Kalindi College

(NAAC Accredited 'A' Grade)

University Of Delhi

DEPARTMENT OF PHYSICS

ACADEMIC SESSION

2020-21

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1. Brief Introduction of Department:

Physics Department was established in the year 1990 in Kalindi College. The department caters to B.Sc.(H) Physics and B.Sc. Physical Science (Physics, Computer Science, Mathematics) and is continuously upgrading itself according to the changing curriculum and needs of the time from Annual to Semester to CBCS systems. Despite limitations of resources, the collective efforts of students, lab staff and teachers have delivered wonderful results with continual increase in the number of students scoring 90% and above in papers. To encourage their efforts, various prizes like Ram Gopal Joshi Memorial Prize, Shanti Devi Bhatnagar Memorial Prize, Ram Murthy Gupta Memorial Prize, Ankur Memorial Prize, Shiv Paul Goel Memorial Prize, Asha Arora Memorial Prize etc. have been instituted for Physics/ Physical Science students.

It is a matter of great pride that our Physics (Hons.) and Physical Science students are getting placements both in private and public sector as well as teaching positions in schools, colleges and polytechnics. The goal of the Physics department is to nurture young talent, to focus on standards, assessment and outcomes, and to ensure that all students learn in a more powerful way. We also find ways to motivate our students to scale greater heights than ever before.

2. Scope of the Subject:

If you want to discover the fundamental laws and underlying principles governing this mysterious world and are keen to know What, How and Why of any of the physical and biological events/ phenomena, then enter the world of Physics. This subject is the gateway to Research and Development not only in Physical Sciences, but also in Computers, Biological and Chemical Sciences. After completing this course, you shall be equipped to take a plunge in any of the frontier areas of technology viz. Nanotechnology/ Nanoscience, Photonics, Plasma Physics, High Energy and Nuclear Physics, Atomic Physics, Astrophysics and Condensed Matter Physics, Radiation Physics, Medical Physics, Physics of the Earth, Environment science etc. The scope of Physics is virtually in every field. In fact, Physics graduates are the most sought after in DRDO Labs, TIFR, PRL, IUAC, IPR, BARC, NIIT's, IISER's etc. for fundamental research. Many Physics graduates have made a career in administration like ICS, Defence Services and multinational companies like Infosys, Wipro etc. besides teaching in schools, colleges and universities. So, come and join the most coveted course among the pure sciences.

3. Details of the Faculty members:

Faculty	Designation	Qualification	Area of Interest
Dr. Rachana Kumar	Associate Professor	M.Sc.(DU), Ph.D.(Maastricht, Netherlands)	Nanotechnology
Dr. Pushpa Bindal	Associate Professor	M.Sc .(IIT-D), M.Tech. (IIT-D), Ph.D.(IIT-D)	Fibre & Integrated Optics, Plasmonics
Dr. Sudha Gulati	Associate Professor	M.Sc., Ph.D.(DU)	Electronics
Dr. Seema Gupta **(T-I-C)**	Associate Professor	M.Sc., Ph.D.(DU)	Electrical Properties of Solid State Materials
Dr. Savita Roy (on lien)	Associate Professor	M.Sc., Ph.D.(DU)	Plasma Physics & Material Science
Dr. Monika Bassi	Associate Professor	M.Sc., Ph.D.(DU)	Electronics
Dr. Punita Verma	Associate Professor	M.Sc.(JMI), Ph.D.(University of Giessen, Germany)	Accelerator Based Experimental Atomic Physics

4. Detail of Laboratory Staff

S.No	Name	Designation
1	Mr. Anand Singh Bisht	Laboratory Assistant
2	Mr. Anand Ram Arya	Laboratory Assistant
3	Mr. Rohtas	Laboratory Assistant
4	Mr. Yashasvi	Laboratory Attendant
5	Mr. Rajinder	Laboratory Attendant
6	Mr. Deepak	Laboratory Attendant

7	Mr. Rajesh Kumar	Laboratory Attendant

5. Medium of Instruction: English

6. Course Detail:

For Honours Course

1st Year

Semester	Core	Generic Elective	AECC
I	Core Course I Mathematical Physics-I Practical Lab Core Course II Mechanics Practical Lab	GE-I GE I Practical Lab	AECC-I (AECC- Ability Enhancement Compulsory Courses): English Communications/ Environmental Science
II	Core course III Electricity and Magnetism Practical Lab Core course IV Waves and Optics Practical Lab	GE -2 GE-2 Practical Lab	AECC-II AECC- Ability Enhancement Compulsory Courses): Environmental Science/English Communication

2nd Year

Semester	Core	Generic Elective	SEC
III	Core course V Mathematical Physics- II Practical Lab	GE-3 GE-3 Practical Lab	SEC -1 SEC-1 Lab

