



સૌરાષ્ટ્ર યુનિવર્સિટી

એકેડેમિક વિભાગ

યુનિવર્સિટી કેમ્પસ, યુનિવર્સિટી રોડ, રાજકોટ-૩૬૦૦૦૫

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નં.એકે/વિજ્ઞાન/૧૦૧૧૪/૨૦૨૪

તા.૨૩/૦૧/૨૦૨૪

B.Sc. Physics

પરિપત્ર:-

સૌરાષ્ટ્ર યુનિવર્સિટીની વિજ્ઞાન વિદ્યાશાખા હેઠળની સ્નાતક કક્ષાના B.Sc.(ભૌતિકશાસ્ત્ર)ના અભ્યાસક્રમ ચલાવતી સર્વે સંલગ્ન કોલેજોના આચાર્યશ્રીઓને આથી જાણ કરવામાં આવે છે કે, NEP-2020 અંતર્ગતના રાજ્ય સરકારશ્રીના તા.૧૧/૦૭/૨૦૨૩ના ઠરાવ ત્યારબાદ તા.૨૭/૦૭/૨૦૨૩ના રોજ પ્રકાશિત થયેલ સ્ટાન્ડર્ડ ઓપરેટિંગ પ્રોસિજર(SOP) તેમજ ત્યારબાદ તેને આનુસંગિક તા.૨૮/૦૭/૨૦૨૩ના રોજ આવેલ સુધારા મુજબના અભ્યાસક્રમો ચેરમેનશ્રી, ભૌતિકશાસ્ત્ર વિષયની અભ્યાસ સમિતિ દ્વારા રજુ કરાયેલ B.Sc.(ભૌતિક) સેમેસ્ટર-૦૨ના અભ્યાસક્રમો આગામી શૈક્ષણિક સત્ર જુન-૨૦૨૩થી અમલમાં આવે તે રીતે ભૌતિકશાસ્ત્ર વિષયની અભ્યાસ સમિતિ, વિજ્ઞાન વિદ્યાશાખા, એકેડેમિક કાઉન્સિલ તથા સિન્ડિકેટની બહાલીની અપેક્ષાએ મંજૂર કરવા માન.કુલપતિશ્રીને ભલામણ કરેલ, જે માન.કુલપતિશ્રીએ મંજૂર કરેલ છે. જેથી સંબંધિત તમામે તે મુજબ તેની ચુસ્તપણે અમલવારી કરવી.

(મુસદ્દો કુલસચિવશ્રીએ મંજૂર કરેલ છે.)

સહી/-

(ડૉ.આર.જી.પરમાર)

કુલસચિવ

બિડાણ:- ઉક્ત અભ્યાસક્રમ (સોફ્ટ કોપી)

રવાના કર્યું

પ્રતિ,

(૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની B.Sc. ફિઝીક્સ વિષય ચલાવતી સ્નાતક કક્ષાની સર્વે સંલગ્ન કોલેજોના આચાર્યશ્રીઓ તરફ

(૨) વિજ્ઞાન વિદ્યાશાખા હેઠળની B.Sc. ફિઝીક્સ વિષયની અભ્યાસ સમિતિના સર્વે સભ્યશ્રીઓ

નકલ જાણ અર્થે રવાના:-

૧. માન.કુલપતિશ્રી/કુલસચિવશ્રીના અંગત સચિવ

નકલ રવાના (યોગ્ય કાર્યવાહી અર્થે):-

૧. ડીનશ્રી, વિજ્ઞાન વિદ્યાશાખા

૨. પરીક્ષા વિભાગ

૩. પી.જી.ટી.આર.વિભાગ

૪. જોડાણ વિભાગ



SAURASHTRA UNIVERSITY



FACULTY OF SCIENCE

Course Structure and Syllabus for Science FYUGP

B.Sc. Honours/ Honours with Research in PHYSICS

Based on

UGC's guidelines NEP-2020 "Curriculum and Credit Framework for Undergraduate Programmes- CCFUP" and

Education Department, Government of Gujarat's
Uniform Credit Structure for all HEIs of Gujarat State and
Implementation of the Common Curriculum and Credit Framework under the National
Education Policy-2020

(No: KCG/admin/2023-24/0607/kh.1 Sachivalaya, Gandhinagar dated 11/07/2023) and

Standard Operating Procedure for Implementation of NEP-2020 for the State of
Gujarat- HEIs of Gujarat

(No: KCG/admin/2023-24/865/ dated 26/07/2023) and

Additional content to be added to SOP published by KCG

(No: KCG/NEP-2020/2023-24/893/ dated 28/07/2023)

General Guidelines for Implementation of **Four Year Under-Graduate Programmes**
for Saurashtra University (16 pages) published in August 2023

(E-mail from Academic Section Saurashtra University dated Oct 11, 2023)

Effective From June – 2023 & onwards



Curriculum Design/Syllabus Preparation Committee

Sr. No.	Name & Designation	
1.	Prof. N.A.Shah Prof & Head Physics Department, Saurashtra University Rajkot.	Member
2.	Mr. Umang J Vyas Associate Prof. & Head Physics Department, H & H B Kotak Institute of Science Rajkot	Member
3.	Dr. R.K.Trivedi Associate Prof. Physics Department, H & H B Kotak Institute of Science Rajkot	Member
4.	Dr. K.H.Jani Associate Prof. Physics Department, D.K.V. Arts & Science College Jamnagar	Member
5.	Dr. Amit Raval Associate Prof. & Head Physics Department, D.K.V. Arts & Science College Jamnagar	Member
6.	Dr. H O Jethava Associate Prof. Physics Department, Saurashtra University Rajkot	Member
7.	Dr. P. Arvindxasan Associate Prof. & Head Physics Department Crise College Rajkot	Member
8.	Dr. Purvesh Vyas Asst Prof. Physics Department Kamani Science College Amreli	Member



Graduate Attributes:

Some of the characteristic attributes a graduate in Physics should possess are:

- Disciplinary knowledge and skills:
- Skilled communication:
- Critical thinking and problem-solving capacity:
- Sense of inquiry:
- Team player/worker:
- Project Management Skills:
- Digital and ICT efficiency:
- Ethical awareness / reasoning:
- National and international perspective:
- Lifelong learning

Graduates should be able to demonstrate the acquisition of the following:

Academic excellence: Comprehensive knowledge and coherent understanding of Physics and other interdisciplinary areas of study.

Practical, professional, and procedural knowledge required for carrying out professional or highly skilled work/tasks related to Physics, including knowledge required for undertaking self-employment initiatives and knowledge and mind-set required for entrepreneurship, improved product development, or a new mode of organization.

Critical and Analytical reasoning/thinking and Effective communications: Analysis and evaluation of information to form a judgment about a subject or idea and ability to communicate the same in a structured form.

Research-related skills: The ability to understand basic research ethics and skills in practicing/doing ethics in the field/ in personal research work, regardless of the funding authority or field of study.

