distances.

**UNIT – IV**

**Hygrometry**

Absolute Humidity – Relative Humidity – Dew point, Daniell's Hygrometer, Regnault's hygrometer. Advantages of Regnault's hygrometer – wet and Dry and Bulb hygrometer

**PUMPS**

Water pumps – common pump –Submersible Pump–Solar powered pump– Head discharge

**UNIT – V**

**Solar Collector and Applications**

Solar Air heaters- Application of solar air heaters. Solar Drying with various driers – Heating and Drying of Agricultural products – Theory of solar drying – moisture content and its measurement – solar ponds – Application of solar ponds – Solar pumping – Solar pump system components – Turbine driven pump – Application of solar energy to agricultural crops.

**TEXT BOOKS:**

1. *Brij Lal and SubrahmanyamN.* 2010. **Heat and Thermodynamics.** *S. Chand and Co, New Delhi*
2. *Mathur D.S.* 2006. **Mechanics**. *S Chand and Co, New Delhi*
3. *Rai G.D.* 2004. **Solar Energy Utilization.** *Khanna Publishers, New Delhi*

**REFERENCE BOOKS:**

1. *Buckman H.O. and Brady*. 1990. **Nature and properties of Soil.** *[10th Edition], Maxwell Macmillan International, London*

2. *William A. Jury, Wilford R. Gardner and Hale Gardner W.* 1972. **Soil physics.** *Wiley, New York*

3. *KohnKe H.* 1988. **Soil physics.** *Tata McGraw Hill Publishing Company Ltd, New York*

4. *John C. Rodda, Richard A. Downing, Frank M. Law*, 1976, **Systematic Hydrology**, *Newnes Butterworths.*

| 17UPY5SA | SKILL BASED COURSE--III : DIGITAL ELECTRONICS AND OPERATIONAL AMPLIFIERS | SEMESTER-V |
|---|---|---|

**Total credits:3**

**Hours/Week:3**

**PREAMBLE**

To enable the students for learning and applying basic principles, theory and concepts of digital electronics.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Understand problems related to number systems and Boolean algebra. | K2 |
| **CO2** | Apply logic gates and Demorgan's law through experiments in laboratories. | K1 |
| **CO3** | Demonstrate flip flops using logic gates and Synchronous counters. Identify Shift Registers using JK / D Flip Flop | K3 |
| **CO4** | Understand and demonstrate memories, its types and their applications. | K3 |
| **CO5** | Make Use of OP-AMP through experiments in laboratories and for various applications. | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | S | M | S | M |
| **CO3** | S | S | S | M | M |
| **CO4** | S | M | S | M | S |
| **CO5** | S | S | M | S | M |

**S-Strong; M-Medium; L-Low**

| 17UPY5SA | SKILL BASED COURSE--III : DIGITAL ELECTRONICS AND OPERATIONAL AMPLIFIERS | SEMESTER-V |
|---|---|---|

**Total credits:3**

**Hours/Week:3**

**OBJECTIVES:**

1. To enable students learn the basic concepts Number System, Boolean Algebra and its applications.

**CONTENTS**

**UNIT - I**

**Number System, Binary Arithmetic and Codes**

Binary Numbers- Octal numbers- Hexadecimal numbers (Conversion of one number system into other). Arithmetic operation – Binary Addition – Binary subtraction – 1's complement subtraction - 2's complement subtraction.

Codes – Binary coded decimal – BCD addition and subtraction – Weighted binary codes – Non- weighted codes- Excess 3 codes – Grey code – Error detection and correction codes – ASCII & EBCDIC codes

**UNIT - II**

**Boolean algebra**

Basic laws of Boolean algebra – Boolean addition and multiplication – Properties of Boolean algebra – De Morgan's theorems .

**Logic gates and Arithmetic Circuits**

OR, AND, NOT, NAND, NOR Ex-OR, Ex-NOR gates – Universal building blocks –– Half adder – Full adder – Half Subtractor – Full Subtractor –

Parallel binary adder – Parallel binary Subtractor – Binary to Grey code converter – Grey to Binary converter

**UNIT- III**

**Flip-flops and their applications**

SR flip-flop – Clocked SR flip flop – D flip-flop JK flip-flop – T flip-flop – Triggering of flip-flops – Level triggering – Edge triggering – Master-Slave JK flip-flop.

Applications: Shift Registers – 3 and 4-bit shift registers – Counters – 4 bit Ripple binary counter – MOD 3 counters – MOD 6 counters and Decade counter (all MOD counters using JK flip-flop only).

**UNIT – IV**

**A/D and D/A Converters and Memory Devices**

A/D Converters – Simultaneous type and counter type – D/A Converters – Weighted resistors type – R-2R ladder type.

Memory Devices: Classification of memories – ROM – Architecture of ROM – 32 x 4 ROM using OR gates – Diode matrix ROM – PROM, EPROM, EEPROM, RAM (Basic ideas only)

**UNIT – V**

**Operational Amplifier**

Introduction- operational overview- IC identification- OP-AMP packages -characteristics of OP-AMP-Common mode rejection ratio(CMRR)- slew rate-inverting amplifier- Non inverting amplifier-adder or summing amplifier-OP-AMP as integrator, differentiator, difference amplifier, logarithmic amplifier-comparator.

