

**GOVT. HOLKAR (MODEL AUTONOMOUS)
SCIENCE COLLEGE, INDORE**



(An ISO 9001:2015 & ISO 14001:2015 Certified Institution)



SSR DOCUMENT

2017-18 TO 2021-22

CRITERION – 5

Student Support and Progression

Metric No. : 5.1.2

Document Title:
Sample of structured course content

Part- A: Introduction for Code

Govt. Holkar (Model, Autonomous) Science College, Indore	
Department of Forensic Science	
SYLLABUS SESSION- 2021-2022	
M.Sc. – 1 st SEMESTER	
Title of the Paper (Course): Forensic Science and Criminal Justice System Course Code: FS-11	
Course Objective	
1: To know basic principle & understanding of forensic science and criminal justice system 2: To know understanding of crime scene management.	
Course Outcomes - After completion of this paper students will come to -	
C01	Explain Fundamental principle and scope of forensic science
C02	Identify the importance and effects of preserving the crime scene
C03	Summarize the various theories of crime.
C04	Recognize the different sections of IEA, IPC and CRPC
C05	Describe relationship between courts, forensic science and police.
Part B: Content of Course	
Unit 1	Introduction to Forensic Science: Forensic Science: Definition, Nature and Scope, Basic principles and its significance, Development of Forensic Science in India and abroad, Functions, Responsibilities and ethics of Forensic Scientist, Organizational structure of Forensic Science Laboratories at Central & State levels, Ethics in Forensic Science Institutions in India.
Unit 2	Crime: Definition, Types, Theories of Causation of Crime- Pre-classical and Neo-classical, Constitutional, geographic, economic, psychological and sociological, Multiple Causation approach, General Factors of Crime and forms of punishment in brief, causes prevention and characteristics of criminals. Criminal Justice System: Police Organization at District, State and Central Level. Organization of courts in India. Jurisdiction of Court in criminal cases, prosecution, FIR, Case Diary, Roznamacha Report Writing and Evidence Evaluation: Report formats of crime scene and laboratory findings. Court Testimony: Admissibility of expert testimony, pro court preparation & Court appearance, examination in-chief & re-examination, cross-examination.
Unit 3	Crime Scene Management and Evidences: Scene of Crime: Classification, protection of scene of crime, preservation of scene of crime – photography, videography and sketching method, Response to Special Crime scene (Man-made and natural). Legal and Human Consideration during investigations. Evidences: Meaning, Types, Searching Methods, Chain of Custody
Unit 4	Collection, Preservation, Packing and Forwarding of Evidences: Collection, preservation, packing and forwarding from scene of crime, Victim and deceased body in cases of Homicide Investigation, Death due to burning, Rape and Sexual offences, Hanging (Suicidal, Homicidal and Accidental), Drowning, Human Remains, Human Poisoning (Fetal and Survival), Death by

	Firearms, Firearm exhibits, Forged, Torn and Charred Documents, Bank Notes, Capturing of Volatile evidences in computer fraud and Cyber Crime, audio and video CCTV Footage, Transportation of Digital Evidences, Blood, Semen and other biological Stains, tissues, Viscera, Hair& Fibre, Glass, Soil and Dust, Petroleum product, Latent Fingerprint, Drug and Poisons, Metals
Unit 5	<p>Indian Penal Code: Introduction, general exceptions, offences against person, offences against property, Attempt to suicide, Sexual offences.</p> <p>Criminal Procedure Code: Introduction and General idea of sections: 291-93, 154,155,156,157,158,159,160,161,162,172,173,174,175 and 176.</p> <p>Indian Evidence Act: Introduction and General idea of sections: 32,45, 46,47,57,58,60,73,135,136,137, and 159.</p> <p>Juvenile Delinquency: Brief Introduction: Juvenile Justice Act, 2000, POCSO Act, 2019, Child and Adolescent Labor Act, 1986, Case Studies.</p>

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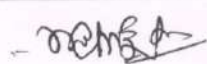
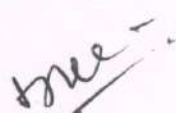
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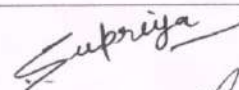
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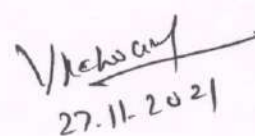
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Part C: Learning Resources

