# ANNEXURE 18B02

# V.V. VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
*Re-accredited with 'A' Grade (3rd Cycle) by NAAC*
VIRUDHUNAGAR - 626 001

## CHOICE BASED CREDIT SYSTEM

## REGULATIONS AND SYLLABUS

**(with effect from Academic Year 2018 - 2019)**

V.V. Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 19 UG Programmes, 14 PG Programmes, 6 M.Phil. Programmes and 3 Ph.D. Programmes. All these programmes, except Ph.D. Programmes, have been framed as per the guidelines given by UGC under Choice Based Credit System (CBCS).

The Departments of Commerce, English, History upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

## CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC.The Students' performance will be evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

### List of Programmes in which CBCS/Elective Course System is implemented

### UG PROGRAMMES

| | | |
|---|---|---|
| Arts & Humanities | : | History (E.M. & T.M.), English, Tamil |
| Physical & Life Sciences | : | Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology, Computer Applications. |
| Commerce & Management | : | Commerce, Commerce with Computer Applications,<br>Commerce with Professional Accounting<br>Business Administration |

**PG PROGRAMMES**

| | | |
|---|---|---|
| Arts & Humanities | : | History, English, Tamil |
| Physical & Life Sciences | : | Mathematics, Physics, Biochemistry, Food Processing & Quality Control, Chemistry, Zoology, Computer Science, Information Technology, Computer Applications (MCA*) |
| Commerce & Management | : | Commerce, Business Administration (MBA*) |

* AICTE approved Programmes

**PRE-DOCTORAL PROGRAMMES (M.Phil.)**

| | | |
|---|---|---|
| Arts &Humanities | : | History, English, Tamil |
| Physical & Life Sciences | : | Mathematics, Biochemistry |
| Commerce & Management | : | Commerce |

**OUTLINE OF CHOICE BASED CREDIT SYSTEM (UG)**

1. Core Courses
2. Elective Courses
    - 2.1. Discipline Specific Elective Courses (DSEC)
    - 2.2. Dissertation / Project
3. Non Major Elective Courses (NMEC)
4. Generic Elective Courses (GEC)
5. Ability Enhancement Courses (AEC)
    - 5.1 Ability Enhancement Compulsory Courses (AECC)
    - 5.2. Skill Enhancement Courses (SEC)

## List of Non Major Elective Courses (NMEC) Offered

**UG PROGRAMMES**

| Name of the Course | Semester | Department |
|---|---|---|
| History of India upto A.D.1858 | III | History(EM) |
| இந்தியவரலாறு கி.பி. 1858 tiu | III | History (TM) |
| Indian National Movement (A.D 1885-1947) | IV | History(EM) |
| இந்தியதேசிய இயக்கம் (கி.பி. 1885 – 1947) | IV | History(TM) |
| English for Professions I | III | English |
| English for Professions II | IV | |
| இக்காலநீதி இலக்கியம் | III | Tamil |
| உரைநடை இலக்கியம் | IV | |
| Basic Hindi - I | III | Hindi |
| Basic Hindi - II | IV | |
| Practical Banking | III | Commerce |
| Basic Accounting Principles | IV | |
| Business Management | III | Business Administration |
| Entrepreneurship | IV | |
| Quantitative Aptitude – I | III | Mathematics |
| Statistics and Operation Research | IV | |
| Physics in Everyday life | III | Physics |
| Fundamentals of Electronics | IV | |
| Industrial Chemistry | III | Chemistry |
| Drugs and Natural Products | IV | |
| Applied Zoology | III | Zoology |
| Animal Science | IV | |
| Basic Food Science | III | Home Science – Nutrition and Dietetics |
| Basic Nutrition and Dietetics | IV | |
| Women and Health | III | Biochemistry |
| Life style associated disorders | IV | |
| Medical Lab Technology | III | Microbiology |
| Applied Microbiology | IV | |
| Infectious Diseases | III | Biotechnology |
| Organic Farming | IV | |
| Basics of Fashion | III | Costume Design And Fashion |
| Interior Designing | IV | |
| Introduction to Computers and Office Automation | III | Computer Science |
| Introduction to Internet and HTML 5 | IV | |
| Computer Fundamentals and E-mail | III | Information Technology |
| Introduction to HTML | IV | |
| Fundamentals of Computers | III | Computer Applications |
| Web Design with HTML | IV | |
| Horticulture – I | III | Botany |
| Horticulture – II | IV | |
| மருத்துவதாவரவியல் - I | III | |
| மருத்துவதாவரவியல் - II | IV | |
| Library and Information Science – I | III | Library Science |
| Library and Information Science - II | IV | |

## List of Generic Elective Courses (GEC) Offered

### GENERIC ELECTIVE COURSES – 1

1. Human Rights /

2. Women Studies

### GENERIC ELECTIVE COURSES – 2

1. Constitution of India /

2. Modern Economics /

3. Adolescent Psychology /

4. Disaster Management

### ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

1. Environmental Studies

2. Value Education

மேல்நிலைகல்விவரைதமிழைமுதன்மைப் பாடமாகஎடுத்துபடிக்காதமாணவிகள் கீழ்கண்டப் பாடங்களைகட்டாயம் படிக்கவேண்டும்

1. அடிப்படைதமிழ் - எழுத்தறிதல்
2. அடிப்படைத் தமிழ் - மொழித்திறனறிதல்

### ELIGIBILITY FOR ADMISSION

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Tamil Nadu or any other equivalent Examination accepted by Academic Council with Mathematics as one of the subjects in Higher Secondary Course.

### DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed Programme of study for a period of three academic years (six semesters).

### MEDIUM OF INSTRUCTION

English

## COURSES OFFERED

| | | |
|---|---|---|
| Part I | : | Tamil/Hindi |
| Part II | : | English |
| Part III | : | Core Courses |
| | | Elective Courses: Discipline Specific Electives Courses<br>Dissertation / Field Project |
| | | Allied Courses: 1. Mathematics<br>2. Applied Electronics and Instrumentation |
| Part IV | : | Non-Major Elective Courses (NMEC) |
| | | Generic Elective Courses (GEC) |
| | | Ability Enhancement Compulsory Courses (AECC) |
| | | Skill Enhancement Courses (SEC) |
| Part V | : | National Service Scheme, Physical Education, Youth Red Cross Society, Red Ribbon Club, Science Forum, Eco Club, Library and Information Science, Consumer Forum, Health and Fitness Club, National Cadet Corps |

Study Tour/ Field visit is mandatory for UG students.
Internship / Field Project is compulsory for II year UG Science students
**Internship:** A designated activity that carries one credit involving more than 7 days of working in an organization under the guidance of an identified mentor
**Field Project:** Project students comprising of maximum 5 members in a team need to undertake project that involve conducting surveys inside/outside the college premises and collection of data from designated communities or natural places.

## EVALUATION SCHEME

| Components | Internal Assessment Marks | External Examination Marks | Total Marks |
|---|---|---|---|
| Theory | 25 | 75 | 100 |
| Practical | 40 | 60 | 100 |
| Project | 40 | 60 | 100 |

## PART III - Core Courses, Discipline Specific Elective Course

**INTERNAL ASSESSMENT**
**Distribution of Marks**
**Theory**

| Mode of Evaluation | | Marks |
|---|---|---|
| Periodic Test | : | 15 |
| Assignment | : | 5 |
| Quiz | : | 5 |
| **Total** | **:** | **25** |

Three Periodic Tests - Average of the best two will be considered
Two Assignments - Best of the two will be considered
Three Quiz Tests - Best of the two will be considered

**Practical**

| Mode of Evaluation | | Marks |
|---|---|---|
| Model Test | : | 30 |
| Performance | : | 10 |
| **Total** | **:** | **40** |

Two Model Tests - Best one will be considered
Performance - Attendance and Record

**Question Pattern for Periodic Tests** **Duration: 2 Hours**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A Q.No.(1- 4) | Multiple Choice | 4 | 4 | 1 | 4 |
| B Q.No.(5- 6) | Internal Choice | 2 | 2 | 5 | 10 |
| C Q.No.(7-9) | Open Choice | 3 | 2 | 10 | 20 |
| D Q.No.(10-12) | Open Choice Problems only | 3 | 2 | 5.5 | 11 |
| | | | | **Total** | **45** |

**For Core courses - Nano Science, Classical &Statistical Mechanics and Medical Physics.**

**Question Pattern for Periodic Tests** **Duration: 2 Hours**

| Section | Type of Question | No. of Questions | No. of Questions to be answered | Marks for each question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 4) | Multiple choice | 4 | 4 | 1 | 4 |
| B<br>Q. No.(5 - 7) | Either or type | 3 | 3 | 7 | 21 |
| C<br>Q. No.(8-10) | Open choice | 3 | 2 | 10 | 20 |
| | | | | **Total** | **45** |

**EXTERNAL EXAMINATION**

**Question Pattern** **Duration: 3 Hours**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 10) | Multiple Choice (Atleast Two question from each unit) | 10 | 10 | 1 | 10 |
| B<br>Q. No.(11 -15) | Internal Choice – Either Or type | 5 | 5 | 5 | 25 |
| C<br>Q. No.(16-20) | Open Choice (one question from each unit) | 5 | 3 | 10 | 30 |
| D*<br>Q. No.(21-24) | Open Choice – Problems only | 4 | 2 | 5 | 10 |
| | | | | **Total** | **75** |

***Question pattern for Core courses - Nano Science, Classical &Statistical Mechanics, Medical Physics and Allied Physics & Allied Electronics.**

**Question Pattern** **Duration: 3 Hours**

| Section | Type of Question | No. of Questions | No. of Questions to be answered | Marks for each question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 10) | Multiple choice (Atleast Two questions from each unit) | 10 | 10 | 1 | 10 |
| B<br>Q. No.(11 -15) | Either or type (one set from each unit) | 5 | 5 | 7 | 35 |
| C<br>Q. No.(16-20) | Open Choice (one from each unit) | 5 | 3 | 10 | 30 |
| | | | | **Total** | **75** |

**ONLINE ASSESSMENT**

Online Test will be conducted for the Core/Discipline Specific Elective Courses in IV, V & VI Semester.

Multiple Choice question Pattern will be followed.

## PART IV - Skill Enhancement Courses and Non Major Elective Courses

**INTERNAL ASSESSMENT**

**Distribution of Marks**
**Theory**

| Mode of Evaluation | | Marks |
|---|---|---|
| Periodic Test | : | 25 |
| Assignment | : | 10 |
| Quiz | : | 5 |
| **Total** | **:** | **40** |

Three Periodic tests - Average of the best two will be considered
Two Assignments - Best of the two will be considered
Three Quiz Tests - Best of the three will be considered

**Question Pattern** **Duration: 1 Hour**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 4) | Open Choice | 4 | 3 | 5 | 15 |
| B<br>Q. No.(5- 6) | Open Choice | 2 | 1 | 10 | 10 |
| | | | | **Total** | **25** |

**EXTERNAL EXAMINATION**

**Question Pattern** **Duration: 2 Hours**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 8) | Open Choice | 8 | 6 | 5 | 30 |
| B<br>Q. No.(9- 13) | Open Choice | 5 | 3 | 10 | 30 |
| | | | | **Total** | **60** |

**PART IV - Generic Elective Courses and Ability Enhancement Compulsory Courses**

- Assessment by Internal Examiner only
- Model Examination is conducted after two periodic tests.
- Book and Study Material prepared by the Faculty Members of the respective departments will be prescribed.

**ASSESSMENT PATTERN**

| Mode of Evaluation | | Marks |
|---|---|---|
| Periodic Test | : | 30 |
| Assignment | : | 10 |
| Summative Examination Internal | : | 60 |
| **Total** | **:** | **100** |

Two Periodic tests - Best of the two will be considered
Two Assignments - Best of the two will be considered

**Question Pattern for Periodic Test** **Duration: 1 Hour**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 4) | Open Choice | 4 | 3 | 6 | 18 |
| B<br>Q. No.(5- 6) | Open Choice | 2 | 1 | 12 | 12 |
| | | | | **Total** | **30** |

**Question Pattern for Model Examination** **Duration: 2 Hours**

| Section | Types of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1- 8) | Open Choice | 8 | 5 | 6 | 30 |
| B<br>Q. No.(9- 13) | Open Choice | 5 | 3 | 10 | 30 |
| | | | | **Total** | **60** |

**EXTRA CREDIT COURSES (Optional)**

- Assessment by Internal Examiner only

Question Pattern for Internal Examination **Duration: 2 Hours**

| Section | Type of Question | No. of Questions | No. of Questions to be answered | Marks for each Question | Total Marks |
|---|---|---|---|---|---|
| A<br>Q. No.(1 -30) | Multiple Choice Questions | 30 | 30 | 1 | 30 |
| B<br>Q.No.(31 -38) | Open Choice (one from each unit) | 8 | 5 | 5 | 25 |
| C<br>Q. No.(39-43) | Open Choice (one from each unit) | 5 | 3 | 15 | 45 |
| | | | | **Total** | 100 |

**Extra Two Credits per course for Online Open Learning Courses**

**ELIGIBILITY FOR THE DEGREE**

i) The candidate will not be eligible for degree without completing the prescribed Courses of study and a minimum Pass marks in all the Courses.

ii) Attendance, progress and conduct certification from the Head of the Institution will be required for the students to write the examination.

