SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN PHYSICS

FIRST YEAR - FIRST SEMESTER
(Syllabus under CBCS w.e.f. 2020-21)

PREAMBLE:

The University Grants Commission (UGC) has initiated several measures to bring equity, efficiency and excellence in the Higher Education System of country. The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation systems, besides governance and other matters.

The learning outcomes-based curriculum framework (LOCF) for the undergraduate programs like B.Sc.(Honours) in Physics is intended to provide a broad framework within which both the undergraduate programs in Physics help to create an academic base that responds to the need of the students to understand the basics of Physics and its ever evolving nature of applications in explaining all the observed natural phenomenon as well as predicting the future applications to the new phenomenon with a global perspective.

The curriculum framework is designed and formulated in order to acquire and maintain standards of achievement in terms of knowledge, understanding and skills in Physics and their applications to the natural phenomenon as well as the development of scientific attitudes and values appropriate for rational reasoning, critical thinking and developing skills for problem solving and initiating research which are competitive globally and are on par in excellence with the standard Higher Education Institutions (HEI) in the advanced countries. The multicultural fabric of our nation requires that the institutions involved in implementing this curriculum framework also work hard towards providing an environment to create, develop and inculcate rational, ethical and moral attitudes and values to help the creation of knowledge society needed for scientific advancement of our nation.

The learning based curriculum framework in Physics should allow for the flexibility and innovation in the program design of the UG education and its syllabi development, teaching learning process and assessment procedures of the learning outcomes.

B. Sc – PHYSICS

STRUCTURE OF COURSES

The B.Sc(Hons) Physics program is based on the Choice Based Credit System (CBCS) approved by the UGC with a total of 148 credits. Out of 148 credits, 84 credits of core courses (CC) and 8 credits of Ability Enhancement Compulsory Courses (AECC) are mandatory while 24 credits of Discipline specific course and 24 credits of Generic Elective Courses (GEC) from Interdisciplinary disciplines as well as 16 credits of Skilled Enhancement courses are elective. A student can offer more than 148 credits (but not more than a total of 160 credits) to qualify for the grant of the B.Sc. (Honors) Physics degree after completing them successfully as per rules and regulations of theHEI (Higher Education Institutions).

CORE COURSE (CC): A discipline specific compulsory basic course.

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE): A discipline specificelective course is a more advanced specialized course.

GENERIC ELECTIVE COURSE (GE) or (GEC): An inter-disciplinary elective course to be opted from a discipline other than ones main discipline(s) of choice. (For example, a course in a discipline other than in which honors has been taken)

SKILL ENHANCEMENT COURSE (SEC): A discipline specific elective skill enhancement course.

ABILITY ENHANCEMENT COMPULSORY COURSE (AECC): These are compulsory courses.

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I YEAR – SEMESTER I

S.NO	COURSE OPTED	COURSE CODE	COURSE NAME	CREDITS THEORY + LAB	CREDITS THEORY + TUTORIALS
1	Core course	CC-I	Mechanics	4+2	---
2	Core course	CC-II	Waves & Optics	4+2	---
3	Generic Elective	GEC-I	Mathematics-Calculus and differential equations	6	---
4	Skill Enhancement course	SEC-I	Physics workshop skills	2	---
5	Ability Enhancement compulsory course	AECC-I	English	4	---
			TOTAL CREDITS	**24**	

EVALUATION AND ASSESSMENT PATTERN (2020-21)

THEORY EXAMINATIONS:

(a) A continuous internal assessment (CIA) (for 25 marks) by the concerned Course teacher as well as by an end of semester examination (for 75 marks) and will consolidated at the end of the course for 100 marks.

(b)Passing minimum for end of semester exam will be 40% out of 75 marks (i.e., 30 marks). Passing minimum for Internal Examination will be 40% out of 25 marks (i.e., 10 marks).

(c) Internal Assessment shall be conducted for 25marks and marks are proportionately reduced for 15 marks.

(d) Extra credit will be awarded for each course on various extracurricular activities like study projects / field trips/Industrial visits/ Seminars etc.

