AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD

27th Km. Milestone, Delhi-Meerut Expressway, Ghaziabad-201015

MINUTES OF THE IQAC MEETING

The IQAC meeting for Session 2023-24 (Odd Semester) was held on 2nd February 2024. The following members were present during the meeting:

1. Dr. Hemant Ahuja
2. Dr. Neelesh Kumar Gupta
3. Dr. Shraddha Dixit
4. Dr. Avadhesh Gupta
5. Dr. Anupama Shanna
6. Dr. Himani Garg
7. Dr. Gopal Babu
8. Dr. Vani Bhargava
9. Dr. Saroj Bala
10. Dr. Shiwani Singhal
11. Ms. Gaganpreet Kaur
12. Dr. Jitender Chhabra
13. Mr. Dushyant Singh Chauhan
14. Mr. Praveen Kumar
15. Mr. Pronab Kumar Adhikari

Minutes of the Meeting Agenda

The meeting initiated with the welcome address by the Director and his sharing about the importance and objectives of IQAC. He also shared his views on how academic and research needs are changing and how to evolve with the challenging needs of education and sustain quality in all our actions. The meeting then continued with the discussion on the following agenda points related to IQAC tasks:

Agenda Point (i)

a. Discussion on the proposal to hold quarterly IQAC meetings throughout the year.

- It was decided at least one IQAC meeting will be conducted in 03 months so that all important activities, their proper plan of action and progress done in this regard can be discussed & implemented.

b. Planning and Evaluation of IQAC contributions annually.

- It was discussed that proper planning for the execution of IQAC tasks will be the responsibility of the respective IQAC members.
- The significant contribution made by the IQAC will be evaluated bi-annually in every academic session.

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Agenda Point (ii)

a. Review of the IQAC's action plan at the start of the academic year for Quality Enhancement.

- For proper and timely completion of all IQAC activities (NBA, NAAC, NIRF, Academic Audits and Other activities) task-specific teams will be formed who will submit the plan of action and will be responsible for the execution of the said tasks.
- The IQAC Coordinator will float the sheet for the distribution of responsibilities. IQAC Members may self-nominate their names for the activities they believe can take suitably.

Agenda Point (iii)

a. Enhancement of focus on Outcome Based Education (OBE).

- It was discussed that FMs needs to be more sensitized about Outcome Based Education (OBE). As on date, it's on paper only and every FM should be aligned and through with the OBE Processes & needs.
- It was decided that FDPs/Workshops/Seminars will be conducted to promote OBE both at the department level as well as the college level on regular basis.

b. Periodic reviews of teaching-learning processes, operational methodologies, and learning outcomes through IQAC.

- It was discussed that academic processes and methodologies should be reviewed on regular intervals for the better & effective implementation.
- It was decided that these processes / methodologies will be modified, if required as per suggestions of the concerned team members in order to further improve the quality of teaching and learning.

c. Documentation of incremental improvements in various activities.

- The need and importance of properly maintaining documents and it was realized that there should be a uniformity in maintaining the documents at the department level.
- It was therefore decided that a proper documented record of all significant achievements done will be maintained in the departments as well as in the IQAC (in some cases) by the respective responsible IQAC members.
- IQAC will provide a list of documents to be maintained by the departments.

Agenda Point (iv)

a. Planning and organization of workshops/seminars on Research Methodology, Intellectual Property Rights (IPR), and Entrepreneurship by IQAC.

- It was discussed that this activity is sometimes neglected and workshops/seminars should be conducted as per proper benchmarking.
- It was decided that workshops/seminars/FDP etc will be conducted on Research Methodology, Intellectual Property Rights (IPR), and Entrepreneurship by IQAC and the IPR Cell of the college through various departments.

Agenda Point (v)

a. Organization of professional development/administrative training programs for non-teaching staff.

- It was discussed that it is very important to enhance the skills and technical abilities of lab staff members through trainings and Staff Development Programs (SDPs).
- It was decided that at least 01 Training Program / SDP shall be conducted by each department in an Academic Year.

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Agenda Point (vi)

a. Academic planning and monitoring in accordance with the academic calendar by departments.
- It was discussed that proper Academic planning and monitoring in accordance with the academic calendar and the ongoing schedules should be done by each department.
- It was decided that Lesson Plan and Syllabus coverage will be reviewed on regular basis and the Online Monitoring of Classes through Camera will be done centrally by IQAC.

b. Review of attendance, student performance in internal and external exams, and actions taken by departments accordingly.
- It was decided that attendance, student performance in internal and external exams will be monitored by the department on regular basis with proper records, as per the standard process already defined.
- It was decided that proper and timely actions will be taken by the departments for students having poor attendance and academic performance and details of action taken will be shared with the Dean Academic after Internal Exams. Action taken for toppers and bottomers will also be monitored.
- Assessment and allotment of classrooms and other academic requirements for class conduct will be done under IQAC.
- Issuance of guidelines for timetable preparation, load distribution, etc., along with providing standard formats, will also be done under IQAC.

Agenda Point (vii)

a. Review of the benchmarking process, including target setting and achievements by departments.
- The importance of benchmarking process and setting of targets both for the departments and college level was discussed and a team will be formed to develop the benchmarking.
- It was decided that the targets will be set both for the departments and the college at the beginning of Academic Year.
- It was also decided that achievements done by the department against the set targets will be analyzed and reviewed after the end of session to ensure proper outcomes.

b. Evaluation of the effectiveness of guidance for competitive exams and career counselling to be provided by departments.
- It was decided that proper process to guide the students for competitive exams and career counselling will be developed as no formal process exists in college for the same.
- The effectiveness of the processes in this regard by the departments will be evaluated regularly by IQAC.

Agenda Point (viii)

a. Discussion on separate coordination efforts concerned with NAAC, NIRF, and NBA as suggested by the Director.
- The need and importance of having separate coordinators for major IQAC activities such as NAAC, NIRF, and NBA was discussed.
- It was decided that to ensure the proper and timely completion of all IQAC activities/tasks proper distribution of work will be done i.e. duties/responsibilities will be assigned to all IQAC members.

Agenda Point (ix)

a. Audit Procedures and related points for the effective implementation of quality initiatives.
- It was decided that Internal Academic Audit will be done in two ways
  - (i) FMs Course Files and Attendance Registers

(ii) Department Audits based on Quality Parameters in the Teaching Learning Process at the end of the Academic Session.

- Formats for the Department Level Audit Report were also discussed and finalized.

After discussion on Agenda Points, the following immediate action points were finalized:

1. The Distribution of IQAC Tasks/Activities among Faculty Members regarding the above-mentioned points was discussed in the meeting and the proposed distribution is enclosed herewith.
2. It was discussed that the Director will meet the small teams for individual activities for which the teams will be presenting their plan of action and roadmap for one Academic Year along with the IQAC Coordinator.
3. AQAR is to be filled by 29th February 2024 so criteria-wise AQAR should be provided to the Director for review by 20 February 2024.
4. NBA accreditation of the IT/ME/EN/ECE/CSE departments is valid till June 2025. For further extension, this time the departments will have to prepare full-fledged for the NBA Visit of 03 days, the application of which will be filed in December 2024.
5. The extended IQAC Team including 06 Faculty members will be assisting directly in Teaching and learning-related tasks like Room Allocation, Time Table Template, Examination Reforms, and all Academic Endeavors.
6. Benchmarking is to be prepared by IQAC for each department before the next IQAC Meeting in March 2024 after filling AQAR.
7. It has been decided that the Presentations on various NAAC criteria(s) will be given by Dr. Awadesh Gupta and Dr. Anupama Sharma, respectively in the next meeting to be held on 09 February 2024.