**TEXT BOOK:**


1. *Salivahanan S. and Arivazhagan S.* 2009. **Digital Circuits and Design.** *Vikas Publishing House, New Delhi*
2. *Malvino and Leach.* 2010. **Digital Principles and Applications**, *Tata McGraw Hill Publishing Company Ltd, New York*
3. *Donald D Leach, Albert paul Malvino, GoutamSaha.* **Digital Principles and Applications.** *Special Indian edition, McGraw Hill Education, New Delhi.*
4. *Murugasen .R and Kiruthiga Sivaprakash .Er, 2014.* ***Modern Physics***, *S.Chand &Company, Pvt.LtD, New Delhi.*
5. Shedha .R.S, 1999. **A Text Book of Applied Electronics**, *S.Chand &Company, Pvt.LtD, New Delhi.*


**REFERENCE BOOKS:**


1. *Moris Mano*. 2004. **Digital Logic and Computer Design.** *Pearson India, New Delhi*
2. *Gothmann W.H.* 2009. **Digital Electronics.** *Phi Learning, New Delhi.*

| 17UPY5SB | SKILL BASED COURSE–IV: MICROPROCESSORS | SEMESTER-V |
|---|---|---|

**Total credits:3**

**Hours/Week:3**

**PREAMBLE**

To enable students, learn basic programming in microprocessor

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Understand the microprocessor architecture | K1 |
| CO2 | Explain memory and I/O devices | K2 |
| CO3 | Develop assemble language programming | K2 |
| CO4 | Learn about the additional instructions in programming techniques | K3 |
| CO5 | Recall on code conversions and stack instructions | K1 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | S | M | M | M |
| **CO3** | S | S | M | S | M |
| **CO4** | M | M | S | M | M |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY5SB | SKILL BASED COURSE–IV: MICROPROCESSORS | SEMESTER-V |
|---|---|---|

**Total credits:3**

**Hours/Week:3**

**OBJECTIVES:**

1. To foster students learn the basic concepts of Microprocessors, semiconductor memories and its programming.

**CONTENTS**

**UNIT – I**

**Micro Computers, Micro Processor And Assembly Language:** Digital computers – computer languages – from large computers to single – chip microcomputers**.**

**Micro Processor Architecture And Microcomputer Systems**: Microprocessor Architecture and its operations – Memory – input and output (I/O) Devices – Examples of a microcomputer system – Review: Logic Devices for interfacing.

**UNIT – II**

**8085 Micro Processor Architecture And Memory Interfacing**: The 8085 MPU – Example of a Microcomputer – Memory – input and output displays – How does an 8085 – Based Single Board Micro computer work.

**Interfacing I/O Devices**: Basic interfacing concepts – interfacing output displays – interfacing input devices – memory – mapped I/O and I/O mapped I/O schemes.

**UNIT – III**

**Introduction I/O 8085 Assembly Language Programming**: The 8085 programming model – instruction classification – instruction format – How

to write, Assemble and Execute a simple program – Overview of the 8085 instruction set.

**INTRODUCTION TO 8085 INSTRUCTION**: Data Transfer (copy) operations – Arithmetic operations – Logic operations – Branch operations – Writing assembly language programs – Debugging a program.

**UNIT – IV**

**Programming Techniques With Additional Instructions**: Programming techniques; Looping, counting and indexing – Additional Data transfer and 16-bit Arithmetic instructions – Arithmetic operations Related to Memory.

**UNIT – V**

**Stack And Subroutines:** Stack, Stack Pointer, Stack related instructions: PUSH, POP, XTHL, XCHG, SPHL, etc.; Subroutines, Unconditional/Conditional Call and Return instructions

**Code Conversion, Bcd, Arithmetic And 16-Bits Data Operators**: BCD-to-Binary conversion – BCD-to-Seven segment LED code conversion – Multiplication – subtraction with carry.

**TEXT BOOKS:**

1. Ramesh. S.Gaonkar – **Microprocessor Architecture Programming and Application with the 8085**. *Prentice Hall, New Delhi*
2. *Aditya P Mathur.* 1990. **Introduction to Microprocessors.** *[3rd Edition] Tata McGraw Hill Publishing Company Ltd, New York*

3. *NagoorKani A.* 2012**. Microprocessors And Microcontrollers.** *[2nd Edition], Tata McGraw Hill Publishing Company Ltd, New York*

**REFERENCE BOOKS:**

1. *Ramachandran K.* 2009. **Mechatronics and Microprocessors.** *Wiley India Pvt. Ltd, New Delhi.*
2. Leventhal**: Introduction to Microprocessor Hardware, Software, programming**.

| 17UPY63A | CORE- VIII:<br>NUCLEAR PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable students, acquire knowledge about concepts of Nuclear Physics and elementary particles

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Outline properties of nucleus and the various nuclear models | K1 |
| CO2 | Learn about the particle accelerators and detectors | K1 |
| CO3 | Determine alpha, beta , gamma rays and their properties | K2 |
| CO4 | Differentiate nuclear fission and nuclear fusion | K2 |
| CO5 | Explain cosmic rays and elementary particles. | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | M | M |
| **CO2** | S | S | M | S | M |
| **CO3** | S | S | M | S | M |
| **CO4** | S | S | M | M | S |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY63A | CORE- VIII:<br>NUCLEAR PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**OBJECTIVES:**

1. To make students acquire fundamental knowledge about the theoretical concepts of Nuclear Physics and elementary particles

## CONTENTS

**UNIT - I**

**Introduction to the Nucleus:** General properties of Nucleus (Size, Mass, Density, Charge, Spin, Angular momentum, Magnetic dipole moment) – Binding energy – Packing fraction – Nuclear stability – Nuclear forces – Definition – Properties – Meson theory – Model of Nuclear Structure – The Liquid Drop model – Semi-Empirical mass formula – The Shell model – Evidence for Shell model –The collective model.