S.NO	ASSESSMENT PATTERN	EVALUATION	MARKS ALLOTTED
1A	DESCRIPTIVE TYPE	CONDUCTED FOR 25 MARKS AND PROPORTIONATELY REDUCED FOR 15 MARKS (BEST OF 1A OR 1B)	**15**
1B	OBJECTIVE TYPE		
2	SEMINARS/ ASSIGNMENTS	SUBMISSION OF RECORDS	05
3	STUDY AREA PROGRAMME/ STUDY PROJECT	SUBMISSION OF RECORDS	05
		TOTAL	25

PRACTICAL EXAMINATIONS:

The duration of each practical examination is 3 hours with 50 marks.Distribution of marks are as follows:

Practicals	**50 marks**
Formula & Explanation	4+2
Tabular form +graph +circuit diagram	2+2+2
Observations	8
Calculation, graph, precautions & Result	4+2+2+2
Viva-Voce	10
Record	10

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B.Sc. DEGREE COURSE IN PHYSICS

FIRST YEAR - FIRST SEMESTER
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Core Course Paper CC-I: MECHANICS

Theory: 60Hrs Credits :04 Teaching Hrs/Week : 4

SYLLABUS

UNIT I

1. FUNDAMENTALS OF DYNAMICS (12Hrs.)

Momentum of variable-mass system: motion of rocket. Motion of a projectile in Uniform gravitational field Dynamics of a system of particles. Centre of Mass. Principle of conservation ofmomentum.Impulse.

Work and Kinetic Energy Theorem. Conservative and non-conservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy. Work & Potential energy. Work done by non- conservative forces. Law of conservationofEnergy.

Elastic and inelastic collisions between particles. Centre of Mass and Laboratory frames.

UNIT II

2. ROTATIONAL DYNAMICS (12Hrs.)

Angular momentum of a particle and system of particles. Torque. Principle of conservation of angular momentum. Rotation about a fixed axis. Moment of Inertia. Calculation of moment of inertia for rectangular, cylindrical and spherical bodies. Kinetic energy of rotation. Motion involving both translationandrotation.

UNIT III

3. ELASTICITY, FLUID MOTION AND OSCILLATIONS (12 Hrs.)

Elasticity: Relation between Elastic constants. Twisting torque on a Cylinder or Wire.

Fluid Motion: Kinematics of Moving Fluids: Poiseuille's Equation for Flow of a Liquid through aCapillaryTube.

Oscillations:SHM: Simple Harmonic Oscillations. Differential equation of SHM and itssolution. Kinetic energy, potential energy, total energy and their time-average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation andQualityFactor.

UNIT IV

4. NON-INERTIAL SYSTEMS AND CENTRAL FORCES (12 Hrs.)

Non-Inertial Systems: Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems.

Gravitation and Central Force Motion: Law of gravitation. Gravitational potential energy. Inertial and gravitational mass. Potential and field due to spherical shell and solidsphere. Motion of a particle under a central force field. Two-body problem and its reduction to one-body problemanditssolution.Theenergyequationandenergydiagram.Kepler'sLaws.Satellitein circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system(GPS).

UNIT V

5. SPECIAL THEORY OF RELATIVITY (12 Hrs.)

Reference frames. Inertial frames; Review of Newton's Laws of Motion. Galilean transformations; Galilean invariance. Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass- energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of EnergyandMomentum.

REFERENCE BOOKS:

- An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973,McGraw-Hill.
- Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, TataMcGraw-Hill.
- Physics, Resnick, Halliday and Walker 8/e. 2008,Wiley.
- Analytical Mechanics, G.R. Fowles and G.L. Cassiday. 2005, CengageLearning
- Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands, 2008, PearsonEducation
- Introduction to Special Relativity, R. Resnick, 2005, John Wiley andSons.
- University Physics, Ronald Lane Reese, 2003, ThomsonBrooks/Cole.