There being no agenda point left, meeting was ended at 1:30 PM.

16/2/24

Dr. Hemant Ahuja
Director

Copy to:

i. The Director General
ii. IQAC Members

Director
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Internal Academic Audit (2023-24 Odd Sem)

An Internal Academic audit is scheduled from the 27th to 29th December 2023. All the attendance registers and course files of the faculty members teaching the first year are to be updated from 06th October to 23rd December 2023.

The following guidelines must be strictly followed in the maintenance of both theory, practical attendance records and course files by each faculty member during the Internal Academic Audit by the Team:

(a) Properly formulated Course Outcomes (COs) statements as per Bloom's Taxonomy for both Theory and Lab subjects.

(b) Mapping of COs with Program Outcomes (POs) and Program Specific Outcomes (PSOs).

(c) Question papers of internal assessments (STs) should be prepared in accordance with NBA guidelines, with appropriate weightage given to questions from all possible Bloom's levels.

(d) Identification of theory topics beyond the syllabus and their inclusion in the Lecture-Wise Schedule (LWS). Mapping of the additional topics with relevant COs should also to be documented in LWS.

(e) Ensure that attendance is correctly recorded on the AKTU AMS and Edu Marshal portal up to 23rd December 2023.

(f) Use only 'P' (Present), 'A' (Absent) and 'Ac' (Present with college duty) in the attendance register, avoid using dots, and refrain from overwriting.

(g) Mark Hostlers, Discipline and Not registered cases.

(h) Ensure that all entries on attendance registers (both Theory and Lab) are complete.

(i) Arrange all documents as per the updated format and in their proper order.

(j) Update the Lecture wise schedule up to the ST exam and get it signed by the Head of Department (HoD).

(k) Attach details of Mentorship Classes in the course file with appropriate references.

(l) Attach an analysis of the Overall Attainment of COs in the form of Direct and indirect Attainments.

The Audit Report is to be submitted by the IQAC Team to the undersigned by 30th December 2023. All HoDs are instructed to ensure that this audit is completed by 29th December 2023, and full cooperation is to be provided to the Audit Team.

A list of auditors assigned to various departments is attached.

Dr. R. K. Agarwal
Director General

Copy to: All HoDs & Dean Examination
Enclosure: Audit Plan

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AUDIT PLAN

S.NO.	NAME OF AUDITOR	DEPARTMENT (AUDITOR)	DEPARTMENT (TO BE AUDITED)	DATE
1.	Dr. Sulekha Saxena Dr. Niti Maheshwari	ECE AS & H	IT	27th Dec 2023
2.	Dr. Anupama Sharma	IT	ME	27th Dec 2023
3.	Mr. Pradeep Gupta Dr. Shivani	CSE IT	ECE	27th Dec 2023
4.	Dr. Akhilesh Verma Ms. Anchal Negi	CSE CE	AS&H	28th Dec 2023
5.	Dr. Pankaj Goel Mr. Atri Tyagi	ECE CE	EN	28th Dec 2023
6.	Dr. Vani Bhargava	EN	MCA	28th Dec 2023
7.	Mr. Dushyant S. Chauhan	ECE	TIFAC	29th Dec 2023
8.	Ms. Arpana Saxena Dr. Akash Kumar	MCA AS & H	CSE	29th Dec 2023
9.	Mr. Vivek Pansari	ME	CE	29th Dec 2023

Director
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AKGEC/IQAC/2023-24/04
Date: 05 May 2024

Action Taken Report (ATR) 2023-24 (Even Semester)

As per the planning and instructions of IQAC members, the following actions have been taken considering the Agenda Points of IQAC Meeting held on 02nd February 2024:

i. As per the discussion held in the meeting, now IQAC meetings were conducted on regular basis and contributions made by IQAC during 2023-24 were also evaluated.

ii. Plan of action and progress made for Academic Quality Enhancement (for NBA, NAAC, NIRF, Academic Audits and Other activities) were also reviewed for the academic year 2023-24.

iii. More focus was given on the enhancement of Outcome Based Education (OBE). All FMs were sensitized about OBE also.

iv. Teaching-learning processes were reviewed and modified periodically for the better & effective implementation.

v. Workshops/seminars on Research Methodology, Intellectual Property Rights (IPR) and Entrepreneurship were organized by various departments. A one-week FDP on "Innovation Management and Intellectual Property Rights" was successfully organized by ECE Department on 04-08 December 2023 in collaboration with NITTTR Chandigarh.

vi. As decided by IQAC, to enhance the skills and technical abilities of lab staff members at least 01 Training Program was conducted by each department during the Academic Year.

vii. Lecture Delivery Schedule (LWS) and Syllabus Coverage was reviewed on regular basis after every Internal Exam and the Online Monitoring of Classes through CCTV was done both at the department level and centrally by IQAC both in online as well as physical mode through lab staff.

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viii. STT Exams were conducted for the eligible students to ensure the improvement in the academic performance of 2nd year students. Toppers and Bottomer students were also counseled by Department HoDs to ensure good academic results in AKTU Exams.

ix. Benchmarking process & achievements by departments was reviewed by IQAC and full efforts were done by each department to achieve the set targets for the session 2023-24.

x. Considering the need and importance separate coordinators were nominated for major IQAC accreditation activities such as NAAC, NIRF and NBA.

xi. To ensure the effective implementation of quality initiatives, the team for IQAC audit on the teaching-learning process was formed. An Internal Academic Audit of all Engineering & MCA Departments was conducted in April 2024. Course Files were thoroughly checked and uploading of attendance on Edumarshal Portal was also verified for each department.

xii. Specific efforts were made by the Training & Placement Cell for placement of core branch students. To enhance the selection ration of students during interviews, some fundamental and practical questions were also included as a part of PUT exam question paper under a special separate section.

Dr. Hemant Ahuja

Director

Copy to:

i. Director General (for kind information)

ii. IQAC Coordinator

iii. Concerned IQAC Members

AKGEC|IOAC|CF|01

File No. _____

AJAY KUMAR GARG ENGINEERING COLLEGE

27ᵗʰ Km. Stone, NH-24, Delhi-Hapur Bypass Road, Adhyatmik Nagar, Ghaziabad-201009

Phone : 8744052891 to 94, 7290034979, 7290034979

AKGEC|IOAC|CF|01

COURSE FILE

DEPARTMENT: APPLIED SCIENCES & HUMANITIES

NAME OF FACULTY: Dr. BANDANA SHARMA

SUBJECT & SUBJECT CODE:

ENGINEERING PHYSICS & BAS101

SECTION & SEMESTER: (S1, S10) & FIRST

SESSION: ODD SEMESTER 2023-24

ORDER OF FORMATS
w.e.f. 2023-24 (Odd Sem)

1	Vision, Mission & Quality Policy of College	AKGEC/IQAC/VM/01
2	Vision & Mission of the Department	AKGEC/IQAC/VM/02
3	Program Educational Objectives, Program Outcomes, Course Outcomes	AKGEC/IQAC/OBE/01
4	Academic Calendar	AKGEC/IQAC/AC/01
5	Time Table	AKGEC/IQAC/LDP/01
6	University Syllabus	AKGEC/IQAC/LDP/02
7	Lecture Delivery Schedule, Its compliance dates & Targets (Attendance & Academic)	AKGEC/IQAC/LDP/03
8	Attendance Register (Theory)	AKGEC/IQAC/AR/01
9	Details of Toppers & Bottomers	AKGEC/IQAC/AR/02
10	Details of Mentorship Classes (If applicable)	AKGEC/IQAC/LDP/05
11	Tutorial Sheets / Assignments / Quiz (As per Bloom's Taxonomy)	AKGEC/IQAC/QP/01
12	Class Test Papers (If any)	AKGEC/IQAC/QP/02
13	Sessional Test Papers	AKGEC/IQAC/QP/03
14	Pre- University Test Papers	AKGEC/IQAC/QP/04
15	Previous Year University Question Papers (3-5 years)	AKGEC/IQAC/QP/05
16	Overall Attainment of CO's (Direct & Indirect Attainments) Previous and Current Semester	AKGEC/IQAC/OBE/02
17	Handouts and Lecture Delivery Notes	AKGEC/IQAC/LDP/06

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Vision, Mission & Quality Policy of College

VISION

To introduce undergraduate and postgraduate courses for all engineering branches and award of Ph.D degree. To be one of the best engineering colleges in the country and to be a deemed university.