Leadership qualities and Teamwork abilities: The graduates should be able to demonstrate the capability for mapping out the tasks of a team and setting direction and inspiring vision, and building a team that can help achieve the goals.

Global Citizenship: Mutual understanding with others from diverse cultures, perspectives, and backgrounds by embracing and practicing constitutional, humanistic, ethical, and moral values in life, including universal human values of truth, righteous conduct, peace, love, nonviolence, and scientific temper.

Life-Long Learning: Ready to imbibe new knowledge, values, and skills with an open mind and willing to adopt change for constructive development.

Programme Outcomes (PO):

By the end of the program the students will be able to:

PO 1	Create the facilities and environment in all the educational institutions to consolidate the knowledge acquired at +2 level and to motivate and inspire the students to create deep interest in Physics, to develop broad and balanced knowledge and
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	understanding of physical concepts, principles and theories of Physics.
PO 2	Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.
PO 3	Develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics.
PO 4	Expose the student to the vast scope of Physics as a theoretical and experimental science with applications in solving most of the problems in nature spanning from 10^{-15} m to 10^{26} m in space and 10^{-10} eV to 10^{25} eV in energy dimensions.
PO 5	Emphasize the discipline of Physics to be the most important branch of science for pursuing the interdisciplinary and multidisciplinary higher education and/or research in interdisciplinary and multidisciplinary areas.
PO 6	To emphasize the importance of Physics as the most important discipline for sustaining the existing industries and establishing new ones to create job opportunities at all levels of employment.

Programme Specific Outcomes (PSO):

By the end of the program the students will be able to:

PSO 1	At the end of first year – Ability to solve well defined problems.
PSO 2	At the end of second year – Ability to solve broadly defined problems.
PSO 3	At the end of third year – Ability to solve complex problems that are ill- structure that require multi-disciplinary skills to solve them.
PSO 4	During fourth year – Experience of workplace problem solving in the form of internship or Research Experience preparing for higher education or Entrepreneurship and employment.



B.Sc. Honours/ Honours with Research in Physics
(NCrF Level- 4.5 First Year – Certificate in Physics)
Semester II

SN	Course Category As per GoG- NEP-SOP - July 2023& additional content 28/7/23	Course Title	Credit			Hrs./ Wk.		Evaluation - Weightage CCE: SEE = 50:50				
			T	P	Total	T	P	CCE Marks		SEE Marks		Total Marks
								T	P	T	P	
1	Major (Core) -3 (Physics)	Physics-2.1: Concept of Physics 2.1 & Physics-2.1(P): Experimental Analysis in Physics- 2.1 (4- Credit Course including Theory & Practical components)	3	1	4	3	2	25	25	50	-	100
2	Major (Core)-4 (Physics)	Physics-2.2: Concept of Physics 2.2 & Physics-2.2(P): Experimental Analysis in Physics- 2.2 (4- Credit Course including Theory & Practical components)	3	1	4	3	2	25	25	50	-	100
3	Minor(Elective)*-2	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.2) Any One from Basket (As per the expertise and resources available in the college) (4- Credit Course including Theory & Practical components)	3	1	4	3	2	25	25	50	-	100
4	Multi/Inter - Disciplinary Course -2 (MDC/IDC-2) (Elective)**	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.3) Any One from Basket (As per the expertise and resources available in the college) (4- Credit Course including Theory & Practical components)	3	1	4	3	2	25	25	50	-	100



5	Ability Enhancement Course -2 (AEC-2)	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.4) English Language	2	-	2	2	-	25	-	25	-	50
6	Skill Enhancement Course-2 (SEC-2)	(As per GoG- NEP-SOP July 2023 & additional content 28/7/23 – Clause 3.3.5) Skill Based Practical Course: Introduction To Basic Electronic Components And Circuits. Designing And Constructing Some Simple Electronic Appliances. Introduction To Basic Optical Phenomena.	-	2	2	-	4	-	25	-	25	50
7	Common Value Added Course-2 (C-VAC-2)*** NSS/NCC/ Sports & Fitness/ Ethics and Culture/ Culture and Communication/ Ethics and Values in Ancient Indian Traditions/ Human Values and Ethics/IPDC	(As per GoG- NEP-SOP July 2023& additional content 28/7/23 – Clause 3.3.6) Any One from Basket VAC based on IKS: NSS/NCC/Sports & Fitness/Human Values and Ethics	-	2	2	-	4	-	25	-	25	50
Total Credits and Marks (Semester-II)			14	08	22	14	16	125	150	225	50	550

* Any one course from the basket is to be selected as a Minor elective course as per the expertise and resources available in the college. The same course will be continued as a Minor in the semester-II as well.

** Any one course from the basket is to be selected as Multi/Inter disciplinary elective courses (MDC/IDC) as per the expertise and resources available in the college. The same MDC/IDC course will be continued in the semester-II as well.

*** **Common Value Added Elective Courses (C-VAC-1)** common to all is to be selected from University Basket for semester 1, as per the expertise and resources available in the college.



**Courses Offered by BoS in Physics to other
FYUGP- B.Sc. Program in Semester-II**

SN	Course Category As per GoG- NEP- SOP - July 2023& additional content 28/7/23	Course Title	Credit			Hrs./ Wk.		Evaluation - Weightage CCE: SEE = 50:50				
			T	P	Total	T	P	CCE Marks		SEE Marks		Total Marks
								T	P	T	P	
1	Minor (Elective)-2 (Physics) (In addition to courses mentioned in SOP basket; Recommended for Statistics, Mathematics, Chemical Science, Life Science, Computer Science, etc...)	Physics-Minor-2.1: Basics of Physics 2.1 & Physics-Minor- 2.1(P): Experimental Analysis in Basic Physics-2.1 (4- Credit Course including Theory & Practical components)	3	1	4	3	2	25	25	50	-	100
2	Multi/Inter - Disciplinary Course -2 (MDC/IDC- 2) (Elective) (In addition to courses mentioned in SOP basket; Recommended for Physical & Chemical Sciences, Statistics)	Physics-MDC-2.1: Introduction to Physics 2.1 & Physics-MDC- 2.1(P): Experimental Analysis in Physics- 2.1 (4- Credit Course including Theory & Practical components)	3	1	4	3	2	25	25	50	-	100



Evaluation Scheme: (As per GoG- NEP-SOP July 2023 & additional content 28/7/23 – Chapter-7: Evaluation Reforms)

The evaluation process should be formulated to make a systematic evaluation of students' progress based on UGC guidelines. The evaluation must be designed with learner attributes in mind. These attributes have clear linkages to Programme Education Objectives and Outcomes. The evaluation consists of the following two components:

1. Continuous and Comprehensive Evaluation (CCE)- Formative
2. Semester End Evaluation (SEE)- Summative

CCE carries 50% of the total marks allotted to a subject and the other 50% being assigned to the SEE.