**UNIT - II**

**Particle Accelerators and Detectors:** Interaction between the energetic particles and matter – Heavy charged particles - Ionization chamber – Solid State detector – GM counter – Wilson Cloud chamber – Diffusion cloud chamber - Nuclear emission – Linear accelerators – Cyclotron – Betatron – Synchrotron.

**UNIT - III**

**Radioactivity:** Natural Radioactivity – Alpha, Beta and Gamma rays – Properties – Determination of e/m of Alpha particle – Determination of Charge of Alpha particle – Determination of e/m of Beta particle – determination of Wavelength of Gamma rays (Du Mond Spectrometer) –

Origin of Gamma rays – Laws of Radioactivity – Soddy-Fajan's displacement law – Law of Radioactive disintegration – Half life period – Mean life period (Definitions, Expression) – Artificial Radioactivity – Preparation of radio elements – Application of radio isotopes.

**UNIT - IV**

**Nuclear Fission:** Nuclear fission – Energy released in Fission – Bohr and Wheelers theory of Nuclear fission – Chain reaction – Multiplication factor – Critical size – Natural Uranium and chain reactions – Atom Bomb – Nuclear reactor.

**Nuclear Fusion:** Nuclear fusion – Source of Stellar energy – Carbon Nitrogen cycle – Proton-Proton cycle – Hydrogen bomb – Controlled thermo nuclear reactions.

**UNIT - V**

**Cosmic rays:** Cosmic rays – Origin of cosmic rays – Latitude effect – Azimuth effect – Attitude effect – Seasonal, Diagonal changes – Primary and Secondary Cosmic rays cascade theory of shower – Pair production and Annihilation – Van Allen Belts.

**Elementary particles:** Introduction – particles and antiparticles – Antimatter – The fundamental interactions – Classification of elementary Particles - The Quark model.

**TEXT BOOKS:**

1. *Murugeshan R. and Kiruthiga Sivaprasath Er.* 2008. **Modern Physics.** S Chand and Co, New Delhi
2. *Tayal D.C.* 2011. **Nuclear Physics**. Himalaya Publishing House, Mumbai

3. Satyaprakash .***Nuclear Physics and particle Physics*.** Sultan Chand& sons educational publishers-New Delhi

**REFERENCE BOOKS:**

1. *Arthur Beiser*. 2008. **Concepts of Modern Physics.** [6th Edition], Tata McGraw Hill Publishing Company Ltd, New York
2. *Richtmyer F.K.* 1956. **Introduction to Modern Physics**. Tata McGraw Hill Publishing Company Ltd, New York.

| 17UPY63B | CORE- IX: QUANTUM MECHANICS AND RELATIVITY | SEMESTER-VI |
|---|---|---|

**Total credits:5**

**Hours/Week:5**

**PREAMBLE**

To enable students, learn the basic principles of wave mechanics,

Schrodinger wave equations and its applications

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Understand the basic concept of properties of waves, de Broglie wavelength and photoelectric effect. | K1 |
| CO2 | Explain uncertainty principle, its physical significance and applications | K2 |
| CO3 | Apply the concepts of Schrodinger equation to one dimensional problem | K3 |
| CO4 | Apply the concepts to three dimensional problem | K1 |
| CO5 | Understand theory of relativity and Lorentz transformation | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | M | S |
| **CO2** | S | S | S | M | M |
| **CO3** | M | M | M | S | M |
| **CO4** | S | S | M | S | M |
| **CO5** | S | S | M | M | M |

**S-Strong; M-Medium; L-Low**

| 17UPY63B | CORE- IX: QUANTUM MECHANICS AND RELATIVITY | SEMESTER-VI |
|---|---|---|

**Total credits:5**

**Hours/Week:5**

**OBJECTIVES**:

1. To enable students learn fundamentals of wave mechanics, Schrodinger wave equations and its applications along with fundamental concepts in Relativity.

**CONTENTS**

**UNIT - I**

**Basic concepts:** Conclusion from the electromagnetic theory-properties of photons-photons and gravity-The effect of(Gravitational Red Shift) gravity on Astronomical radiations-Einstein's photoelectric equation-Role of constants c and h physics-The Electron volt-de Broglie's matter waves-Absence of matter waves in macroscopic world-Davisson and Germer's experiment on diffraction of electrons-Matter waves(due to electrons) in atoms-wave-particle duality in nature-Quantum properties of micro particles.

**UNIT - II**

**Development of Quantum Mechanics:** Probabilistic description of photons(double slit experiment) –Particle/Waves in classical physics and its physical significance-The form of wave function and its physical significance-The form of wave function for matter wave (wave packet, group velocity and phase velocity)-Heisenberg's uncertainty principle:($\Delta x$, $\Delta P_X$, $\Delta E$, $\Delta t$),Experiment, Applications-Operators and Observations-Angular momentum operators and its representation in spherical polar coordinates-Expectation value.

**UNIT - III**

**One Dimensional Problem:** Schrödinger equation(time dependent form)-commutation relations - Steady state form of Schrödinger equation – Equation of continuity and probability current density - particle in a rectangular potential well - particle in one dimensional box - Orthogonality of Eigen functions-The harmonic oscillator-the potential step – rectangular potential barrier.

**UNIT - IV**

**Three Dimensional Problems:** Schrödinger equation for the hydrogen atom – solution – quantum numbers – Eigen functions – Angular, Radial wave functions – shells and sub shells in atom – Aufbau principle – Hund's rule – Penetrating and non penetrating orbits.