MISSION

We strive to provide and maintain academic environment and systems, enabling maximum learning to produce competent professionals. We also aim at achieving this through transparent academic and administrative policies in the college. We intend to provide conducive atmosphere for research, development and consultancy services to our faculty at national and international level.

QUALITY POLICY

To provide and continually improve academic environment and systems which give total satisfaction and enable students to develop their full potential and mature into competent professionals and responsible members of society.

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Vision, Mission of the Department of AS&H

VISION

Our vision is to expand our first-year students' horizon of knowledge by exposing them to holistic education as well as enhancing their English Language competence.

Department of Applied Sciences and Humanities will become a centre of excellence in teaching and research, and a natural benchmark for other organizations to measure themselves against.

MISSION

"Setting first-year engineering students up for success"

To deliver a unique first year broad based experience that emphasizes hands-on-learning, technical immersion in engineering concepts, problem solving strategies through integrated interdisciplinary learning that encourages freshmen, covering all branches of Engineering, to forge real world connections to science, technology and community.

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DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S): CSE

PEO 1. The graduate of CSE will have a strong foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problem in their career.

PEO 2. The graduate of CSE will have the ability to analyses the requirements, understand the technical specification and design the much engineering solutions by applying computer science theory and principles.

PEO 3. The graduates of CSE will have exposure to work as teams on emerging cutting edge technologies with effective communication skills and leadership qualities.

PEO 4. The graduates of CSE will have successful career by engaging in life long learning.

PEO 5. The graduates of CSE will have skills to work collaboratively on multidisciplinary projects and exhibits high levels of professional and ethics values.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex Computer Science & Engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex Computer Science & Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex Computer Science & engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex Computer Science & engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes in the field of Computer Science.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Ability to exhibit analytical & logical skills and apply knowledge of Maths and Computer Science to design, develop, test and maintenance of software solutions.

PSO 2: Ability to identify, formulate and resolve real life/social problems by using current computer technology.

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Cos: Engineering Physics (BAS101)

(w.e.f. Session: 2022-23)

DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

C201.1: To explain the distribution of energy in black body radiation and to **differentiate** between particle and wave nature with an explanation of Compton's effect and Schrodinger's wave equation.

C201:2: To explain the concept of displacement current and the consistency of Ampere's law, as well as to **examine** the properties of electro-magnetic waves in various mediums using Maxwell's equations.

C201:3: To recognize wave behavior using various examples and applications of interference and diffraction phenomena, as well as to **interpret** the concepts of grating and resolving power.

C201:4: To describe the functioning of optical fiber, its properties, and to **distinguish** between different types of optical fiber. To understand the concept, properties, and applications of lasers.

C201:5: To **describe** the properties and applications of superconducting materials and nanomaterials.

PO-CO MAPPING

(w.e.f. Session: 2022-23)

gram outcomes		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
BAS101 GINEERING PHYSICS	C101.1	3	3	2	3	3							3	3	2
	C101.2	3	3	2	3	3							3	3	2
	C101.3	1	1	1	1	1							1	1	1
	C101.4	3	3	2	3	3							3	3	2
	C101.5	1	1	1	1	1							1	1	1

3: Strongly Related   2: Moderately Related   1: Weakly related   0: Not related

Bandana Sharma
[Subject Teacher]

[NBA Coordinator]

HoD, AS & Hum

Director
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DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S): EN

PEO1. Graduates of the program will apply skills and knowledge of Electrical and Electronics Engineering along with basic sciences, engineering's and humanities to solve the problems of social, environmental and industrial relevance and or peruse higher studies and research.

PEO2. Graduates of the program will engage in design and analysis of systems, tools and applications in the field of Electrical and Electronics Engineering.

PEO3. Graduates of the program will work effectively as individual and as team in the inter-disciplinary projects, and acquire leadership and communication skills suitable for the profession.

PEO4. Graduates of the program will engage in lifelong learning, career enhancement and adapt to evolving societal and environmental needs, maintaining professional ethics.

PEO5. Graduates of the program will apply the contextual know-how and reasoning to address issues related health safety and socio-cultural consideration and appreciate impact of Electrical & Electronics Engineering solutions for above areas and environmental sustainability.

PROGRAM OUTCOMES
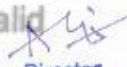
Engineering Graduates will be able to:

PO1.Engineering knowledge: Apply knowledge of Basic Sciences, Mathematics, Engineering Fundamentals of Electrical and Electronics Engineering to solve the complex engineering problems.

PO2.Problem analysis: Systematically analyse the complex engineering problems and substantiate conclusions employing the basic concepts of Mathematical, Natural and Engineering sciences.

PO3.Design/development of solutions: Develop viable solutions for the complex Engineering problems & processes and design the system components satisfying the specific needs of public health, safety and socio-environmental considerations.

PO4.Conduct investigations of complex problems: Investigate complex engineering problem using research based knowledge and methods to arrive at valid conclusion.

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PO5.Modern tool usage: Develop the competence of modern engineering and IT tools and apply them appropriately to predict and model complex engineering problems and systems.

PO6.The engineer and society: Apply the contextual knowledge and reasoning to assess the issues like health, safety, legal and socio-cultural considerations relevant to the professional electrical engineering practices.

PO7.Environment and sustainability: Appreciate the impact of professional electrical engineering solutions on the society and environment and their sustainability.

PO8.Ethics: Practice good professional ethics, responsibilities and norms.

PO9.Individual and team work: Work effectively as individual and team member in a multidisciplinary setting.

PO10.Communication: Communicate effectively with the engineering fraternity and society about complex electrical engineering problems; comprehend and write reports, design documentation and make presentations.

PO11.Project management and finance: Apply the understanding of engineering and management principles at work places and handle projects in multi-disciplinary environment.

PO12.Life-long learning: Develop an urge for independent, lifelong learning in broader context of technological changes.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1. Apply concepts & tools of Electrical and Electronics Engineering to address problems encountered in power sector in particular and other sectors in general.

PSO2. Design, Analyze, test and install electrical machine and instruments, Modern Power System and its components and microprocessor & microcontroller based systems.

Cos: Engineering Physics (BAS101)

(w.e.f. Session: 2022-23)

DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

C201.1: To explain the distribution of energy in black body radiation and to **differentiate** between particle and wave nature with an explanation of Compton's effect and Schrodinger's wave equation.

C201:2: To explain the concept of displacement current and the consistency of Ampere's law, as well as to **examine** the properties of electro-magnetic waves in various mediums using Maxwell's equations.