- No Pass minimum for Internal Assessment.
- Pass minimum for External Examination is 27 marks out of 75 marks for Core Courses, Allied Courses and Discipline Specific Elective Courses.
- Pass minimum for External Examination is 21 marks out of 60 marks for Non Major Elective Courses and Skill Enhancement Courses.
- Pass minimum for External Practical Examination is 21 marks out of 60 marks and aggregate minimum pass percentage is 40.
- Pass minimum for Generic Elective Course and Ability Enhancement Compulsory Course is 40.

# BACHELOR OF PHYSICS
# PROGRAM CODE - 2016

## PROGRAMME OUTCOMES

**The students will be able to**

- get an in-depth understanding of the subject.
- develop an effective oral and written communication.
- have wider social mobility into reality.
- outsource the acquired knowledge with social concern and responsibility.
- have a wholesome personality by imbibing ethical and traditional values.
- strengthen the passion for learning with vigour and self-motivation.

## PROGRAMME SPECIFIC OUTCOMES

The students of B.Sc. Physics degree Programme will be able to

1. relate conceptual understanding of the physics to real-world situations
2. assimilate experimental skills.
3. be acquainted with various fields of Physics such as Mechanics, Properties of matter, Heat &Thermodynamics, Optics, Electricity and electromagnetism .
4. apply discipline-based and cross-discipline-based knowledge to elucidate a problem.
5. analyse a wide range of physical phenomena with the knowledge acquired from Classical mechanics, Quantum mechanics, Mathematical Physics and Statistical Mechanics.
6. identify their interest in specific academic and research area.
7. function effectively as an individual, and in assorted teams.
8. inculcate ethical principles and discharge social responsibilities in the issues related to energy, environment and nature.
9. get wide range of employability opportunities with their analytical thinking and systematic approach of the subject.

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**PART I TAMIL**

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | I | 18UTAG11 | தாள்: 1 பொதுத்தமிழ் | 3 | 100 |
| 2. | II | 18UTAG21N | தாள்: 2 பொதுத்தமிழ் | 3 | 100 |
| 3. | III | 18UTAG31 | தாள்: 3 பொதுத்தமிழ் | 3 | 100 |
| 4. | IV | 18UTAG41 | தாள்: 4 பொதுத்தமிழ் | 3 | 100 |
| | **TOTAL** | | | **12** | **400** |

**PART I HINDI**

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | I | 18UHDG11 | Prose – I & II, Ancient Stories - I, General Essays, Functional Hindi – I & Grammar | 3 | 100 |
| 2. | II | 18UHDG21 | Drama, Ancient Stories - II, Letter Correspondence, Functional Hindi-II & Grammar | 3 | 100 |
| 3. | III | 18UHDG31 | Ancient Poetry, Drama, Indian History, Hindi Grammar & Functional Hindi III | 3 | 100 |
| 4. | IV | 18UHDG41 | Modern Poetry, Hindi Literary Essays, Letter Correspondence, Conversation & Functional Hindi IV | 3 | 100 |
| | **TOTAL** | | | **12** | **400** |

**PART II**

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | I | 18UENG11A | English for Advanced Learners - I | 3 | 100 |
| | | 18UENG11B | English for Career Guidance - I | | |
| | | 18UENG11C | English for Communicative Competence-I | | |
| 2. | II | 18UENG21A | English for Advanced Learners - II | 3 | 100 |
| | | 18UENG21B | English for Career Guidance - II | | |
| | | 18UENG21C | English for Communicative Competence - II | | |
| 3. | III | 18UENG31A | English for Advanced Learners - III | 3 | 100 |
| | | 18UENG31B | English for Career Guidance – III | | |
| | | 18UENG31C | English for Communicative Competence - III | | |
| 4. | IV | 18UENG41A | English for Advanced Learners - IV | 3 | 100 |
| | | 18UENG41B | English for Career Guidance – IV | | |
| | | 18UENG41C | English for Communicative Competence - IV | | |
| | **TOTAL** | | | **12** | **400** |

## PART III – CORE, DISCIPLINE SPECIFIC ELECTIVE COURSES

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1 | I | 18UPHC11N | Mechanics and Properties of matter | 4 | 100 |
| 2 | I | 18UPHC12N | Electricity | 4 | 100 |
| 3 | II | 18UPHC21 | Electromagnetism | 4 | 100 |
| 4 | II | 18UPHC22 | Heat and Thermodynamics | 4 | 100 |
| 5 | II | 18UPHC21PN | Core Practical- I | 2 | 100 |
| 6 | III | 18UPHC31N | Optics | 5 | 100 |
| 7 | IV | 18UPHC41 | Modern Physics | 5 | 100 |
| 8 | IV | 18UPHC41P | Core Practical –II | 2 | 100 |
| 9 | V | 18UPHC51 | Nuclear and Particle Physics | 4 | 100 |
| 10 | V | 18UPHC52 | Analog Electronics | 4 | 100 |
| 11 | V | 18UPHC53 | Classical and Statistical Mechanics | 4 | 100 |
| 12 | V | 18UPHE51/<br>18UPHE52/<br>18UPHE53 | Discipline Specific Elective 1 (DSEC 1)<br>1. Solid State Physics<br>2. Spectroscopy<br>3.Cellular Mobile Communication | 4 | 100 |
| 13 | V | 18UGOL51 | Online Assessment | 1 | 50 |
| 14 | VI | 18UPHC61 | Mathematical Physics | 4 | 100 |
| 15 | VI | 18UPHC62 | Digital Electronics | 4 | 100 |
| 16 | VI | 18UPHC63 | Nano Science | 4 | 100 |
| 17 | VI | 18UPHE61/<br>18UPHE62/<br>18UPHE63 | Discipline Specific Elective 2 (DSEC 2)<br>1. Material Science<br>2. Medical Physics<br>3. Micro Controller 8051 | 4 | 100 |
| 18 | VI | 18UGOL61 | Online Assessment | 1 | 50 |
| 19 | VI | 18UPHC61P | Core Practical –III | 3 | 100 |
| 20 | VI | 18UPHC62P | Core Practical –IV | 3 | 100 |
| 21 | VI | 18UPHC63P | Core Practical –V | 2 | 100 |
| | | | **Total** | **72** | **2000** |

## PART III – ALLIED COURSE I- MATHEMATICS

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | I | 18UMTA11 | Mathematics –I | 4 | 100 |
| 2. | II | 18UMTA21 | Mathematics – II | 3 | 100 |
| | | 18UMTA22 | Mathematics - III | 3 | 100 |
| | | | **Total** | **10** | **300** |

## PART III - ALLIED COURSE II- APPLIED ELECTRONICS AND INSTRUMENTATION

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | III | 18UEIA31N | Basic Electronics | 4 | 100 |
| 2. | IV | 18UEIA41 | Electronic Devices and Instrumentation | 4 | 100 |
| | IV | 18UEIA41PN | Allied Practical -I | 2 | 100 |
| | | | **Total** | **10** | **300** |

## PART IV -SKILL ENHANCEMENT COURSES

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | II | 18UPHS21 | Programming in C | 2 | 100 |
| 2. | III | 18UPHS31 | Solar Energy | 2 | 100 |
| 3. | IV | 18UPHS41 | Astrophysics | 2 | 100 |
| 4. | V | 18UPHS51 | Microprocessor | 2 | 100 |
| 5. | V | 18UPHS52P | Practical - Programming in C | 2 | 100 |
| 6. | VI | 18UPHS61 | Communication Electronics | 2 | 100 |
| | | | **Total** | **12** | **600** |

## PART IV –NON MAJOR ELECTIVE COURSES

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | I | 18UPHN31 | Physics in Everyday life | 2 | 100 |
| 2. | II | 18UPHN41 | Fundamentals of Electronics | 2 | 100 |
| | | | **Total** | **4** | **200** |

## PART IV – GENERIC ELECTIVE AND ABILITY ENHANCEMENT COMPULSORY COURSES

| S.No. | Sem. | Code | Title of the Course | Credits | Marks |
|---|---|---|---|---|---|
| 1. | I | 18UGVE11 | Value Education | 2 | 100 |
| 2 | III | 18UGEH31<br>18UGEW32 | Human Rights/<br>Women Studies | 1 | 100 |
| 3. | IV | 18UGEC41 | Constitution of India/ | 1 | 100 |
| 4 | | 18UGEM42 | Modern Economics/ | | |
| 5 | | 18UGEA43 | Adolescent Psychology/ | | |
| 6 | | 18UGED44<br>18UGED44N | Disaster Management<br>Disaster Management | | |
| 8 | | 18UPHI41G | Internship/Field Project | 1 | 100 |
| 9 | | PART-V | Extension Activities | 1 | - |
| 10 | V | 18UGES51 | Environmental Studies | 2 | 100 |
| | | | **Total** | **8** | **500** |

**PART –V -EXTENSION ACTIVITIES**

| S.No. | Sem. | Code | Title of the Course | Credit |
|---|---|---|---|---|
| 1 | I, II, III & IV | 18UVNS1 | National Service Scheme | 1 |
| 2 | | 18UVNS2 | Physical Education | |
| 3 | | 18UVYR1<br>18UVYR2 | Youth Red Cross Society | |
| 4 | | 18UVRR1 | Red Ribbon Club | |
| 5 | | 18UVSF1 | Science Forum | |
| 6 | | 18UVEC1 | Eco Club | |
| 7 | | 18UVLI1 | Library and Information Science | |
| 8 | | 18UVCC1 | Consumer Forum | |
| 9 | | 18UVHF1 | Health and Fitness Club | |
| 10 | | 18UVNC1<br>18UVNC2 | National Cadet Corps | |

**EXTRA CREDIT COURSES (Optional)**

| S.No. | Sem. | Code | Title of the Course | Credits | Total Marks |
|---|---|---|---|---|---|
| 1. | V | 18UPH051 | *Project<br>(Internal Only) | 2 | 100 |
| 2. | VI | 18UPH061 | Physics for Competitive Examination – (Internal only) | 2 | 100 |