**UNIT - V**

**Special Theory of Relativity :** Frame of references – Galilean transformation – Newtonian relativity – The velocity of light – Failure of Newtonian mechanics – Newtonian relativity and electromagnetism – the concept of Ether – Michelson – Morley experiment – Einstein's postulates – Lorentz transformations – Inverse transformations – Velocity transformation – length contraction – Time dilation – variation of mass – Energy equation in relativity – Equivalence of energy and mass – World regions and the light cone.

**TEXT BOOKS:**

1. *Gupta, Kumar and Sharma*. 2012. **Quantum Mechanics.** *[31st Edition], Jai Prakash Nath Publications, Meerut*

2. *Aruldas*. 2008. **Quantum Mechanics.** *[2nd Edition], PHI Learning, New Delhi*

3. H.S. Mani and G.K. Metha, **Introduction to Modern Physics**, *EWP, New Delhi, LCSE, 1988.*

4. S.P. Puri, **Special theory of relativity**, *Pearson, 2013.*

5. SwatiSaluja, Sathya Prakash, 2005.**Quantum mechanics**, *Publication: kedar Nath , Ram Nath and Co.*

6. P. M. Mathews, T. K. Venkatesan, **A Text Book for Quantum Mechanics** : *McGraw – Hill Publishers.*

**REFERENCE BOOKS:**

1. *Schiff L.I.* 1968. **Quantum Mechanics.** *[3rd Edition], Mcgraw-Hill College, Blacklick*

2. *Richtmyer and Et Al F.K.* 1956. **Introduction to Modern Physics.** *Tata McGraw Hill Publishing Company Ltd, New York*

3. *Agarwal B.K. and Prakash Hari*. 2007. **Quantum Mechanics. [***1st Edition], PHI Learning, New Delhi*

| 17UPY63C | CORE- X:<br>SOLID STATE PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:5**

**Hours/Week:5**

**PREAMBLE**

To enable students, learn bond theory, superconductivity and the concepts of Hall effect

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Learn about different features of crystals | K3 |
| CO2 | Classify solids based on band theory | K1 |
| CO3 | Explain free electron theory and determine Hall effect through experiments in laboratory | K3 |
| CO4 | Understand dielectric and know about the concepts of superconductivity | K2 |
| CO5 | Classify magnetic materials based on domain theory | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | M | S | S | M | M |
| **CO2** | S | S | M | M | S |
| **CO3** | S | S | M | M | M |
| **CO4** | S | M | M | S | M |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY63C | CORE- X:<br>SOLID STATE PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:5**

**Hours/Week:5**

**OBJECTIVES:**

1. To enable students to acquire the fundamental knowledge of bond theory and formation of different materials.

**CONTENTS**

**UNIT - I**

**Crystal Structures:** Crystallography: Distinction between crystalline and amorphous solids – Different features of the crystal – Crystal lattice – Basis – Crystal structure – Unit cell – Number of lattice points per unit cell- Bravais lattices – Miller indices – Elements of Symmetry – Structure of diamond and NaCl crystal – Atomic Packing – Atomic radius –-Lattice constant and density- Crystal structures (SC, HCP, FCC, BCC) – Interplanar distance.

**UNIT - II**

**Bond theory of solids:** Classification of solids – Basics of Bond theory in crystals – Ionic, Covalent, Metallic, Molecular and Hydrogen bonding .

**Thermal properties of solids:** Specific heat capacity of solids – Einstein's theory of specific heat of solids –Debye's theory of specific heat capacity of a solid .

**UNIT - III**

**Free electron theory:** Drude Lorentz theory – Explanation of Ohm's law – Electrical conductivity – Thermal conductivity – Widemann and Franz law – Summerfield model

**Hall Effect**: Hall voltage and Hall coefficient – Mobility and Hall angle – Importance of Hall effect – Experimental determination of Hall coefficient.

**UNIT - IV**

**Dielectrics:** Dielectric constant and displacement vector- Dielectric loss – Clausius Mossotti relation- Atomic and molecular polarizability – Types of polarizability.

**Super conductivity:** Phenomena – Magnetic properties – Meissner effect – Experimental facts – Isotopes effect – Thermodynamic effect – Types of Superconductors – Applications -- BCS Theory.

**UNIT - V**

**Magnetic Materials :** Introduction – Dia, Para and Ferromagnetic materials -- Langevin's theory of diamagnetism – Langevin's theory of paramagnetism – Ferromagnetism – Domain theory of Ferromagnetism Hysteresis based on domains – Antiferromagnetism – Ferrimagnetism – Ferrites – Ferro electricity – Ferroelectric crystals -- Nuclear magnetic resonance.

**TEXT BOOKS:**

1. *Gupta and Kumar*.2012. **Solid State Physics**. *K.Nath & Co, Meerut*
2. *Murugeshan R. and Kiruthiga Sivaprasath Er.* 2008. **Modern Physics.** *S Chand and Co, New Delhi*
3. *Pillai S.O.* 2010**. Solid State Physics.** *[6th Edition], New Age Publisher, New Delhi*

**REFERENCE BOOKS:**

*1. Charles Kittel*. 2004. **Introduction to Solid State Physics.** *[8th Edition], JohnWiley & Sons, New York*