1. Saferstein: Criminalistics – An Introduction to Forensic Science, Prentice Hall Inc. USA (1995).
2. C.G.G. Aitken and D.A. Stoney: The use of statistics in Forensic Science, Ellis Harwood Limited, England (1991)
3. James, H.S. and Nordby, J.J.; Forensic Science; an Introduction to scientific and Investigative Techniques, CRC press, USA (2003)
4. O'Hara & Osterberg: An introduction to Criminalistics.
5. Forest: Forensic Science, An Introduction.
6. Lee, Honry: Advance in Forensic Science.
7. Sharma J.D. Vidhivigyan Avem Vish Vigya.
8. Sharma J.D. Apradho ka Vigyanic Anveshan.
9. Sharma B.R. Forensic Science in Criminal Investigation and trials.
10. Mordby, J. Deed Reckoning – The Art of forensic Science detection, CRC press LLC, Boca Raton FL, CRC press (2000)
11. Ram Ahuja: criminology, Rewal Publ. Jabalpur (2000).
12. Indian Penal Code
13. Criminal Procedure Code
14. Indian Evidence Act.



27.11.2021



Part D – Assessment and Evaluation		
Suggested Continuous Evaluation Methods: By Presentation, PPT, By Test, By written Exam		
Maximum Marks: 100		
Continuous Comprehensive Evaluation (CCE): 25 External Exam (EE): 75		
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 25	Class Test Assignment/Presentation	25
External Assessment: External Exam: 75 Time: 3 hours	75	75
		100

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Part A: Introduction for Code:

Govt. Holkar (Model, Autonomous) Science College, Indore		
Department of Forensic Science		
SYLLABUS SESSION – 2021-2022		
M.Sc. – 1st SEMESTER		
Title of the Paper (Course):	Forensic Medicine	Course Code: FS-12
Course Objective		
1: To understand the basic concept of forensic medicine and legal procedures.		
2: To have knowledge of personal identity traits, post-mortem examination, injuries and different modes of death.		
Course Outcomes - After completion of this paper students will come to-		
C01	Describe the Forensic medicine and legal procedures of court.	
C02	Link the parameters to fix personal identity.	
C03	Relate the post-mortem changes & their medico legal importance.	
C04	Interpret the death and its Medico-legal Aspect	
C05	Illustrate Post-mortem examination and sexual offences.	

Part B: Content of the Course

Unit 1	Forensic Medicine: Definition of Forensic Medicine and Medical Jurisprudence, Brief knowledge about legal procedure in court, inquest, Subpoena & oath of medical expert, Criminal court and their powers Recording of medical expert evidence in courts. Professional Negligence, Types of medical evidence, Kinds of witness and rules for giving evidence.
Unit 2	Personal Identity: Definition and importance, parameters contributing to personal identity- Race, Sex, Age, Complexion, Features & Photographs, Anthropometry, Stature, Scar, Hair, Teeth, Wounds, Foetal Age, Bite Marks, Fingerprints, Footprints, Tattoo marks, Birth marks, Occupational Marks, Handwriting, Clothes and Ornaments, Voice & Speech, DNA, Disputed paternity.
Unit 3	Wounds & Injuries: Introduction, its types, Mechanical Injury- Abrasion, Contusion, Laceration, Incised wound, Stab, Self-inflicted and fabricated, Firearm Injury, Bomb explosion wounds. Regional Injuries: Head Injury, Skull, Traffic Accident, Air craft, Boxing, Railway, Mass-Disasters. Medico-Legal aspects, post mortem & ante mortem wounds: General characteristics of injuries from cold, heat, burns, scalds, lightning, electricity and radiation, Forensic Importance of Wounds.
Unit 4	Death and its Medico- legal aspects: Modes of death (Coma, Syncope, Asphyxia), Sudden death, Post – Mortem Changes: Cessation of vital functions, Changes in the Eyes, Skin and muscles. Temperature, post- mortem lividity, Rigor mortis,