*Project – Based on Physics/ Electronics / Energy Audit

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## BACHELOR OF PHYSICS

Programme Code – 2016

| Semester | | Course Code | Courses | Hours per week | Credits | Total Marks | |
|---|---|---|---|---|---|---|---|
| | | | | | | Int. | Ext. |
| I | Part I | 18UTAG11 | Tamil/Hindi I | 6 | 3 | 25 | 75 |
| | Part II | 18UENG11 | English I | 6 | 3 | 25 | 75 |
| | Part III | 18UPHC11N | **Core Course -1** Mechanics and Properties of matter | 4 | 4 | 25 | 75 |
| | | 18UPHC12N | **Core Course - 2** Electricity | 4 | 4 | 25 | 75 |
| | | 18UPHC21P | **Core Course** Practical – I General Physics -I | 2 | - | - | - |
| | | 18UMTA11 | **Allied Course –I** Mathematics - 1 | 6 | 4 | 25 | 75 |
| | Part IV | 18UGVE11 | Value Education | 2 | 2 | 40 | 60 |
| | | | **TOTAL** | **30** | **20** | **600** | |

| Semester | | Course Code | Courses | Hours per week | Credits | Total Marks | |
|---|---|---|---|---|---|---|---|
| | | | | | | Int. | Ext. |
| II | Part I | 18UTAG21N | Tamil /Hindi II | 6 | 3 | 25 | 75 |
| | Part II | 18UENG21 | English II | 6 | 3 | 25 | 75 |
| | Part III | 18UPHC21 | **Core Course - 3** Electromagnetism | 4 | 4 | 25 | 75 |
| | | 18UPHC22 | **Core Course - 4** Heat and Thermodynamics | 4 | 4 | 25 | 75 |
| | | 18UPHC21PN | **Core Course** Practical –I General Physics -I | 2 | 2 | 40 | 60 |
| | | 18UMTA21<br>18UMTA22 | **Allied Course -I**<br>Mathematics - 2<br>Mathematics - 3 | <br>3<br>3 | <br>3<br>3 | <br>25<br>25 | <br>75<br>75 |
| | Part IV | 18UPHS21 | **SEC -1** Programming in C | 2 | 2 | 40 | 60 |
| | | | **TOTAL** | **30** | **24** | **800** | |

| Semester | | Course Code | Courses | Hours per week | Credits | Total Marks | |
|---|---|---|---|---|---|---|---|
| | | | | | | Int. | Ext. |
| III | Part I | 18UTAG31 | Tamil/ Hindi III | 6 | 3 | 25 | 75 |
| | Part II | 18UENG31 | English III | 6 | 3 | 25 | 75 |
| | Part III | 18UPHC31N | **Core Course -5**<br>Optics | 5 | 5 | 25 | 75 |
| | | 18UPHC41P | **Core Course**<br>Practical – 2<br>General Physics -II | 2 | - | - | - |
| | | 18UEIA31N<br>18UEIA41P | **Allied-Course -II**<br>Basic Electronics<br>Allied Electronics<br>Practical -1 | 4<br>2 | 4<br>- | 25<br>- | 75<br>- |
| | Part IV | 18UPHS31 | **SEC -2**<br>Solar Energy | 2 | 2 | 40 | 60 |
| | | 18UPHN31 | **NMEC-1**<br>Physics in Everyday life | 2 | 2 | 40 | 60 |
| | Part IV | 18UGEH31<br>18UGEW32 | **Generic Elective -1**<br>1.Human Rights/<br>2. Women Studies | 0 | 1 | 40 | 60 |
| | | 18UGEC41/<br>18UGEM42/<br>18UGEA43/<br>18UGED44<br>18UGED44N | **Generic Elective -2**<br>Constitution of India/<br>Modern Economics/<br>Adolescent Psychology/<br>Disaster Management<br>Disaster Management | 1 | - | - | |
| | | | **TOTAL** | **30** | **20** | **700** | |

| Semester | | Course Code | Courses | Hours per week | Credits | Total Marks | |
|---|---|---|---|---|---|---|---|
| | | | | | | Int. | Ext. |
| IV | Part I | 18UTAG41 | Tamil /Hindi IV | 6 | 3 | 25 | 75 |
| | Part II | 18UENG41 | English IV | 6 | 3 | 25 | 75 |
| | Part III | 18UPHC41 | **Core Course - 6**<br>Modern Physics | 5 | 5 | 25 | 75 |
| | | 18UPHC41P | **Core Course**<br>Practical –2<br>General Physics -II | 2 | 2 | 40 | 60 |
| | | 18UEIA41 | **Allied Course – II**<br>Electronic Devices and Instrumentation | 4 | 4 | 25 | 75 |
| | | 18UEIA41P | Allied Electronics<br>Practical – 1 | 2 | 2 | 40 | 60 |
| | Part IV | 18UPHS41 | **SEC -3**<br>Astrophysics | 2 | 2 | 40 | 60 |
| | | 18UPHN41 | **NMEC-2**<br>Fundamentals of Electronics | 2 | 2 | 40 | 60 |
| | | 18UPHI41G | Internship/Field Project | 0 | 1 | 100 | - |
| | | 18UGEC41/<br>18UGEM42/<br>18UGEA43/<br>18UGED44<br>18UGED44N | **Generic Elective -2**<br>Constitution of India/<br>Modern Economics/<br>Adolescent Psychology/<br>Disaster Management<br>Disaster Management | 1 | 1 | 100 | - |
| | Part V | | Extension Activities | - | 1 | - | |
| | | | **TOTAL** | **30** | **26** | **1000** | |

| Semester | | Course Code | Courses | Hours per week | Credits | Total Marks | |
|---|---|---|---|---|---|---|---|
| | | | | | | Int. | Ext. |
| V | Part III | 18UPHC51 | **Core Course – 7** Nuclear and Particle Physics | 4 | 4 | 25 | 75 |
| | | 18UPHC52 | **Core Course - 8** Analog Electronics | 4 | 4 | 25 | 75 |
| | | 18UPHC53 | **Core Course – 9** Classical and Statistical Mechanics | 4 | 4 | 25 | 75 |
| | | 18UPHC61P | **Core Course** Practical -3 General Physics -III | 3 | - | - | - |
| | | 18UPHC62P | **Core Course** Practical - 4 Electronics | 3 | - | - | - |
| | | 18UPHC63P | **Core Course** Practical -5 Digital Electronics | 2 | - | - | - |
| | | 18UPHE51<br>18UPHE52<br>18UPHE53 | **DSEC -1**<br>1.Solid State Physics<br>2.Spectroscopy<br>3.Cellular Mobile Communication | 4 | 4 | 25 | 75 |
| | | 18UPHOL51 | Online Assessment | - | 1 | 50 | |
| | Part IV | 18UPHS51 | **SEC -4** Microprocessor | 2 | 2 | 40 | 60 |
| | | 18UPHS52P | **SEC -5** Practical- Programming in C | 2 | 2 | 40 | 60 |
| | | 18UGES51 | Environmental Studies | 2 | 2 | 100 | - |
| | | | **TOTAL** | **30** | **23** | **750** | |

| Semester | | Course Code | Courses | Hours per week | Credits | Total Marks | |
|---|---|---|---|---|---|---|---|
| | | | | | | Int. | Ext. |
| VI | Part III | 18UPHC61 | **Core Course -10** Mathematical Physics | 5 | 4 | 25 | 75 |
| | | 18UPHC62 | **Core Course -11** Digital Electronics | 5 | 4 | 25 | 75 |
| | | 18UPHC63 | **Core Course -12** Nano science | 5 | 4 | 25 | 75 |
| | | 18UPHC61P | **Core Course** Core Practical -3 General Physics -III | 3 | 3 | 40 | 60 |
| | | 18UPHC62P | **Core Course** Core Practical –4 Electronics | 3 | 3 | 40 | 60 |
| | | 18UPHC63P | **Core Course** Core Practical –5 Digital Electronics | 2 | 2 | 40 | 60 |
| | | 18UPHE61/ 18UPHE62/ 18UPHE63 | **DSEC -2** 1.Material Science 2.Medical Physics 3.Micro Controller 8051 | 5 | 4 | 25 | 75 |
| | | 18UPHOL61 | Online Assessment | - | 1 | 50 | |
| | Part IV | 18UPHS61 | **SEC -6** Communication Electronics | 2 | 2 | 40 | 60 |
| | | | **TOTAL** | **30** | **27** | **850** | |

# V.V. VANNIAPERUMAL COLLEGE FOR WOMEN

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VIRUDHUNAGAR - 626 001

**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V | **NUCLEAR AND PARTICLE PHYSICS** | Hours/Week: 4 | |
| Core Course -7 | | Credits: 4 | |
| Course Code- **18UPHC51** | | Internal 25 | External 75 |

## COURSE OUTCOMES

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

- acquire basic knowledge about the properties of nuclei
- explain the different forms of radioactivity, explore theories of nuclear decays and nuclear reactions
- understand the principles of nuclear reactions, the nuclear fission and fusion reactions
- acquire the knowledge of different accelerators& detectors and understanding of cosmic rays
- understand the classification, properties of elementary particles and the concept behind INO

## UNIT I

**Nuclear properties and structure:**

Classification of a Nuclei - general properties - binding energy - nuclear stability - theories of nuclear composition - nuclear forces - Meson theory - liquid drop model - shellmodel. (12Hours)

## UNIT II

**Radioactivity:**

Introduction-properties of Alpha, Beta and Gamma rays - range of ∝ particles - experimental measurements - ∝ particle spectra -β ray spectra - origin of line and continuous spectra - neutrino theory of βeta decay - detection of neutrino-determination

of wavelength of Gamma rays - origin of Gamma rays - internal conversion - law of radioactive disintegration- half-life period - mean life. (12Hours)

**UNIT III**

**Nuclear reactions:**

The discovery of artificial transmutation-Bohr's theory of Nuclear disintegration - Q-value equation - energy balance - threshold energy - types of nuclear reactions - conservation laws-nuclear fission - energy released in fission - chain reaction- nuclear reactors - pressurized water reactor - boiling water reactor - fast breeder reactor- nuclear fusion - sources of stellar energy - thermo nuclear reactions- fusion reactor-plasma confinement. (12Hours)

**UNIT IV**

**Nuclear Instrumentation and Cosmic rays:**

Cyclotron - synchro cyclotron - Betatron - the Wilson cloud chamber - bubble chamber

Cosmic rays-latitude, altitude and azimuth effects-primary and secondary cosmic rays- cosmic ray showers-Van Allen belt- origin of cosmic rays. (12Hours)

**UNIT V**

**Elementary particles:**

Elementary particles -introduction-particles and antiparticles -antimatter-the fundamental interaction-elementary particle quantum numbers-conservation laws and symmetry-the quark model (12Hours)

Assignment Topic: Exposure to Indian Neutrino Observatory (INO)

(Not included for Summative Examination)

**TEXT BOOKS**

1. Murugeshan, R., & KiruthigaSivaprasath. (2018). *Modern Physics.*18th Edition (Reprint). New Delhi: S.Chand Publishing Pvt. Ltd.

UNIT – I: Chapter 17 - Sections: 17.2 -17.7, 17.7.1, 17.10, 17.12

UNIT –II: Chapter 20- Sections: 20.1, 20.4, 20.6, 20.10, 20.12, 20.13, 20.15, 20.18

UNIT –III: Chapter 21 - Sections: 21.1- 21.2

Chapter 22- Sections: 22.1, 22.1.1, 22.2, 22.3, 22.6.22.7

UNIT-IV: Chapter 19 - Sections: 19.3, 19.4, 19.5

Chapter 18 - Sections: 18.7, 18.8

Chapter 23 - Sections: 23.1-23.6, 23.9, 23.10

UNIT–V: Chapter 24 - Sections: 24.1-24.7

**REFERENCE BOOKS**

1. Arthur Beiser. (1983). *Concepts of Modern Physics*.3rd Edition. New Delhi: McGraw-Hill International Book Company.
2. Tayal, D.C. (1986). *Nuclear Physics*. Mumbai: Himalaya Publishing House.
3. Subramanyam, N., & Brijlal. (2008). *Atomic and Nuclear Physics*. Revised by JivanSeshan. New Delhi: S Chand & Co Ltd.
4. Saxena, A.K. (2014). *Principles of Modern Physics*. 4th Edition. London: Narosa Publishing House.
5. Krane, S. Kenneth. (2008). *Introductory Nuclear Physics*. New Delhi: Wiley India Pvt. Ltd.

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V | **ANALOG ELECTRONICS** | Hours/Week: 4 | |
| Core Course - 8 | | Credits: 4 | |
| Course Code-<br>**18UPHC52** | | Internal<br>25 | External<br>75 |

**COURSE OUTCOMES**

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

- acquire basic and practical knowledge about oscillators
- understand the concept of multivibrators
- get knowledge about the different types of modulation
- understand the concept of Voltage regulators
- grasp the practical knowledge about Operational Amplifiers

**UNIT I**

**Oscillators:**

Principle of feedback - Barkhausen criterion for oscillations - Hartley, Colpitt's and RC Phase shift oscillator with mathematical analysis - Wien bridge oscillator - Blocking oscillator. (12 Hours)

**UNIT II**

**Multivibrator:**

Astablemultivibrator, Monostablemultivibrator using transistors - Schmitt trigger using IC 555-AstableMultivibartor using IC 555-Monostable multivibrator using IC 555. (12 Hours)

**UNIT III**

**Modulation**:

Need for modulation - different kinds of modulation - amplitude modulation - percentage of modulation - AM modulator with transistor - SSB transmission - demodulation - envelope detector - frequency modulation - expression for frequency modulation - FM discriminator. (12 Hours)

**UNIT IV**

**DC Power supply:**

Regulated power supply - types of voltage regulators - zener diode voltage regulators - transistor series voltage regulators - transistor shunt voltage regulators - IC voltage regulators - fixed positive voltage regulators- fixed negative voltage regulators - adjustable voltage regulators. (12 Hours)

**UNIT V**

**Operational amplifier**:

Differential amplifier - basic circuit and operation of differential amplifier - CMRR - slew rate - application of OP-AMPS - Inverting amplifier - Non-inverting amplifier - summing amplifier - Integrators - Differentiators. (12 Hours)

**TEXT BOOKS**

1. Jose Robin, G. & Ubaldraj, A. (2008). *Analog Electronics and Digital Electronics.* 1st edition. Marthandam: IndiraPublications.
2. Jose Robin, G. & Ubaldraj, A. (2004). *Basic Electronics & Applied Electronics.* 1st edition. Marthandam: Indira Publications.
3. Mehta, V.K., & Rohit Mehta. (2013). *Principles of Electronics.* Reprint. New Delhi: Chand & Company Ltd.