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Core Course Paper CC-I: MECHANICS

BLUE PRINT FOR THE MODEL PAPER (2020-21)

S. No.	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section - A (Essay Questions)	10	10	100	5	5	50
2	Section - B (Short answer Questions)	10	5	50	5	5	25
Total Marks				**150**	**Total Marks**		**75**

BLUE PRINT FOR THE QUESTION PAPER SETTING

Chapter Name	Essay Question 10 Marks	Short Questions 5 Marks	Marks allotted to the Chapter
UNIT – I	2	2	30
UNIT – II	2	2	30
UNIT – III	2	2	30
UNIT – IV	2	2	30
UNIT – V	2	2	30
Total No. of Questions	**10**	**10**	**150**

[**Note**: Question paper setters are instructed to add Numerical Problems (each of 4 marks) with a maximum weightage of 16 marks either in Section-A or Section-B covering all the five units in the syllabus]

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Core Course Paper CC-I: MECHANICS

Time: 3hrs **Max Marks: 75**

MODEL QUESTION PAPER

PART-A

Answer ALL the questions. Each question carries 10 marks: **Marks: 5 X 10 = 50M**

1(a
(OR)
1 (b

2(a)
(OR)
2(b)

3(a).
(OR)
3(b)

4(a).
(OR)
4(b)

5(a).
(OR)
5(b).

PART – B

Answer any FIVE of the following questions. Each question carries 5 marks. Marks: 5×5=25M

6.
7
8.
9.
10
11
12
13
14
15

[**Note**: Question paper setters are instructed to add Numerical Problems (each of 4 marks) with a maximum weightage of 16 marks either in Section-A or Section-B covering all the five units in the syllabus]

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B.Sc. DEGREE COURSE IN PHYSICS

FIRST YEAR - FIRST SEMESTER
(Syllabus under CBCS w.e.f. 2020-21)

Core Course Paper CC-I: MECHANICS

Practical: 30Hrs Credits :02 Teaching Hrs/Week : 2

LAB

Minimum of 6 experiments to be done and recorded

LIST OF EXPERIMENTS:

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To study the random error inobservations.
3. To determine the height of a building using aSextant.
4. To study the Motion of Spring and calculate (a) Spring constant, (b) **g** and (c) Modulus of rigidity.
5. To determine the Moment of Inertia of aFlywheel.
6. To determine **g** and velocity for a freely falling body using Digital TimingTechnique
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young's Modulus of a Wire by Optical LeverMethod.
9. To determine the Modulus of Rigidity of a Wire by Maxwell'sneedle.
10. To determine the elastic Constants of a wire by Searle'smethod.
11. To determine the value of g using BarPendulum.
12. To determine the value of g using Kater'sPendulum.

REFERENCE BOOKS:

- Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann EducationalPublishers
- A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Edn, 2011, KitabMahal
- Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.
- Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge UniversityPress

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FIRST YEAR - FIRST SEMESTER
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Core Course Paper CC-II: WAVES AND OPTICS

Theory: 60Hrs Credits :04 Teaching Hrs/Week : 4

SYLLABUS

UNIT I

1. HARMONIC OSCILLATIONS AND WAVE MOTION (12Hrs.)

Superposition of Collinear Harmonic oscillations: Linearity and Superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats). Superposition of N collinear Harmonic Oscillations with (1) equal phase differences and (2) equalfrequencydifferences.

Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods.Lissajous Figures with equal an unequal frequency andtheiruses.

Wave Motion: Plane and Spherical Waves. Longitudinal and Transverse Waves. PlaneProgressive (Travelling) Waves. Wave Equation. Particle and Wave Velocities. Differential Equation. Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave. Water Waves: Ripple andGravityWaves.

UNIT II

2. VELOCITY AND SUPERPOSITION OFWAVES (12 Hrs.)

Velocity of Waves: Velocity of Transverse Vibrations of Stretched Strings. Velocity ofLongitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound.
Laplace'sCorrection.

Superposition of Two Harmonic Waves: Standing (Stationary) Waves in a String:Fixed and Free Ends. Analytical Treatment. Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Plucked and Struck Strings. Melde's Experiment. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes. Superposition of N Harmonic Waves.

UNIT III

3. INTERFERENCE (14Hrs.)

Electromagnetic nature of light. Definition and properties of wave front. Huygens Principle. Temporal andSpatialCoherence.Division of amplitude and wavefront. Young's double slit experiment.Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton'sRings:
Measurement of wavelength andrefractive index.Michelson Interferometer-(1) Idea of form of fringes (Notheoryrequired), (2) Determination of Wavelength, (3) Wavelength Difference, (4) Refractive Index, and (5) Visibility of Fringes.Fabry-Perotinterferometer.