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PO-CO MAPPING

(w.e.f. Session: 2022-23)

ram outcomes		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
AS101 INEERING HYSICS	C101.1	3	3	2	3	3							3	3	2
	C101.2	3	3	2	3	3							3	3	2
	C101.3	1	1	1	1	1							1	1	1
	C101.4	3	3	2	3	3							3	3	2
	C101.5	1	1	1	1	1							1	1	1

3: Strongly Related   2: Moderately Related   1: Weakly related   0: Not related

........andang Sharma
[Subject Teacher]

....
[NBA Coordinator]

HoD, AS & H

Director
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DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S): ME

PEO 1. The graduates of the mechanical engineering progamme will have adequate knowledge of science, mathematics and management field to suitably use it in practical problem studies and analysis to arrive at right solutions/decisions.

PEO 2. The graduate of the mechanical engineering programme will have sound and in-depth knowledge and skill of core mechanical fields viz. Machine Design, Manufacturing Technology, Thermal Sciences (Basics & Applied), CAD/CAM, hydraulics and mechanics, Strength of Materials and Materials Science in particular and other associated fields of mechanical engineering in general. The graduates of mechanical engineering programme will have successful professional careers.

PEO 3. The graduates of mechanical engineering programme will acquire additional advanced and updated knowledge through modified curriculum by making use of technological facilities available in centre of excellence (Tifac-core) of the institute.

PEO 4. To promote institute and industry relations through regular interactions and by creating memorandum of understanding between the two. The graduates of mechanical engineering will be capable of demonstrating their management skills as leaders/members of a team in engineering assignments.

PEO 5. The graduates of mechanical engineering programme will continue to learn and to adapt in a world of constantly evolving technology. The graduate of mechanical engineering programme will be capable of continuing further higher studies at National and international level.

PROGRAM OUTCOMES

PO 1. Engineering knowledge :- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Problem analysis :- Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design/development of solutions :- Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for the public health and safety, the cultural, societal, and environmental considerations.

PO 4. Conduct investigations of complex problems :- Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Modern tool usage :- Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. The engineer and society :- Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Environment and sustainability :- Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Ethics :- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Individual and team work :- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communication :- Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Project management and finance :- Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Life-long learning :- Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1. Research Skills :- Use research based knowledge to conduct investigations, analysis and interpretation of the information from relevant literature to arrive at valid conclusions.

PSO 2. Analytical Skills :- Identify, formulate and analyze complex engineering problems related to mechanical engineering domain.

PSO 3. Problem-Solving Skills :- Apply knowledge of mathematics and science to solve engineering problems in the broad area of thermal, design and production and simultaneously develop problem solving skills.

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Cos: Engineering Physics (BAS101)

(w.e.f. Session: 2022-23)

DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

C201.1: To explain the distribution of energy in black body radiation and to **differentiate** between particle and wave nature with an explanation of Compton's effect and Schrodinger's wave equation.

C201:2: To explain the concept of displacement current and the consistency of Ampere's law, as well as to **examine** the properties of electro-magnetic waves in various mediums using Maxwell's equations.

C201:3: To recognize wave behavior using various examples and applications of interference and diffraction phenomena, as well as to **interpret** the concepts of grating and resolving power.

C201:4: To describe the functioning of optical fiber, its properties, and to **distinguish** between different types of optical fiber. To understand the concept, properties, and applications of lasers.

C201:5: To **describe** the properties and applications of superconducting materials and nanomaterials.

PO-CO MAPPING

(w.e.f. Session: 2022-23)

Program outcomes		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
5101 GG. SICS	C101.1	3	3	2	3	3							3	3	2	3
	C101.2	3	3	2	3	3							3	3	2	3
	C101.3	1	1	1	1	1							1	1	1	1
	C101.4	3	3	2	3	3							3	3	2	3
	C101.5	1	1	1	1	1							1	1	1	1

3: Strongly Related   2: Moderately Related   1: Weakly related   0: Not related

Dr. Bandana Shayne
[Subject Teacher]

[NBA Coordinator]

HoD, Ajay Kumar Garg Engg. College
Director
Ghaziabad

JAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
7th KM Stone, Delhi-Meerut Expressway, Adhyatmik Nagar, Ghaziabad - 201009

AKGEC/D.A./Notices/2023-24/007
20th November 2023

ACADEMIC CALENDAR FOR I/II YEAR, ODD SEMESTER, 2023-24

Activity	Date	Day
Registration of B.Tech II Year Regular Students	4th September 2023	Monday
Commencement of B.Tech II Year Classes for regular students	5th September 2023	Tuesday
Registration of B.Tech/MCA/M.Tech I Year and B.Tech II year Lateral entry Students	29th September – 2nd October 2023	Friday- Monday
Commencement of Induction Program and Classes for B.Tech/MCA/M.Tech I Year and B.Tech II year Lateral entry Students	3rd October 2023	Tuesday
Sessional Test-1 (2 Unit, 2 Hour) of B.Tech II Year regular students	9th – 14th October 2023	Monday-Saturday
Last Date of Distribution of corrected answer scripts	19th October 2023	Thursday
Mid Term Lab Assessment of B.Tech II Year Regular students	16th – 20th October 2023	Monday-Friday
Mid Term Lab Assessment of B.Tech/MCA/M.Tech I Year and B.Tech II year Lateral entry Students	6th to 10th November 2023	Monday-Friday
Sessional Test-1 (2 Unit, 2 Hour) of B.Tech/MCA/M.Tech I Year and B.Tech II year Lateral entry Students *B.Tech II year Regular students will attend full day classes*	21st – 28th November 2023	Tuesday – Tuesday
Last Date of Distribution of corrected answer scripts	1st December 2023	Friday
Sessional Test-2 of all B.Tech/MCA/M.Tech I Year and B.Tech II year students (2 Hour)	26th December 2023 – 3rd January 2024	Tuesday – Wednesday
Last Date of Distribution of corrected answer scripts of ST2	8th January 2024	Monday

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13	End Term Lab Assessment of all B.Tech/MCA/M.Tech I Year and B.Tech II year students	22nd January – 2nd February 2024	Monday-Friday
14	Last day of Teaching for all of B.Tech/MCA/M.Tech I Year and B.Tech II year students	2nd February 2024	Friday
15	Pre University Test (PUT) of all B.Tech/MCA/M.Tech I Year and B.Tech II year students	5th – 16th February 2024	Monday-Friday
	Last date of submitting Pre University Test Marks	21st February 2024	Wednesday
17	End Semester Theory Examination (External) of B.Tech/MCA/M.Tech I Year and B.Tech II year students	25th February – 20th March 2024	Sunday- Wednesday
18	End Semester Practical Examination (External) of B.Tech/MCA/M.Tech I Year and B.Tech II year students	21st – 26th March 2024	Thursday-Tuesday

Departments are required to plan and conduct additional classes for the branch change students to cover the syllabus. The ST1 for the new subjects (except common subjects of the second year) must be organized and conducted at the departmental level before the commencement of ST2.