**BOOK 1:**

UNIT – I: Chapter 4 and study material

UNIT – II: Chapter 4

UNIT – V: Chapter 3

**BOOK 2:**

UNIT –II: Chapter 6

UNIT –III: Chapter 3

**BOOK 3:**

UNIT - IV: Chapter 17

**REFERENCE BOOKS**

1. Gayakwad., Ramakant A. (2011). *Op-Amps and Linear Integrated circuits*. 4th Edition. New Delhi: PHI Learning Pvt. Ltd.
2. Roy Choudhary, D., & Shail, B. Jain. (2010). *Linear Integrated Circuits.* 4th Edition. New Delhi: New Age International Publications.
3. Salivahanan, S., Suresh Kumar, N., &Vallavaraj, A. (2010). *Electronic Devices & Circuits,* Second Edition. New Delhi: The McGraw Hills Education Pvt. Ltd.

Dr.T.VasanthaMalliga
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V | **CLASSICAL AND STATISTICAL MECHANICS** | Hours/Week: 4 | |
| Core Course - 9 | | Credits: 4 | |
| Course Code **18UPHC53** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

- understand basic mechanical concepts related mechanical systems
- realize the conservation theorems concerning with linear momentum, angular momentum and energy
- grasp the concept of Lagrangian Formulation
- represent the equations of motion for complicated mechanical systems using the Hamiltonian formulation
- understand the Boltzmann's theorem connecting entropy and probability
- gain the applications of statistical physics

**UNIT I**

**Mechanics of System of Particles**:

Conservation of linear momentum - angular momentum and energy - conservative forces - mechanics of system of particles - conservation theorem for linear momentum - angular momentum and energy - degrees of freedom - constraints – types of constraints - generalized co-ordinates – transformation equations - generalized velocities - generalized momentum. (12 Hours)

**UNIT II**

**Lagrangian and Applications:**

D'Alembert's principle – Lagrangian equations of motions from D'Alembert's principle (Derivation) – deduction of Hamilton's principle from D'Alembert's principle - deduction of Hamilton's principle from variational principle for system involving forces not derivable from potential function - simple applications (simple pendulum, compound pendulum, Atwood's machine, linear harmonic oscillator in one dimension) – superiority of Lagrangian approach over Newton's approach. (12 Hours)

**UNIT III**

**Hamiltonian and Applications:**

Hamilton's canonical equations of motion (derivation) - physical signifance of H - deduction of Hamilton's equations of motion from variational principle - Hamilton's equations of motion in different co-ordinate system – simple applications (simple pendulum, compound pendulum, linear harmonic oscillator, motion of a particle in central force field). (12 Hours)

**UNIT IV**

**Statistical Mechanics:**

Phase space - volume in phase space - microcanonical, canonical and grand canonical ensembles - Liouville's theorem (Statement & Explanation) - macroscopic and microscopic descriptions - probability - thermodynamic probability - Boltzmann's theorem on entropy and probability - fundamental postulates of statistical mechanics - statistical equilibrium. (12 Hours)

**UNIT V**

**Classical and Quantum Statistics:**

Maxwell-Boltzman distribution law - molecular energies in an ideal gas - Bose-Einstein statistics - application of Bose-Einstein statistics - Planck radiation formula - derivation of Wien's law from Planck's law - derivation of Rayleigh Jean's law from Planck's law - Fermi-Dirac statistics - application of Fermi-Dirac statistics - electron gas - comparison of three distribution laws. (12 Hours)

**TEXT BOOKS**

1. Murugeshan, R., & KiruthigaSivaprasath. (2016). *Modern Physics.* Eighteenth Edition. New Delhi: S.Chand & Company Pvt. Ltd.
2. Gupta, Kumar& Sharma. (2008). *Classical Mechanics*. Twenty 4th Edition, Meerut: PragatiPrakasan.

**BOOK 1**

UNIT - I: Chapter 42 - Sections: 42.1 - 42.4

UNIT - IV: Chapter 43 - Sections: 43.1 - 43.5

UNIT - V: Chapter 43 - Sections: 43.6 - 43.9

**BOOK 2**

UNIT - II: Chapter 2 - Sections: 2.5, 2.7.1, 2.8, 2.9.1, 2.9.2, 2.9.10, 2.17

UNIT - III: Chapter 3 - Sections: 3.3 to 3.5, 3.7, 3.8, 3.9.1, 3.9.2, 3.9.4, 3.9.6

**REFERENCE BOOKS**

1. Goldstein. (1980). *Classical Mechanics*. 2nd Edition. Mumbai: Narosa Publishing House.
2. Gupta, B.D., & SathyaPrakash. (2003).*Classical Mechanics.* Meerut: Kedarnath Ramnath.
3. Takwale, R.G., &Puranik, P.S. (1993). *Introduction to Classical Mechanics.* New Delhi: Tata McGraw-Hill Publishing Company Limited.

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Course Designer

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V | **SOLID STATE PHYSICS** | Hours/Week: 4 | |
| DSEC - 1 | | Credits: 4 | |
| Course Code | | Internal | External |
| **18UPHE51** | | 25 | 75 |

**COURSE OUTCOMES**

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

- acquire the role of solid state physics in the field of physics.
- understand the crystal structure.
- know the different types of bonding in the crystal.
- get an in-depthknowledgeabout the defects in solids.
- provide a foundation of free electron theory.
- gain knowledge about effective mass and Hall effect.

**UNIT I**

**Crystal structure:**

Introduction - crystal lattice - seven classes of crystals - structure of crystals - other cubic structures - directions in crystals - planes in crystals - Miller indices - distances of separation between successive ( $k\ l$) planes. (12 Hours)

**UNIT II**

**Bonding in solids:**

Introduction - types of bonds in crystal - ionic bonding - covalent (valence) bonding - metallic Bonding - hydrogen bonding - Van-der Waals (molecular) bonding - variation of interatomic force with interatomic spacing - cohesive Energy - cohesive energy of ionic solids. (12 Hours)

**UNIT III**

**Defects in solids:**

Introduction - imperfections in crystals - line defects - surface imperfections - stacking faults - twin boundary - volume defects - effects of crystals imperfections.

(12 Hours)

**UNIT IV**

**Electron theory of solids:**

Introduction - the classical free electron theory -electron energies in metals and Fermi energy - density of states -electron in periodic potential -Brillouin zones - distinction between metals, insulators and semiconductors. (12 Hours)

**UNIT V**

**Electron theory of solids:**

Effective mass of electron and concept of hole - Hall effect - specific heat theories of solids - electronic work function in metals -quantum mechanical tunneling in solids.

(12 Hours)

**TEXT BOOKS**

1. Palanisamy, P.K. (2013). *Solid State Physics.* India: Scitech Publications Pvt. Ltd.
2. Arumugam, M. (2013). *Material Science.* Kumbakonam: Anuradha Publications.

**BOOK 1**

UNIT - I: Chapter1 - Sections: 1.1-1.8

UNIT - II**:**Chapter6 - Sections: 6.1-6.10

UNIT - III**:**Chapter 3 - Sections: 3.1-3.8

**BOOK 2**

UNIT 4: Chapter 4 - Sections: 4.1 -4.10

UNIT 5: Chapter 4 - Sections: 4.11 -4.15

**REFERENCE BOOKS**

1. Gupta, S.L., & Kumar, V. (2007). *Solid State Physics.* Meerut: K. Nath & Co Educational Publishers.
2. Keer, H.V. (2008). *Principles of Solid State*. New Delhi: New Age International Publishers.
3. Gupta, H.C. (2005). *Solid State Physics*. New Delhi: Vikas Publishing House PVT. Ltd.
4. Pillai, S.O. (2007). *Solid State Physics*. New Delhi: New Age International Publishers.

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Course Designer

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V | **SPECTROSCOPY** | Hours/Week: 4 | |
| DSEC - I | | Credits: 4 | |
| Course Code- **18UPHE52** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

- gain knowledge about the interactions of electromagnetic radiation and matter and their applications in spectroscopy.
- identify the transitions between the vibrational energy levels of molecules occur in the infrared region
- get insight into Raman spectroscopy
- apply the techniques and instrumentation to understand electron spectra of diatomic molecules
- analyze the properties of diatomic molecule using Microwave spectroscopy

**UNIT I**

**Molecular spectra:**

Electromagnetic spectrum - types of molecular energies- different spectroscopic methods- an overview- spectral line width- absorption and emission of radiation- Einstein's coefficients - Lasers. (12 Hours)

**UNIT II**

**Microwave Spectroscopy:**

The rigid diatomic molecule - the intensities of spectral lines- effects of isotopic substitution - the non-rigid rotator - the spectrum of non-rigid rotator. (12 Hours)

**UNIT III**

**Infrared Spectroscopy:**

Vibrational energy of a diatomic molecule - infrared spectra - preliminaries - infrared selection rules - vibrating diatomic molecules - diatomic vibrating rotator - vibrations of polyatomic molecules - normal vibrations of $CO_2$ and $H_2O$ molecules - dipole moment changes in $CO_2$ molecule - nomenclature of internal modes - more about anharmonicity - rotation vibration spectra of polyatomic molecules. (12 Hours)

**UNIT IV**

**Raman Spectroscopy:**

Theory of Raman scattering - quantum theory - rotational Raman spectra - symmetric top molecules - vibrational Raman spectra - mutual exclusion principle - Raman Spectrometer - polarization of Raman scattered light- structure determination using IR and Raman spectroscopy. (12 Hours)

**UNIT V**

**Electronic spectra of diatomic molecule:**

Vibrational coarse structure - vibrational analysis of band systems - Deeslandre's table - Franck-Condon principle -Intensity of vibrational electronic spectra - Dissociation - Predissociation - Photoelectron spectroscopy. (12 Hours)

**TEXT BOOKS**

1. Arul Das. (2005). *Molecular structure and Spectroscopy*. New Delhi: Prentice-Hall of India Pvt. Ltd.
2. Banwell, Coliin N., McCash., & Elaine M. (1995). *Fundamental of Molecular Spectroscopy.* New Delhi: McGraw-Hill International Book Company.

**BOOK1:**

**UNIT I:** Chapter 1 – Sections: 1.1 -1.8

**UNIT II:** Chapter 7 - Sections: 7.1 -7.5, 7.7, 7.8, 7.1

**UNIT III:** Chapter 8 - Sections: 8.2-8.6, 8.8, 8.10

**UNIT IV:** Chapter 9 - Sections:9.2, 9.3, 9.6, 9.9, 9.10, 9.12

**BOOK2:**

**UNIT V:** Chapter2- Sections: 2.3.1- 2.3.4

## REFERENCE BOOKS

1. Gupta, Kumar &Sharma. (1987). *Elements of Spectroscopy*. 6th Edition. Meerut: Pragati Prakashan.
2. Chatwal, R., Gurdeep., & Anand, K Sham. (1985). *Spectroscopy*. Revised 2nd Edition. Mumbai: Himalaya Publishing House.

