

॥ सा विद्या या विमुक्तये ॥



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

“ज्ञानतीर्थ” परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

“Dnyanteerth”, Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade



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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९-२० पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक ०८ जून २०१९ रोजी संपन्न झालेल्या ४४व्या मा. विद्या परिषद बैठकीतील ऐनवेळचा विषय क्र.११/४४-२०१९ च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे खालील विषयांचे C.B.C.S. (Choice Based Credit System) Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९-२० पासून लागू करण्यात येत आहेत.

- | | |
|-------------------------------------------------------|---------------------------------------|
| 1. Agricultural Microbiology | 18. Dyes and Drugs |
| 2. Agrochemicals & Fertilizers | 19. Electronics |
| 3. Analytical Chemistry | 20. Environmental Science |
| 4. B.C.A. | 21. Fishery Science |
| 5. B.Voc. (Food Processing, Preservation and Storage) | 22. Food Science |
| 6. B.Voc. (Web Printing Technology) | 23. Geology |
| 7. Biochemistry | 24. Horticulture |
| 8. Bioinformatics | 25. Industrial Chemistry |
| 9. Biophysics | 26. Information Technology (Optional) |
| 10. Biotechnology (Vocational) | 27. Mathematics |
| 11. Biotechnonology | 28. Microbiology |
| 12. Botany | 29. Network Technology |
| 13. Chemistry | 30. Physics |
| 14. Computer Application (Optional) | 31. Software Engineering |
| 15. Computer Science (Optional) | 32. Statistics |
| 16. Computer Science | 33. Zoology |
| 17. Dairy Science | |

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

‘ज्ञानतीर्थ’ परिसर,

विष्णुपुरी, नांदेड - ४३१ ६०६.

जा.क्र.: शैक्षणिक-०१/परिपत्रक/पदवी-सीबीसीएस अभ्यासक्रम/
२०१९-२०/२९२

दिनांक : ०३.०७.२०१९.

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
- ५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
- ६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

स्वाक्षरित / -

उपकुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

SWAMI RAMANAND TEERTH MATHAWADA UNIVERSITY, NANDED



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड.

B. Sc. First Year Physics Syllabus (CBCS Pattern) (Effective from 2019-2020)

Disclaimer

The Syllabus of B. Sc. Physics First Year (Semester I and II) given here is prepared according to the Choice Based Credit System (CBCS) pattern of S.R.T.M. University following the guidelines of UGC, New Delhi, and has been duly approved by the BOS in Physics, the Faculty of Science and Technology and the Academic Council of the University.



Preamble:

Swami Ramanand Teerth Marathwada University, Nanded, following the directives of the **University Grants Commission, New Delhi (UGC)**, has been taking several measures for improving quality of higher education in its jurisdiction. Few of the major steps in this regard include the improvement and revision of the curricula of various programmes offered by it in tune with the courses at national and international level, implementing innovative methods in teaching-learning processes, imparting skill based value added education, improvisation in the examination and evaluation processes, etc. These measures are very much useful in achieving **3Es, the equity, efficiency and excellence** in higher education of this region.

Following directives of UGC, New Delhi, this University has decided to adopt the **cumulative grade point average (CGPA)** for assessing academic performance of the students in the university examinations from the academic year 2014-2015. Further, following the suggestions by the UGC and looking at the better employability, entrepreneurship possibilities and also to enhance the latent skills of the students SRTMU has also adopted the **Choice Based Credit System (CBCS)** at graduate as well as post-graduate level. The CBCS system offers flexibility to the students in choosing courses of their own choice from the exhaustive list comprising core, elective/minor or skill based components that are evaluated following the grading system. In the coming academic year 2019-2020 the University shall be implementing the first revision of the B. Sc. First Year Physics syllabus under the CBCS system. This document provides detailed information on the structure of the B Sc Physics course along with the evaluation process and the available choice to the science graduates with Physics as one of the course at the B. Sc. Program.