	Decomposition, Adipocere, Mummification, Post-mortem Interval, Estimation time since death. Mechanical Asphyxia: Hanging and its types, Ligature marks and its examination, Strangulation, Bansadola, Garroting, Mugging, Suffocation, Gagging, Choking and Café coronary. Traumatic Asphyxia: Burking, Postural Asphyxia, Sexual Asphyxia, Drowning (Ante Mortem and Post Mortem)
Unit 5	Post-Mortem Examination: Importance, external & Internal examination in brief, Viscera & its preservation, Examination of decomposed and mutilated bodies, Exhumation, Cause of death Sexual Offences: Sexual offences, Virginity and Pregnancy

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Part C : Learning Resources:

1. Modi J. S. : Medical Jurisprudence and Toxicology.
2. Taylor : Medical Jurisprudence
3. Parikh C.K. : Chikitsa Nyaya Shastra Aur Vish Vigyan.
4. Kieth Simpsen & Bernard Knight : Forensic Medicine
5. Poison : CJ, DJ, Gee, B. Knight : Forensic Medicine
6. Reddy : Forensic Medicine

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Part D – Assessment and Evaluation		
Suggested Continuous Evaluation Methods: By Presentation, PPT, By Test, By written Exam Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 25 External Exam (EE): 75		
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 25	Class Test Assignment/Presentation	25
External Assessment: External Exam: 75 Time: 3 hours	75	75
		100

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Govt. Holkar (Model, Autonomous) Science College, Indore

**Department of Electronics
Syllabus Session 2021-22**

Class: B.Sc. I Sem
Subject: Electronics

Marks: 75 + (CCE) 25 = 100
Credit: 4

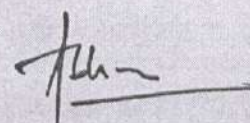
Paper: Core (Major) I
Title of Paper: Semiconductor Devices

Code of the Paper: C108-1

Part A: Introduction		
1	Pre-requisite (if any)	To study this course, a student must have had the subject Science in class 12 th . इस पाठ्यक्रम का अध्ययन करने के लिए विद्यार्थियों को 12 वी कक्षा में विज्ञान विषय का होना आवश्यक है। This course can be opted as an elective by the student of following subjects: NA
2	Course Objectives	To know the basic knowledge of semiconducting material and devices
	Course Learning Outcomes	1: Analyze the behavior of semiconductor materials अर्धचालक पदार्थों के व्यवहार का वर्णन करना। 2: Reproduce the I-V characteristics of diode/ BJT/MOSFET devices डायोड/BJT/ मॉसफेट युक्तियों का I-V अभिलाक्षणिक आरेखित करना 3: Apply standard devices models to explain/ calculate critical internal parameters of semi-conductor devices. अर्धचालक युक्तियों पर मानक युक्ति मॉडल को प्रदान कर वर्णित करना तथा उनके महत्वपूर्ण मापदंडों का पता करना। 4: Categorize the behavior and characteristics of power devices, such as, SCR/UJT, etc. पावर यक्तियाँ जैसे SCR/UJT आदि के व्यवहार तथा अभिलाक्षणिक का वर्णन करना।
Part B-Content of the Course		
भाग ब - पाठ्यक्रम की विषयवस्तु		
Total No. of Lectures-Tutorials-Practical (in hours per week):60 L-T-P: 2-0-0		
व्याख्यान- टयटोरियल -प्रायोगिक कक्षाओं की कुल संख्या (प्रति सप्ताह घंटे) : 60 L-T-P: 2-0-0		
Unit	Topics	No. of Lectures
1	Semiconductor Basics: Introduction to Semiconductor Materials, Crystal Structure, Planes and Miller Indices, Energy Band in Solids, Concept of Effective Mass, Density of States. Carrier Concentration at Normal Equilibrium in Intrinsic Semiconductors. Derivation of Fermi Level for Intrinsic & Extrinsic Semiconductors, Donors, Acceptors, Dependence of Fermi Level on Temperature and Doping Concentration, Temperature Dependence of Carrier Concentrations. Carrier Transport Phenomena: Carrier Drift, Mobility, Resistivity, Hall Effect, Diffusion Process, Einstein Relation, Current Density Equation, Carrier Injection, Generation and Recombination Processes, Continuity Equation.	14