In each course, every credit carries 25 marks, of which 50% marks is assigned for CCE and rest 50% marks for SEE. The 50% marks assigned to the CCE is distributed between the continuous classroom evaluation and mid-term evaluation. The pattern may be as follows:

SN	Evaluation	T-3+P-1 = Total 4 credit subjects (Marks)	2 credit subjects (Marks)
1	CCE (50%)		
	Classroom & Mid-Term Evaluation	T-25+P-25	25
2	SEE (50%)	50	25
	Total	100	50

Continuous and Comprehensive Evaluation (CCE)

Subject-wise CCE will be undertaken by the concerned faculty member. The mode of evaluation will be decided by the faculty member concerned with the subject. Normally CCE consists of class participation, case analysis and presentation, assignment, tutorials, slip tests (announced/ surprised), quizzes, attendance etc. or any combination of these. The students are expected to submit their answer scripts/ reports of internal evaluation within the stipulated time. Failure to do so may result in the script not being valued. Another part of CCE consists of mid-term written evaluation, which is compulsory for all students. It can be done in a scheduled manner. The duration of the mid-term evaluation shall be one hour.

Semester End Evaluation (SEE)

The SEE carries 50% of the marks assigned to a course. SEE shall be of 2 hours for 3/ 4 credit course and 2 hours in case of 1/2 credit courses. The controller of the examination will conduct these examinations. Paper setting and evaluation will be done by the external examiners to an extent of 50% of the evaluation process. This examination shall be conducted as per a schedule which shall be notified in advance.

The backlog exam will be conducted twice a year just after the result declared of the semester evaluation. Students shall have a second chance to clear their backlog and avoid the burden to carry forward the backlog with the next semester exam.



Appearance in all the evaluations is mandatory and no exemption can be granted except in the following cases:

1. In case of inability to attend the exam due to reasons considered genuine by the controller of examination in consultation with the Director/Board.
2. In case of medical emergency, a certificate from the registered medical practitioner must be produced before the commencement of exams. The evaluation board will then take final decision on the recommendation for exemption.

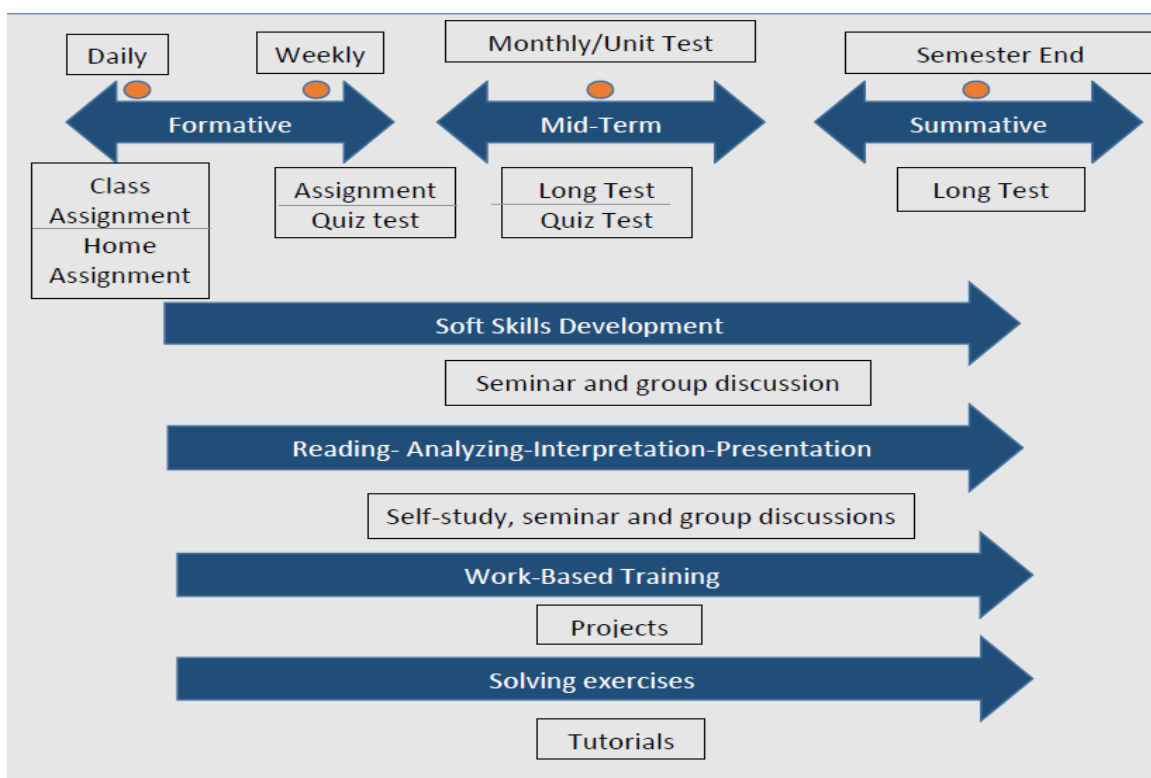
Eligibility Criteria to appear in SEE

To be able to appear for the SEE, a student must comply with the following conditions:

1. Should have at least 75% of attendance in all the courses put together.
2. Should have at least 70% of attendance in each course/subject.
3. Should not have any disciplinary proceedings pending against him/her.
4. Should have no pending due.

Continuum of Evaluation

Evaluation must be continuous which may include both formative and summative components in a timely manner for continuous feedback as follow:





Mode of Evaluation

A wide range of modes of evaluation for evaluating students is available for the teachers/ institutions to use. A suitable compendium of such a mode needs to be carefully chosen for a particular program depending on its nature, objectives, and available resources. The mode of evaluation can be as below:

Written Mode	Oral Mode	Practical Mode	Integrated Mode
Semester Exam Class Test Open book exam/test Open note exam/test Self-test/Online test Essay/Article writing Quizzes/Objective test Class assignment Home assignment Reports writing Research/Dissertation Class Studies	Viva/Oral exam Group Discussion Role Play Authentic Problem Solving Quiz Interview	Lab work Computer simulation/virtual labs Craft work Co-curricular work	Paper presentation/Seminar Field Assignment Poster Presentation

Written Mode		
Evaluation Type	Nature	Objective
Semester Exam	Traditionally essay type with objective/short answer questions to evaluate Lower Ordered Thinking (LOT) OBE skills.	For depth and planned preparation
Class test	Traditionally essay type	Fixed date forces students to learn
Open book test	Allowed choice of reference book	Measures what students can do with resources, less stress on memory
Open note test	To get used to the system	Encourage good note taking
Self-test	For subjective and objective items	Mastery learning occurs with proper feedback
Article/essay writing	Individual long written assignment	Individual expression and creativity
Quizzes/Objective test	Short duration structured test	Excellent validity as greater syllabus coverage
Class assignment	With defined time	Student's performance to make decision
Home assignment	With undefined time	Reinforce learning and facilitate mastery of specific skills
Reports Writing	On activities performed or event observed	Develop a key transferable skill
Research/Dissertation	Detailed research-based report	To judge creativity and research skills
Case Studies	Analyse a given case (real or fictional)	To assess thinking, value, and attitude