UNIT IV

4. FRAUNHOFER DIFFRACTION (10Hrs)

Kirchhoff's Integral Theorem, Fresnel-Kirchhoff's Integral formula. (Qualitativediscussiononly)

Fraunhofer diffraction: Single slit. Circular aperture, Resolving Power of a telescope. Double slit. Multiple slits. Diffraction grating. Resolving powerofgrating.

UNIT V

5. FRESNEL DIFFRACTION AND HOLOGRAPHY (12Hrs.)

Fresnel Diffraction: Fresnel's Assumptions. Fresnel's Half-Period Zones for PlaneWave. Explanation of Rectilinear Propagation of Light. Theory of a Zone Plate: Multiple Foci of a Zone Plate.Fresnel's Integral, Fresnel diffraction pattern of a straight edge, a slit and a wire.

Holography: Principle of Holography. Recording and Reconstruction Method. Theory of Holography as Interference between two Plane Waves. Pointsourceholograms.

REFERENCE BOOKS:

- Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, TataMcGraw-Hill.
- Fundamentals of Optics, F.A. Jenkins and H.E. White, 1981,McGraw-Hill
- Principles of Optics, Max Born and Emil Wolf, 7^{th} Edn., 1999, PergamonPress.
- Optics, Ajoy Ghatak, 2008, Tata McGrawHill
- The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley andSons.
- The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGrawHill.
- Fundamental of Optics, A. Kumar, H.R. Gulati and D.R. Khanna, 2011, R. Chand Publications.

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Core Course Paper CC-II: WAVES AND OPTICS

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S. No.	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section - A (Essay Questions)	10	10	100	5	5	50
2	Section - B (Short answer Questions)	10	5	50	5	5	25
Total Marks				**150**	**Total Marks**		**75**

BLUE PRINT FOR THE QUESTION PAPER SETTING

Chapter Name	Essay Question 10 Marks	Short Questions 5 Marks	Marks allotted to the Chapter
UNIT – I	2	2	30
UNIT – II	2	2	30
UNIT – III	2	2	30
UNIT – IV	2	2	30
UNIT – V	2	2	30
Total No. of Questions	**10**	**10**	**150**

[**Note**: Question paper setters are instructed to add Numerical Problems (each of 4 marks) with a maximum weightage of 16 marks either in Section-A or Section-B covering all the five units in the syllabus]

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Core Course Paper CC-II: WAVES AND OPTICS

Time: 3hrs **Max Marks: 75**

MODEL QUESTION PAPER

PART-A

Answer ALL the questions. Each question carries 10 marks: **Marks: 5 X 10 = 50M**

1(a
(OR)
1 (b

2(a)
(OR)
2(b)

3(a).
(OR)
3(b)

4(a).
(OR)
4(b)

5(a).
(OR)
5(b).

PART – B

Answer any FIVE of the following questions. Each question carries 5 marks. Marks: 5×5=25M

6.
7
8.
9.
10
11
12
13
14
15

[**Note**: Question paper setters are instructed to add Numerical Problems (each of 4 marks) with a maximum weightage of 16 marks either in Section-A or Section-B covering all the five units in the syllabus]

SRI VENKATESWARA UNIVERSITY
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FIRST YEAR - FIRST SEMESTER
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Core Course CC II: WAVES AND OPTICS

Practical: 30Hrs Credits :02 Teaching Hrs/Week : 2

LAB

Minimum of 6 experiments to be done and recorded

LIST OF EXPERIMENTS:

1. To determine the frequency of an electric tuning fork by Melde's experiment and verify λ^2 – T law.
2. To investigate the motion of coupledoscillators.
3. To study LissajousFigures.
4. Familiarization with: Schuster`s focusing; determination of angle ofprism.
5. To determine refractive index of the Material of a prism using sodiumsource.
6. To determine the dispersive power and Cauchy constants of the material of a prism using mercurysource.
7. To determine the wavelength of sodium source using Michelson'sinterferometer.
8. To determine wavelength of sodium light using FresnelBiprism.
9. To determine wavelength of sodium light using Newton'sRings.
10. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shapedFilm.
11. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffractiongrating.
12. To determine dispersive power and resolving power of a plane diffractiongrating.

REFERENCE BOOKS:

- Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia PublishingHouse
- A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11th Ed., 2011, KitabMahal
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann EducationalPublishers
- A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.