SESSION 2021 - 22


विभागाध्यक्ष
इलेक्ट्रॉनिक्स विभाग
डा. होलकर विज्ञान महाविद्यालय

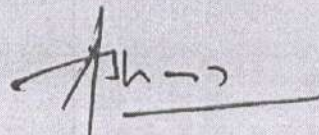


	<p>सेमीकंडक्टर आधारभूत: सेमीकंडक्टर मैटेरियल्स का परिचय, क्रिस्टल स्ट्रक्चर, प्लेन और मिलर इंडेक्स, ठोस में ऊर्जा बैंड, प्रभावी द्रव्यमान की अवधारणा, सघनता की अवस्था। आंतरिक अर्धचालकों में सामान्य साम्यावस्था पर वाहक सांद्रता। अर्धचालकों में आंतरिक और बाह्य के लिए फर्मी स्तर की व्युत्पत्ति। दाता, ग्राही। तापमान और डोपिंग पर फर्मी स्तर की निर्भरता, वाहक सांद्रता की तापमान निर्भरता। वाहक परिवहन घटना : वाहक ड्रिफ्ट, विचलता, प्रतिरोधकता, हॉल प्रभाव, विसरण क्रिया, आइंस्टीन संबंध, धारा सघनता समीकरण, वाहक अन्तःक्षेपण, जनरेशन तथा रेकॉम्बिनेशन की अवधारणा, सातत्य</p>	
2	<p>P-N Junction Diode: Formation of Depletion Layer, Space Charge at a junction, Derivation of Electrostatic Potential Difference at Thermal Equilibrium, Depletion Width and Depletion Capacitance of an Abrupt junction. Concept of Linearly Graded junction, Derivation of Diode Equation, and I-V Characteristics, Zener Diode, Zener and Avalanche junction Breakdown Mechanism. LED, Tunnel diode, Varactor diode, Solar cell, Schottky Diode: working, circuit symbol, characteristics and applications.</p> <p>पीएन संधि डायोड: PN संधि डायोड अवक्षय परत का निर्माण, संधि पर स्पेस चार्ज, तापीय साम्यावस्था पर इलेक्ट्रोस्टैटिक विभवान्तर के सूत्र व्युत्पत्ति, अब्रुप्ट जंक्शन कि अवक्षय चौड़ाई तथा अवक्षय संधारित्र, रेखीय ग्रेडेड संधि की अवधारणा, डायोड समीकरण की व्युत्पत्ति तथा धारा-विभव अभिलाक्षणिक, जेनर डायोड, जेनर तथा ऐवेलॉन्ची भंजन, LED, टनल डायोड, वैरेक्टर डायोड, सोलर सेल, शॉर्टकी डायोड: प्रतीक, कार्यविधि, अभिलाक्षणिक तथा अनुप्रयोग.</p>	14
3.	<p>Bipolar Junction Transistors (BJT): PNP and NPN Transistors, Basic Transistor Action, Emitter Efficiency, Base Transport Factor, Current Gain, Energy Band Diagram of Transistor in Thermal Equilibrium, Quantitative Analysis of Static Characteristics (Minority Carrier Distribution and Terminal Currents). Base-Width Modulation, Modes of operation, Input and Output Characteristics of CB, CE and CC Configurations. Metal Semiconductor Junctions: Ohmic and Rectifying Contacts.</p> <p>द्विध्रुवी जंक्शन ट्रांजिस्टर (BJT): PNP और NPN ट्रांजिस्टर, ट्रांजिस्टर की क्रिया की अवधारणा, उत्सर्जक दक्षता, आधार ट्रांसपोर्ट गुणांक, धारा लाभ, तापीय साम्यावस्था में ट्रांजिस्टर का ऊर्जा बैंड चित्र, स्थैतिक विशेषताओं मात्रात्मक विश्लेषण (अल्पसंख्याक आवेश वाहकों का वितरण तथा टर्मिनल धारा), बेस विड्थ माइग्रेशन, कार्यप्रणाली, उभयनिष्ठ आधार, उभयनिष्ठ उत्सर्जक, उभयनिष्ठ संग्राहक अभिविन्यासों की इनपुट तथा आउटपुट अभिलाक्षणिक, धातु अर्धचालक संधि: ओमिक तथा रेक्टिफाइंग कॉन्टैक्ट्स।</p>	14
4	<p>Field Effects Transistors: JEET, Construction, Idea of Channel Formation, Pinch-OFF and Saturation Voltage, Current-Voltage Output Characteristics. MOSFET, type of MOSFETs, Circuit Symbols, Working and Characteristic curves of Depletion type MOSFET (both N channel and P channel). Complimentary MOS (CMOS).</p>	18