Dr.A.AzhaguParvathi
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester - V | **CELLULAR MOBILE COMMUNICATION** | Hours/Week: 4 | |
| DSEC - 1 | | Credits: 4 | |
| Course Code- **18UPHE53** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

- acquire knowledge about mobile Communication
- understand the concepts of digital modulation techniques
- acquire knowledge about mobile propagation
- gain knowledge about digital cellular systems
- know about the mobile communication standards

**UNIT I**

**Mobile Communication Introduction**:

Cell Mobile Telephone system - Tuning efficiency - Frequency reuse concept - Co-channel interference reduction - Hand-off mechanism - Frequency spectrum utilization Cell splitting**.** (12 Hours)

**UNIT II**

**Modulation Techniques**:

Amplitude Modulation - Angle modulation - Digital modulation Techniques: ASK, PSK, FSK, MSK - Gaussian minimum FSK (GMFSK) Differential quadrature phase shift keying (DQPSK**)** (12 Hours)

**UNITIII**

**Mobile Propagation and Antennas**:

Mobile Radio Propagation - Antennas at cell site - Tilting effect - Parasitic elements – Diversitytechniques. (12 Hours)

**UNIT IV**

**Digital Cellular Systems**:

Digital speech - Group of special mobile (GSM) - Multiple access techniques (TDMA, FDMA, CDMA) (12 Hours)

**UNIT V**

**Mobile Communication Standards**:

North American Standards - Japanese cellular TDMA (PPC) - Advanced systems (GPRS, WAP & UMT) (12 Hours)

**TEXT BOOK**

1. Jeyasri Arokiamary. V. (2009). *Mobile Communication*. 1st Edition. Pune: Technical publications.

**UNIT I:** Chapter 1.2, 1.3, 1.5, 1.6 and 1.13

**UNIT II:** Chapter 2.2 – Section 2.2.1 to 2.2.3
Chapter 2.3 – Section 2.3.1 to 2.3.3
Chapter 2.6 – Section 2.6.1 to 2.6.7

**UNIT III:** Chapter 3.2 - Section 3.2.1 to 3.2.4
Chapter 3.4 - Section 3.4.1 to 3.4.4
Chapter 3.5, 3.6, 3.7

**UNIT IV:** Chapter 4.2 – Section 4.2.1, 4.2.2
Chapter 4.4 – Section 4.4.1 to 4.4.3
Chapter 4.5 – Section 4.5.1 to 4.5.3

**UNIT V:** Chapter 4.6 – Section 4.6.1
Chapter 4.7 & 4.10 – Section 4.10.2, 4.10.3 & 4.10.5

**REFERENCE BOOKS**

1. Rappaport, Odore S. (2010). *Wireless Communications*.2nd Edition. USA: Prentice Hall of India Private Limited.
2. Rappaport, Theodore S. (2010).*Wireless Communications: Principles and Practice*. 2nd Edition. London: Pearson publications.
3. Schiller. (2008). *Mobile Communications*.2nd Edition. London: Pearson publications.

Dr.I.Rathinamala
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V | **MICROPROCESSOR** | Hours/Week: 2 | |
| SEC -5 | | Credits: 2 | |
| Course Code-**18UPHS51** | | Internal 40 | External 60 |

**COURSE OUTCOMES**

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

- understand the pinout diagram of Microprocessor 8085
- know the architecture of Microprocessor 8085
- study about the instructions of Microprocessor 8085
- provide a foundation of programming principles using Microprocessor 8085.
- gain knowledge about stack and subroutine.

**UNIT I**

**Features of 8085 Microprocessor:**

Microprocessor - Features of 8085 µP- Pin diagram of Intel 8085 - address bus - multiplexed data bus - control and status signals - power supply and clock signals serial I/O signals - Need of Multiplexing and demultiplexing. (6 Hours)

**UNIT II**

**Architecture:**

Architecture of Intel 8085 Microprocessor - Arithmetic and logical group - Register group - interrupt control - serial I/O control group-Instruction Register, Decoder and control group. (6 Hours)

**UNIT III**

**Instructions:**

Instruction format - OP code format - data format - instructions classification data transfer group - arithmetic group – logical group - branch group - stack, I/O and machine control group - addressing modes. (6 Hours)

**UNIT IV**

**Simple assembly language programs:**

Addition of two 8-bit number –8-bit subtraction - two's complement of 8 bit number - to find the largest number in data Array - to arrange a set of numbers in descending order. (6 Hours)

**UNIT V**

**Stack and subroutine:**

Program technique - stack and subroutine - stack - instructions - instructions - POP RP - summary of stack - subroutine -instructions- interrupts - classification. (6 Hours)

**TEXT BOOK**

1. Gupta, M.K. (2007). *Microprocessor, Microcomputer, Microcontroller and interfacing*. 2nd Edition. New Delhi: Paragon International Publishers.

**UNIT – I:** Chapter -1 and 3

**UNIT – II:** Chapter -3

**UNIT – III:** Chapter -4

**UNIT – IV**: Chapter -7

**UNIT – V**: Chapter-8.21-8.22

Chapter -10

**REFERENCE BOOKS**

1. Gaonkar, Ramesh S. (2013). *Microprocessor, Architecture, Programming, and Applications with the 8085*. 6th Edition. India: Penram International Publishing Pvt. Ltd.
2. Hall, Douglas V. (1991).*Microprocessors and Interfacing Programming and Hardware*. New Delhi: Tata McGraw Hill Publishing Company Limited.
3. NagoorKani, A. (2005). *Microprocessor & Microcontroller*. 1st Edition. RBA Publication.
4. Ahson, S.I. (1989). *Microprocessor with Applications in Process Control*. 3rd Reprint. New Delhi: Tata McGraw Hill Publishing Company Limited.

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Course Designer

# V.V. VANNIAPERUMAL COLLEGE FOR WOMEN

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*Re-accredited with 'A' Grade (3rd Cycle) by NAAC*

VIRUDHUNAGAR - 626 001

**B.Sc. Physics**

**(2018-2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V | **PROGRAMMING IN C** | Hours/Week: 2 | |
| SEC - 5 | | Credits: 2 | |
| Course Code **18UPHS52P** | | Internal 40 | External 60 |

List of 'C' Programs (Any 10)

1. Conversion of temperature from Celsius to Fahrenheit and vice-versa
2. Conversion of a number from decimal to binary and vice-versa
3. Calculation of radius of curvature of lens byNewton's rings
4. Calculation of resonance frequency of LCR circuit
5. Calculation of roots of quadratic equations
6. Performance of basic arithmetic operations
7. Calculation of power for difference resistance values
8. Calculation of distance travelled by a vehicle
9. Calculation of the amount of work done in twisting a wire
10. Calculation of time period of oscillations of a compound pendulum.
11. Determination of mass fromrelativistic equation $m = \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}$
12. Solve the given integral using Trapezoidal rule

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VIRUDHUNAGAR - 626 001

**B.Sc. Physics**
**(2018-2019 onwards)**

| | | | |
|---|---|---|---|
| Semester VI | **MATHEMATICAL PHYSICS** | Hours/Week: 5 | |
| Core Course-10 | | Credits: 4 | |
| Course Code **18UPHC61** | | Internal 25 | External 75 |

## COURSE OUTCOMES

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

- understand the various theorems and its applications in Vectors.
- learn about special type of matrices that are relevant in Physics.
- impart basic Knowledge in Beta, Gamma and Error functions.
- get insight into applications of Fourier series and Integrals
- get familiar with the special functions like Legendre, Bessel and Hermite functions.
- understand the Physics concept behind the Mathematical principle.

## UNIT I

**Vector Analysis:**

Introduction - gradient of a scalar field - line, surface and volume integrals - divergence of a vector function - expression for divergence in cartesian coordinates - curl of a vector function - expression for curl in cartesian coordinates - physical significance of curl - Gauss divergence theorem - Stoke'stheorem - Green's theorem - application of vectors to hydrodynamics - equation of continuity - the equation of heat flow in solids: Fourier's heat flow equation, Poisson's equation. (15 Hours)

**UNIT II**

**Matrices:**

Special types of matrices - transpose of matrix - the conjugate of matrix - the conjugate transpose (or the transposed conjugate) of a matrix - symmetric and anti symmetric matrices -Hermitian and skew- Hermitian matrices - singular and non-singular matrices - orthogonal matrices - unitary matrices - vectors as matrices and vector spaces - solution of linear equations -eigen values, eigen vectors : characteristic equation of a matrix - matrices in Physics - the rotation matrix - Pauli spin matrices. (15 Hours)

**UNIT III**

**The Beta, Gamma and Error Functions:**

Definitions - symmetry property of beta function - evaluation of beta function - transformation of beta function (other forms of beta function) - evaluation of gamma function - transformation of gamma function ( other forms of gamma function) - relation between beta and gamma functions - graph of gamma function - evaluation of error function. (15 Hours)

**UNIT IV**

**Fourier series and Integrals:**

Fourier Series - half range series in interval 0 to π - change of interval from (-π, π) to $(-l, l)$ - complex form of Fourier series - Fourier series in the interval (0,t) - physical examples of Fourier series - half wave rectifier - full wave rectifier - a saw tooth wave.

**Fourier's Transforms:**

Introduction - Fourier's transform - convolution theorem - Parsevals theorem - problems (15 Hours)

**UNIT V**

**Special Functions:**

Bessel's differential equation - Legendre's differential equation - Hermite differential equations- problems.(15 Hours)

**TEXT BOOKS**

1. Murugesan, R. (1996). *Mechanics and Mathematical Methods*. First Edition. New Delhi: S. Chand & Company Ltd.

2. Satya Prakash. (2014). *Mathematical Physics with Classical Mechanics*. Reprint.New Delhi: Sultan Chand & Sons.

**BOOK 1**

UNIT I – Chapter – 7 - Sections:7.1 to 7.8, 7.10 to 7.12, 7.13.1, 7,13.3b, 7.13.3c2

UNITII – Chapter – 8 - Sections:8.5 (i), (ii)

UNIT V – Chapter – 9 -Sections:9.9, 9.11, 9.12

**BOOK 2**

UNIT I: Chapter – 1 - Sections:1.15

UNIT II**:** Chapter – 2 - Sections:2.5 to 2.10, 2.14, 2.26, 2.27,2.8

UNIT III**:** Chapter - 4 -Sections:4.1 to 4.7, 4.10, 4.11

UNIT IV**:** Chapter - 8 – Sections:8.1, 8.3 to 8.6, 8.9.1, 8.9.2

Chapter – 10 – Sections: 10.1, 10.2, 10.3.6, 10.3.7

**REFERENCE BOOKS**

1. Gupta, B.D. (2011). *Mathematical Physics*. 4th Edition.New Delhi: Vikas Publishing House Pvt. Ltd.
2. Dass, H.K., & Dr.RamaVerma. (2011). *Mathematical Physics.* 6thRevised Edition. New Delhi: S.Chand& Company Ltd.
3. Saxena, A. X. (2015). *Mathematical Physics.* Mumbai: Narosa Publishing House Pvt. Ltd.

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester VI | **DIGITAL ELECTRONICS** | Hours/Week: 5 | |
| Core Course -11 | | Credits: 4 | |
| Course Code **18UPHC62** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

- understand Binary codes and Boolean algebra.
- design arithmetic and logic circuits.
- realize the designing of encoder and decoder
- know the basics of construction of flip-flop
- understand the techniques and designing of counters, Registers and converters

**UNIT I**

**Number system:**

Number system - arithmetic operation - l's and 2's complements - binary coded decimal- Boolean logic operations – basic laws of Boolean algebra - De Morgan's theorems. (15Hours)

**UNITII**

**Minimization Techniques and Arithmetic circuits:**

Sum of Products and Product of Sums - Karnaugh map-positive and negative logic - logic gates –TTL NAND gate - TTL NOR gate- Half adder - Full adder - Half subtractor - Full subtractor. (15 Hours)

**UNIT III**

**Combinational Circuits:**

Multiplexer- basic four input multiplexer - demultiplexer -1 to 4 demultiplexer – Decoders- basic Binary Decoder - 3 to 8 decoder-BCD to decimal decoder – Encoders- Octal to Binary Encoder- Decimal to BCD Encoder. (15 Hours)

**UNITIV**

**Flip-Flops:**

Latches-Flip-flops- Types of Flip-Flop - NOR based S-R Flip- NAND based S-R Flip-Flop - D flip flop - J-K flip flop - T flip flop – Master slave J.K Flip-Flop.

(15 Hours)

**UNIT V**

**Counters, Registers and Converters:**

Asynchronous counter-decade counter- synchronous counter-Shift Registers - SISO - SIPO - PISO- PIPO - Registers - Ring Counter - D/A converters - R-2R ladder D/A converter - A/D Converter –counter type A/D converter. (15 Hours)

**TEXT BOOK**

1. Salivahanan, S. & Arivazhagan, S. (2007). *Digital Circuits and Design*. 3rd Edition, New Delhi: Vikas publishing House PVT Ltd.