The revised courses given in this document are of student-centric nature and help the stakeholders to understand the basic laws of nature and develop necessary skills to apply them to the advanced areas of studies. There are few core or mandatory courses meant to provide adequate knowledge of the basic courses of physics such as principles of cooling and liquification of gasses, thermodynamics, theoretical physics, AC current, part of industrial electronics and enable the students to apply them to the advanced courses as well as in industrial and research related fields. The theory courses are also supplemented by the respective laboratory hands-on courses, which provide the students with the first hand do it yourself kind of training and enable them to understand the Physics principles at deeper level. This also enables the students to develop their keen interest in studying Physics. In addition to the core courses



Swami Ramanand Teerth Marathwada University, Nanded
B. Sc. First Year Physics (Semester I & II) CBCS Pattern syllabus effective from 2019-20

there will be elective courses as well as skill enhancement courses of advanced nature and help the students to develop their skills through hands-on activities as they progress in the program. Details of the courses offered as a part of the B. Sc. Physics program are given below.

Outline of the Choice Based Credit System:

1. Core or Compulsory Courses: Every student graduating in Science faculty with Physics as one of the optional subject is required to **study** these theory and practical papers as core or compulsory courses. There shall be two such theory papers (P-I and P-II, each of 02 credits), one each in Semester I and II, whose performance shall be assessed at the end of the respective semesters. There shall be one practical course corresponding to both these compulsory courses, however, the performance of the candidates in the practical course shall be assessed on the annual basis i.e., at the end of the Semester II by a pair of external examiners appointed by the University.

2. Elective Courses: Students have freedom to choose an advanced course of their interest and inclination from a pool of courses made available by the university for a particular semester. The elective courses are mostly offered from third semester onwards and are of specific or specialized or advanced nature designed such that the students after completing these courses shall be able to expand their knowledgebase. These elective courses will also be supplemented by practical courses.

3. Skill Enhancement Courses (SEC): These courses are aimed at providing hands-on-training, competencies, skills, etc. to the students. As these courses are primarily of hands-on-training type, therefore, students are expected to devote much of their time in laboratory activities rather than the conventional classroom teaching. Therefore, one-third of the time allocated to this course will be utilized for the classroom teaching, imparting instructions, etc., while remaining two-third will be utilized by the students in developing their skills through the hands-on exercises. The exercises to be undertaken for this purpose shall be of different nature than that of their regular laboratory / practical courses. There shall be two such skill enhancement courses, one each in semester V and VI, which shall be selected by the students depending on their choice and inclination. Performance of the students in these courses shall be assessed at the end of the semester VI following annual pattern by a pair of external examiners along with their practical courses.

4. Laboratory/Practical Courses: Every students studying in B Sc First Year (Semester I and II) is required to complete two laboratory / practical courses (Paper Nos. P-?? and P-??), which shall be assessed / examined at the end of the Semester-II (annual pattern).



Swami Ramanand Teerth Marathwada University, Nanded

B. Sc. First Year Physics (Semester I & II) CBCS Pattern syllabus effective from 2019-20

The B. Sc. Physics First Year (Semester I and II) syllabus given in this document was prepared by different subcommittees constituted in the meeting of the BOS in Physics held on 10th April 2018 and was finalized after due consent from all the respected members. The BOS has also invited comments, suggestions, corrections on the draft syllabus from all the Physics teachers affiliated to this university, which were later incorporated while finalizing the syllabus of B. Sc. Physics First Year program.

(Dr. M. K. Patil)

Chairman,

Board of Studies in Physics



B. Sc. Physics F. Y. (CBCS) Course Structure and Marking Scheme

Semester	Paper No.	Name of the Course	Contact		Assessment Scheme			Credits
			Lect/wk (L+T)	Total Hrs	MSA	ESA	Total Mark	
I	CCP I (Section A)	Mechanics and Properties of Matter (P-I)	03	45	10	40	50	2
	CCP I (Section B)	Mathematical Methods in Physics (P-II)	03	45	10	40	50	2
II	CCP II (Section A)	Heat and Thermodynamics (P-III)	03	45	10	40	50	2
	CCP II (Section B)	Electricity and Magnetism (P-IV)	03	45	10	40	50	2
Practical Paper	CCP P I (Annual Pattern)	P-V :Practicals based on Section A &B of CCP-I& II	04	60	20	80	100	4
Total Credits of Semester I and II								12