Oral Mode		
Evaluation Type	Nature	Objective
Viva/Oral exam	Individually or in small group	Practical experience towards job interview situation
Group discussion	Small group of 2-5 members work on a joint task	Encourage teamwork
Role Play	Small group of 2-5 members work on a joint task	Develop personality
Authenticate problem solving	Small group of 2-5 members work on a joint task	Communication of ideas
Quiz	Small group of 2-5 members work on a joint task	Assess memory power
Interview	Individually	Judge the personal confidence level

Practical Mode		
Evaluation Type	Nature	Objective
Lab work	Component of working with one's hand	Keep the students on the task
Computer simulation/virtual labs	Component of working with one's hand	To understand the practical exposure
Craft work	Component of working with one's hand	Encourage application of concepts learnt
Co-curricular work	Component of working with one's hand	For immediate feedback

Integrated Mode		
Evaluation Type	Nature	Objective
Paper presentation/Seminar	Group or individual work	Learn from others presentation
Field Assignment	Field visit with report	Develop observation and recording skills
Poster presentation	Group or individual work	Develop research, creativity, and discussion skills

Models of Evaluation

Based on the types of evaluation, various models of evaluation implementation are suggested for theory, practical, self-study and work-based learning. The focus of these models is to encourage the students to improve on skills and performance.

Evaluation Norms & Question Paper Pattern for Theory & Practical Courses: Please refer General Guidelines for Implementation of Four Year Under-Graduate Programmes for Saurashtra University (16 pages) published in August 2023.



Model for Theory Courses- Theory-3+Practical-1 = 4 Credit Course

CCE-50% (50 Marks) & SEE-50% (50 Marks)

T*-25-Evaluation Pattern (Theory Internal)	Marks
Class Test (Average of TWO tests)	T*-25+P*-25
Quiz (Average of TWO quizzes)	
Home Assignment	
Active Learning- PBL/CSBL/Seminar/Flipped Class Room etc..OBE tools.	
Class Assignment	
Attendance	
Continuous and Comprehensive Evaluation	
Semester-End Evaluation	T-50

P*-25-Model for Practical Courses- 1 Credit Course

CCE-100% (25 Marks)

Evaluation Pattern (Practical)	Marks
Lab work assessment	10
Viva voce/Lab quiz	10
Attendance	05
Continuous and Comprehensive Evaluation	25

Model for Skill Enhancement Course - Skill based Practical Course -2 Credit Course

CCE-50% (25 Marks) SEE-50% (25 Marks)

Exam Pattern	Marks
Lab work assessment or Project based Assessment	10
Viva voce/Lab quiz	10
Attendance & Performance	05
Continuous and Comprehensive Evaluation	25
Semester-End Evaluation	25

Model for Skill Enhancement Course - Skill Based Practical Course -2 Credit Course

CCE-50% (50) & SEE-50% (50)

Exam Pattern	Marks
Lab work assessment or Project based Assessment	10
Viva voce/Lab quiz	10
Attendance & Performance	05
Continuous and Comprehensive Evaluation	25
Semester-End Evaluation	25



Theory Question Paper Pattern
Semester End Examination (SEE)
Major/Minor/MDC/IDC – 4 Credit Course (Theory)

Instructions:

- All Units/ Module carry equal weightage of 10 Marks each.
- There must be One Question from each Unit/ Module.
- Time duration: 2 Hours.
- Marks: 50.

The Theory Question Paper Skeleton is as follows.

Question 1 (Unit/Module 1)		Marks
A		(10/7/6/5)
B		(0/3/4/5)
OR		
A		(10/7/6/5)
B		(0/3/4/5)
Question 2 (Unit/Module 1)		Marks
A		(10/7/6/5)
B		(0/3/4/5)
OR		
A		(10/7/6/5)
B		(0/3/4/5)
Question 3 (Unit/Module 1)		Marks
A		(10/7/6/5)
B		(0/3/4/5)
OR		
A		(10/7/6/5)
B		(0/3/4/5)
Question 4 (Unit/Module 1)		Marks
A		(10/7/6/5)
B		(0/3/4/5)
OR		
A		(10/7/6/5)
B		(0/3/4/5)
Question 5 (Unit/Module 1)		Marks
A		(10/7/6/5)
B		(0/3/4/5)
OR		
A		(10/7/6/5)
B		(0/3/4/5)



Practical Question Paper Pattern
Semester End Examination (SEE)
Major/Minor/MDC/IDC - 4 Credit Course (Practical/Performance)

Instructions:

- Certified journal is must and minimum requirement to appearing for semester end practical examination.
- Should have at least 75% attendance in practical sessions during the semester.
- Time duration: **2 Hours**.

One Practical/Performance of 25 Marks (Viva – 10 Marks & Practicals – 15 Marks)

Exam Pattern	Marks
Attempt any 3 out of 5 problems. (*Each problem carries 05 Marks; Each problem may be split into sub-problem(s)/question(s), if required.)	15
Viva voce	10
CCE	25



B.Sc. Honours/ Honours with Research in Physics
(NCrF Level- 4.5 First Year – Certificate in Physics)

Semester II

Course Category	Major (Core)-3
Title of the Course	Physics-2.1: Concept of Physics 2.1
Course Credit	03
Teaching Hours per Semester	45
Total Marks	CCE-25 + SEE-50

Course Objectives

Students will be able to study

- 1) Waves and their types, Interference and superposition principle, along with laws governing the vibration of strings and various normal modes.
- 2) Sound waves and their velocities in various mediums, Newton's formula and Laplace's correction, application of Acoustic and Doppler Effect.
- 3) A diode is employed in rectifier circuits to convert AC into DC, brief overview of filter circuits and the utilization of Zener diodes as voltage regulator.
- 4) An introduction to various diode types and their respective advantages and application.
- 5) The fundamental construction and classifications of BJT transistors and characteristics of CB and CE configuration and their comparison with each other.

Course Outcomes – Cos

Upon completion of the course, students will be able to:

- 1) The features of a wave, categorizing distinctions in wave motion and understandings their corresponding laws.
- 2) The speed of sound waves in different mediums, and their associated laws also application of various phenomena of sounds.
- 3) The conversion of AC into DC with different types of rectifier circuits and modification with the help of various filter circuits
- 4) The various types of diodes and their working principle along with applications.
- 5) The knowledge of basic structure and their types of transistors and comparison with different configuration.