2. *Dekker A.J.* 1969. **Solid State Physics,** *Macmillan India. New Delhi.*

| 18UPY63P | CORE PRACTICAL –VII: GENERAL EXPERIMENTS | SEMESTER –VI |
|---|---|---|

**Total credits:2**

**Hours/Week:4**

**LIST OF EXPERIMENTS:**

**Any 8 Experiments**

1. Young's Modulus – Uniform bending-Koenig's method.
2. Spectrometer – Cauchy's constants
3. Spectrometer -Dispersive Power of the Prism
4. Band gap energy of a semiconductor –Thermal Method
5. Hall Effect-Determination of charge carrier
6. Ballistic Galvanometer – Calibration of low range Voltmeter
7. Colpitt's Oscillator
8. Field along the axis of a coil – Determination of $B_H$
9. RC Coupled Amplifier – Single Stage.
10. Spectrometer-Hollow prism
11. IC regulated Dual power supply

| 18UPY63Q | CORE PRACTICAL - VIII: SPECIAL ELECTRONICS AND MICROPROCESSOR | SEMESTER –VI |
|---|---|---|

**Total credits:2**

**Hours/Week:4**

**LIST OF EXPERIMENTS :**

**Any 8 Experiments**

1. 8085 ALP for 8 bit Addition and Subtraction
2. 8085 ALP for 8 Bit Multiplication and Division
3. 8085 ALP for finding the Biggest number element in the array and Sum of the elements in the Array
4. 8085 LED Interface
5. 8085 traffic Light Controller
6. OP-AMP –Adder, Subtractor
7. OP-AMP-Inverting-non-inverting
8. OP-AMP-Integrator, differentiator
9. Zero crossing detector
10. Astable multivibrator
11. 4-bit adder and Subtractor-IC 7483

| 17UPY6EA | ELECTIVE- II: FUNDAMENTALS OF NANOSCIENCE | SEMESTER-VI |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

## PREAMBLE

To enable students , learn basics of nanotechnology and their applications

## COURSE OUTCOMES

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Outline the basics of Nanotechnology | K2 |
| CO2 | Learn about synthesis of nanomaterials | K1 |
| CO3 | Classify types of nanostructures | K2 |
| CO4 | Summarize on functional nanomaterials | K2 |
| CO5 | Apply nanomaterials in various fields | K3 |

## MAPPING WITH PROGRAMME OUTCOMES

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | S | S | M | M |
| **CO3** | S | M | M | M | S |
| **CO4** | S | S | M | M | S |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY6EA | ELECTIVE- II: FUNDAMENTALS OF NANOSCIENCE | SEMESTER- VI |
|---|---|---|

**Total Credits:4**

**Hours/WeeK:4**

**OBJECTIVES:**

1. To enable students learn fundamentals of Nanoscience, nanomaterials synthesis mechanisms and applications**.**

## CONTENTS

**UNIT - I**

**Introduction to Nanotechnology**

Scientific revolution, Historical milestones, Emergence of Nanotechnology, Definition of nanotechnology, Bohr radius, Quantum confinement, Nanosized effects, Challenges in Nanotechnology

**UNIT - II**

**Synthesis of Nanomaterials**

Physical method: Ball Milling, Sputter deposition, electric arc deposition, Ion beam technique. Chemical method: Wet chemical synthesis – sol-gel processing, co-precipitation, hydrothermal, chemical vapor condensation, chemical bath deposition

**UNIT - III**

**Types of Nanostructures**

Definition of a Nano system - Types of Nanocrystals-One Dimensional (1D)-Two Dimensional (2D) –Three Dimensional (3D) nanostructure materials - Quantum dots - Quantum wire

**UNIT - IV**

**Functional Nanomaterials**

Carbon (CNT, graphene), Noble Metals (Au, Ag), Metal oxides (TiO2, SnO2, ZnO), Semiconductors (CdS, CdSe, CdTe), Magnetic nanoparticles, Semiconductor Nanocomposites

**UNIT - V**

**Applications of Nanomaterials**

Applications in Physics: Nanoelectronics, Quantum dot and Dye sensitized solar cells, Photovoltaics, Hydrogen Production, Quantum electronic devices, CNT based transistor and Field Emission Display, Other applications: Nanosensors, Nanomedicine, Nanorobotics.

**TEXT BOOKS:**

*1. Viswanathan B.* 2006. **Structure and Properties of Solid State Materials** *[2nd Edition], Oxford: Alpha Science International*

*2. Pradeep T.* 2007. **Nano-The Essentials.** *Tata McGraw-Hill publishing company limited, New Delhi*

*3. Ramachandra Rao, M.S, Shubra Singh,* **Nanoscience And Nanotechnology: Fundamentals to Frontiers** , *Wiley India.*

*4. Puri* V.K , 2004, **Digital Electronics: Circuits and Systems**, *McGraw- Hill Education, Publication .*

**REFERENCE BOOKS:**

*1.Wilson. M, Kannangara. K, Smith. G, Simmons. M and Raguse B.* 2005. **Nanotechnology: Basic Science and Emerging technologies**, *[1stEdition], Overseas Press India Pvt Ltd, New Delhi.*

*2. Hari Singh Nalwa*. 2002. **Nano Structured Materials and nanotechnology.** *(Concise Edition) Academic Press.*

| 17UPY6EB | ELECTIVE- II:<br>OPTICAL FIBRES AND FIBRE OPTIC COMMUNICATION SYSTEMS | SEMESTER-VI |
|---|---|---|

**Total credits:4**
**Hours/Week:4**

**PREAMBLE**

To enable students, learn the principle behind fiber optics and its communications

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Classify fibres based on mode of propagation | K1 |
| CO2 | Summarize various techniques for fibre fabrication | K2 |
| CO3 | Explain fibre optic losses and dispersion | K2 |
| CO4 | Select light sources for fibre communication | K3 |
| CO5 | Apply optical fibres in various fields | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | S | M |
| **CO2** | S | S | M | M | S |
| **CO3** | S | M | S | S | S |
| **CO4** | S | S | M | M | M |
| **CO5** | S | S | M | S | S |

**S-Strong; M-Medium; L-Low**

| 17UPY6EB | ELECTIVE- II:<br>OPTICAL FIBRES AND FIBRE OPTIC COMMUNICATION SYSTEMS | SEMESTER-VI |
|---|---|---|

**Total credits:4**
**Hours/WeeK:4**

**OBJECTIVES**:

1. To enable students learn fundamentals of Fiber optics and their communication mechanisms along with their applications.