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FIRST YEAR - FIRST SEMESTER
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Skill Enhancement Course SEC I: PHYSICS WORKSHOP SKILL

Theory: 30Hrs Credits :02 Teaching Hrs/Week : 2

SYLLABUS

The aim of this course is to enable the students to familiar and experience with various mechanical and electrical tools through hands-on mode.

UNIT I

1. UNITS, MEASURING SYSTEMS AND PRIME MOVERS (10hours)

Measuring units. conversion to SI and CGS. Familiarization with meterscale, Vernier calipers, Screw gauge and their utility. Measure the dimension of a solid block, volume of cylindrical beaker/glass, diameter of a thin wire, thickness of metal sheet, etc. Use of Sextant to measure height of buildings,mountains, etc.

PRIME MOVERS: Mechanism, gear system, wheel, Fixing of gears with motor axel. Lever mechanism, Lifting of heavy weight using lever, braking systems, pulleys, working principle of power generation systems. Demonstration of pulley experiment.

UNIT II

2. **MECHANICAL SKILL (10 hours)**

Concept of workshop practice. Overview of manufacturing methods:casting, foundry, machining, forming and welding. Types of welding joints and welding defects. Common materials used for manufacturing like steel, copper, iron, metal sheets, composites and alloy, wood. Concept of machine processing, introduction to common machine tools like lathe, shaper, drilling, milling and surface machines. Cutting tools, lubricating oils. Cutting of a metal sheet using blade. Smoothening of cutting edge of sheet using file. Drilling of holes of different diameter in metal sheet and wooden block. Use of bench vice and tools for fitting. Make funnel usingmetal sheet.

UNIT III

3. ELECTRICAL AND ELECTRONIC SKILL (10hours)

Use of Multimeter. Soldering of electrical circuitshaving discrete components (R, L, C, diode) and ICs on PCB. Operation of oscilloscope. Making regulated power supply. Timer circuit, Electronic switch using transistor and relay.

REFERENCE BOOKS:

- A text book in Electrical Technology - B L Theraja – S. Chand andCompany.
- Performance and design of AC machines – M.G. Say, ELBSEdn.
- Mechanical workshop practice, K.C. John, 2010, PHI Learning Pvt.Ltd.
- Workshop Processes, Practices and Materials, Bruce J Black 2005, 3rd Edn., Editor Newnes [ISBN: 0750660732]
- New Engineering Technology, Lawrence Smyth/Liam Hennessy, The Educational Company of Ireland [ISBN: 0861674480]

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Skill Enhancement Course SEC I: PHYSICS WORKSHOP SKILL

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S. No.	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section - A (Essay Questions)	6	10	60	3	10	30
2	Section - B (Short answer Questions)	8	5	40	4	5	20
Total Marks				**100**	**Total Marks**		**50**

BLUE PRINT FOR THE QUESTION PAPER SETTING

Chapter Name	Essay Question 10 Marks	Short Questions 5 Marks	Marks allotted to the Chapter
UNIT – I	2	2	30
UNIT – II	2	3	35
UNIT – III	2	3	35
Total No. of Questions	**6**	**8**	**100**

[**Note**: Question paper setters are instructed to add Numerical Problems (each of 2 marks) with a maximum weightage of 8 marks either in Section-A or Section-B covering all the three units in the syllabus]

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Skill Enhancement Course SEC I: PHYSICS WORKSHOP SKILL

Time: 2hrs **Max Marks: 50**

MODEL QUESTION PAPER

SECTION-A **3 X 10 = 30M**

Answer ALL the questions. Each question carries 10 marks:

1(a
(OR)
1 (b

2(a)
(OR)
2(b)

3(a).
(OR)
3(b)

SECTION– B **4 X 5 = 20M**

Answer any FOUR of the following questions. Each question carries 5 marks.