26/11/23

Dr. Hemant Ahuja
Dean Academics

Ajay Kumar Garg Engineering College, Ghaziabad
Faculty Wise Time Table

Name of the Faculty : Dr.Bandana Sharma   Department : AS&HUM   Sem. : I   Year/Session : 2023-24

PERIOD/DAY	1 8:30-9:20	2 9:20-10:10	3 10:10-11:00	4 11:00-11:50	5 11:-50-12:40	6 12:40-1:30	7 1:30-2:20	8 2:20-3:10	9 3:10-4:00	LOAD L	T	P	PR/S	Total
MONDAY	S-1			S-10			OE	S-10A		15		8		19
TUESDAY	S-10	S-1					OE							
WEDNESDAY		S-1			S-1A		OE	S-10						
THURSDAY	S-10				S-1		OE							
FRIDAY		S-1B		S-10B			S-1	S-10						
SATURDAY	S-1			S-10										

Read by: _____

Signature : _____

Date: 03/10/2023

I/CTT   H OD I/C

S.No.	Sub Code/Lab Code	Sub Name/ Lab Name	Course	Semester	Section	Venue
1.	BAS101/BAS151	Engineering Physics/Engineering Physics Lab	B.TECH	I	S-1	LT- 8
2.	BAS101/BAS151	Engineering Physics/Engineering Physics Lab	B.TECH	I	S-10	LT-17

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DETAILED SYLLABI

B. Tech. First Year
(All Branches except Agriculture Engineering and Biotechnology)

Effective from Session 2022-23

B. Tech. First Year, Semester- I
(All Branches except Agriculture Engineering and Biotechnology)

3- WEEKS STUDENT INDUCTION PROGRAMME
in the beginning of the session

N	Subject Code	Subject Name	Type	Category	Period			Sessional Component		Sessional (SW) (TS/PS)	End Semester Examination (ESE)	Total	Credit
					L	T	P	CT	TA	CT+TA	TE/PE	SW+ESE	Cr
1.	BAS101/ BAS102	Engineering Physics/ Engineering Chemistry	T	BS	3	1	0	20	10	30	70	100	4
2.	BAS103	Engineering Mathematics-I	T	BS	3	1	0	20	10	30	70	100	4
3.	BEE101/ BEC101	Fundamentals of Electrical Engineering/ Fundamentals of Electronics Engineering	T	ES	2	1	0	20	10	30	70	100	3
4.	BCS101/ BME101	Programming for Problem Solving/ Fundamentals of Mechanical Engineering	T	ES	2	1	0	20	10	30	70	100	3
5.	BAS104/ BAS105	Environment and Ecology/ Soft Skills	T	BS/ HS	3	0	0	20	10	30	70	100	3
6.	BAS151/ BAS152	Engineering Physics Lab/ Engineering Chemistry Lab	P	BS	0	0	3	-	50	50	50	100	1
7.	BEE151/ BEC151	Basic Electrical Engineering Lab/ Basic Electronics Engineering Lab	P	ES	0	0	3	-	50	50	50	100	1
8.	BCS151/ BAS155	Programming for Problem Solving Lab/ English Language Lab	P	ES/ HS	0	0	3	-	50	50	50	100	1
9.	BCE151 / BWS151	Engineering Graphics & Design Lab/ Workshop Practice Lab	P	ES	0	1	3	-	50	50	50	100	2
					13	5	12				350	550	900	22

Abbreviation Used:
BS: Basic Science Course
ES: Engineering Science Course
HS: Humanities and Social Science Course
VA: Value Added Course

ars

Bandana Sharma)

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BAS101 / BAS201: ENGINEERING PHYSICS

Content	Contact Hours
Unit-1: Quantum Mechanics	9
Inadequacy of classical mechanics, Planck's theory of black body radiation(qualitative), Compton effect, de-Broglie concept of matter waves, Davisson and Germer Experiment, Phase velocity and group velocity, Time-dependent and time-independent Schrodinger wave equations, Physical interpretation of wave function, Particle in a one-Dimensional box.	
Unit-2: Electromagnetic Field Theory	8
Basic concept of Stoke's theorem and Divergence theorem, Basic laws of electricity and magnetism, Continuity equation for current density, Displacement current, Maxwell equations in integral and differential form, Maxwell equations in vacuum and in conducting medium, Poynting vector and Poynting theorem, Plane electromagnetic waves in vacuum and their transverse nature. Relation between electric and magnetic fields of an electromagnetic wave, Plane electromagnetic waves in conducting medium, Skin depth.	
Unit-3: Wave Optics	10
Coherent sources, Interference in uniform and wedge shaped thin films, Necessity of extended sources, Newton's Rings and its applications, Introduction to diffraction, Fraunhoffer diffraction at single slit and double slit, Absent spectra, Diffraction grating, Spectra with grating, Dispersive power, Resolving power, Rayleigh's criterion of resolution, Resolving power of grating.	
Unit-4: Fiber Optics & Laser	9
Fibre Optics: Principle and construction of optical fiber, Acceptance angle, Numerical aperture, Acceptance cone, Step index and graded index fibers, Fiber optic communication principle, Attenuation, Dispersion, Application of fiber. **Laser:** Absorption of radiation, Spontaneous and stimulated emission of radiation, Population inversion, Einstein's Coefficients, Principles of laser action, Solid state Laser (Ruby laser) and Gas Laser (He-Ne laser), Laser applications.	
Unit-5: Superconductors and Nano-Materials:	8
Superconductors: Temperature dependence of resistivity in superconducting materials, Meissner effect, Temperature dependence of critical field, Persistent current, Type I and Type II superconductors, High temperature superconductors, Properties and Applications of Super-conductors. **Nano-Materials:** Introduction and properties of nano materials, Basics concept of Quantum Dots, Quantum wires and Quantum well, Fabrication of nano materials -Top-Down approach (CVD) and Bottom-Up approach (Sol Gel), Properties and Application of nano materials.	

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Course Outcomes:

On completion of course the students are able :

CO	CO Statement	Bloom's Level
CO1	To explain the distribution of energy in black body radiation and to understand the difference in particle and wave nature with explanation of Compton effect and Schrodinger wave equation.	Understanding, Apply
CO2	To understand the concept of displacement current and consistency of Ampere's law and also the properties of electromagnetic waves in different medium with the use of Maxwell's equations.	Understanding, Analyze
CO3	To understand the behavior of waves through various examples/applications of interference and diffraction phenomenon and the concept of grating and resolving power.	Apply
CO4	To know the functioning of optical fiber and its properties and applications. To understand the concept, properties and applications of Laser.	Understanding, Apply
CO5	To know the properties and applications of superconducting materials and nano materials.	Understanding

Reference Books:

1. Concepts of Modern Physics - Aurthur Beiser (Mc-Graw Hill)
2. Optics - Brijlal & Subramanian (S. Chand)
3. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)
4. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)
5. Engineering Physics-Malik HK and Singh AK (Mc Graw Hill)

Dr. Bandana Sharma

AJAY KUMAR GARG ENGINEERING COLLEGE GHAZIABAD
DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

LECTURE DELIEVERY NOTES

Course : B.Tech.

Year: I

Sem: I

Branches: CSE, CSE (AI&ML), CSE(DS), AI&ML, EN, ME

Section: ......S1.S10.