## CONTENTS

**UNIT – I**

**Fibre Classification**

Propagation of light waves in an optical fibre – Acceptance angle and Acceptance cone of a fibre – Numerical Aperture (NA) – NA of a graded Index Fibre – Mode of propagation. Fibres – classification – stepped index fibre – stepped index monomode fibre – Graded index multimode fibre – Comparison of step and graded index fibres.

**UNIT – II**

**Fibre Fabrication And Cables**

Classification of Techniques – External chemical vapour deposition – Characteristics – Internal chemical vapour deposition (1st method only) – Characteristics – Phasil system Fibre cable construction – losses incurred during installation of cable – Testing of cables – cable selection criteria.

**UNIT – III :**

**Fibre Losses And Dispersion In Optics** Attenuation in optic fibre – Rayleigh Scattering losses – Absorption losses – Bending losses – Radiation induced losses – Inherent defect losses – CORE- and Cladding losses. Dispersion in an Optical Fibre – Inter-modal dispersion – Material Chromatic Dispersion – Dispersion Power penalty – Total Dispersion delay.

**UNIT – IV**

**Light Sources For Optical Fibres**

LED – The process involved in LEDS – Structures of LED – Fibre – LED Coupling – Modulation bandwidth and Spectral Emission of LEDS- Laser diodes, Demodulation.

**UNIT – V**

**Applications In Communication Systems**

Introduction – Video Link Satellite Link – Computer Link – Nuclear Reaction Link – Community Antenna Television – Switched Star CATV – Networking. Optical Networks and networking, Fibre amplifiers, WDM, DWDM& CWDM.

**TEXT BOOK:**

1. *Subir Kumar Sarkar*. 2007. **Optical Fibres and Fibre Optic Communication Systems.** *[4th Edition] S Chand and Co, New Delhi*
2. *SG Gupta.* ***Text book on Optical Fiber Communication and its Applications.*** *Eastern Economy Edition*

**REFERENCE BOOK:**

1. *Thyagarajan K. and AjoyGhatak.* 2004, **Introduction To Fiber Optics.** *Cambridge University Press, New Delhi.*

| 17UPY6EC | ELECTIVE- II: BIO-PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable students, learn basics of Biophysics, Molecular Kinetics and Radiation Biology.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| **CO1** | Outline the structure of biomolecules | K2 |
| **CO2** | Learn about diffusion, osmosis and filtration | K1 |
| **CO3** | Recall significance of adsorption, hydrotrophy and colloids. | K1 |
| **CO4** | Apply optical techniques in biological studies | K3 |
| **CO5** | Explain the concepts of radioactivity and bio electricity | K2 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | M | M | S | S | S |
| **CO2** | M | S | S | M | S |
| **CO3** | S | S | M | M | M |
| **CO4** | S | S | M | S | S |
| **CO5** | S | S | M | M | M |

**S-Strong; M-Medium; L-Low**

| 17UPY6EC | ELECTIVE- II: BIO-PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**

**Hours/WeeK:4**

**OBJECTIVES:**

1. To enable students learn fundamentals of Biophysics, Molecular Kinetics and Radiation Biology.

**CONTENTS**

**UNIT – I**

**Structure of biomolecules**

Introduction - Atomic structure - Hydrogen atom - Bonds between atoms and molecules - secondary or weak bonds - Bond energy - Disulphate bonds – Peptide bond - Structure of Proteins - Molecular weight determination - Kinetic methods - Static methods - Structure of nucleic acids - DNA - RNA.

**UNIT – II**

**Kinetics of molecules I**

**Diffusion:** Factors affecting diffusion - Simple diffusion – Fick's law of diffusion - Diffusion of electrolytes - Biological significance of diffusion

**Osmosis:** Osmosis - Osmotic pressure - Laws of osmosis - osmometry - osmotic pressure of electrolytes.

**Filteration :** Filteration - Passage of fluid though blood vessels - Formation of Urine- Dialysis Principle of dialysis in artificial kidney - kinds of dialysis.

**UNIT – III**

**Kinetics of molecules II**

**Adsorption:** Adsorption - Factors affecting adsorption - Adsorption of ions by Solids and Liquids - adsorption of Gases by solids - Biological significance of adsorption.

**Hydrotropy :** Hydrotropy - Biological importance of hydrotropy.

**Precipitation:** Precipitation - Biological significance.

**Colloids:** Types of colloids - characteristics of colloids - stability of colloids - Gel - Emulsions - Techniques for the separation of colloids - Biological importance of colloids – Gibb's Donnan Equilibrium.

**UNIT - IV**

**Optical Techniques in Biological Studies**

Characteristics of light- compound· microscope - Ultraviolet microscope - Electron microscope - Transmission electron microscope - Scanning Electron microscope - Monochromator – Light sensitive detectors- Spectrophotometer - Atomic absorption flame photometer – Electromagnetic radiation Spectroscopy - Ultraviolet, visible, infrared and fluorescent spectroscopy – Atomic absorption and emission spectroscopy - mass spectroscopy - Raman spectroscopy – x ray diffraction crystallography.