**UNIT I -** Chapter 1 – Sections: 1.2, 1.4, 1.5, 1.8

Chapter 2 – Sections: 2.3, 2.4, 2.5

**UNIT II -** Chapter 2 – Sections: 2.6, 2.7

Chapter 3 – Sections: 3.2, 3.3

Chapter 4 – Sections: 4.9.1 & 4.9.6

Chapter 5 – Sections 5.3, 5.4, 5.6, 5.7

**UNITIII**– Chapter6 –Sections: 6.2, 6.2.1, 6.4, 6.4.1, 6.5, 6.5.1 , 6.5.2, 6.5.6, 6.5.7, 6.7, 6.7.1- 6.7.2

**UNIT IV**-Chapter 7 – Sections: 7.2, 7.2.2, 7.3- 7.7, 7.10.1, 7.10.2

**UNIT V**-Chapter 8 – Sections: 8.2, 8.5.2, 8.9

Chapter 9 – Sections: 9.2, 9.2.1, 9.2.3, 9.2.5, 9.2.7, 9.4.1

Chapter13 - Sections 13.2, 13.4.2, 13.7, 13.9.2

**REFERENCEBOOKS**

1. Leach, Donald P., Albert Paul Malvino & GoutamSaha. (2014). *Digital principles and Applications.* 6th Edition. New Delhi: Tata McGraw Hill Publishing Company Ltd.
2. Basava Raj, B. (2000), *Digital Fundamentals.* 3rdReprint. New Delhi: Vikas Publishing House Pvt. Ltd.
3. Salivahanan, S. & Arivazhagan, S. (2010). *Digital Electronics*. 1st Edition. New Delhi: Vikas Publishing House PVT Ltd.

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester VI | **NANO SCIENCE** | Hours/Week: 5 | |
| Core Course - 12 | | Credits: 4 | |
| Course Code **18UPHC63** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

- understand the basic concepts of Nano Science
- get an in-depth knowledgeabout the synthesis of Nano materials
- study the various characterization techniques of Nano materials
- gain knowledge about the properties of Nano materials
- know the applications of Nanotechnology

**UNIT I**

**Nanomaterials:**

Introduction-solid materials and their strength-perspective of length-Nano science and Nanotechnology-nanostructures in nature-quantum structures-quantum confinement-surface effects of nanomaterials -prime materials-carbon nanostructures.

(15 Hours)

**UNIT II**

**Preparation methods:**

Nanomaterials synthesis-physical approaches -laser ablation-high-energy ball milling (Mechanical alloying method) - chemical vapor deposition - chemical approaches-solvo thermal synthesis-hydrothermal synthesis-sol-gel synthesis-co-precipitation. (15 Hours)

**UNIT III**

**Characterization Techniques:**

Principles of electron Microscopy-Scanning Electron Microscope (SEM) - Energy dispersive X-ray analysis (EDX)-Atomic Force Microscope (AFM) - Powder method - grain size /crystallite size using Scherrer's Formula- Photoluminescence.

(15 Hours)

**UNITIV**

**Properties:**

Mechanical behavior- mechanical properties of nanomaterials-elastic properties-hardness and strength-ductility and toughness- optical properties of nanomaterials-surface Plasmon resonance- quantum size effects- electrical properties -magnetic properties of nanomaterials. (15 Hours)

**UNITV**

**Applications:**

Nano catalysts-food and agriculture Industry- cosmetics and consumer Goods-structure and engineering-automotive industry- water treatment and the environment-nano-medical applications–textiles-paints- energy - defense and space applications-structural applications. (15 Hours)

**TEXT BOOKS**

1. Shah Tokeer Ahmad. M.A, (2010), *Principles of Nano science and Nanotechnology*. New Delhi: Narosa Publishing House.
2. Murty B.S., Shankar. P., Baldev Raj., Rathi.B., & Band James Murday, (2012). *Text Book of Nanoscience and Nanotechnology*. India: Universities Press- Pvt. Ltd.

**BOOK - 1**

UNIT - I- Chapter 1-Section: 1.1-1.10

UNIT - II- Chapter 2-Section: 2.1-2.3, 2.3.2, 2.3.5, 2.3.6, 2.4,2.4.1, 2.4.2, 2.4.4, 2.4.7

UNIT - III- Chapter 3 –Section: 3.1-3.3, 3.5, 3.8

Chapter 4- Section: 4.6, 4.6.1

Chapter 5 – Section: 5.6

UNIT – IV- Chapter6-Section: 6.2, 6.2.1, 6.2.1.1-6.2.1.3, 6.3.1, 6.3.1.1, 6.3.1.2, 6.4, 6.6.1

**BOOK - 2**

UNIT – V- Chapter 4 - Section: 4.4 - 4.15

**REFERENCE BOOKS**

1. Chattopadhyay, K.K., & Banerjee, A.N. (2012). *Introduction to Nanoscience and Nanotechnology*. NewDelhi PHI Learning Private Limited.
2. Poole,Jr., Charles P., Owens., Frank J., & John, A. (2006). *Introduction to Nanotechnology*. New Jersy: Wiley Sons. Inc., Publication.
3. Pradeep, T. (2007). *Nano: The Essentials: Understanding Nanoscience and Nano Technology*. New Delhi: McGraw Hill Education Pvt. Ltd.

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester VI | **MATERIAL SCIENCE** | Hours/Week: 5 | |
| DSEC-2 | | Credits: 4 | |
| Course Code | | Internal | External |
| **18UPHE61** | | 25 | 75 |

**COURSE OUTCOMES**

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

- study properties & uses of dielectric materials.
- realize the basic ideas of conducting materials
- grasp the concept of super conducting material
- understand the basics of new materials
- appreciate the optical of materials

**UNIT I**

**Dielectric Material:**

Introduction - fundamental definition in dielectric - different types of electric polarization - frequency and temperature effects on polarization - Dielectric loss - local field or internal field - Classius-Mosotti relation - Determination of dielectric constant - Dielectric break down - properties and different types of insulating material. (15 Hours)

**UNIT II**

**Conducting Material:**

Atomic interpretation of ohm's law - relaxation time and electrical conductivity - derivation of electrical conductivity of metal - electrical and thermal conductivity - Relaxation time, collision time and mean free path - Source of resistivity of metals - Thermal conductivity - Wiedemann-Franz law - Electrical conductivity at high

frequencies - Geometrical and magnetic field effects on electrical conductivity - Different types of conducting metals. (15 Hours)

**UNIT III**

**Super Conducting Materials:**

Introduction - Explanation for the occurrence of super conductivity - General properties of superconductors - Other general observations - Types of superconductors - High temperature superconductors - Application of superconductor. (15 Hours)

**UNIT IV**

**Optical Materials:**

Optical absorption in metals, semiconductors and insulators - Nonlinear optical materials and their applications (second and third harmonic generation and optical rectification & Optical gratings) - Some important nonlinear optical materials and their properties - Display devices and display materials - Laser materials. (15 Hours)

**UNIT V**

**New Materials:**

Metallic glasses - Fiber Reinforced Plastic (FRP) & Fiber Reinforced Metals (FRM) – Biomaterials - Cermets – High temperature materials - Thermo electric materials - Electrets - Nuclear Engineering materials - Nanophase materials - Intermetallic compounds - Shape memory alloys - Smart Materials - Conducting polymers.

(15 Hours)

**TEXT BOOK**

1. Arumugam, M. (2013). M*aterial Science*.23rd reprint. Tamil Nadu: Anuradha Agencies.

   Unit I– Chapter 6 – Sections: 6.1-6.10

   Unit II– Chapter 5– Sections: 5.2 – 5.4, 5.6 – 5.8, 5.10-5.11, 5.13

   Unit III- Chapter 8– Sections: 8.1 – 8.7

   Unit IV – Chapter 10– Sections: 10.2 – 10.3, 10.6, 10.9.

   Unit V– Chapter 11– Sections: 11.2-11.3, 11.6, 11.8 – 11.17

**REFERENCE BOOKS**

1. Puri, R.K., & Babbar, V.K. (1997). *Solid State Physics*. 1st Edition. New Delhi: S. Chand & Co.
2. Palanisamy, P.K. (2011).*Physics of material.* 1st Edition. India: Scitech publications Pvt. Ltd.
3. Pillai, S.O. (2010). *Solid State Physics,* 6th Revised Edition. New Delhi: New Age International Publishers.
4. Keer, V. (1993). *Principles of the solid state*. First Edition. New York: Wiley Eastern Ltd.
5. Charles Kittel. (2007). *Introduction to Solid Physics*. 3rd Reprint. New York: WSE Wiley India Pvt. Ltd.

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester VI | **MEDICAL PHYSICS** | Hours/Week: 5 | |
| DSEC-2 | | Credits: 4 | |
| Course Code<br>**18UPHE62** | | Internal<br>25 | External<br>75 |

**COURSE OUTCOMES**

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

- appreciate the role of Physics in the field of Medicine.
- understand the types of electrodes.
- knowabout the transducers.
- study about ECG and EEG.
- Know about pacemeakers.
- gain knowledge about CT and MRI Scan.

**UNIT I**

**Bio Medical Electrodes:**

Transport of ions through cell membrane-resting and action potentials-bio electric potentials-design of medical Instruments- components of the bio medical instrument system- electrodes (micro electrodes, depth & needle electrodes and surface electrodes.

(15 Hours)

**UNIT II**

**Transducers:**

Transducers - active transducers- passive transducers- resistive transducers- capacitive transducers - inductive transducers (LVDT). (15 Hours)

**UNIT III**

**Bio Medical Recorders:**

Electrocardiograph -block diagram description of an ECG - ECG leads- multichannel ECG machine – EEG- Block diagram description of EEG- Recording of evoked potentials-Electromyograph-Other bio medical recorders. (15 Hours)

**UNIT IV**

**Physiological Assist Devices:**

Pacemakers- energy requirements to excite heart muscle- methods of stimulation - pacemaker batteries-mercury cells- Lithium cells –photometers and calorimeters-filter photometer-flame photometer-filter fluorometer- chromatography-digital thermometer. (15 Hours)

**UNIT V**

**Advances in Bio Medical Instrumentation:**

Computer tomography (without derivation) -ultrasonic imaging systems- ultrasonic propagation through tissues-recording devices - ultrasonic imaging Instrumentation-applications of diagnostic ultrasound- magnetic resonance imaging - MRI instrumentation. (15 Hours)

**TEXT BOOKS**

1. Arumugam, M. (2014). *Bio medical Instrumentation*. 14th Reprint. Tamil Nadu: Anuradha Publications.
2. Khandpur, R.S. (2008). *Hand book of Bio medical Instrumentation*. 2nd Edition, 12th Reprint. New Delhi: Tata McGraw Hill Company Ltd.

**BOOK 1**

Unit I - Chapter 1 – Sections: 1.4-1.6
Chapter 2 – Sections: 2.2 - 2.4(2.4.1-2.4.7)
Unit II - Chapter 2 – Sections: 2.5 (2.5.1 -2.5.15)
Unit IV - Chapter 5 – Sections: 5.2 (5.2.1, 5.2.2), 5.3(i &ii)
Chapter 7 – Sections: 7.5.1,7.5.3,7.5.4,7.5.5, 7.6
Unit V - Chapter 10 – Sections: 10.7, 10.9, 10.9.2, 10.9.4, 10.9.7, 10.9.8, 10.10, 10.10.8

**BOOK 2**

Unit III – Chapter 5 – Sections: 5.1, 5.1.1, 5.1.2, 5.1.5, 5.4, 5.4.1, 5.4.2, 5.5, 5.6.