B. Sc. Physics S. Y. (CBCS) Course Structure and Marking Scheme

Semester	Paper No.	Name of the Course	Contact		Assessment Scheme			Credits
			Lect/wk (L+T)	Total Hrs	MSA	ESA	Total Mark	
III	CCP III (Section A)	Waves and Oscillations (P-VI)	03	45	10	40	50	2
	CCP III (Section B)	Statistical Physics, Electromagnetics and Theory of Relativity (P-VII)	03	45	10	40	50	2
	CCPS I (Section A)	Skill Enhancement Course I (SEC I)	03	45	25	25	50	2
IV	CCP IV (Section A)	Optics and Lasers (P-VIII)	03	45	10	40	50	2
	CCP IV (Section B)	Basic Electronics (P-IX)	03	45	10	40	50	2
	CCPS I (Section B)	Skill Enhancement Course II (SEC II)	03	45	25	25	50	2
Practical Papers (Annual Pattern)	CCPP II (Annual Pattern)	P-X :Practicals based on Section A of CCP-III & IV	03	45	25	25	50	2
	CCPP III (Annual Pattern)	P-XI :Practicals based on Section B of CCP-III & IV	03	45	25	25	50	2
Total Credits of Semester III and IV								16

MSA - Mid Semester Assessment

ESA – End Semester Assessment

CCP – Core Course Physics

CCPP – Core Course Physics Practical



B. Sc. Physics T. Y. (CBCS) Course Structure and Marking Scheme

Semester	Paper No.	Name of the Course	Contact		Assessment Scheme			Credits
			Lect/wk (L+T)	Total Hrs	MSA	ESA	Total Mark	
V	DSEP I (Section A)	Quantum Mechanics (P-XII)	03	45	10	40	50	2
	DSEP II (Section B) (Elective Course)	Solid State Physics (P-XIII A) OR Solar Energy (P-XIII B) OR Astrophysics (P-XIII C)	03	45	10	40	50	2
	DSEPP I (Section A)	Practicals Based on P-XII (P-XVI)	03	6 pract 24 hours	05	20	25	1
	DSEPP II (Section A)	Practicals Based on P-XIII (P-XVII)	03	6 pract 24 hours	05	20	25	1
	SEC III	Renewable energy & harvesting OR Electrical Ckt Analysis Skill	03	45 Hands-on	25	25	50	2
VI	DSEP II (Section A)	Atomic and Molecular Physics (P-XIV)	03	45	10	40	50	2
	DSEP II (Section B) (Elective Course)	Digital & Communication Electornics (P-XV A) OR Linear & Digital Electronics Circuits (P-XV B) OR Fibre Optics Communication (P-XV C)	03	45	10	40	50	2
	DSEPP I (Section B)	Practicals Based on P-XIV (P-XVI)	03	6 pract 24 hours	05	20	25	1
	DSEPP II (Section B)	Practicals Based on P-XV (P-XVII)	03	6 pract 24 hours	05	20	25	1
	SEC IV	Physics Workshop Skill OR Semiconductor Devices Applications Skill	--	45 Hands-on	25	25	50	2
Total Credits of Semester V and VI								16

MSA - Mid Semester Assessment

ESA – End Semester Assessment

DSEP – Discipline Specific Elective Paper

DSEPP – Discipline Specific Elective Paper Practical

SEC – Skill Enhancement Course



CCP I - (Section A) P-I Core Course: Mechanics and Properties of Matter

Credits: 02

Periods: 45

Total Marks: 50 (CA=10, ESE=40)

Learning objectives: *The objective of this course is to introduce the students to the world of mechanics and properties of the matter that exists in different phases i.e., solid, liquid and gas. Laws of motion and its applications to various systems studied in this paper is of fundamental nature and enable the students to handle different types of problems and is the pre-requisite for several other advanced courses in physics and chemistry. The pre-requisite for this course is knowledge of calculus, wave theory and modern physics. This course is the core course and every student pursuing B Sc with physics as one of the optional is required to study this course.*

Unit I: Mechanics

(12 Periods)

Laws of Mechanics (Newton's Laws of Motion), Newton's Law of Gravitation, Kepler's Law of Planetary Motion, Gravitational Field, Gravitational Intensity, Gravitational Potential, Gravitational Potential energy, Conservation Law, Work, Power, Kinetic Energy (Work Energy Theorem), Conservation of energy for a particle energy function, Motion of a body near the surface of earth, Types of conservative and non- conservative forces

Unit-II: Surface Tension

(08 Periods)

Molecular Forces, Surface Tension & its explanation, Pressure difference across a curved surface, Expression for Excess Pressure inside a Spherical Drop and spherical Soap Bubble, Surface Tension by Jaeger's Method, Surface Tension by Ferguson Method.