4

5

6

7

8

9

10

11

[**Note**: Question paper setters are instructed to add Numerical Problems (each of 2 marks) with a maximum weightage of 8 marks either in Section-A or Section-B covering all the three units in the syllabus]

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FIRST YEAR - FIRST SEMESTER
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Generic Elective Course (GEC -I) - Mathematics Calculus and Differential Equations

Theory: 90Hrs **Credits :06** **Teaching Hrs/Week : 6**

SYLLABUS

Objective: Calculus invented by Newton and Leibnitz is a powerful analytical tool to solve mathematical problems which arise in all branches of science and engineering. The main emphasis of this course is to equip the student with necessary analytic and technical skills to handle problems of a mathematical nature as well as practical problems using calculus and differential equation. The aim should be to expose the students to basic ideas quickly without much theoretical emphasis with importance on applications.
Excepted Outcomes: After completing the course, students are expected to be able to apply knowledge of calculus and differential equations in the areas of their own interest.

UNIT-I

Curvature, Asymptotes, Tracing of Curves (Catenary, Cycloid, Folium of Descartes), Rectification, Quadrature, Elementary ideas about Sphere, Cones, Cylinders and Conicoids.

UNIT-II

Review of limits, continuity and differentiability of functions of one variable and their properties, Rolle's theorem, Mean value theorems, Taylor's theorem with Lagrange's theorem and Cauchy's form of remainder, Taylor's series, Maclaurin's series of sinx, cosx, es, log (1+x),(1+x)n,L' Hospital's Rule, other Intermediate forms.

UNIT-III

Limit and Continuity of functions of several variables, Partial derivatives, Partial derivatives of higher orders, Homogeneous functions, Change of variables, Mean value theorem, Taylors theorem and Maclaurin's theorem for functions of two variables (statements &applications), Maxima and Minima of functions of two and three variables, Implicit functions, Lagrange's multipliers (Formulae & its applications), Concepts of Multiple integrals & its applications.

UNIT-IV

Ordinary Differential Equations of order one and degree one (variables separable, homogeneous, exact and linear). Equations of order one but higher degree. Second order linear equations with constant coefficients, homogeneous forms, Second order equations with variable coefficients, Variation ofparameters.

REFERENCE BOOKS:

1. Shanti Narayan, P. K. Mittal, Differential Calculus, S. Chand,2014.
2. Shanti Narayan, P. K. Mittal, Integral Calculus, S. Chand,2014.
3. S.C. Mallik and S. Arora-Mathematical Analysis, New AgeInternationalPublications.
4. J. Sinharoy and S. Padhy: A Course of Ordinary and Partial Differential Equations,
5. KalyaniPublishers.
6. H. Anton, I. BivensandS. Davis, Calculus, 10thEd., John Wileyand Sons (Asia) P.Ltd., Singapore, 2002.
7. Shanti Narayan and P.K. Mittal-Analytical Solid Geometry, S. Chand & Company Pvt. Ltd., NewDelhi.
8. Martin Braun-Differential Equations and theirApplications-Martin Braun, Springer International.
9. 8.B.P.Acharyaand,D.C.Aahu:AnalyticalGeometryofQuadraticSurfaces,KalyaniPublishers.

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Generic Elective Course (GEC -I) - Mathematics Calculus and Differential Equations

BLUE PRINT FOR THE MODEL PAPER

S. No.	Type of Question	To be given in the Question Paper			To be answered		
		No. of Questions	Marks allotted to each question	Total Marks	No. of Questions	Marks allotted to each question	Total Marks
1	Section - A (Essay Questions)	10	10	100	5	5	50
2	Section - B (Short answer Questions)	10	5	50	5	5	25
Total Marks				**150**	**Total Marks**		**75**

BLUE PRINT FOR THE QUESTION PAPER SETTING

Chapter Name	Essay Question 10 Marks	Short Questions 5 Marks	Marks allotted to the Chapter
UNIT – I	2	2	30
UNIT – II	2	2	30
UNIT – III	2	2	30
UNIT – IV	2	2	30
UNIT – V	2	2	30
Total No. of Questions	**10**	**10**	**150**

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE EXAMINATION IN PHYSICS

FIRST YEAR - FIRST SEMESTER
(Syllabus under CBCS w.e.f. 2020-21)

Generic Elective Course (GEC -I) - Mathematics Calculus and Differential Equations

Time: 3hrs **Max Marks: 75**

MODEL QUESTION PAPER

PART-A **5 X 10 = 50M**

Answer ALL the questions. Each question carries 10 marks:

1(a
(OR)
1 (b

2(a)
(OR)
2(b)

3(a).
(OR)
3(b)

4(a).
(OR)
4(b)

5(a).
(OR)
5(b).