<p>Power Devices: UJT: Basic construction and working, Equivalent circuit, intrinsic Standoff Ratio, Characteristics and relaxation oscillator-expression.</p> <p>SCR: Construction, Working and Characteristics, Triac, Diac, IGBT, MESFET: circuit symbols, basic constructional features, operation and application.</p> <p>क्षेत्र प्रभाव ट्रांजिस्टर : JFET, संरचना, चैनल निर्माण की अवधारणा, पिंच-ऑफ तथा संतृप्ति विभव, धारा विभव आउटपुट अभिलाक्षणिक। MOSFET, MOSFETs के प्रकार। परिपथ प्रतीक, डिप्लेशन टाइप MOSFET (N चैनल तथा P चैनल) तथा एन्हांस्मेंट टाइप MOSFET (N चैनल तथा P चैनल) की किर्याविधि तथा अभिलाक्षणिक। कॉम्प्लीमेंट्री MOS (CMOS).</p> <p>पॉवर युक्तियाँ: UJT: आधारभूत संरचना तथा किर्याविधि, समतुल्य परिपथ, इंट्रिंसिक स्टैंडऑफ अनुपात, रिलेक्सेशन दोलित्र का समीकरण तथा अभिलाक्षणिक।</p> <p>SCR: संरचना, किर्याविधि तथा अभिलाक्षणिक, Triac, Diac, IGBT, MESFET: परिपथ, प्रतीक, आधारभूत संरचना, किर्याविधि तथा अनुप्रयोग।</p>		
Keywords/Tags:		
<p align="center">Part C-Learning Resources भाग स - अनशसित अध्ययन संसाधन</p>		
<p>Text Books, Reference Books, Other resources पाठ्य पुस्तकें, संदर्भ पुस्तकें, अन्य संसाधन</p>		
<p>Suggested Readings: अनशसित सहायक पुस्तकें / ग्रन्थ/अन्य पाठ्य संसाधन/पाठ्य सामग्री</p> <ol style="list-style-type: none"> 1. Malvino A.P., <i>Electronic Principles</i>, Tata Me Graw Hill pub, 7th Ed., 2017 2. Mehta V.K., <i>Principles of Electronics</i>, S. Chand & Co, 2007 3. S.M. Sze, <i>Physics of Semiconductor Devices: Physics and Technology</i>, 2nd Edition, Wiley India edition, 2008. <p>2 Suggestive digital platforms web links अनुशसित डिजिटल प्लेटफॉर्म वेब लिंक National Digital Library: https://ndl.iitkgp.ac.in/</p> <p>Suggested equivalent online courses:</p> <ol style="list-style-type: none"> 1. https://www.coursera.org/ 2. Lectures: MIT open courseware, MIT Course Number 6.012 https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-012-microelectronic-devices-and-circuits-fall-2009/lecture-notes/ 3. NPTEL E-Learning Courses: https://npTEL.ac.in/courses/117/102/117102061/ 		
<p align="center">Part D- Assessment and Evaluation भाग द - अनशसित मूल्यांकन विधियाँ</p>		
<p>Suggested Continuous Evaluation Methods: अनुशसित सतत मूल्यांकन विधियाँ: Maximum Marks:100, अधिकतम अंक :100 Continuous Comprehensive Evaluation (CCE) : 25marks सतत व्यापक मूल्यांकन) CCE) अंक : 25</p>		
<p align="right">End Term Exam (ETE) : 75marks मुख्य सिद्धांत परीक्षा(ETE) अंक : 75</p>		
Internal Assessment:	Class Test Assignment/Presentation	
आंतरिक मूल्यांकन :		15 -

Continuous Comprehensive Evaluation (CCE):25 सतत व्यापक मल्यांकन) CCE):		10 =25
External Assessment: आकलन University Exam Section :75 Time: 02.00 Hours विश्वविद्यालय परीक्षा 75 समय 02: 00 घंटे	Section(A): Three Very Short Question (50 Words Each) (अनुभाग-अ): तीन अति लघु प्रश्न (प्रत्येक 50 शब्द) Section (B): Four Short Questions (200 Words Each) (अनुभाग-ब): चार लघु प्रश्न (प्रत्येक 200 शब्द) Section(C): Two Long Questions (500 Word Each) (अनुभाग-स): दो दीर्घ उत्तरीय प्रश्न (प्रत्येक 500 शब्द)	03 x 03 = 9 04 x 09 =36 02 x 15 = 30 Total 75
Any remarks/ suggestions:		