Unit- III: Viscosity

(10Periods)

Introduction, Coefficient of Viscosity, Streamline flow, critical velocity, Reynolds Number & its significance, Bernoullies Theorem, Poiseuille's equation for the flow of liquid through a tube, Experimental determination of coefficient viscosity by Poiseuille's Method.

Unit- IV: Elasticity

(15 Periods)

Introduction, Hooke's Law, Elastic Constants (Y , K & η), Poisson's Ratio, Twisting couple on a cylinder or a (wire), Torsional pendulum ,Bending of Beam, Bending Moment, Cantilever (Weight of the beam is ineffective, Weight of the beam is effective), Depression of a Beam supported at the ends and loaded at the Centre, Determination of Y by bending of beam.

Books Recommended:

- 1. Elements of Properties of Matter** –D.S.Mathur, Shamlal Charitable trust, New Delhi.
- 2. General Properties of Matter** – J. C. Upadhyaya, Ram Prasad & Sons, Agra.
- 3. Mechanics-** J. C. Upadhyaya, Ram Prasad & Sons, Agra.



CCP I - (Section B) P-II Core Course: *Mathematical Methods in Physics*

Credits: 02	Periods: 45	Total Marks: 50 (CA=10, ESE=40)
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Learning objectives: *This course is also aimed to develop knowledge in mathematical physics and its applications, to develop expertise in mathematical methods required in the study of Physics, to develop critical thinking and problem solving skill. After completion of this course students will be able to apply the concept of vectors and complex variables to various physical quantities. This course will also enable the students to solve the problems related to partial differentiation. Fourier Analysis unit will enable the students to analyze the periodic functions.*

Unit I: Complex variables **(10 Periods)**

Introduction, Definition, complex algebra (Addition, Subtraction, Multiplication, Division, conjugate complex number), Argand diagram, Graphical representation of Sum, Difference, product and Quotient of complex number, Properties of moduli, arguments and geometry of complex numbers, Rectangular, polar and exponential form of complex numbers.

Unit-II: Vector Analysis **(15 Periods)**

Introduction to Scalars, Vectors, Dot products and Cross Product of two vectors, Vector triple product, Scalar triple product, Scalar and vector field, Gradient of a scalar field, Divergence of a vector field and Curl of a vector field and their Physical interpretation, Laplacian Operator (∇^2), Line integral, Surface integral, Volume integral, Gauss's divergence theorem, Stoke's theorem, (Statements only), Vector identities.

Unit -III: Partial Differentiation **(10 Periods)**

Definition of Partial Differentiation, Order or Successive Differentiation, total Differentiation and Chain rule, Change of variables from Cartesian to Polar Co-ordinates, Condition for maxima and minimum (without proof), Linear Homogeneous Partial differential equations with constant coefficients, Rules for finding the complementary function.

Unit -IV: Fourier series **(10 Periods)**

Introduction of Periodic Functions, Definition of Fourier Series, Evaluation of the coefficients of Fourier series, Cosine series, Sine series, Dirichlet's Conditions, Graphical representations of even and odd functions, Advantages of Fourier series, Physical applications of Fourier series analysis: Square wave and half wave Rectifier.

Books Recommended:

1. Vector Analysis - Murray R. Spigel
2. Mathematical Physics - B.S. Rajput
3. Mathematical Physics- B.D. Gupta (Vikas publishing House)
4. Methods of Mathematical Physics by Laud Talbout and Gambhir
5. Mathematical methods in Physical Sciences- Masy and Bias.
6. Mathematics For Engineers and Physists – Pipe
7. Advance Engineering Mathematics by H.K.Dass(S.Chand Publication)
8. Mathematics For Engineers and Physists- Pipe



CCP II - (Section A) P-III Core Course: Heat and Thermodynamics

Credits: 02	Periods: 45	Total Marks: 50 (CA=10, ESE=40)
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Learning objectives: *This course will introduce the students to the world of heat and thermodynamics and the behaviour of the physical systems at different thermodynamical conditions. After completing this course students will understand the difference in the behaviour of the ideal and real gases, transport phenomenon in gases. Students will also understand the working of various heat engines and the ways to increase their working efficiency.*

Unit-I: Thermometry (12 Periods)

Types of Thermometers, Centigrade and Fahrenheit scale, relation between Celsius, Kelvin, Fahrenheit & Rankine scales, Platinum resistance thermometer, Seebeck effect.