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?				Yes	
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?				Yes	
3	Major	Yes	Minor		Yes	
	Skill Enhancement Courses	No	Ability Enhancement Courses		No	
	Value Added Courses	No	Exit/ Vocational Courses		No	
4	Holistic Education	Yes	Multidisciplinary	No	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?				Yes	
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?				Yes	
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?				No	
8	ઇન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?				No	

Unit No.	Topics	Hours	Marks
1	Wave Motion and Waves in a String: Wave motion, Transverse Wave Travelling in String, Velocity of a Wave in a String, Interference and the principle of Superposition, Standing waves on a String, Normal Modes of a String, Laws of Transverse Vibrations of a String, Numerical Examples	9	10
2	Sound: Speed of Sound Wave in a material medium, Speed of Sound in Gas- Newton's Formula and Laplace's Correction, Intensity and loudness of Sound Wave - Decibels, Beats, Musical Scale, Acoustics of Buildings, Application of Acoustic phenomena, Doppler Effect, Numerical Examples.	9	10
3	Semiconductor Diode: Use of Diode in Rectifiers, Half-Wave Rectifier, Full-Wave Rectifier, Centre-tap Rectifier, Bridge Rectifier, Performance of Half-Wave & Full-Wave Rectifier (Rms value of current, Ripple factor, Rectification Efficiency), Comparison of Rectifiers, Filter Circuit, Capacitor Filter, Inductor Filter, LC filter, π Filter, Review of Zener diode, Zener Diode as Voltage Regulator, Numerical Examples.	9	10



4	Transistor: Structure of Transistor, Types of BJT, Action of a Transistor, working of a Transistor, Relation Between Different Current in Transistor, Three Configurations of Transistor, Transistor Characteristics (CB and CE Configuration), Comparison between the three configurations, Why CE Configuration is preferred in Circuit, Numerical Examples.	9	10
5	Semiconductor devices: Principle, Construction, Working and Applications of - Photo Diode, Varactor diode, Solar Cell, , Photo transistor ,LED, Advantages of LED, Multicolour LED, LDR, Tunnel Diode, Numerical Examples.	9	10

REFERENCE BOOKS for Unit 1,2:

1. Concept of physics By H C Verma part 1 Publisher: Bharati Bhawan
2. Sears and Zemanski's University Physics with modern physics By H D Young
Publisher: PEARSON

REFERENCE BOOKS for Unit 3, 4, 5:

1. Principles of electronics By V.K.Mehta & Rohit Mehta, Publisher: S.Chand
2. Basic Electronics By B.L.Thereja, Publisher : S.Chand.

Other Reference Books:

1. Electromagnetics by B. B. Laud, Publisher: Willey Eastern Limited.
2. Electricity and Magnetism by Edward M. Purcell, Publisher: McGraw-Hill
3. Electricity and Magnetism by J.H. Fewkes & J.Yarwood, Publisher: Oxford University Press
4. University Physics by Ronald Lane Reese, Publisher: Thomson Brooks



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Semester II

Course Category	Major (Core)-3 Practical
Title of the Course	Physics-2.1(P): Experimental Analysis in Physics-2.1
Course Credit	01
Teaching Hours per Semester	30
Total Marks	CCE-25

Course Objectives

The objectives of the course are as following.

1. To make students aware of the basic Mechanical and Electronic Instruments
2. To enhance the basic skills of Performing experiment
3. The objective of this course is also to give students some basic introduction about calibration of spectrometer, importance of transistor and magnetometer.
4. To impart the skill of dealing with many electrical, electronic and mechanical equipment
5. To develop their working skill/ scientific temperament for performing experiment.

Course Outcomes – Cos

1. Students will be able to know experimental technique for Physics
2. Students will get Hands on experience of different equipment.
3. Students will develop the following skills
 - Fixing units, tabulation of observations, analysis of data (graphical/analytical).
 - Unknown frequency of tuning fork by Melde's experiment and Resonator.
 - Knowledge about the characteristics of CE and CB transistor.
 - Knowledge of how to find magnetic moment by deflection magnetometer.
4. Students will study practically the characteristics of photo diode.



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?			Yes		
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?			Yes		
3	Major	Yes	Minor	Yes		
	Skill Enhancement Courses	No	Ability Enhancement Courses	No		
	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	Yes	Multidisciplinary	No	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસંગિક જોગવાઈ કરાયેલ છે ?				Yes	
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?				Yes	
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?				No	
8	ઈન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?				No	

Pr.No.	Practical
1	To determine the unknown frequency of Tuning Fork by Melde' s Experiment
2	To Study the Resonator and to determine unknown frequency of tuning fork.
3	To Calibrate a Spectrometer.
4	To study the CB Characteristic of Transistor.
5	To study the CE Characteristic of Transistor.
6	To study Half-Wave Rectifier.
7	To Study of a Transformer.
8	To study Characteristics of Photo diode.
9	To find the magnetic moment and pole strength of given magnets using deflection magneto meter.
10	To find the ratio of magnetic moments of two magnets using deflection magneto meter.

Reference Books:

1. B. Sc. Practical Physics by C. L. Arora Pub: S. Chand
2. A text of Practical Physics By Indu Prakash & Ramkrishna
3. Practical Physics by G. L. Gupta and V. Kumar Pub. Pragati Prakashan, Meerut
4. B. Saraf Physics through experiments Vol. I & II.



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Semester II

Course Category	Major (Core) -4
Title of the Course	<u>Physics 2-2: Concept of Physics</u> <u>2-2</u>
Course Credit	03
Teaching Hours per Semester	45
Total Marks	CCE-25 + SEE-50

Course Objectives

Students will be able to study

- 1) Interference and its types, along with methods for generating interference patterns.
- 2) The different types of experimental techniques for interference pattern and determining their various parameters such as wavelength, refractive index, etc.
- 3) To understand diffraction and their types and obtain diffraction pattern with different experiments such as single slit, double slit, and diffraction grating.
- 4) Introduction of polarization and their types and production of polarization by various methods such as absorption, refraction, Nicole Prism etc.
- 5) The laws of reflection and refraction from Fermat's Principal, Properties of nodal points and Newton's formula to obtain focal length.

Course Outcomes – Cos

Students will be able to understand/ get knowledge about

- 1) The Interference and their types and different methods to obtain interference pattern.
- 2) Various types of experimental techniques for obtaining interference pattern and their parameters.
- 3) Various approaches of obtaining diffraction phenomena and their types.
- 4) The polarization and their types also get information about various methods of obtaining polarization.
- 5) Laws of reflection and refraction from Fermat's Principal and obtain relation of focal length by Newton's formula.