**UNIT -V**

**Bioelectricity and Radiation Biology**

Membrane potential - Resting membrane potential - Action potential and nerve impulse conduction Rate of nerve impulse conduction- Recording of nerve impulses by C.R.O – Resting membrane potential - Monophasic and diphasic action potentials - Radioactivity - Natural

radioactivity Artificial or induced radioactivity – Radioactive disintegration - units of Radioactivity.

**TEXT BOOKS:**

1. *Subramanian, M.A.* 2006. **Biophysics: Principles and Techniques**. *MJP Publishers, Chennai [Units II, IV & V]*
2. *Palanichamy, S. and Shanmugavelu, M.* **Principles Of Biophysics.** *Palani Paramount Publications, Palani (Units I & III)*

**REFERENCE BOOKS:**

1. *Thiravia* Raj, *S.***Biophysics.** *Saras Publications, Nagerkoil*
2. *Daniel, M.* 1998. **Basic Biophysics for Biologist.** *Agro-bios, Jodhpur.*
3. *Pattabhi, V. and Gowtham, N.* 2011. **Biophysics.** *[2nd Edition], Narosa Publishing House, New Delhi*

| 17UPY6ED | ELECTIVE- III:<br>SPACE PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable the students, learn fundamental concepts of Space Physics, Stellar Evolution and the theories of Universe.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Understand basic astronomical instruments | K2 |
| CO2 | Recall of Solar systems | K1 |
| CO3 | Explain birth and death of variable stars and binary stars | K2 |
| CO4 | Outline stars and the measurement of stellar distance | K2 |
| CO5 | Learn theories of universe, galaxies and star clusters | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | S | S |
| **CO2** | M | S | S | M | S |
| **CO3** | S | S | M | M | M |
| **CO4** | S | M | S | M | S |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY6ED | ELECTIVE- III:<br>SPACE PHYSICS | SEMESTER-VI |
|---|---|---|

**Total Credits: 4**

**Hours/WeeK:4**

**OBJECTIVES:**

1. To make students learn fundamental concepts of Space Physics, Stellar Evolution and the theories of Universe, Galaxies and Star Clusters.

## CONTENTS

**UNIT - I**

**Astronomical instruments**

Optical telescope - reflecting telescope - types of reflecting telescope - advantages of reflecting telescope - Radio telescopes - astronomical spectrographs - photographic photometry - photo electric photometry - detectors and image processing.

**UNIT - II**

**Solar system**

The sun-physical and orbital data - Photosphere - Chromosphere - corona - solar prominences - sunspot - sunspot cycle - theory of sunspots - solar flare - mass of the sun - solar constant - temperature of the sun - source of solar energy - solar wind. Other members of the solar system - Mercury - Venus - Earth - Mars - Jupiter - Saturn - Uranus - Neptune - Pluto - Moon - Bode's law - Asteroids - comets - Meteors.

**UNIT - III**

**Stellar Evolution, Binary and variable stars**

Birth of a star - Death of a star - Chandrasekhar limit - white dwarfs - Neutron stars - black holes - Quasars - Nebulae - Supernovae

Binary stars - Origin of Binary stars. Variable stars - Cepheid variables - RV Tauri variables - long period variables - irregular variables - flare stars.

**UNIT-IV**

**Magnitudes, distance and spectral classification of stars**

Magnitude and brightness - apparent magnitude of stars - absolute magnetic of stars - relation between apparent magnitude and absolute magnitude of stars - Luminosities of stars - measurement of stellar distance - Geometrical parallax method - distance from red shift measurement - Harvard system of spectral classification .

**UNIT-V**

**Theories of the universe, galaxies and star clusters**

Origin of the universe - the big bang theory - the steady state theory - the oscillating universe theory - Hubble's law.

Galaxies - types of galaxies - Milky Way - star clusters - open clusters - globular clusters.

**TEXT BOOKS:**

1. *Krishnasamy, K.S.* 2002. **Astro Physics – A Modern Perspective**. *New Age International Pvt Ltd, New Delhi.*
2. *Murugesan, R.* 2003. **Modern Physics**, *[11th Edition] S Chand & Company Ltd, New Delhi.*

**REFERENCE BOOKS:**


1. *BaidyanathBasu*, 2001. **An Introduction to Astro physics**, *2nd printing, Prentice Hall of India Private limited, New Delhi.*
2. *Kumaravelu*, *S.* 1993. **Astronomy**, *Janki calendar corporation, Sivakasi.*
3. *Baker and Fredrick*, 1964**. Astronomy.** *[9th Edition] Van No strand Rein hold Co, New York.*
4. **Illustrated World of Science Encyclopedia** - *Vol I and Vol VIII - Creative world publication - Chicago.*

| 17UPY6EE | ELECTIVE –III: GEOPHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**

**Hours/Week:4**

**PREAMBLE**

To enable the students, learn fundamental concepts of Seismology and Geophysics

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Understand the basics of seismology and its properties | K2 |
| CO2 | Outline surface waves and seismometry | K2 |
| CO3 | Explain the basics of earthquake and gravity | K2 |
| CO4 | Infer theories of earth magnetism and internal structure of earth | K2 |
| CO5 | Learn about the concepts of radioactivity and geothermal physics | K1 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | M | M | S |
| **CO2** | S | S | M | S | M |
| **CO3** | S | S | S | M | M |
| **CO4** | M | M | S | S | M |
| **CO5** | S | S | M | M | M |

**S-Strong; M-Medium; L-Low**

| 17UPY6EE | ELECTIVE –III: GEOPHYSICS | SEMESTER-VI |
|---|---|---|

**Total Credits:4**

**Hours/Week:4**

**Objectives:**

1. To enable students to learn fundamental concepts of Seismology, Geophysics and Geomagnetism

**UNIT - I**

**Introduction and Seismology**

Introduction - Seismology: P waves, S waves, their velocities - Time distance curves and the location of epicenters - Effect of boundaries - Major discontinuities and resulting phase of seismic waves - Derivation of properties from the velocities

**UNIT - II**

**Surface Waves and Seismometry**

**Surface waves:** Rayleigh waves and Love waves - Study of earth by surface waves.

**Seismometry:** Horizontal seismograph and seismography equation – Strain seismograph.

**UNIT - III**

**Earthquakes and Gravity**

**Earthquakes:** Focus, magnitude, frequency - Detection and prediction - Gravity: The potential (Laplace's equation and Poisson's equation) - Absolute and relative measurements of gravity - Hammond Faller method - Worden gravimeter.