Subject: ENGINEERING PHYSICS

Subject Code: BAS-101

No. of Units: 5

No. of Topics:50

Reference Books

1. Concepts of Modern Physics - Aurthur Beiser (Mc-Graw Hill)

2. Optics - Brijlal & Subramanian (S. Chand)

3. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)

4. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)

5. Engineering Physics-Malik HK and Singh AK (Mc Graw Hill)

Dr. Bandana Shaww

Faculty Sign

ISO In-Charge Sign

HOD Sign

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Ghaziabad

AJAY KUMAR GARG ENGINEERING COLLEGE GHAZIABAD
DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

COURSE: B.Tech. **Sem: I** **Name of Faculty:** Dr. Bandana Sharma

Subject Code: BAS101 **Name of the subject:** Engineering Physics

Type of Course: Regular course

Internal Marks : 30 **External Marks : 70**

Contact Hours and type of course:

L	T	P
5	0	0

Course Assessment Methods:

S.No	Assessment Type	Frequency	Held At	Weightage
1	CLASS TEST	Twice in a semester	College level	05
2	SESSIONAL TEST-1	Once a Semester	College level	50
3	SESSIONAL TEST-2	Once a Semester	College level	50
4	PRE-UNIVERSITY TEST	Once in a Semester	College level	70 .
5	END SEMESTER EXAMS	Once in a Semester	University level	70

UNIT	No of Topics	No of lectures scheduled	No of lectures held (Section:9J.)	
1	9	11	14	⁹ᵈ 1CM 1Ex. topic
2	9	10	13	¥ I End
3	10	12	20	* 1CT+ 2SP 1 Extra
4	9	9	11.	¥ 2ST+1 fet
5	8	8	1F.	* 1Crd
Extra topic	5	5	5	
Total units-5	**Total Topics- 50**	**Total Lectures-55**	**Total Lectures-.14**	

Target Details:

S.No.	Target		ST-1	ST-2	PUT	UT
1	Academic	Pass %	80	90	90	100
		Class Average	50	50	55	60
2	Attendance		95	95	95	

Prerequisites: An understanding of fundamental concepts and the mathematical foundations of

1 Classical Mechanics

2 Electrostatics and Magnetostatics

3 Optics (interference and diffraction)

4 Light-matter interactions

5 Materials and Their Characteristics

Pre-requisite for the following courses:

Electromagnetic Field Theory

Optical Communication

Material Science

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BAS101: ENGINEERING PHYSICS: COURSE OUTCOMES

C101.1: To explain the distribution of energy in black body radiation and to **differentiate** between particle and wave nature with an explanation of Compton's effect and Schrodinger's wave equation.

C101.2: To explain the concept of displacement current and the consistency of Ampere's law, as well as to **examine** the properties of electro-magnetic waves in various mediums using Maxwell's equations

C101.3: To recognize wave behavior using various examples and applications of interference and diffraction phenomena, as well as to **interpret** the concepts of grating and resolving power

C101.4: To describe the functioning of optical fiber, its properties, and to **distinguish** between different types of optical fiber. To understand the concept, properties, and applications of lasers.

C101.5: To **describe** the properties and applications of superconducting materials and nanomaterials

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LECTURE WISE SCHEDULE

SECTION: S-1.....

UNIT 1: QUANTUM MECHANICS

S. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Inadequacy of classical Mechanics, Planck's theory of black body radiation (qualitative)	1	2	06/10 09/10	
2	Compton's Effect	2	2	11/10, 12/10	
3	De-Broglie concept of matter waves	1	1	13/10	
4	Davisson and Germer Experiment	1	2	14/10 16/10	
5	Phase velocity and group velocity	1	1	17/10	
6	Time-dependent Schrodinger's wave equations	1	1	18/10	
7	Time-independent Schrodinger's wave equations	1	1	19/10	
8	Physical interpretation of wave function and conditions fulfilled by wave function	1	1	25/10	
9	Particle in a one-Dimensional box	2	2	26/10 26/10	CT: 27/10

Lectures Scheduled = 11

Lectures held = 13+1 = 14

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LECTURE WISE SCHEDULE

SECTION: S-2...

UNIT 2: ELECTROMAGNETIC FIELD THEORY

Sl. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Basic concept of Stoke's theorem and Divergence theorem, Basic laws of electricity and magnetism	1	/	30/ 10	
2	Continuity equation for current density	1	1	31/10	
3	Displacement current, Maxwell equations in integral and differential form	1	2	1/11 2/11	
4	Maxwell equations in vacuum and plane electromagnetic wave equations in vacuum	1	1	3/11	
5	Transverse nature of electromagnetic wave in free space.	2	3	4/11 6/11 7/11	
6	Maxwell equations in conducting medium	1	1	7/11	
7	Plane electromagnetic waves in conducting medium , Skin depth	1	1	8/11	
8	Poynting vector and Poynting theorem	1	1	9/11	
9	Relation between electric and magnetic fields of an electromagnetic wave	1	2	1.0/11 20/11	

Lectures Scheduled = 10   Lectures held = 13

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LECTURE WISE SCHEDULE

SECTION: S-1.

UNIT-3: WAVE OPTICS

Sl. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Coherent sources and their formation	1	1	28|11	21|11 ⎤ ST1 21|11 ⎦
2	Interference in uniform thin films	1	1	30|11	
3	Interference in wedge shaped thin films	1	2	1|12 4|12	
4	Necessity of extended sources	1	1	5|12	
5	Newton's Ring experiment and its applications	2	3	6|12 7|12 11/12	
6	Introduction to diffraction, Fraunhoffer's diffraction at single slit	1	2	11|12 12|12	
7	Double slit diffraction and absent spectra	1	2	13|12 14|12	
8	Diffraction grating Spectra, missing order and maximum possible order with grating	2	3	15|12 18|12 19|12	
9	Dispersive power, Resolving power, Rayleigh's criterion of resolution	1	1	20|12	21/12 (cT2)
10	Resolving power of grating	1	1	22|12	2,2,7 (ST2)

Lectures Scheduled = 12   **Lectures held =** 17 +3 = 20
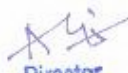
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LECTURE WISE SCHEDULE

SECTION: S-1.

UNIT 4 : FIBER OPTICS & LASER

Sl. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Principle and construction of optical fiber	1	2	4/1, 5/1	
2	Acceptance angle, Numerical aperture, Acceptance cone	1	2	8/1 8/1 (Num.)	
3	Step index and graded index fibers	1	1	9/1	
4	Attenuation, Dispersion, Application of fiber	1	1	10/1	
5	Absorption of radiation, Spontaneous and stimulated emission of radiation	1	1	11/1	
6	Einstein's Coefficients and Einstein's relation	1	1	12/1	
7	Population inversion, Principles of laser action	1	1	16/1	
8	Solid state Laser (Ruby laser)	1	1	17/1	
9	Gas Laser (He-Ne laser), Laser applications.	1	1	18/1	

Lectures Scheduled = 09   **Lectures held = 11**

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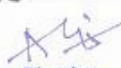
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LECTURE WISE SCHEDULE

SECTION: S4...

UNIT 5: SUPERCONDUCTORS AND NANOMATERIALS

Sl. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Temperature dependence of resistivity in superconducting materials	1	1	19/1	
2	Meissner effect, Temperature dependence of critical field, Persistent current	1	2	23/1 23/1	
3	Type I and Type II superconductors	1	1	24/1	
4	High temperature superconductors, Properties and Applications of Super-conductors	1	2	25/1 25/1	
5	Nano-Materials: Introduction and properties of nano materials	1	1	27/1	
6	Basics concept of Quantum Dots, Quantum wires and Quantum well	1	1	29/1	
7	Fabrication of nano materials –Top Down approach (CVD) and Bottom-Up approach (Sol Gel)	1	2	31/1 1/2	
8	Properties and Application of nano materials	1	1	2/2	

Lectures Scheduled = 08　　　　　　　　　　　　　　　Lectures held = 11

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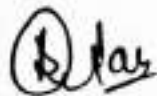
EXTRA TOPICS COVERAGE

	Topic	Related Unit	Related CO	No. of Lectures required	No. of Lectures held	Held on Date	Remarks
	Heisenberg Uncertainty principle and its application	1	CO1	1	1	10/11	
	Radiation pressure and momentum	2	CO2	1	1	8/11	
	Young's double slit experiment and Fresnel's Biprism experiment	3	CO3	1	1	29/11	
	Main components of a laser system	4	CO4	1	1	15/1	
5	Carbon nanotubes (CNTs)	5	CO5	1	1	30/1	

Total Lectures Scheduled.........55.......... Total Lectures held.......14.................

