KURUKSHETRA UNIVERSITY
KURUKSHETRA

(Established by the State Legislature Act XII of 1956)
("A+" Grade NAAC Accredited)

Scheme of Examination for SEC (PHYSICS)

Under Multiple Entry-Exit, Internships and
CBCS-LOCF in accordance to NEP 2020
w.e.f. 2023-24 (in phased manner)

Kurukshetra University Kurukshetra

Scheme and Syllabus of Examination for Undergraduate programme

Scheme of Examination for SEC (PHYSICS)

Under Multiple Entry-Exit, Internships and
CBCS-LOCF in accordance to NEP 2020
w.e.f. 2023-24 (in phased manner)

Semester	Course Type	Course Code	Nomenclature of paper	Credits	Contact hours	Internal marks	End term Marks	Total Marks	Duration of exam (Hrs) T + P
2nd sem	SEC-2	B23-SEC-227	Physics Laboratory Skill Enhancement	2	2	15	35	50	3
			Practicum	1	2	5	20	25	3
3rd sem	SEC-3	B23-SEC-329	Basic Instrumentation Skills	2	2	15	35	50	3
			Practicum	1	2	5	20	25	3

Kurukshetra University Kurukshetra
Undergraduate Programs
Course: SEC-1

Session: 2023-24			
PartA - Introduction			
Subject	Physics		
Semester	1st		
Name of the Course	Physics Laboratory Skill Enhancement		
Course Code	B23-SEC-227		
CourseType: (CC/MCC/MDC/CC-M/ DSEC /VOC/DSE/PC/AEC/VAC)	SEC		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (ifany)	NA		
CourseLearningOutcomes(CLO):	After completing this course, the learner will be able to: 1. Learning measuring devices like Vernier callipers, Screw gauge, spherometer, micro-meter, travelling microscope and Sextant for measuring various length scales. 2. Developing mechanical skill such as casting, foundry, machining, forming and welding and will become familiar with common machine tools like lathe, shaper, drilling, milling, surface machines and Cutting tools. 3. Acquiring optical skills that will be helpful in healthcare and automobiles. 4. Obtain skills in the usage of multi-meters and electric measuring devices, soldering of electrical circuits, oscilloscopes, power supplies and relays.. 5. Learn to present observations, results, analysis and different concepts related to Physics Laboratory Skill		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4

Max. Marks:75 **Internal Assessment Marks:20** **End Term Exam Marks:55**	**Time:3hrs**

PartB-Contentsofthe Course

Instructions for Paper- Setter

1.Nine questions will be set in total.

2. Question no. 1 will be compulsory and based on the conceptual aspects of the entire syllabus. This question may have 4 parts and the answer should be in brief but not in Yes/No.

3. Four more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	**Units and Dimensions** – Physical quantities – fundamental (mass, length and time) and derived. Need of measurement, fundamental and derived units, system of units, measuring process. SI and CGS system of units, Measuring devices: Vernier calliper, Screw gauge, spherometer, micro-meter, spectrometer and travelling microscope. Measurement of the dimensions of a solid block, volume of a cylindrical beaker/glass, diameter of a thin wire, thickness of metal sheet, etc. Use of Sextant to measure height of buildings, mountains, etc.\	7
II	**Mechanical Skills:** Overview of manufacturing methods: casting, foundry, machining, forming and welding. Types of welding joints and welding defects. Concept of machine processing, introduction to common machine tools like lathe, shaper, drilling, milling and surface machines. Cutting tools, lubricating oils. Common materials used for manufacturing like steel, copper, iron, metal sheets, composites and alloy and wood.	8
III	**Optical Skills:** Optical devices – mirrors, lenses, prism, grating, telescope, microscope and polarimeter, their theory viz. focal length, refractive index, dispersive power and resolving power etc., applications of optical devices in automobiles and healthcare, basics of an optical camera.	7
IV	**Electrical and Electronic Skills:** Idea of passive electrical components - resistor, capacitor and inductor and active electronic components – diode, transistor and ICs, Use of ammeter, voltmeter, galvanometer and multi-meter. Soldering of electrical circuits having discrete components R, L, C, diode, transistor and ICs on PCB. Operation of cathode ray oscilloscope. Making regulated power supply. Timer circuit, electronic switch using transistor and relay.	8
	Practicum 1. Comparison of diameter of a thin wire using screw gauge and travelling microscope. 2. To find the height/area of a distant object using sextant. 3. To find radius of curvature of a curved surface. 4. To identify various parts of a spectrometer.	30

	5. To find the least count of a spectrometer. 6. Drilling of hole in metal, wood and plastic. 7. Cutting of metal sheets. 8. Cutting of glass sheets. 9. To find the power of a concave/convex mirror. 10. To find the power of a concave/convex lens. 11. To find the resolving power of a telescope. 12. To study the V-I characteristic of a resistor. 13. To study V-I characteristic of a diode. 14. To study a regulated power supply. **Note: Student will perform at least six experiments. The examiner will allot one practical at the time of end term examination.**	

SuggestedEvaluationMethods

InternalAssessment: ➢ **Theory (15 Marks)** • Class Participation: **04 Marks** • Seminar/presentation/assignment/quiz/class test etc.: **04 Marks** • Mid-Term Exam: **7 Marks** ➢ **Practicum (5 Marks)** • Class Participation: **Nil** • Seminar/Demonstration/Viva-voce/Lab records etc.: **5 Marks** • Mid-Term Exam: **Nil**	**End Term Examination : 35 Marks** **: 20 Marks**