Unit –II: Real Gases and Their Behavior (12Periods)

Behavior of gases at high pressure, Boyle temperature, Andrew's Experiment on CO₂, Amagat's Experiment, Vander wall's Equation of State, Critical Constants, Corresponding states, Coefficients of Vander wall's Equation, Reduced Equation of State, Joule Thomson Porous Plug Experiment, Temperature of Inversion, Relation between Boyle temperature and Temperature of Inversion

Unit-III: Transport Phenomenon in Gases (9 Periods)

Molecular Collisions, Mean free path, Expression for mean free path, Transport Phenomena, Viscosity of Gases, Thermal Conductivity of Gases, Diffusion, Inter relation between three transport coefficients.

Unit-IV: Thermodynamics and Thermodynamical Relations (12Periods)

First Law of Thermodynamics, Relation connecting P, V and T in an Adiabatic Process, Second Law of Thermodynamics (Kelvin and Clausius statements), Carnot's cycle, Carnot's heat Engine, Carnot's Theorem, Entropy, Entropy of Irreversible processes entropy of reversible process, Third Law of Thermodynamics. Internal energy, Helmholtz' function, Enthalpy, Gibb's function, Maxwell's Thermodynamical Relations, **T- dS** equations, Clausius-Clapeyron latent heat equations.

Books Recommended:

1. Heat and Thermodynamics – Brij Lal, N.Subrahmanyam, P. S.Hemne For B. Sc. Students as per UGC Model Syllabus, Sultan Chand & Company Ltd.
2. Heat and Thermodynamics – D.S.Mathur, Sultan Chand & Sons, New Delhi
3. Thermodynamics and Statistical Physics – S.L.Kakani
4. Thermodynamics, Kinetic Theory, and Statistical Thermodynamics – Sears and Salinger, Narosa Publishing House, New Delhi.



CCP II - (Section B) P-IV Core Course: Electricity and Magnetism

Credits: 02	Periods: 45	Total Marks: 50 (CA=10, ESE=40)
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Learning objectives: *The objective of this course is to introduce the students to the concepts of static and dynamical electrical magnetic fields, the sources for generating such fields, polarization and induction effects, understand the basic difference between the DC and AC circuits and their functioning. This course is of most applied nature and will enable the students to understand the role of electricity in everyday life, relate electrical conduction, relate using Ohm's law and will also enable the students to understand the working principles of various electrical components and gadgets.*

Unit- I: Electrostatics and Magnetostatics (15 Periods)

Concept of electric field, electric flux, Gauss's law, conservative nature of electric field, concept of electric potential, potential energy of a system of charges, energy density in an electric field.

Concept of Magnetic Field (**B**) and magnetic flux (Φ), Lorentz Force, Force on a current carrying conductor, Biot and Savart's Law, Applications of Biot-Savart's law to straight and circular current carrying conductor, Amperes circuital law (Integral form), Curl of magnetic field (Ampere's circuital law differential form). Motion of charged particles in uniform electric field, Motion of charged particle in magnetic field, Maxwell's displacement current.

Unit- II: Magnetization (9 Periods)

Introduction, Magnetic Induction (**B**), Flux density, Intensity of magnetization (**I**), Intensity of magnetizing field (**H**) Permeability, Susceptibility, Relation between Permeability and Susceptibility, Hysteresis curve, Brief introduction of ferromagnetic, paramagnetic and diamagnetic phenomenon, I-H curve By magnetometer method, Principle and construction of Moving coil type Ballistic Galvanometer with theory ($q \propto \theta$).

Unit- IV: Time Varying (Dynamic) Fields (Waves) (9 Periods)

Definition of electromagnetic induction, Faraday's Law of Electromagnetic Induction, Lenz's law, Self induction, Self induction of a Solenoid, Mutual induction, Mutual Induction of a pair of coil, Work done in establishing current in an inductance, Mutual inductance of a Co axial solenoids, Problems.