Books Required:

1. Concepts of Modern Physics - Aurthur Beiser (Mc-Graw Hill)

2. Optics - Brijlal & Subramanian (S. Chand)

3. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)

4. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)

5. Engineering Physics-Malik HK and Singh AK (Mc Graw Hill)

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XTRA TOPIC CO-PO MAPPING WITH JUSTIFICATION: ENGINEERING PHYSICS

	Topic	Related Unit	Relevance to COs	Relevance to POs/PSOs	Justification
	Heisenberg Uncertainty principle and its application	1	CO1	PO1-PO5, PO12, PSO1, PSO2	The Heisenberg Uncertainty Principle is the outcome of wave mechanics, so this concept was introduced so that students could understand how this concept is applicable for microscopic particles.
2	Radiation pressure and momentum	2	CO2	PO1-PO5, PO12, PSO1, PSO2	The concept of radiation pressure arises due to the exchange of momentum between the electromagnetic field and the object. This force is seen since electromagnetic waves carry transport momentum. Since radiation pressure is used in many applications, its basic description is added as an extra topic.
3	Young's double slit experiment and Fresnel's Biprism experiment	3	CO3	PO1-PO5, PO12, PSO1, PSO2	Young's double slit experiment and Fresnel's biprism experiment is the best examples to understand how coherent sources are generated to get a sustained interference pattern.
4	Main components of a laser system	4	CO4	PO1-PO5, PO12, PSO1, PSO2	In order to understand the complete working of a laser, it is essential to understand the main components of a laser. So, the description of these components and their roles is included in the extra topics.
5	Carbon nanotubes (CNTs)	5	CO5	PO1-PO5, PO12, PSO1, PSO2	Carbon nanotubes (CNTs) have attracted significant interest due to their unique combination of properties, which make them suitable for a wide range of applications in areas from electronics to biotechnology and other applications. So their description is added as an extra topic.

Bandana Shaima

Faculty Name & Signature

NBA Coordinator

HOD Signature

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AJAY KUMAR GARG ENGG.COLLEGE GHAZIABAD
TUTORIAL SHEET 1

DEPARTMENT: AS & HUMANITIES
SEMESTER: I
SUB.CODE: BAS101
OBE REMARKS:

COURSE: B.TECH
SUBJECT- ENGINEERING PHYSICS

Q.NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Co No.	C O1	C O1	C O1	C O1	C O1	C O1	C O1	C O1	C O1	C O2	C O2	C O2	C O2	C O2	C O3	C O3	C O3	C O3	C O3
Bloom level	L2	L3	L5	L3	L5	L2	L5	L5	L5	L4	L3	L4	L3	L3	L4	L2	L3	L4	L4

Q.NO	20	21	22	23	24	25	26
Co No.	C OL	C O3	C O3	C O3	C O3	C O3	C Q3
Bloom level	L2	L3	L5	L3	L5	L2	L5

Bloom's Level: L1: Remember, L2: Understand, L3: Apply, L4: Analyze, L5: Evaluate, L6: Create

Submission Date: ....

1. Explain wave-particle duality. What are matter waves? Find the de-Broglie wavelength associated with an electron which is accelerated through 50 volt.
2. Derive Schrodinger's time independent and time dependent equation. A particle is in motion between x = 0 and x = a with zero potential energy. At points for which x < 0 and x >a, the potential energy is infinite. Solving Schrodinger's equation, obtain energy eigen values and normalized wave function for the particle. Also plot first three allowed wave wave functions.
3. What is black body radiation? Describe the distribution of energy in the spectrum of black body radiation.
4. What is Planck's quantum hypothesis of radiation? Establish Planck's radiation formula and show that Wien's formula and Rayleigh Jeans's formula are special cases of Planck's formula.
5. What is Compton's effect? Derive an expression for Compton's shift.
6. Define phase velocity. Derive expression for them. Prove that phase velocity of de-Broglie wave is greater than speed of light. (with necessary diagram)
7. What is the physical significance of wave function Ψ? What conditions must it fulfill?
8. Describe Davisson Germer experiment to describe wave nature of electron.
9. Calculate the wavelength associated with1MeV electron, 1MeV proton, 1MeV photon.
10. An X-ray of wavelength 1.1A is incident on a calcite crystal. Find the wavelength of X-ray scattered at 45° angle.

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Director

11. Explain the concept of Maxwell's Displacement current. Why there is a need of modification in Ampere's law? Write differential form of Ampere's law.

12. Derive Maxwell's equations and explain their physical significance.

13. Derive plane electromagnetic wave equations in free space. And prove that velocity of electromagnetic space is equal to speed of light. Prove that E M wave are transverse in nature.

14. Derive wave equations in conducting medium. Show that EM wave propagating in conducting medium is an attenuated wave. Derive an expression for skin depth.

15. Define Poynting vector. Deduce Poynting theorem for the flow of energy in an electromagnetic field and explain its physical significance.

16. Find the skin depth δ at a frequency of 3.0×10^6 Hz in aluminium where $\sigma = 38.0 \times 10^6$ S/m and $\mu_r = 1$.

17. For a conducting medium, $\sigma = 5.8 \times 10^6$ Siemens/m and $\varepsilon_r = 1$. Find out the conduction and displacement current densities if the magnitude of electric field intensity E is given by $E = 150 \sin (10^{10} t)$ Volt/m.

18. The sunlight strikes the upper atmosphere of earth with energy flux 1.38kWm^{-2}. What will be the peak values of electric and magnetic field at the points?

19. The energy flux of 10watt/m² of a laser beam is incident on an ideal plane mirror for one hour. Find the momentum imparted in the mirror during this time and force.

20. A 100W sodium lamp radiating its power. Calculate the electric and magnetic field strength at a distance of 5m from the lamp.

21. White light falls normally on a thin film of soapy water whose thickness is $1.5 \times 10^{-5} cm$ and refractive index is 1.33. Which wavelength in the visible region will be reflected strongly?

22. A soap film of refractive index 1.43 is illuminated by white light at an angle of 30°. The refracted light is examined by a spectroscope in which dark band corresponding to the wavelength $6 \times 10^{-7} m$ is observed. Calculate the thickness of the film.

23. White light is incident on a soap film at an angle of $\sin^{-1}(4/5)$ and the reflected light is observed with a spectroscope. It is observed that two consecutive bands correspond to wavelength 6.1×10^{-5} cm and 6.0×10^{-5} cm. if the refractive index of the film be 4/3, calculate the thickness.

24. In Newton's ring experiment the diameter of 4th and 12th dark rings are 0.400 cm and 0.700 cm respectively. Deduce the diameter of 20th dark ring. (0.906)

25. Newton's rings are formed in reflected light of wavelength 6000Å with a liquid between plano convex lens and glass plate. If the diameter of sixth bright ring is 3.1mm and radius of curvature is 100cm, calculate the refractive index of liquid.

26. A diffraction grating used at normal incidence gives a yellow line ($\lambda = 6000$Å) in a certain spectral order superimposed on a blue line ($\lambda = 4800$Å) of next higher order. If the angle of diffraction is $\sin^{-1}(3/4)$, calculate the grating element.