PartC-Learning Resources

Recommended Books/e-resources/LMS:

1. A text book in Electrical Technology - B L Theraja, S. Chand and Company.
2. Performance and design of AC machines M.G. Say, ELBS Edn.
3. Mechanical workshop practice, K.C. John, 2010, PHI Learning Pvt. Ltd.
4. Optical Physics, A. Lipson, S.G. Lipson, H. Lipson, 4th Edn., 1996, Cambridge Univ. Press
5. Workshop Processes, Practices and Materials, Bruce J Black 2005, 3rd Edn., Editor Newnes [ISBN: 0750660732]
6. New Engineering Technology, Lawrence Smyth/Liam Hennessy, The Educational Company of Ireland [ISBN0861674480].

Kurukshetra University Kurukshetra
Undergraduate Programs
Course: SEC-3

Session: 2023-24			
PartA - Introduction			
Subject	Physics		
Semester	2nd		
Name of the Course	**Basic Instrumentation Skills**		
Course Code	B23-SEC-329		
CourseType: (CC/MCC/MDC/CC-M/ DSEC /VOC/DSE/PC/AEC/VAC)	SEC		
Level of the course (As per Annexure-I	100-199		
Pre-requisite for the course (ifany)	NA		
CourseLearningOutcomes(CLO):	After completing this course, the learner will be able to: 1. Understand the necessary working knowledge on accuracy, precision, resolution, range and errors/uncertainty in measurements. 2. Explanation of the specifications of CRO and their significance. 3. Understandthe Signal and pulse Generators and impedance Bridges. 4. Learn about the basics of digital instruments. 5. Understand the observations, results, analysis and different concepts related to basic instruments.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Max. Marks:75 **Internal Assessment Marks:20** **End Term Exam Marks:55**		**Time:3hrs**	

Part B-Contents of the Course

Instructions for Paper- Setter

1.Nine questions will be set in total.

2. Question no. 1 will be compulsory and based on the conceptual aspects of the entire syllabus. This question may have 4 parts and the answer should be in brief but not in Yes/No.

3. Four more questions are to be attempted, selecting one question out of two questions set from each unit. Each question may contain two or more parts. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	**Basic of Measurements**: Instruments accuracy, precision, sensitivity, resolution range, etc. Errors in measurements and loading effects. Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance. **Electronic Voltmeter**: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principle of voltage measurement (block diagram only). Specifications of an electronic Voltmeter and their significance. AC millivoltmeter: Types of AC millivoltmeters. Block diagram of ac millivoltmeter, specifications and their significance.	8
II	**Oscilloscope**: Block diagram of basic CRO. CRT, electrostatic focusing and acceleration (Explanation only no mathematical treatment), brief discussion on screen phosphor, visual persistence. Time base operation, synchronization. Front panel controls. Specifications of CRO and their significance. **Use of CRO:** for the measurement of voltage (dc and ac) and frequency and time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digitalstorage Oscilloscope: principle of working	9
III	**Signal and pulse Generators:** Block diagram, explanation and specifications of low frequency signal generator and pulse generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis. **Impedance Bridges:** Block diagram of bridge. working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge. Block diagram and working principles of a Q- Meter. Digital LCR bridges.	7
IV	**Digital Instruments:** Comparison of analog & digital instruments. Characteristics of a digital meter. Working principle of digital voltmeter. **Digital Multimeter:** Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.	6

	Practicum 1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance. 2. To observe the limitations of a multimeter for measuring high frequency voltage and currents. 3. To measure Q of a coil and its dependence on frequency, using a Q- meter. 4. Measurement of voltage, frequency, time period and phase difference using Oscilloscope. 5. Measurement of time period, frequency, average period using universal counter/frequency counter. 6. Measurement of rise, fall and delay times using an Oscilloscope. 7. Measurement of distortion of a RF signal generator using distortion factor meter. 8. Measurement of R, L and C using a LCR bridge/ universal bridge **Note: Student will perform at least six experiments. The examiner will allot one practical at the time of end term examination.**	30
SuggestedEvaluationMethods		
InternalAssessment: ➢ **Theory (15 Marks)** • Class Participation: **04 Marks** • Seminar/presentation/assignment/quiz/class test etc.: **04 Marks** • Mid-Term Exam: **7 Marks** ➢ **Practicum (05 Marks)** • Class Participation: **Nil** • Seminar/Demonstration/Viva-voce/Lab records etc.: **05 Marks** • Mid-Term Exam: **Nil**		**End Term Examination : 35 Marks** **20 Marks**
PartC-Learning Resources		
Recommended Books/e-resources/LMS: **1.** Logic circuit design, Shimon P. Vingron, 2012, Springer. **2.** Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning. **3.** Electronic Devices and circuits, S. Salivahanan& N. S.Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill. **4.** Digital Circuits and Systems, Venugopal, 2011, Tata McGraw Hill. **5.** Electronic Instrumentation, H.S. Kalsi, 3rd Ed. Tata McGraw Hill. **6.** A text book in Electrical Technology - B L Theraja - S Chand and Co. **7.** Performance and design of AC machines - M G Say ELBS Edn.		