**REFERENCE BOOKS**

1. Mandeep Singh. (2010). *Introduction to Biomedical Instrumentation*. New Delhi: PHI Learning Private Limited.
2. Chatterjee Shakti. (2008). *Biomedical Instrumentation Systems*. India: Thomson Press Ltd.
3. Sawhney, G. S. (2012). *Biomedical Electronics and Instrumentation Made Easy*. New Delhi: I.K. International Pvt. Ltd.
4. Rao, C.R. (2006). *Principles of Medical Electronics and Biomedical Instrumentation* India: Universities Press, S.K Publisher

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester VI | **MICROCONTROLLER 8051** | Hours/Week: 5 | |
| DSEC-2 | | Credits: 4 | |
| Course Code- **18UPHE63** | | Internal 25 | External 75 |

**COURSE OUTCOMES**

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

- acquire the concept of Microcontroller architecture
- understand the instruction set and develop the programming skills
- acquire practical knowledge about 8051 microcontroller
- acquire knowledge about interfacing concept
- understand the concept of memory interfacing

**UNIT I**

**Intel 8051 Microcontroller**:

Introduction - features of 8051 -pin configuration of 8051 architecture of 8051 - Internal and external memories -interfacing and timing diagrams for memory interfacing. (15 Hours)

**UNIT II**

**Introduction Set & Addressing:**

Addressing Mode of 8051 - instruction set of 8051 - simple programs (addition, subtraction, multiplication, division) -ascending Order - descending order smallest number - largest number - interfacing programs. (15 Hours)

**UNIT III**

**8051 Peripheral Function:**

8051 interrupt structure -timer/counters operation of 8051 -serial communication – I/O ports - interrupts of 8051- programming interrupts. (15 Hours)

**UNIT IV**

**8051 Interfacing Functions:**

Interfacing of 8051 - keyboard, LCD, LED, seven segment display, ADC, DAC closed loop control of servomotor - stepper motor. (15 Hours)

**UNIT V**

**Direct Memory Access**:

Introduction - DMA Controller - block diagram of 8257 pin configuration of 8257 - DMA operating modes - intel 8279 key board display. (15 Hours)

**TEXT BOOK**

1. Godse, A.P.,&Godse, D. A., (2015).*Microprocessor and Microcontroller*.I edition. Mumbai: Technical Publications.
   Unit - I: Chapter 15 - Sections: 15.1, 15.2, 15.3.1 -15.3.6, 15.4, 15.5.1 -15.5.1.3, 15.5.2.
   Unit - II: Chapter 16 - Sections: 16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.10
   Unit - III: Chapter 17 - Sections: 17.1 – 17.8
   Unit - IV & V: Chapter 18 - Sections: 18.1 - 18.7

**REFERENCE BOOKS**

1. Raj Kamal, (2009). *Microcontrollers: Architecture, Programming, Interfacing and System Design.* India: Pearson Education.
2. Mohamad Ali Mazadi. (2007). *The 8051 Microcontroller and Embedded Systems: Using Assembly and C.* India: Pearson Education.
3. Kenneth Ayala. (2007). *8051 Microcontroller.* 3rd edition. New York: West Publishing Company.

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester VI | **COMMUNICATION ELECTRONICS** | Hours/Week: 2 | |
| SEC - 6 | | Credits: 2 | |
| Course Code- **18UPHS61** | | Internal 40 | External 60 |

**COURSE OUTCOMES**

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

- acquire basic knowledge about the digital communication systems.
- gain the Digital data transmission and Error control coding.
- understand the concept of Network hardware.
- acquire knowledge about wireless transmission.
- understand the principles of satellite communication

**UNIT I**

**Digital communication system:**

Elements of a digital communication system - sampling theory - PCM generation - PCM transmitter & receiver - Uniform & non uniform quantizers - Delta modulation - Analysis of Delta modulation. (6 Hours)

**UNIT II**

**Digital data transmission:**

Description of ASK, PSK, FSK signaling schemes - error control coding - Parity check codes - Linear block code - systematic code - cyclic codes. (6 Hours)

**UNIT III**

**Network hardware:**

Local Area Networks - Metropolitan Area Networks - Wide Area Networks - Wireless Networks - Home Networks- Internet works - The Internet - ARPANET - Internet Usage - Architecture – ETHERNET. (6 Hours)

**UNIT IV**

**Wireless Transmission:**

The Electromagnetic Spectrum - Radio Transmission - Microwave Transmission - Infrared and millimeter waves - Lightwave transmission-PSTN - Structure of the telephone system. (6 Hours)

**UNIT V**

**Satellite communication**:

Kepler's laws- Satellite orbits - Attitude control- Station keeping - Antenna look angles - Satellite frequency plans & allocations - Satellite transponder. (6 Hours)

**TEXT BOOKS**

1. Samshanmugam, K. (2006). *Digital & Analog Communication system*. New York: John Wiley & sons Publications.
2. Tanenbaum, Andrew S. (2005).*Computer Networks. 4th* edition. New Delhi: Prentice Hall of India Pvt. Ltd.
3. Dennis Roddy., & John Coolen. (2008). *Electronic Communications.* 4th edition. New Delhi: Prentice Hall of India Pvt. Ltd.

**BOOK-1**

UNIT I: Chapter 1: 1.2 – 1.2.7

Chapter 10: 10.2.1, 10.3, 10.3.1, 10.3.2, 10.4, 10.4.1, 10.4.5

UNIT II:Chapter 8: 8.1

Chapter 9: 9.1, 9.1.2, 9.1.3, 9.1.4, 9.2, 9.21, 9.3, 9.3.1

**BOOK-2**

UNIT III: Chapter 1: 1.2, 1.5.1 (relevant sections), 1.5.3

UNIT IV: Chapter 2: 2.3, 2.5, 2.5.1

**BOOK-3:**

UNIT V: Chapter 19 – Sections: 19.1 - 19.6, 19.8 - 19.10, 19.12, 19.13

**REFERENCE BOOKS**

1. Jose Robin, G. &Ubald Raj, A. (2004). *Basic Electronics & Applied Electronics.* 1st edition. Marthandam: Indira Publications.
2. Siman Haykin. (1994). *Communication Systems*. 3rd Edition. New York: John wiley & Sons Inc.
3. Vijachitra , S. (2013). *Communication Engineering*. New Delhi: Tata McGraw-Hill Education

Dr.R.HepziPramilaDevamani
Course Designer

# V.V. VANNIAPERUMAL COLLEGE FOR WOMEN

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VIRUDHUNAGAR - 626 001

**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V & VI | **PRACTICAL – 3** | Hours/Week: 3 | |
| Core Course - 3 | | Credits: 3 | |
| Course Code-**18UPHC61P** | **GENERAL PHYSICS - III** | Internal 40 | External 60 |

**List of Practical**

1. Absolute capacity of condenser using B.G.
2. i-d curve by spectrometer
3. i-i' by spectrometer
4. Cauchy's constants by spectrometer
5. Hartmann's Interpolation formula by spectrometer
6. L.C.R-Series Resonance Circuit
7. L.C.R-Parallel Resonance Circuit
8. Self inductance of the give coil by Anderson's Bridge
9. Self inductance of the give coil by Maxwell's Bridge
10. Determination of λ –Biprism and Spectrometer.
11. λ of Hg spectrum using Grating - minimum deviation by spectrometer
12. Determination of mutual inductance
13. Temperature coefficient of a coil using potentiometer
14. E.m.f. of a thermocouple by B.G
15. Comparison of Mutual inductances by B.G
16. High Resistance by leakage - B.G

Dr.K.Umamaheswari
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V & VI | **PRACTICAL – 4**<br>**ELECTRONICS** | Hours/Week: 3 | |
| Core Course 4 | | Credits: 3 | |
| Course Code-<br>**18UPHC62P** | | Internal<br>40 | External<br>60 |

**List of Practical**

1. Reverse bias characteristics of Zener diode and voltage regulator
2. Hartley Oscillator
3. Astablemultivibrator using discrete components
4. Dual power supply using IC
5. Voltage doubler and tripler
6. FET characteristics
7. Adder and subtractor using IC 741
8. Schmitt trigger using IC 555
9. Universal NAND & NOR gates using IC
10. Low pass filter and high pass filter
11. Verification of reciprocity theorem
12. Integrator and Differentiator using Op Amp
13. UJT – VI characteristics
14. Amplitude Modulation
15. Single stage amplifier
16. Verification of Norton's theorem

Dr.T.VasanthaMalliga
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester V & VI | **PRACTICAL – 5**<br>**DIGITAL ELECTRONICS** | Hours/Week: 2 | |
| Core Course -5 | | Credits: 2 | |
| Course Code-<br>**18UPHC63P** | | Internal<br>40 | External<br>60 |

**List of Practical**

1. LED characteristics and characteristics of seven segment display
2. R-S Flip flop
3. Astablemultivibrator using IC 555
4. Binary to Gray and Gray to Binary Conversion
5. D Flip flop
6. Decoders - 2 to 4 decoder
7. J-K Flip flop
8. Decade counter
9. BCD to seven segment decoder
10. Addition and subtraction of two 8-bit numbers using Microprocessor 8085
11. Division of two 8-bit numbers using Microprocessor 8085
12. Multiplication of two 8-bit numbers using Microprocessor 8085
13. Ring Counter
14. Multiplexer and de multiplexer
15. Inverting and Non-Inverting amplifier-IC741
16. Shift register

Dr.P.Malliga
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | |
|---|---|---|
| Semester VI | **PROJECT** | 0 Hours |
| Extra Credit | | Credits: 2 |
| Course Code-**18UPHO51** | | Internal : 100 Marks |

**Internal only**

Candidate is expected to select a project in the field of Physics or Electronics. The report on the completed project work shall be submitted to the department in the month of March during VI semester. Two typed copies (one for candidates/one for Department) of the project report will be submitted through the Head of the department. Evaluation will be done internally. Minimum pages for project report should be 20 pages.

Project work - 60 marks
Presentation &Viva-voce - 40 marks.

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 -2019 onwards)**

| | | |
|---|---|---|
| Semester VI | **PHYSICS FOR COMPETITIVE EXAMINATION** | 0 Hours |
| Extra Credit | | Credits: 2 |
| Course Code-**18UPHO61** | | Internal : 100 Marks |

**Internal only**

**COURSE OUTCOMES**

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

- invigorate principle involved in Mechanics Electricity, Atomic and Nuclear Physics
- apply the basic principles of Physics in solving problems
- develop problem solving skill
- excel in competitive examinations

**UNIT I**

Newton's First law – Second law – Third law – Impulse – motion in a lift – relativity – theory of relativity – consequence of special theory of relativity.

**UNIT II**

Capacitance – parallel plate capacitor,cylindrical capacitor – spherical capacitor – Energy of a capacitor – combination of capacitors – Kirchhoff's law - wheat stone's bridge.

**UNIT III**

Electric current and circuits – Electric current – current density – Drift velocity – Ohms law – Electrical Resistance – Resistivity and conductivity – variation of Resistance with temperature - Thermistor – colourcode – combination of resistances.

**UNIT IV**

Quantum nature of light – photoelectric effect – Einstein's explanation of photoelectric effect – Compton Effect – matter waves.

**UNIT V**

Production of X-ray -X- ray spectra- Bragg's law – Radioactivity – Half life – mean life – units of radioactivity.

**BOOKS FOR STUDY**

1. SathyaPrakash.A.S, andParakashan, (2014), *Objective Physics*, – Meerut, 22nd edition -2004 – 05.

UNIT – I:Chapter 6 – Sections 6 - 6.1, 6.2, 6.5, 6.8.

Chapter 55 – Sections 55 - 55.4, 55.5, & 55.6

UNIT -II:Chapter – 35 Sections 35 - 35.1, 35.6, - 35.10.

UNIT –III:Chapter 36 - Sections 36 - 36.1 - 36.9 & 36.11.

UNIT –IV:Chapter – 47 Sections 47 - 47.1 to 47.5 &54.1

UNIT –V:Chapter – 50 – Sections 50- 50.1, 50.2.2, 50.3, 50.4, 50.5

**REFERENCEBOOKS**

1. Pandey, D.C. (2003).*An Objective Approach Physics.*Volume I &II. Meerut: ArihantParkashan,
2. Mahesh Jain. (2011).*Objective Physics*.New Delhi: S. Chand Company.

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester III | **OPTICS** | Hours/Week: 5 | |
| Core Course-5 | | Credits: 5 | |
| Course Code **18UPHC31N** | | Internal 25 | External 75 |

## COURSE OUTCOMES

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

- get an idea about the geometrical and physical nature of light.
- understand the geometrical aspects of light and to the design of optical systems with an emphasis on image forming systems.
- analyze and understand the phenomenon of interference of light waves.
- gain an insight into the theories of diffraction and comprehend the concepts of polarization of light.
- know about the construction and classification of fibers.
- acquire basic idea about molecular spectroscopy.

## UNIT I

### Geometrical Optics:

Refraction through a thin lens-equivalent focal length of two thin lenses separated by a distance -dispersion through a prism-Cauchy's formula-achromatism in prisms-dispersion without deviation-direct vision spectroscope-aberrations- spherical aberration -methods and conditions for minimising spherical aberration of two thin lenses separated by a distance-aplanatic lens-chromatic aberration-condition for achromatism of two lenses placed in contact and separated by a finite distance-Huygen's eyepiece-Ramsden's eyepiece-comparison of eyepieces. (15 Hours)

## UNIT II

### Interference and Fresnel Diffraction:

Theory of interference fringes-colours of thin films-production of colours in thin films-wedge-shaped film-Newton's rings-determination of wavelength of light-

Michelson's interferometer-uses of Michelson's interferometer-construction and working of Fabry-Perot interferometer-determination of wavelength-Fresnel's explanation of rectilinear propagation of light-zone plate-comparison of a zone plate with a convex lens.