Unit-I: Alternating Current circuits (12 Periods)

Brief introduction to AC through Capacitor and Inductor, Nature of Impedance(**z**) and Reactance(**x**) of Inductance(**z_L&x_L**), Capacitance(**z_C&x_C**) and Resistance(**z_R&x_R**), Complex number and J-operator, Complex Impedance and reactance, Application of Complex numbers in solving AC Circuit (Not vector diagram), L-C-R (Series resonance and Parallel resonance) circuits. Power in AC circuit and Power Factor, Principle, working and types of transformers (step up and step down with figures), Current, voltage and turns ratio of transformer, Efficiency of transformer, AC bridges (Wheatstone bridge).



Books Recommended:

1. Electricity and Magnetism –BrijLal, Subramanyan (RatanPrakashanMandir, Twentieth revised and enlarged edition 1997)
2. Fundamentals of physics- P.B.Patil (Renuka Prakashan, Aurangabad)
3. Electricity and Electronics – D.C.Tayal (Himalaya Publishing Co, Mumbai)
4. Electricity and Magnetism-Murugesan(S.Chand& Co.)

Reference Books

1. Electricity and Magnetism-K.K. Tiwari(S.Chand& Co.)
2. Electricity and Magnetism – Khare, Shrivastav (Twentieth revised 1997)
3. Introduction to Electrodynamics – D.G. Griffith (3rd edition Benjamin Cumming, 1998)
4. Electricity and Magnetism-E.M.Purcell, Berkley physics course, vol-2 (MGH)
5. Foundations of Electromagnetic theory- Reitz, Milford, Christey
6. Electromagnetics by Joseph A. Edminister 2nd edition (New Delhi: Mc Graw Hill, 2006)

CCPP I (Section A & B) : Laboratory Course (P-V) : Physics Practical Paper

Credits: 04	Periods: 4560 (Hands-on)	Total Marks: 100 (CA=20, ESE=80)
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Learning Objectives: *Objective of this Laboratory course is to introduce the students to the practical applications of the four core courses in Physics that the students have studied in Semester I and II. The Laboratory course also includes experiments based on the computational methods applicable for solving problems in physical situations. The course will consist of lectures (both theory and practical) in the Computer Lab. Evaluation of the computational method does not include the programming skill of the students but will only analyze the basis of formulating the problem. Each student appearing for examination must produce a journal showing that he has completed not less than 12 experiments during the year; out of which at least two should be based on the computational methods.*

1. Y- by Spiral spring.
2. η - by Spiral spring.
3. η - by Static torsion.
4. η - by Maxwell's needle.
5. Y- by bending loaded at the middle.
6. Viscosity of given liquid by Poiseuille's method.
7. Surface Tension of liquid by Jaeger's method.
8. Determination of Viscosity of given liquid by Searle's Viscometer.
9. Field along the axis of Circular coil (Determination of radius of the coil)
10. Small resistance by Carry Fosters Bridge.
11. Ballistic galvanometer (Figure of merit)
12. Comparison of capacity by Desauty Method
13. Determination of angle of Prism by Spectrometer
- 14 Determination of Refractive Index of Prism by Spectrometer
- 15 Characteristics of P-N junction diode (forward and reverse)
16. Zener Diode Characteristics
- 17 Introduction to **SCILAB**, Advantages and disadvantages, **SCILAB** environment, Command Window, Figure window, Edit window, Variables and arrays, initializing variables in **SCILAB**.
- 18 Solving Simple Operations: Addition, Subtraction, Multiplication and division using **SCILAB**
- 29 Addition and subtractions of simple complex numbers using **SCILAB** software
20. Solving solution to first order differential partial differential equation using computer Software (**SCILAB**)



Question Paper Pattern
Semester End Assessment
B. Sc. Physics First and Second Semester (CBCS) Section A
Total Marks: 40

Note: All questions are compulsory and carry equal marks

Question 1 – Single long answer type question **15 marks**

OR

Two sub-questions (*a* and *b* of 8 & 7 marks) **15 marks**

(Note: This question will be based on Unit I & II)

Question 2 – Single long answer type question **15 marks**

OR

Two sub-questions (*a* and *b* of 8 & 7 marks) **15 marks**

(Note: This question will be based on Unit III & IV)

Question 3 – Write Short Notes on ANY TWO (each of 5 marks) **10 marks**

a.

b.

c.

d.

(Note: This question shall be based on entire syllabus and must have one sub-question from each of the unit)