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?			Yes		
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?			Yes		
3	Major	Yes	Minor	No		
	Skill Enhancement Courses	No	Ability Enhancement Courses	No		
	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	Yes	Multidisciplinary	No	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?			Yes		
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?			Yes		
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?			No		
8	ઇન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?			No		

Unit No.	Topics	Hours	Marks
1	Wave Optics: Interference: Introduction, Electromagnetic nature of Light, Superposition of Waves, Interference (Up to definition of interference), Conditions for Interference, Techniques of Obtaining Interference: Division of Amplitude and Division of Wave front, Young's Double Slit Experiment.	9	10



2	Experimental Technique for Interference: Fresnel Biprism and determination of wavelength of light using it, Thin Film, Plan parallel thin film, Interference due to reflected light in Thin Films, Types of thin film - Parallel and wedge-shaped films, Newton's Rings: Determination of Wavelength of Light & refractive index, Numerical Examples.	9	10
3	Wave Optics: Diffraction: Types of Diffraction-Fraunhofer and Fresnel Diffraction, Fraunhofer Diffraction at single slit, Fraunhofer Diffraction at Double Slit, Plane Diffraction Grating, Fraunhofer Diffraction at Plane Diffraction Grating. Diffraction Pattern of a straight edge, Numerical Examples.	9	10
4	Wave Optics: Polarization: Introduction, Polarization, unpolarized and polarized light, Production of Polarized Light- By Selective Absorption, By Reflection, By Scattering, By Double Refraction, Polarizer and Analyzer, Nicol Prism, Numerical Examples.	9	10



5	Geometrical Optics: Fermat's Principle of Least Time, Law of reflection & Law of refraction from Fermat's Principle, Cardinal Points, Nodal Points and Nodal Planes, Properties of Nodal Points, Newton's Formula, Relation between f_1 and f_2 , Numerical Examples.	9	10
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Reference Books:

1. A Text Book Of OPTICS By N.Subrahmanyam, Brijlal, M.N.Avadhanul Publisher: S.chand.
2. Principle of OPTICS By B.K.Mathur Publisher: Gopal Printing
3. Fundamentals of OPTICS By Jenkins and White Publisher: McGraw-Hill
4. Fundamentals of OPTICS By Gulati and Khanna Publisher: R.Chand



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Semester II

Course Category	Major (Core)-4 Practical
Title of the Course	Experimental Analysis In Physics 1
Course Credit	01
Teaching Hours per Semester	30
Total Marks	CCE-25

Course Objectives

The objectives of the course are as following.

- 1) To make students aware of the basic Mechanical and Electronic Instruments
- 2) To enhance the basic skills of Performing experiment
- 3) The objective of this course is also to give students some basic introduction about calibration of spectrometer, importance of transistor and magnetometer.
- 4) To impart the skill of dealing with many electrical, electronic and mechanical equipment
- 5) To develop their working skill/ scientific temperament for performing experiment

Course Outcomes – Cos

Students will be able to understand/ get knowledge about

- 1) Fundamental unit and different unit system, Fixing units, tabulation of observations, analysis of data (graphical/analytical).
- 2) Accuracy of measurement and sources of errors, importance of significant figures.
- 3) Students will develop the skill to understand the experimental knowledge of
 - Moment of Inertia
 - Modulus of Rigidity
 - Full wave rectifier
 - Bridge rectifier
 - Newton's Ring
 - Torsional Pendulum

1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?	Yes		
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?	Yes		
3	Major	Yes	Minor	No
	Skill Enhancement Courses	No	Ability Enhancement Courses	No



	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	Yes	Multidisciplinary	No	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?					Yes
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?					Yes
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?					No
8	ઇન્ડીયન નોલેજ સીસ્ટમ (IKS) પર આધારિત વિષય છે ?					No

Pr.No.	Practical
1	To determine the Moment of Inertia of a Fly wheel.
2	To Verify the first Law of vibrating strings by Melde's Experiment.
3	To Verify the second Law of vibrating strings by Melde's Experiment.
4	To Verify the third Law of vibrating strings by Melde's Experiment.
5	To determine the modulus of rigidity (η) using torsional pendulum.
6	To determine the moment of inertia by using torsional pendulum.
7	To Study Dispersive curve, and to determine the dispersive power of the material of a prism for different colours.
8	To determine wavelength of light using Newton's Ring.
9	To study Full-Wave Rectifier (Centre tap).
10	To study Bridge Rectifier.

Reference Books:

5. B. Sc. Practical Physics by C. L. Arora Pub: S. Chand
6. A text of Practical Physics By Indu Prakash & Ramkrishna
7. Practical Physics by G. L. Gupta and V. Kumar Pub. Pragati Prakashan, Meerut
- B. Saraf Physics through experiments Vol. I & II



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Semester II

Course Category	Minor (Core) -2
Title of the Course	<u>Physics of Elementary Waves and Semiconductor Devices</u>
Course Credit	03
Teaching Hours per Semester	45
Total Marks	CCE-25 + SEE-50

Course Objectives

Students will be able to study

- 1) Waves and their types, Interference and superposition principle, along with laws governing the vibration of strings and various normal modes.
- 2) Sound waves and their velocities in various mediums, Newton's formula and Laplace's correction, application of Acoustic and Doppler Effect.
- 3) A diode is employed in rectifier circuits to convert AC into DC, brief overview of filter circuits and the utilization of Zener diodes as voltage regulator.
- 4) An introduction to various diode types and their respective advantages and application.
- 5) The fundamental construction and classifications of BJT transistors and characteristics of CB and CE configuration and their comparison with each other.

Course Outcomes – Cos

Students will be able to understand/ get knowledge about

- 1) The features of a wave, categorizing distinctions in wave motion and understandings their corresponding laws.
- 2) The speed of sound waves in different mediums, and their associated laws also application of various phenomena of sounds.
- 3) The conversion of AC into DC with different types of rectifier circuits and modification with the help of various filter circuits
- 4) The various types of diodes and their working principle along with applications.
- 5) The basic structure and their types of transistors and comparison with different configuration.



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?			Yes		
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?			Yes		
3	Major	Yes	Minor	Yes		
	Skill Enhancement Courses	No	Ability Enhancement Courses	No		
	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	Yes	Multidisciplinary	No	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?			Yes		
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?			Yes		
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?			No		
8	ઇન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?			No		

Unit No.	Topics	Hours	Marks
1	Transverse Waves: Wave Motion, Wave Pulse on a String, Sine Wave Travelling on a String, Velocity of a Wave on a String, Power Transmitted along the String by a Sine Wave, Interference and the Principle of Superposition, Interference of Waves Going in Same Direction, Reflection and Transmission of Waves	9	10
2	Sound waves and Its Applications: Speed of Sound Wave in a material medium, Speed of Sound in Gas- Newton's Formula and Laplace's Correction, Intensity and loudness of Sound Wave - Decibels, Beats, Musical Scale, Acoustics of Buildings, Application of Acoustic phenomena, Doppler Effect, Numerical Examples.	9	10



3	P-N Junction Diode: Use of Diode in Rectifiers, Half-Wave Rectifier, Full-Wave Rectifier, Centre-tap Rectifier, Bridge Rectifier, Performance of Half-Wave & Full-Wave Rectifier (Rms value of current, Ripple factor, Rectification Efficiency), Comparison of Rectifiers, Filter Circuit, Capacitor Filter, Inductor Filter, LC filter, π Filter, Review of Zener diode, Zener Diode as Voltage Regulator, Numerical Examples.	9	10
4	Extrinsic Semiconductor device: Principle, Construction, Working and Applications of - Photo Diode, Varactor diode, Solar Cell, , Photo transistor ,LED, Advantages of LED, Multicolor LED, LDR, Tunnel Diode, Numerical Examples.	9	10
5	Bipolar Junction Transistor: Structure of Transistor, Types of BJT, Action of a Transistor, Working of a Transistor, Relation Between Different Current in Transistor, Three Configurations of Transistor, Transistor Characteristics (CB and CE Configuration), Comparison between the three configurations, Why CE Configuration is preferred in Circuit, Numerical Examples.	9	10



Reference Books:

REFERENCE BOOKS for Unit 1,2:

1. Concept of physics By H C Verma part 1 Publisher: Bharati Bhawan
2. Sears and Zemansky's University Physics with modern physics By H D Young
Publisher: PEARSON

REFERENCE BOOKS for Unit 3, 4, 5:

1. Principles of electronics By V.K.Mehta& Rohit Mehta, Publisher: S.Chand
2. Basic Electronics By B.L.Thereja, Publisher : S.Chand.