	Core course VI Thermal Physics Practical Lab Core course VII Digital Systems and Applications Practical Lab		
IV	Core course VIII Mathematical Physics- III Practical Lab Core course IX Elements of Modern Physics Practical Lab Core course X Analog Systems and Applications Practical Lab	GE-4 GE-4 Practical Lab	SEC -2 SEC -2 Lab

3rd Year

Semester	**Core**	**DSE-I**	**DSE-II**
V	Core course XI Quantum Mechanics and Applications Practical Lab Core course XII Solid State Physics	DSE-1 DSE -1 Lab	DSE-2 DSE-2 Lab

	Practical Lab		
VI	Core course XIII Electromagnetic Theory Practical Lab Core course XIV Statistical Mechanics Practical Lab	DSE-3 DSE-3 Lab	DSE-4 DSE-4 Lab

List of Generic Elective Physics Papers (GE -1 to GE-4) for other Departments/Disciplines: (any four)

I Semester (GE-1):

1. Electricity and Magnetism + Lab
2. Mathematical Physics + Lab
3. Digital, Analog and Instrumentation + Lab
4. Applied Dynamics + Lab
5. Medical Physics + Lab

II Semester (GE-2):

7. Mechanics + Lab
8. Elements of Modern Physics + Lab
9. Solid State Physics + Lab
10. Embedded System: Introduction to Microcontroller + Lab
11. Biological Physics + Tutorials

III Semester (GE-3):

12. Waves and Optics + Lab
13. Quantum Mechanics + Lab
14. Communication System + Lab
15. Verilog and FPGA Based System Design + Lab
16. Nano Materials and Applications + Lab

IV Semester (GE-4):

17. Thermal Physics + Lab

18. Digital Signal Processing + Lab

19. Nuclear and Particle Physics + Tut

20. Astronomy and Astrophysics + Tutorials

21. Atmospheric Physics + Lab

22. Physics of the Earth + Tutorials

List of SEC (Skill Enhancement Courses):- SEC-1 & SEC-2 (any two)

1. Physics Workshop Skills
2. Computational Physics Skills
3. Electrical Circuits and Network Skills
4. Basic Instrumentation Skills
5. Renewable Energy and Energy Harvesting
6. Engineering Design and Prototyping/Technical Drawing
6. Radiation Safety
8. Applied Optics
9. Weather Forecasting
10. Introduction to Physical Computing
11 Numerical Analysis

List of Discipline Specific Elective Papers (DSE-1 to DSE-4):

(4 papers to be selected: 02 each for Odd semester and Even semester as listed below)

Odd semester:

1. Experimental Techniques + Lab
2. Advanced Mathematical Physics + Lab
3. Embedded Systems- Introduction to Microcontroller + Lab
4. Nuclear and Particle Physics + Tutorial
5. Physics of Devices and Communication + Lab
6. Astronomy and Astrophysics + Tutorial
7. Atmospheric Physics + Lab
8. Biological Physics + Tutorial
9. Linear Algebra and Tensor Analysis+ Tutorial

Even Semester:

10. Nano Materials and Applications + Lab
11. Communication System + Lab
12. Medical Physics + Lab

13. Applied Dynamics + Lab
14. Digital Signal Processing + Lab
15. Physics of the Earth + Tutorial
16. Advanced Mathematical Physics-II + Tutorial
17. Classical Dynamics + Tutorial
18. Dissertation
19. Verilog and FPGA Based System Design + Lab
20. Advanced Quantum Mechanics+ Tutorial

For Programme Courses:

1st Year

Semester	**Core**	**AECC**
I	Core course -I Mechanics Practical Lab	
II	Core course II Electricity and Magnetism Practical Lab	

2nd Year

Semester	**Core**	**SEC**
III	Core course III Thermal Physics and Statistical Mechanics Practical Lab	SEC -1 SEC-1 Lab
IV	Core course IV Elements of Modern Physics Practical Lab	SEC -2 SEC-2 Lab

3rd Year

Semester	**DSE**	**Generic Elective**	**SEC**
V	DSE -1	NA	SEC-3

	DSE-1 Lab		SEC-3 Lab
VI	DSE-2 DSE-2 Lab	NA	SEC-4 SEC-4 Lab

Discipline Specific (Physics) Elective papers

(DSE 1, DSE 2): Choose 2 (one for each semester)

Odd Semester: (Choose any one)

1. Digital, Analog and Instrumentation (4) + Lab (4)
2. Elements of Modern Physics (4) + Lab (4)
3. Mathematical Physics (4) + Lab (4)
4. Nano Materials and Applications (4) + Lab (4)
5. Communication System (4) + Lab (4)
6. Verilog and FPGA Based System Design (4) + Lab (4)
7. Medical Physics (4) + Lab (4)
8. Applied Dynamics (4) + Lab (4)