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 मा. होलकर विद्यालय महाविद्यालय
 इन्दौर



Govt. Holkar (Model, Autonomous) Science College, Indore

Department of Electronics

Syllabus Session 2021-22

Class: B.Sc. I Sem

Subject: Electronics

Paper: Practical (Major)

Title of Paper: Semiconductor Devices Laboratory

Marks: 75 + (CCE) 25 = 100

Credit: 2

Code of the Paper: P1

Part A Introduction		
1	Pre-requisite (if any)	To study this course, a student must have had the subject Science in class 12th इस पाठ्यक्रम का अध्ययन करने के लिए विद्यार्थियों को 12 वी कक्षा में विज्ञान विषय का होना आवश्यक है। And have opted SI-ELEC2G. This course can be opted as an elective by the students of following subjects.
2	Course Objectives	To understand practical behavior of Semiconductor Devices.
	Course Learning Outcomes	On completion of this course , learners will be able to:
		1. Examine the characteristics of basic semiconductor devices. आधारभूत अर्धचालक युक्तिओं के अभिलाक्षणिक की जांच करना।
		2. Perform experiments for studying the behavior of semiconductor devices for circuit design applications. सर्किट डिजाइन अनुप्रयोगों के लिए, अर्धचालक उपकरणों के व्यवहार का अध्ययन करने के लिए प्रयोग करना।
		3. Calculate various device parameters values from their I-V characteristics. I-V अभिलाक्षणिक माध्यम से युक्तिओं के विभिन्न मापदण्डों के मानों को परिकलित करना।
		4. Interpret the experimental data for better understanding the device behavior युक्तियों के व्यवहार को सुव्यवस्थित तरीके से समझने के लिए प्रयोगात्मक डेटा की व्याख्या करना।
Part B- Content of the Course		
Total No. of Lectures- Tutorials- Practical (in hours per week) : 60		L-T-P: 0-0-2
Unit	Topics	No. of Lectures
1	1. Study of the I-V Characteristics of Diode – Ordinary and Zener Diode. 2. Study of I-V Characteristics of LED. 3. Study of the I-V Characteristics of the CE configuration of BJT and obtain r_i , r_o , β . 4. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r_i , r_o , α .	60

SESSION 2021 - 22

विभागाध्यक्ष

इलेक्ट्रॉनिक्स विभाग

जी. होल्कर विज्ञान महाविद्यालय

5. Study of the I-V Characteristics of the Common Collector Configuration of BJT and obtain voltage gain, r_i and r_o ,	
6. Study of the I-V Characteristics of the UJT.	
7. Study of the I-V Characteristics of the SCR	
8. Study of the I-V Characteristics of the JFET.	
9. Study of the I-V Characteristics of the MOSFET.	
10. Study of Characteristics of Solar Cell	
11. Study of Hall Effect.	

Keywords/Tags:

Part C-Learning Resources

भाग स - अनुशंसित अध्ययन संसाधन

Text Books, Reference Books, Other resources

पाठ्य पुस्तकें, संदर्भ पुस्तकें, अन्य संसाधन

Suggested Readings:

अनुशंसित सहायक पुस्तकें / ग्रन्थ/अन्य पाठ्य संसाधन/पाठ्य सामग्री

1. S P Chandra, B shashikala, Electronics Laboratory Primer, S. Chand & Co. 2008

2. Harnam Singh, P.S. Hemne, Practical Physics, S Chand & Co, 2000

Suggestive digital platforms web links

अनुशंसित डिजिटल प्लेटफॉर्म वेब लिंक

National Digital Library: <https://ndl.iitkgp.ac.in/>

Suggested equivalent online courses:

अनुशंसित समकक्ष ऑनलाइन पाठ्यक्रम:

Virtual Lab: <http://vlabs.iitkgp.ac.in/be/>

Part D-Assessment and Evaluation

भाग द - अनुशंसित मूल्यांकन विधियां

Suggested Continuous Evaluation Methods: अनुशंसित सतत मूल्यांकन विधियाँ:

Internal Assessment आंतरिक मूल्यांकन	Marks अंक	External Assessment बाह्य मूल्यांकन	Marks अंक
Class Interaction/ Quiz कक्षा में संवाद/प्रश्नोत्तरी	10	Viva Voce on Practical प्रायोगिक मौखिक वायवा	15
Attendance उपस्थिति	5	Practical Record File प्रायोगिक रिकार्ड फाइल	10
Assignments (Charts/Model Seminar/ Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey/ Industrial visit) असाइनमेंट (चार्ट/मॉडल/सेमिनार /ग्रामीण सेवा/प्रौद्योगिकी प्रसार/भ्रमण/ प्रयोगशाला भ्रमण/ औद्योगिक यात्रा)	10	Table work/ Experiments टेबल वर्क/प्रयोग	50
Total	25		75

विद्ययाध्यक्ष

इलेक्ट्रॉनिक्स विभाग

आ. विभाग, विद्यापीठ महाराष्ट्र

SESSION 2021 - 22

Govt. Holkar (Model Autonomous) Science College, Indore
Department of Physics
Syllabus Session 2021-22

Class - M.Sc. Semester - I

Marks 75+25 (CCE) =100

Subject - Physics

Min. Marks= 26+9=35

Title of the Paper - Classical Mechanics

Paper Code - PH12

Paper -Core 2

Credits- 4

Part - A

Introduction for Code - PH12

SUBJECT : PHYSICS (CLASSICAL MECHANICS)

Pre-requisite (if any)	B.Sc. with Physics as one of the Subject
Course Objectives	To impart knowledge about various fundamentals of classical mechanics to study Physics problems
Course Learning Outcomes (CLO)	<p>After the completion of the course student will be able to understand :</p> <ol style="list-style-type: none"> 1. To optimize the variables and learn how symmetries lead to constant of motion. 2. The equivalence between Newtonian mechanic, Lagrangian, Hamiltonian, mechanic and Poisson's Brackets 3. To know the method of contour integration to evaluate definite integrals of varying complexity 4. Theory of small oscillations in coupled system.

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
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Department of Physics
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
Part B : Contents of the Course


UNIT-I	Newtonian mechanics of one and many particles systems: Conservation laws, Constraints their classification, Principle of virtual work; D'Ambert's Principle in generalized coordinates, The Lagrange's equation from D'Ambert's Principle. Configuration space, Hamilton's principle deduction from D'Ambert's principle, Generalized moment and Lagrangian formulation of the conservation theorems, Reduction to the equivalent one body problem; the equation of motion and first integrals, the differential equation for the orbit.
UNIT-II	The equations of canonical transformation and generating functions; The Hamilton-Jacobi, Action and Angle variables. Poisson's brackets; simple algebraic properties of Poisson's brackets. The equation of motion in Poisson's Brackets notation. Poisson theorem; Principle of least action. The Kepler problem, Inverse central force field, Rutherford scattering.
UNIT-III	Theory of small oscillations, Equations of motion, Eigen frequencies and general motion, normal modes and coordinates, Applications to coupled pendulum and linear bistable molecule. Rotating coordinate systems. Acceleration in rotating frames. Coriolis force and its terrestrial astronomical applications, Elementary treatment of Eulerian coordinates and transformation matrices. Angular momentum, inertia tensor. Euler equations of motion for a rigid body. Torque free motion for a rigid body.
UNIT-IV	Symmetries of space and time. Invariance under Galilean transformation, Covariant four dimensional formulations, 4 - Vectors and 4 - scalars. Relativistic generalization of Newton's laws, 4-momentum and 4 - force, Invariance under Lorentz transformation relativistic mechanics. Covariant Lagrangian, covariant Hamiltonian, Examples.
UNIT-V	This unit will have a short note question covering all the four units. The students will have to answer any two questions out of the four.



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Syllabus Session 2021-22

Part C :-Learning Resources

Suggested Readings.