(15 Hours)

**UNIT III**

**Fraunhofer Diffraction and Polarisation:**

Diffraction at a single slit-Fraunhofer diffraction at a single slit-plane transmission diffraction grating-determination of wavelength(normal incidence)-Rayleigh criteria-resolving power of a plane diffraction grating.

Double refraction-Nicol prism-plane, circularly and elliptically polarized light-quarter wave plate-half wave plate-production and detection of plane, circularly and elliptically polarized light-optical activity-specific rotation-Laurent's half shade polarimeter. (15 Hours)

**UNIT IV**

**Optical Fibre and its Losses:**

Optical fiber communication system-Different generations in optical fiber communication-Advantages of optical fiber communication-Different types of fiber- step index fiber, Graded index fiber, single mode fiber and multimode fiber-Ray theory of step index fiber-Total internal reflection-Light propagation through step index fibers (without analysis)-Fiber materials-Fiber cables-Attenuation-Absorption-Scattering losses-Linear Scattering losses-Bending losses. (15 Hours)

**UNIT V**

**Spectroscopy:**

Types of spectra-Infrared spectra-Ultraviolet spectra-Rayleigh's scattering-Molecular spectra-theory of origin of pure rotational spectra-vibrational-rotational spectra of a molecule-non-rigid rotator-vibrating diatomic molecule as a harmonic oscillator-electronic spectra of molecules-Raman effect-experimental study-quantum theory-applications of Raman effect. (15 Hours)

**TEXT BOOKS**

1. Murugesan, R. & Kiruthiga Sivaprasath. (2014). *Optics and Spectroscopy.*17th Revised Edition. New Delhi: S.Chand & Company Pvt Ltd,

2. Dr.Arumugam, M. (2002).*Optical Fiber Communication and Sensors*. Chennai: Sankar Printers Pvt. Ltd.
3. Murugesan, R. & Kiruthiga Sivaprasath. (2014). *Modern Physics.*17th Revised Edition. New Delhi: S.Chand & Company Pvt. Ltd.

**BOOK 1**

**UNIT –I** Chapter 1- Sections: 1.3,1.4, 1.7 -1.11, 1.15-1.22, 1.25-1.28.
**UNIT –II** Chapter 2 – Sections: 2.1, 2.2, 2.5-2.9, 2.11, 2.12, 2.18 -2.20, 3.1-3.3, 3.5.
**UNIT –III** Chapter 3 - Sections: 3.7, 3.10, 3.12, 3.17, 3.19, 3.24.
Chapter 4 - Sections: 4.1, 4.5, 4.8, 4.10, 4.12-4.15, 4.19, 4.20
**UNIT – V** Chapter 5 – Sections: 5.1 – 5.4

**BOOK 2**

**UNIT –IV** Chapter 1 - Sections: 1.6, 1.7, 1.8
Chapter 2 - Sections: 2.2, 2.2.1, 2.3-2.3.1, 2.3.2
Chapter 3 - Sections: 3.1, 3.5
Chapter 4 - Sections: 4.1, 4.2, 4.3, 4.4-4.4.1, 4.4.3

**BOOK 3**

**UNIT –V** Chapter 19 - Sections: 19.6-19.8
Chapter 23 - Sections: 23.9- 23.11
Chapter 19 - Sections: 19.9, 19.11- 19.14

**REFERENCE BOOKS**

1. Banwell, C.N. (1995*). Fundamentals of Molecular Spectroscopy*. New Delhi: Tata McGraw Hill Publishing Company Limited.
2. Aruldhas, G. (2005). *Molecular Structure and Spectroscopy*, New Delhi: Prentice- Hall of India Pvt. Limited.
3. Ajoy Ghatak. (2005). *Optics*. 3rd Edition. New Delhi: McGraw Hill Company.
4. Gupta Kumar Sharma. (2008). *Elements of Spectroscopy*. 20thEdition. Meerut: Pragathi Prakashan
5. Subramanian., Brijal, N., & Avadhanulu, M.N, (2012). *Optics.* 24th Revised Edition. New Delhi: S.Chand Company Ltd,

Dr.A.Azhagu Parvathi
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 -2019 onwards)**

| | | | |
|---|---|---|---|
| Semester IV | **ALLIED ELECTRONICS PRACTICAL - 1** | Hours/Week: 2 | |
| Allied Course-2 | | Credits: 2 | |
| Course Code **18UEIA41PN** | | Internal 40 | External 60 |

**List of Experiments:**

1. Measurement of R, L and C using multimeter.
2. Zener diode characteristics
3. Thermistor characteristics.
4. Logic gates using discrete components.
5. Bridge rectifier
6. Diode wave shaping circuits
7. UJT relaxation oscillator
8. Transistor characteristics –common emitter mode.
9. Emitter follower
10. Logic gates using IC gates
11. Verification of De Morgan's theorem using IC
12. IC voltage regulator
13. Measurement of DC, AC voltage and frequency using CRO
14. Half adder and Half subtractor

Dr.P.Malliga
Course Designer

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**B.Sc. PHYSICS (SEMESTER)**
**(2018 - 2019 onwards)**

| | | | |
|---|---|---|---|
| Semester I /III | **ALLIED PHYSICS-I** | Hours/Week: 4 | |
| Allied Course- 1 | | Credits: 4 | |
| Course Code **18UPHA11/ 18UPHA31** | | Internal 25 | External 75 |

**COURSE OUTCOME**

On completion of the course, the students shall be able to

- gain knowledge about on Mechanics and theory of Relativity.
- know about properties of materials.
- Understand the concept of entropy
- Know the fundamental of electricity

**UNIT I**

Gravitation - Kepler's Law of planetary motion – Newton's law of gravitation – mass & density of earth – Determination of G by Boy's method – Variation of g with latitude ,altitude and depth. Relativity - Theory of relativity – Lorentz transformation - Postulates of special theory of relativity – Michelson Morley experiment – Length contraction – Time dilation – variation of mass with velocity – mass Energy equivalence.

(12 Hours)

**UNIT II**

Elasticity - Different Moduli of elasticity – Poisson's ratio – Bending of beams – Expression for the bending moment – Determination of Young's modulus by uniform bending – Determination of Young's modulus by non-uniform bending – Torsion of a cylinder – Expression for couple per unit twist – Work done in twisting – Torsional oscillations of a body -Determination of Rigidity modulus by Torsion pendulum.

(12Hours)

**UNIT III**

Viscosity - Streamline flow and turbulent flow – Co-efficient of viscosity – Derivation of Poiseuille's formula – Terminal Velocity – Stokes' Law – Determination of **n** of a highly viscous liquid – lubrication - Surface Tension: Molecular theory of Surface Tension –excess pressure inside a liquid drop – excess Pressure inside a soap bubble**.** (12 Hours)

**UNIT IV**

Entropy – change of entropy in a Carnot's cycle – change of entropy in conversion of ice into steam- Radiation - Stefan's law – Determination of Stefan's constant by filament heating method – Energy distribution in black body spectrum – Statement of Planck's law of radiation – Wien's law – Rayleigh-Jeans law. (10 Hours)

**UNIT V**

Electrostatics - Coulomb's law – Gauss law – Application of Gauss law at a point outside the charged sphere. Capacitor - principle of a capacitor – capacitance of parallel plate capacitor – Energy stored in a charged capacitor – Loss of energy on sharing of charges between two capacitors. Current Electricity - Kirchhoff's laws – Application of Kirchhoff's law to Wheatstone network – Carey-Foster's bridge – Determination of temperature co-efficient of resistance -Potentiometer – Calibration of ammeter – Calibration of voltmeter (Low range) (14 Hours)

**TEXT BOOK**

Murugeshan, R.(2014). *Allied Physics*, NewDelhi. Sultan Chand &Company Private Ltd.

**REFERENCE BOOKS**

1. Brijilal, N, Subramaniyan and Hemne, P.S. (2014). *Heat,Thermodynamics and Statistical Physics*, New Delhi: Sulton Chand & Company Private Ltd.
2. Ubald Raj, A & Jose Robin, G.(2016). *Allied Physics–I*, Marthandam: Indira Publications.

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SEMESTER II/IV
**(2018 - 2019 onwards)**

| | | | |
|---|---|---|---|
| Semester II | **ALLIED PHYSICS-II** | Hours/Week: 4 | |
| Allied Course- 2 | | Credits: 4 | |
| Course Code **18UPHA21/ 18UPHA41** | | Internal 25 | External 75 |

**COURSE OUTCOME**

On completion of the course, the students shall be able to

- understand the concepts of Refraction of light through prism and aberration in lens.
- acquire the knowledge of interference, diffraction and polarisation.
- know about the basics of analog electronics.
- comprehend the basics of digital electronics

**UNIT I**

Electromagnetism - Torque on a current loop in a uniform magnetic field – D'Arsonval moving coil Galvanometer (Mirror galvanometer) – current and voltage sensitiveness of a moving coil galvanometer – moving coil Ballistic Galvanometer – comparison of emf's of two cells using B.G.-Alternating Current – Average and rms value - series Resonance circuit – parallel resonance circuit – comparison between series and parallel resonant circuits – power in an a.c circuit containing inductance, capacitance and resistance –wattless current - choke coil (12 Hours)

**UNIT II**

Optics - dispersion through a prism – expression for the dispersive power of the material of a thin prism – Achromatism in prism – deviation without dispersion – dispersion without deviation-Interference - condition for interference - Interference in thin films – Air wedge.- Diffraction - plane transmission grating- Polarisation of light – Double refraction – Nicol prism. (12 Hours)

**UNIT III**

Fibre Optics - fibre construction – light propagation in fibre – numerical aperture– Fibre optic communication system–advantages of fibre optic communication system-Spectroscopy: Infra red spectroscopy – properties – sources – detectors.-Raman Effect - Experimental study of Raman Effect – characteristics of Raman lines – quantum theory of Raman Effect – applications-Wave nature of matter–de-Broglie Wavelength – Electron diffraction – G.P. Thomson's experiment. (13 Hours)

**UNIT IV**

Electronics in diode - V-I characteristics of a junction diode – Zener diode – V-I characteristics of Zener diode–Light Emitting Diode–Transistor– Characteristics of a transistor (CE mode) – Common-Emitter Transistor Amplifier – Hartley Oscillator-Number System- Decimal number system–Binary number system–Conversion of Binary number into Decimal number–Conversion of Decimal number into Binary number – Binary addition – Binary Subtraction. (12 Hours)

**UNIT V**

Boolean Algebra – postulates and theorems of Boolean algebra – De Morgan's theorem - Digital Logic Gates – NOT,OR,AND,NOR and NAND gate universal gate – NAND gate – NAND gate - The Exclusive OR gate - Half adder – Full adder – Half subtractor – Full subtractor. (11 Hours)

**TEXT BOOK**

R.Murugeshan, R, (2014), *Allied Physics*, New Delhi: Sultan Chand &Company Private Ltd.

**REFERENCE BOOKS**

1. Brijlal and Subramaniam, N. (2013). *Text book of Optics*, New Delhi: Sultan Chand & Company Pvt. Ltd.
2. Ubald Raj, A & Jose Robin, G. (2016). *Allied Physics–II*, Marthandam: Indira Publications.

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**B.Sc. PHYSICS (SEMESTER)**

**(2018 - 2019 onwards)**

| | | | |
|---|---|---|---|
| Semester I/II III/IV | **ALLIED PHYSICS - PRACTICAL- I** | Hours/Week: 2 | |
| Allied Course-Practical-I | | Credits: 2 | |
| Course Code **18UPHA21P/ 18UPHA41P** | | Internal 40 | External 60 |

List of Experiments:

1. Young's Modulus by non- uniform bending - optic lever.
2. Young's Modulus by uniform bending - pin and microscope.
3. Torsion Pendulum - determination of M.I and G.
4. Calibration of voltmeter (low range) – Potentiometer.
5. Resistance and resistivity – Potentiometer.
6. Co-efficient of viscosity - Stoke's method.
7. Melde's string - Frequency of fork.
8. Spectrometer - μ of a prism.
9. Air wedge - Thickness of a wire.
10. L.C.R. - Series resonance - determination of L & Q factor.
11. Mirror Galvanometer - voltage and current sensitiveness.
12. Verification of truth table for AND, OR, NOT gates using discrete components.
13. Zener diode characteristics.
14. Comparison of capacitances - DeSauty's method using head phone.

Dr.K.UmaMaheswari
Course Designer