PART – B **5×5=25M**

Answer any FIVE of the following questions. Each question carries 5 marks.

6.
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8.
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P SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN PHYSICS

FIRST YEAR - FIRST SEMESTER
(Syllabus under CBCS w.e.f. 2020-21)

Generic Elective Course (GEC -I) - Mathematics Calculus and Differential Equations

EVALUATION AND ASSESSMENT PATTERN (2020-21)

a) A continuous internal assessment (CIA) (for 25 marks) by the concerned Course teacher as well as by an end of semester examination (for 75 marks) and will consolidated at the end of the course for 100 marks.

b) Passing minimum for end of semester exam will be 40% out of 75 marks (i.e., 30 marks). Passing minimum for Internal Examination will be 40% out of 25 marks (i.e., 10 marks).

c) Internal Assessment shall be conducted for 25marks and marks are proportionately reduced for 15 marks.

d) Extra credit will be awarded for each course on various extracurricular activities like study projects / field trips/Industrial visits/ Seminars etc.

S.NO	ASSESSMENT PATTERN	EVALUATION	MARKS ALLOTTED
1A	DESCRIPTIVE TYPE	CONDUCTED FOR 25 MARKS AND PROPORTIONATELY REDUCED FOR 15 MARKS (BEST OF 1A OR 1B)	**15**
1B	OBJECTIVE TYPE		
2	SEMINARS/ ASSIGNMENTS	SUBMISSION OF RECORDS	05
3	STUDY AREA PROGRAMME/ STUDY PROJECT	SUBMISSION OF RECORDS	05
		TOTAL	25

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN PHYSICS

FIRST YEAR - FIRST SEMESTER
(Syllabus under CBCS w.e.f. 2020-21)

ENGLISH I: English Communication Skills-I
ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)
COMMUNICATION, WRITING AND THINKING SKILLS

Theory: 60Hrs **Credits :04** **Teaching Hrs/Week : 4**

SYLLABUS

MODULE 1: SPEECH SOUNDS (10 Hours)
Phonemic symbols - Vowels – Consonants-Diphthongs- Syllables -Word stress - Stress in polysyllabic words – Stress in words used as different parts of speech - Sentence stress - Weak forms and strong forms – Intonation - Awareness of different accents: American, British and Indian - Influence of the mother tongue

MODULE 2: NON- VERBAL COMMUNICATION (10hrs)
Body Language: Personal Appearance – Posture - Gestures and Hand Movements - Eye Contact - Facial Expressions - Paralinguistic Features – Rate – Pauses – Volume - Pitch/ Intonation/Cadence/ Voice Modulation - Pronunciation and Articulation

MODULE 3: PARAGRAPH WRITING (20hrs)
Construction of a Paragraph -Narrative Description -Comparison and Contrast -Sustained Analogy - Cause and Effect - Quotation and Paraphrasing – Enumeration – Definition – Testimony - Facts, Figures, Instances - Features of a Paragraph - Unity – Coherence - Expansion and Emphasis - Descriptive Writing Techniques - Argumentative Paragraph - Analytical Paragraph

MODULE 4: CRITICAL THINKING (20hrs)
Introduction to critical thinking – Benefits - Barriers – Reasoning - Arguments - Deductive and inductive arguments – Fallacies - Inferential comprehension- Critical thinking in academic writing - Clarity - Accuracy – Precision – Relevance

REFERENCES:

1. Communication Skills in English; V Sasi Kumar; 2011; 2nd Ed.; MG University.
2. Communication Skills; Sanjaya Kumar and Pushpa Latha; 2011; 1st Ed.; Oxford.
3. Communication Skills; Sanjaya Kumar and Pushpa Latha; 2011; 1st Ed.; Oxford.
4. Critical Thinking Academic Writing and Presentation Skills; Marilyn Anderson; 2010; 1stEd.;MG University.

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE EXAMINATION IN PHYSICS

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SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE EXAMINATION IN PHYSICS

FIRST YEAR - FIRST SEMESTER
(Syllabus under CBCS w.e.f. 2020-21)

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ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)

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SRI VENKATESWARA UNIVERSITY
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		TOTAL	25