1. H.Goldstein (Addison Wesley)-Classical Mechanics
2. N.C.Rana&P.S.Jog-Classical Mechanics
3. Landu&Lifshitz(Pergamann Press)-Classical Mechanics
4. A. Sommarfield(Academic Press)-Classical Mechanics
5. R.G.Takwale& P.S. Puranik-Introduction to Classical Mechanics

Part D

Assessment and Evaluation – PH12

Suggested Continuous Evaluation Method


Max. Marks = 100


Continuous Comprehensive Evaluation (CCE) = 25 Marks

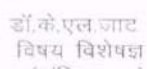
Autonomous College Semester end Examination = 75 Marks

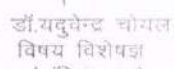
Internal Assessment :	Class Test	Marks Distribution
Continuous Comprehensive Evaluation (CCE):25	CCE-I	12.5
	CCE-II	12.5
		Total= 25Marks
External Assessment:	Question Paper Based	Marks Distribution
Autonomous College Exam : 75 Marks Time : 3 Hrs	One Question from each unit with 100% Internal choice	15×5 = 75 Marks
		Total = 75 Marks


Any Remarks/ Suggestion :


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Govt. Holkar (Model Autonomous) Science College, Indore
Department of Physics
Syllabus Session 2021-22

Class - M.Sc. Semester - I

Marks 75+25(CCE) =100

Subject - Physics

Min. Marks= 26+9=35

Title of the Paper - Quantum Mechanics- I

Paper Code – PH13

Paper -Core 3

Credits- 4

Part - A

Introduction for Code - PH13

SUBJECT : PHYSICS (QUANTUM MECHANICS-I)

Pre-requisite (if any)	B.Sc. with Physics as one of the Subject
Course Objectives	To introduce fundamentals of Quantum Mechanics
Course Learning Outcomes	<p>After the completion of the course student will be able to understand :</p> <ol style="list-style-type: none"> 1. The Solution of Schrodinger equation for simple potentials. 2. Representation of state vectors and dynamical variables by Matrix and unitary transformations. 3. Various approximation methods in QM to solve non-exactly solvable problems.

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
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
Part B : Contents of the Course


UNIT-I	Basic Postulates of Quantum Mechanics, equation of continuity, Normality, orthogonality and closure properties of eigen functions, expectation values and Ehrenfest theorem, solution of Schrodinger wave equation for one dimensional (a) Potential well (b) Potential step and (c) Potential barrier.
UNIT-II	Solution of Schrodinger equation for (a) Linear Harmonic Oscillator (b) Hydrogen - like atom (C) Square Well potential and their respective application to atomic spectra, molecular spectra and low energy nuclear states (deuteron).
UNIT-III	Linear vector space, concept of Hilbert space, bra and ket notation for state vector, representation of state vectors and dynamical variables by matrices and Unitary Transformations (Translation and rotation), Creation and Annihilation operators, Heisenberg uncertainty relation through operators (Schwartz inequality).
UNIT-IV	Angular momentum in quantum mechanics, Eigen values and Eigen function of L^2 and L_z in terms of Spherical Harmonics, commutation relation. Time Independent Perturbation theory. Non-degenerate and degenerate cases.
UNIT-V	Matrix Mechanics: The Schrodinger picture, The Heisenberg picture, The Interaction picture, Linear Harmonic Oscillator (solution using the Schrodinger and Heisenberg Picture)


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Department of Physics
Syllabus Session 2021-22

Part C :-Learning Resources

Suggested Reading.

1. L I Schiff-Quantum Mechanics
2. S Gasiorovicz-Quantum Physics
3. B Craseman and J D Powell-Quantum Mechanics
4. A P Messiah-Quantum Mechanics
5. J. J. Sakurai-Modern Quantum Mechanics
6. Mathews and Venkatesan-Quantum Mechanics
7. A .K.Ghatak and Loknathan-Quantum Mechanics

Part D

Assessment and Evaluation – PH13

Suggested Continuous Evaluation Method

Max. Marks = 100


Continuous Comprehensive Evaluation (CCE) = 25 Marks


Autonomous College Semester end Examination = 75 Marks


Internal Assessment :	Class Test	Marks Distribution
Continuous Comprehensive Evaluation (CCE):25	CCE-I	12.5
	CCE-II	12.5
		Total= 25Marks
External Assessment:	Question Paper Based	Marks Distribution
Autonomous College Exam : 75 marks Time : 3 Hrs	One Question from each unit with 100% Internal choice	15×5= 75 Marks
		Total= 75 Marks

Any Remarks/ Suggestion :



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