Other Reference Books:

1. Electromagnetics by B. B. Laud, Publisher: Willey Eastern Limited.
2. Electricity and Magnetism By Edward M. Purcell, Publisher: McGraw-Hill
3. Electricity and Magnetism By J.H. Fewkes & J.Yarwood, Publisher: Oxford
University Press
4. University Physics By Ronald Lane Reese, Publisher: Thomson Brooks



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Semester II

Course Category	Minor (Core)-2 Practical
Title of the Course	Physics-2P: Experimental Analysis In Physics-1
Course Credit	01
Teaching Hours per Semester	30
Total Marks	CCE-25

Course Objectives

The objectives of the course are as following.

1. To make students aware of the basic Mechanical and Electronic Instruments
2. To enhance the basic skills of Performing experiment
3. The objective of this course is also to give students some basic introduction about calibration of spectrometer, importance of transistor and magnetometer.
4. To impart the skill of dealing with many electrical, electronic and mechanical equipment
5. To develop their working skill/ scientific temperament for performing experiment

Course Outcomes – Cos

1. Students will be able to know experimental technique for Physics
2. Students will get Hands on experience of different equipment.
3. Students will develop the following skills
 - Fixing units, tabulation of observations, analysis of data (graphical/analytical).
 - Unknown frequency of tuning fork by Melde's experiment and Resonator.
 - Knowledge about the characteristics of CE and CB transistor.
 - Knowledge of how to find magnetic moment by deflection magnetometer.
4. Students will be study practically the characteristics of photo diode.



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?			Yes		
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?			Yes		
3	Major	Yes	Minor	Yes		
	Skill Enhancement Courses	No	Ability Enhancement Courses	No		
	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	Yes	Multidisciplinary	No	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?				Yes	
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?				Yes	
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?				No	
8	ઈન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?				No	

Pr.No.	Practical
1	To determine the unknown frequency of Tuning Fork by Melde' s Experiment
2	To Study the Resonator and to determine unknown frequency of tuning fork.
3	To Calibrate a Spectrometer.
4	To study the CB Characteristic of Transistor.
5	To study the CE Characteristic of Transistor.
6	To study Half-Wave Rectifier.
7	To Study of a Transformer.
8	To study Characteristics of Photo diode.
9	To find the magnetic moment and pole strength of given magnets using deflection magneto meter.
10	To find the ratio of magnetic moments of two magnets using deflection magneto meter.



Reference Books:

1. B. Sc. Practical Physics by C. L. Arora Pub: S. Chand
2. A text of Practical Physics By Indu Prakash & Ramkrishna
3. Practical Physics by G. L. Gupta and V. Kumar Pub. Pragati Prakashan, Meerut
4. B. Saraf Physics through experiments Vol. I & II.



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Semester II

***This course is recommended for Biological & Chemical Sciences, Statistics.**

Course Category	Multi/Inter-Disciplinary Course-2 (MDC/IDC-2) (Elective)
Title of the Course	<u>Physics of Basic Waves and Semiconductors</u>
Course Credit	03
Teaching Hours per Semester	45
Total Marks	CCE-25 + SEE-50

Course Objectives

Students will be able to study

- 1) Waves and their types, Interference and superposition principle, along with laws governing the vibration of strings and various normal modes.
- 2) Sound waves and their velocities in various mediums, Newton's formula and Laplace's correction, application of Acoustic and Doppler effect.
- 3) To understand the fundamental physics of semiconductor and their different types
- 4) To construct semiconductor diode, its functions and their application
- 5) To understand basic principle, construction and working of different diodes

Course Outcomes - COs

Students will be able to understand/ get knowledge about

- 1) The features of a wave, categorizing distinctions in wave motion and understandings their corresponding laws.
- 2) Learning the speed of sound waves in different mediums, and their associated laws also application of various phenomena of sounds.
- 3) Basics of semiconductor physics, including different types of semiconductors
- 4) The characteristics of diodes and their application as rectifiers.
- 5) Fundamental of different diodes and their application's



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?			Yes		
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?			Yes		
3	Major	No	Minor	No		
	Skill Enhancement Courses	No	Ability Enhancement Courses	No		
	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	Yes	Multidisciplinary	Yes	Interdisciplinary	Yes
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?			Yes		
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?			Yes		
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?			No		
8	ઇન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?			No		

Unit No.	Topics	Hours	Marks
1	Transverse Waves: Wave motion, Transverse Wave Travelling in String, Velocity of a Wave in a String, Interference and the principle of Superposition, Standing waves on a String, Normal Modes of a String, Laws of Transverse Vibrations of a String, Numerical Examples.	9	10



2	Standing Waves: Standing Waves, Standing Waves on a String Fixed at Both Ends (Qualitative Discussion), Analytic Treatment of Vibration of a String Fixed at Both Ends, Vibration of a String Fixed at One End, Laws of Transverse Vibrations of a String: Sonometer, Transverse and Longitudinal Waves, Polarization of Waves	9	10
3	Sound waves and Its Applications: Speed of Sound Wave in a material medium, Speed of Sound in Gas- Newton's Formula and Laplace's Correction, Intensity and loudness of Sound Wave - Decibels, Beats, Musical Scale, Acoustics of Buildings, Application of Acoustic phenomena, Doppler Effect, Numerical Examples	9	10
4	Basic Semiconductor Components: Principle, Construction, Working and Applications of - Photo Diode, Varactor diode, Solar Cell, Photo transistor, LED, Advantages of LED, Multicolour LED, LDR, Tunnel Diode, Numerical Examples.	9	10



5	Transistor: Introduction, Junction Transistor Structure, The surprising Action of a Transistor, Working of Transistor, Amplifying Action of Transistor, Three Configuration, Transistor Characteristics, Comparison between the three configuration.	9	10
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Reference Books:

REFERENCE BOOKS for Unit 1,2,3:

1. Concept of physics By H C Verma part 1 Publisher: Bharati Bhawan
2. Sears and Zemansky's University Physics with modern physics By H D Young
Publisher: PEARSON

REFERENCE BOOKS for Unit 4, 5:

1. Basic Electronics and Linear circuits by D.C. Kulshrestha and N.N. Bhargava
2. Principles of electronics By V.K.Mehta& Rohit Mehta, Publisher: S.Chand
3. Basic Electronics By B.L.Thereja, Publisher : S.Chand.