**UNIT - IV**

**Geomagnetism and Internal structure of the Earth**

**Geomagnetism:** Fundamental equations - Measurements: method of Gauss, saturation induction magnetometers, proton precession magnetometers, alkali vapour magnetometers - Theories of earth's magnetism - Causes of the main field -Dynamo theories – Internal structure of the earth: The CORE- variation of mechanical properties with depth - Materials and equation of state of the interior of the earth.

**UNIT - V**

**Geochronology and Geothermal Physics**

**Geochronology:** Radioactivity of the earth - Radioactive dating of rocks and minerals Geological time scale - The age of the earth - Geothermal physics: Flow of heat to the surface of the earth - Sources of heat within the earth - Process of heat transport internal temperature of the earth.

**TEXT BOOKS:**

1. *Garland, G.D.* l979. **Introduction to Geophysics**, *[11th Edition], WB Saunder Company, London*
2. *Cook, A.H.* 1973. **Physics of the Earth and Planets**. *[1stEdition], McMillan Press, London*

| 17UPY6EF | ELECTIVE –III: MEDICAL PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**
**Hours/Week:4**

**PREAMBLE**

To enable students, learn fundamental concepts of Radiation Physics and its applications.

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge Level |
|---|---|---|
| CO1 | Recall on the characteristics and production of X-rays | K1 |
| CO2 | Summarize theory of radiation and various radiation chambers | K2 |
| CO3 | Explain principle and the function of various imaging system | K2 |
| CO4 | Discuss basic teletheraphy techniques | K2 |
| CO5 | Analyze various measures and radiation protection devices | K3 |

**MAPPING WITH PROGRAMME OUTCOMES**

| COs / POs | PO1 | PO2 | PO3 | PO4 | PO5 |
|---|---|---|---|---|---|
| **CO1** | S | S | S | M | M |
| **CO2** | S | S | S | M | M |
| **CO3** | S | S | S | M | S |
| **CO4** | S | S | S | S | S |
| **CO5** | S | S | M | M | S |

**S-Strong; M-Medium; L-Low**

| 17UPY6EF | ELECTIVE –III:<br>MEDICAL PHYSICS | SEMESTER-VI |
|---|---|---|

**Total credits:4**
**Hours/Week:4**

**OBJECTIVES:**

1. To enable students learn fundamental concepts Radiation Physics and its applications in medical fields.

## CONTEUNTS

### UNIT - I

**X-Rays**

Electromagnetic spectrum - production of x-rays - x-ray spectra - Brehmsstrahlung - Characteristic x-ray - X-ray tubes - Coolidge tube - x-ray tube design - tube cooling - stationary mode - Rotating anode x-ray tubes - Tube rating - quality and intensity of x-ray. X-ray generator circuits - half wave and full wave rectification - filament circuit - kilo voltage circuit - high frequency generator - exposure timers - HT cables.

### UNIT - II

**Radiation Physics**

Radiation units - exposure - absorbed dose - rad gray - kera relative biological effectiveness - effective dose - sievert - inverse square law - interaction of radiation with matter - linear attenuation coefficient. Radiation Detectors -Thisble chamber - condenser chambers - Geiger counter - Scintillation counter - ionization chamber - Dosimeters - survey methods - area monitors - TLD and semiconductor detectors.

### UNIT - III

**Medical Imaging Physics**

Radiological imaging - Radiography - Filters - grids - cassette - X-ray film - film processing - fluoroscopy - computed tomography scanner - principle function - display - generations - mammography. Ultrasound imaging -

magnetic resonance imaging - thyroid uptake system - Gamma camera (Only Principle, function and display)

**UNIT - IV**

**Radiation Therapy Physics**

Radiotherapy - kilo voltage machines - deep therapy machines - tele-cobalt machines - Medical linear accelerator. Basics of Teletherapy units - deep x-ray, telecobalt units, medical linear accelerator - Radiation protection - external beam characteristics - phantom - dose maximum and build up - bolus - percentage depth dose - tissue - air ratio - back scatter factor.

**UNIT - V**

**Radiation Protection**

Principles of radiation protection - protective materials - radiation effects - somatic, genetic stochastic and deterministic effect, Personal monitoring devices - TLD film badge - pocket dosimeter.

**TEXT BOOKS:**

1. *Thayalan, K.* 2003. **Basic Radiological Physics.** *Jayapee Brothers Medical Publishing Pvt Ltd, New Delhi*
2. *Williams and Wilkins,* 1990. **Christensen's Physics of Diagnostic Radiology**: *Curry Dowdey and Murry - Lippincot*
3. *Khan, F.M.* 2003 **Physics of Radiation Therapy** - *Williams and Wilkins, [3rd Edition]*
4. *Bushberg, Seibert, Leidholdt, Boone Lippincot Williams and Wilkins*, 2002. **The Essential Physics of Medical Imaging**: *[2nd Edition]*

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