Even Semester: (Choose any one)

9. Solid State Physics (4) + Lab (4)
10. Embedded System: Introduction to Microcontroller (4) + Lab (4)
11. Nuclear and Particle Physics (5) + Tut (1)
12. Quantum Mechanics (4) + Lab (4)
13. Digital Signal Processing (4) + Lab (4)
14. Astronomy and Astrophysics (5) + Tutorials (1)
15. Atmospheric Physics (4) + Lab (4)
16. Physics of the Earth (5) + Tutorials (1)
17. Biological Physics (5) + Tutorials (1)
18. Dissertation

Skill Enhancement Course (any four) SEC 1 to SEC 4

1. Physics Workshop Skills
2. Computational Physics Skills
3. Electrical Circuit Network Skills
4. Basic Instrumentation Skills
5. Renewable Energy and Energy Harvesting
6. Mechanical Drawing

7. Radiation Safety
8. Applied Optics
9. Weather Forecasting
10. Introduction to Physical Computing
11. Numerical Analysis

7. Infrastructure:

The Department has fully equipped laboratories. There are two big laboratories; one is for Mechanics, Electricity and Thermal experiments and the other for Electronics experiments. A semi-dark room is there for Ballistic Galvanometer experiments. A complete dark room is also the part of the department for optics experiments. There is a computer lab, which is very helpful for the students to analyze their data and do projects. A separate room, research arena, is allotted for research work.

8. Award and Achievements (Permanent Faculty):

Sr. No.	Name of the teacher	Nature of Award	Year
1.	Dr. Savita Roy	"Best Teacher Award" by Govt. of NCT of Delhi	2010-11
2.	Dr. Monika Bassi	"Best Teacher Award" by Govt. of NCT of Delhi	2012-13
3.	Dr. Rachana Kumar	"Best Teacher Award" by Govt. of NCT of Delhi	2014-15
4.	Dr. Pushpa Bindal	"Best Teacher Award" by Govt. of NCT of Delhi	2017-18
5.	Dr. Punita Verma	Indian Association of Physics Teachers (IAPT)'s Dinabandhu Sahu Memorial Yearly Award for a Physics Teacher	2019-20

9. Institutional Scholarship and Prizes for students:

Every year the students of B.Sc. (H) and B.Sc. (Physical Science), achieve following scholarships and prizes:

S.	Name of Prize	Awarded For

No.		
1	Ram Gopal Joshi Memorial Prize	Highest Marks in B.Sc.(H) Physics Sem I & II Combined
2	Shiv Paul Goel Memorial Prize	Highest Marks in Physics in B.Sc. (P.S.) Sem I & II Combined
3	Asha Arora Memorial Prize	Highest Marks in Physics in B.Sc.(H) Physics Sem I, II, III & IV Combined
4	Shanti Devi Bhatnagar Memorial Prize	Highest Marks in B.Sc.(H) Physics Sem III & IV Combined
5	Ram Murthy Gupta Memorial Prize	Highest Marks in Chemistry Paper of B.Sc. (H) Physics Sem I
6	Students Union Prizes	For Standing First and Second in B.Sc. (H) Physics I, II and III year
7	Academic Prizes	For Standing First and Second in B.Sc. (H) Physics I, II and III year
8	Ankur Memorial Prize	Highest Marks in Physics In B.Sc. (P.S.) Sem I, II, III and IV Combined

10. Research in Department: Ongoing Research Projects funded by Kalindi College through Corpus Fund of Research

Sr. No.	Name of the Principle Investigator (Co-investigator)	Title of the Project
1.	Dr. Rachana Kumar, Dr. Seema Gupta, Mr. Ankur Anand	To study Carbon Nanotube (CNT) based gas sensors, effect of gas adsorption and their selective gas sensing properties.
2.	Dr. Pushpa Bindal and Dr. Triranjita Srivastava	Propagation Characterization of Metamaterial based Waveguides
3.	Dr. Pushpa Bindal, Dr. Triranjita Srivastava, Ms. Ritika Pant	An Exposition to e-content development for undergraduate students

4.	Dr. Monika Bassi, Dr. Rashmi Menon, Ms. Varsha, Dr. Majhar Ali	Investigation of Mechanics Problems through Computer Simulation using Scilab
5.	Dr. Sudha Gulati, Dr. Monika Bassi, Dr. Savita Sharma	Study of Electrical behavior of Metal Semiconductor Contacts for UV Photodetectors
6.	Dr. Punita Verma	A pedagogical approach towards understanding techniques for accelerator based experiments
7.	Dr. Punita Verma	Student wellness: A strategy for student's success assessment through Medico-Physiological and lifestyle patterns
8.	Dr. Punita Verma	Scientific solution of manual scavenging and social entrepreneurship