Other Reference Books:

1. Electromagnetics by B. B. Laud, Publisher: Willey Eastern Limited.
2. Electricity and Magnetism By Edward M. Purcell, Publisher: McGraw-Hill
3. Electricity and Magnetism By J.H. Fewkes & J.Yarwood, Publisher: Oxford University Press



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Semester II

***This course is recommended for Biological & Chemical Sciences, Statistics.**

Course Category	Multi/Inter -Disciplinary Course-2 Practical (MDC/IDC-2) (Elective)
Title of the Course	Experimental Study in Physics 1
Course Credit	01
Teaching Hours per Semester	30
Total Marks	CCE-25

Course Objectives

The objectives of the course are as follows.

1. To make students aware of the basic Mechanical and Electrical Instruments
2. To enhance the basic skills of Performing experiment
3. The objective of this course is also to give students some basic introduction about accuracy of measurement and sources of errors, importance of significant figures.
4. To impart the skill of dealing with many electrical, electronic and mechanical equipment
5. To develop their working skill/ scientific temperament for performing experiment

Course Outcomes – Cos

1. Students will be able to know experimental techniques for Physics.
2. Students will get Hands on experience of different equipment.
3. Students will develop the following skills.
 - Fixing units, tabulation of observations, analysis of data (graphical/analytical).
 - Accuracy of measurement and sources of errors, importance of significant figures.
 - Knowledge of how g can be determined experimentally and derive satisfaction.
 - Knowledge of how various elastic moduli can be determined experimentally.
4. Students will be study practically the char. of simple diode and Zener diode.



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?				Yes	
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?				Yes	
3	Major	No	Minor	No		
	Skill Enhancement Courses	No	Ability Enhancement Courses	No		
	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	Yes	Multidisciplinary	Yes	Interdisciplinary	Yes
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?				Yes	
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?				Yes	
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?				No	
8	ઈન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?				No	

Pr.No.	Practical
1	To determine the unknown frequency of Tuning Fork by Melde' s Experiment
2	To Study the Resonator and to determine unknown frequency of tuning fork.
3	To Calibrate a Spectrometer.
4	To study the CB Characteristic of Transistor.
5	To study the CE Characteristic of Transistor.
6	To study Half-Wave Rectifier.
7	To Study of a Transformer.
8	To study Characteristics of Photo diode.
9	To find the magnetic moment and pole strength of given magnets using deflection magneto meter.
10	To find the ratio of magnetic moments of two magnets using deflection magneto meter.



Reference Books:

1. B. Sc. Practical Physics by C. L. Arora Pub: S. Chand
2. A text of Practical Physics By Indu Prakash & Ramkrishna
3. Practical Physics by G. L. Gupta and V. Kumar Pub. Pragati Prakashan, Meerut
4. B. Saraf Physics through experiments Vol. I & II.



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Semester II

Course Category	Skill Enhancement Course-2 (SEC-2)
Title of the Course	INTRODUCTION TO BASIC ELECTRONIC COMPONENTS AND CIRCUITS. DESIGNING AND CONSTRUCTING SOME SIMPLE ELECTRONIC APPLIANCES. INTRODUCTION TO BASIC OPTICAL PHENOMENA.
Course Credit	02
Teaching Hours per Semester	60
Total Marks	CCE-25 + SEE-25

Course Objectives

The objectives of the course are as follows.

1. To impart training in making the students aware of the difference of electrical and electronic components, their functions, their applications.
2. To introduce the students the Bread Boards and Printed Circuit Boards (PCBs). How to use them to construct the electronic circuit.
3. To impart training in how to develop a circuit on the PCB (Printed Circuit Board). How to mount the electronic components by soldering on PCBs.
4. The objective of this course is to make the students capable enough to construct simple devices such as mobile charge, Battery eliminators etc.

Course Outcomes – Cos

Students will enhance or develop the following skills at the end of the course.

1. They will learn the difference of electrical and electronic components, their functions, their applications.
2. They will learn about the Bread Boards and Printed Circuit Boards (PCBs). How to use them to construct the electronic circuit.



3. They will learn how to develop a circuit on the PCB (Printed Circuit Board). How to mount the electronic components by soldering on PCBs.
4. The students would become capable enough to construct simple devices such as mobile charge, Battery eliminators etc.

1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?				Yes	
2	Value added Courses Imparting Transferable and Life Skills નાગુણોધરાવે છે?				Yes	
3	Major	No	Minor		No	
	Skill Enhancement Courses	Yes	Ability Enhancement Courses		No	
	Value Added Courses	No	Exit/ Vocational Courses		No	
4	Holistic Education	Yes	Multidisciplinary	No	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસંગિક જોગવાઈ કરાયેલ છે ?				Yes	
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?				Yes	
7	Swayam પ્લેટફોર્મપરના MOOC વિષય પર આધારિત આ વિષય છે ?				No	
8	ઇન્ડિયન નોલેજ સીસ્ટમ (IKS) પરઆધારિત વિષય છે ?				No	



Unit No.	Topics	Hours	Marks
1	<ol style="list-style-type: none">1. Introduction to Semi-conductors. Introduction to Semi-conductor PN-Junction. PN-Junction Diode V-characteristics.2. Introduction to different types of semiconductor Diodes. (Zener Diode, Varactor Diode etc.). Methods of identification and testing of Diodes.3. Introduction to Bipolar Junction Transistors. Different configurations of BJT. The alpha and beta factors of BJT. Identification of different terminals of BJT. Testing of BJT4. BJT V-I characteristics in different configuration.5. Introduction to Printed Circuit Board and Breadboards. Types of PCBs. Concepts of mounting electrical and electronic components on PCB by soldering.6. Designing and constructing simple circuits Half wave rectifier, Full wave rectifier, Filtering circuits, Regulators etc.7. Determining the reflective index of rectangular glass slab and also measure the lateral displacement.8. Determining the focal length of concave mirror.9. Determining the reflective index and maximum deviation angle of a Prism.10. Determining the focal length of convex lens.	60	50

Reference Books:

Reference Books:

1. **BASIC ELECTRONICS AND LINEAR CIRCUITS**
 - N N BHARGVA, D C KULSHRESHTHA AND S C GUPTA, McGraw Hill Education (India) Private Limited.
2. **PRINCIPLES OF ELECTRONICS**
 - V K MEHTA AND ROHIT MEHTA, S CHAND PUBLICATION
3. **BASIC ELECTRONICS**
 - B. L. THERAJA,
 - S. CHAND PUBLICATION



Model for Skill Enhancement Course - Skill based Practical Course -2 Credit Course

CCE-50% (25 Marks) & SEE-50% (25 Marks)

Exam Pattern	Marks
Lab work assessment or Project based Assessment	10
Viva voce/Lab quiz	10
Attendance & Performance	05
Continuous and Comprehensive Evaluation	25
Semester-End Evaluation-THREE Exercise from Each Head- TWO hrs.	25