11. Seminar/workshop organized by Department:

Our department regularly organizes seminar/workshop/webinar etc., for inculcating knowledge beyond the course curriculum and motivating the students towards higher education. Moreover, the students get an opportunity to interact with renowned Physicist and Scientist invited for lectures at our department. The seminar/webinars held in academic year 2019-20 are given below:

I. **National Seminar on "Nuclear, Particle and Accelerator Physics :** Eminent speakers at the seminar were Prof. Ajoy Ghatak, Prof. Brajesh C. Choudhary , Dr. Rajeev Mehta, Dr. N. Madhavan, Dr. Debashish Sen, Prof. Samit K. Mandal.

II. **National Webinar on "*What is Light : Evolution of Quantum Theory:*** Prof. Ajoy K. Ghatak, the eminent Professor, scientist, writer of many books, was the speaker of the webinar..

III. **National Webinar on "*An Introduction to measurement of Light":***. Dr. Shibu Saha, the eminent scientist, was the speaker at the event.

IV. **National Webinar on "*Science, Society and Exponential Change: Reimagining the Future":*** Dr. Pratibha Jolly, the former Principal of Miranda House, was the eminent speaker of the webinar.

V. **National Webinar on "*Emerging Out a Winner in Lockdown":*** Dr. Anula Maurya, the honourable Vice Chancellor of Jagadguru Ramanandacharya Sanskrit University was the speaker of the webinar.

12. Highlights of Departmental Society (PHYSCOM):

Physcom society is an Academic society of Physics and Computer Science Departments. It is a union of three courses- Physics (H), Computer Science (H) and Physical Sciences. The society is executed by the students; Office Bearers being selected by a tough screening and interview process by the faculty members.

Physcom Society every year organizes workshops and events for the overall growth and development of students. In this society, students participate actively in various competitions, showing originality, exceptional creativity and dedication in their pursuits. It also conducts various lectures on contemporary scientific topics by eminent speakers, organizes educational trips to research institutes, quizzes, paper presentation etc. The list of activities held in the academic year 2019-20 are given below:

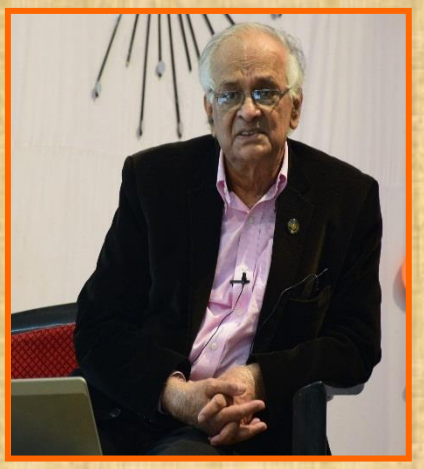
I. **Field visit to Electronic Materials and Devices Laboratory (EMDL)**
II. **ASTRODROID 2.0**
III. **Mission to Moon**

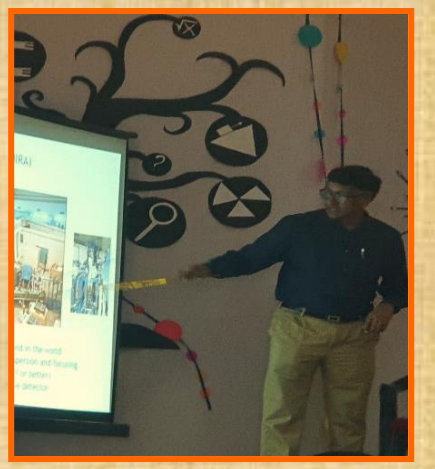
13. Distinguished Alumni:

S. No.	Name of the Alumna	Current Status/ Position
1.	Dr. Raksha	Assistant Professor, Kirori Mal College
2.	Dr. Komila Suri	Assistant Professor, Shyamlal College
3.	Dr. Ruby	Assistant Professor, Swami Shraddhanand College
4.	Ms. Divya Maan	Lecturer, District Institute of Education and Training, SCERT, New Delhi
5.	Dr. Richa Sharma	Assistant Professor, Delhi Technological University
6.	Dr. Poonam Singh	Assistant Professor, Sri Aurobindo College (On Adhoc)
7.	Dr. Savita Sharma	Assistant Professor, Kalindi College (On Adhoc)

8.	Dr. Mansi Dhingra	Assistant Professor, Maitreyi College (On Adhoc)
9.	Ms. Shweta Yadav	Assistant Professor, Bhagini Nivedita College (On Adhoc)

14. Some Glimpses





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