AJAY KUMAR GARG ENGG.COLLEGE GHAZIABAD
TUTORIAL SHEET 2

DEPARTMENT: AS & HUMANITIES
SEMESTER: I
SUB.CODE: BAS101
OBE REMARKS:

COURSE: B.TECH
SUBJECT- ENGINEERING PHYSICS

Q.NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Co No.	C 03	C 03	C 03	C 03	C 03	C 03	C 03	C 03	C 04	C 04	C 04	C 04	C 04	C 04	C 04	C 04	C 05	C 05	C 05
Bloom level	L2	L3	L5	L3	L5	L2	L5	L5	L5	L4	L3	L4	L3	L3	L4	L2	L3	L4	L4

Q.NO	20	21	22	23
Co No.	C 05	C 05	C 05	C 05
Bloom level	L2	L3	L5	L3

*Bloom's Level: L1: Remember, L2: Understand, L3: Apply, L4: Analyze, L5: Evaluate, L6: Create

Submission Date: ....

1. Derive an expression for diameters of bright and dark rings in reflected light.
2. In Newton's ring experiment the diameter of 4th and 12th dark rings are 0.400 cm and 0.700 cm respectively. Deduce the diameter of 20th dark ring. (0.906)
3. Newton's rings are formed in reflected light of wavelength 6000Å with a liquid between plano convex lens and glass plate. If the diameter of sixth bright ring is 3.1mm and radius of curvature is 100cm, calculate the refractive index of liquid.
4. Derive an expression for maximas and minimas in single slitt diffraction.
5. A diffraction grating used at normal incidence gives a yellow line (λ=6000Å) in a certain spectral order superimposed on a blue line (λ=4800Å) of next higher order. If the angle of diffraction is $\sin^{-1}(3/4)$, calculate the grating element.
6. A diffraction grating used at normal incidence gives a green line (5400Å)in a certain order superimposed on the violet line (4050Å) of the next higher order. If the angle of diffraction is 30°, calculate the value of n. Also find how many lines per cm are there is the gratings?
7. How many orders will be visible if the wavelength of incident radiation is 5000Å and the number of lines on the grating is 2620 to an inch.
8. Derive an expression for resolving power of a grating.
9. What sis the basic principle of communication in optical fibres. Describe its main components
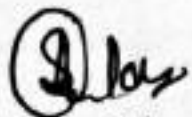10. Define acceptance angle and numerical Aperture in optical fibers. Derive an expression for acceptance angle and Numerical Aperture with suitable diagram.
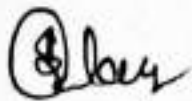
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11. A step index fiber has a core and cladding refractive indices 1.466 and 1.460 respectively. Calculate critical angle, acceptance angle and Numerical Aperture.

12. Discuss the classification of optical fibers. on the basis of refractive index. Explain the propagation mechanism in these optical fibers. What do you understand by attenuation in optical fibers, give factors responsible for it?

13. A laser has two states at 300K. If it emits radiation of wavelength 6000 Å, then calculate population ratio N_2/N_1.

14. What is the importance of metastable states in laser action? Explain with suitable diagram.

15. The optical power, after propagating through a fiber that is 500m long is reduced to 25% of its original value. Calculate the fiber loss in dB/km.

16. Describe construction, working and energy level diagram of Ruby laser.

17. What is critical magnetic field? Describe the dependence of temperature on magnetic field in superconductors.

18. What is Meissner effect? Describe type-1 and type-2 superconductors.

19. What are the properties of High TC superconductors?

20. A superconducting tin has a critical temperature of 3.7 K at zero magnetic fields and a critical field of 0.0306 Tesla at 0 K. Find the critical field at 2 K.

21. Calculate the critical current and current density for a wire of a lead having a diameter of 1 mm at 4.2 K. The critical temperature for lead is 7.18 K and H = 6.5×10^4 A m^{-1}.

22. Find the critical current which can pass through a long thin superconducting wire of aluminum of diameter 2 mm, the critical magnetic field for aluminum is 7.9×10^3 A m^{-1}.

23. Calculate the critical current which can flow through a long thin super conducting wire of diameter 1 mm. The critical magnetic field is 7.9×10^3 Amp m^{-1}.

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AKGEC/IQAC/QP//02

Ajay Kumar Garg Engineering College, Ghaziabad
Department of Applied Sciences & Humanities
CLASS TEST-1

Course: B.Tech
Session: 2023-24
Subject: Engineering Physics
Max Marks: 10

Semester: I
Sections: S.1
Sub. Code: BAS-101
Time: 40 Min

Q.NO	1	2	3	4	5
Co No.	I	I	-	-	-
Bloom level	L3	L4	-	-	

LI: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate
L6: Create.

Note: Answer all questions

1) Derive time indepent Schrodinger's wave equation and explain physical significance of ψ. What are the condition which must be fullfilled by ψ

2) Derive an expression for compton's shift. Prove that Compton's shift depends upon angle of scattering.

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Ajay Kumar Garg Engineering College, Ghaziabad
Department of Applied Sciences & Humanities
CLASS TEST-1

Course: B.Tech
Session: 2023-24
Subject: Engineering Physics
Max Marks: 10

Semester: I
Sections: S1o.
Sub. Code: BAS-101 4
Time: 40 Min

Q.NO	1	2	3	4	5
Co No.	1	1			
Bloom level	L5	L6			

L1: Remember, L2: Understand, L3: Apply, L4: Analyse, L5: Evaluate, L6: Create.

Note: Answer all questions

1) Solve Schrödinger's wave equation for a particle enclosed in one dimensional infinite potential box of width 'a'. Find energy eigen values and eigen functions.

2) Explain wave particle duality. Find the de-Broglie wavelength associated with 20.6 eV neutron.
$$\left(M_{on} = 1.67 \times 10^{-27} kg, \quad C = 3 \times 10^8 \, m/s, \quad h = 6.623 \times 10^{-34} \, J\text{-}s \right)$$

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AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

Sessional Test

Program: B.Tech.
Session: 2023-24
Subject: Engineering Physics
Max. Marks: 50

Semester: I
Section: S1, S2, S3, S4, S5, S6, S7, S8, S9, S10
Subject Code: BAS101/BAS101H
Time: 2 Hours

OBE Remarks:

Q.No	1	2	3	4	5	6	7	8	9	10	11	12
CO No.	CO1	CO1	CO2	CO2	CO1/CO2	CO1	CO1	CO2	CO2	CO2/CO1	CO1	CO2
Bloom's Level* (L1 to L6)	L3	L2	L2	L3	L5	L2	L5	L4	L2	L4	L4	L3
Weightage CO1:28.5						Weightage CO2:21.5						

Bloom's Level: L1: Remember, L2: Understand, L3: Apply, L4: Analyze, L5: Evaluate, L6: Create

Note: Answer **all** the sections with all the questions.

सभी अनुभागों के सभी प्रश्नों के उत्तर दें

Section-A   (2*5=10)

1. What is phase velocity? Prove that phase velocity is greater than velocity of light
   चरण वेग क्या है? सिद्ध कीजिए कि चरण वेग प्रकाश के वेग से अधिक है

2. What are the postulates of Planck's quantum theory? Write Planck's radiation formula.
   प्लैंक के क्वांटम सिद्धांत के सिद्धांत क्या हैं? प्लैंक का विकिरण सूत्र लिखिए।

3. Write equation of continuity and what is its physical significance?
   सातत्य का समीकरण लिखिए तथा इसका भौतिक महत्व क्या है?

4. Using Maxwell's fourth equation derive Maxwell's first equation.
   मैक्सवेल के चौथे समीकरण का उपयोग करके मैक्सवेल का पहला समीकरण प्राप्त करें।

5. What voltage must be applied to an electron microscope to produce electrons of wavelength 0.32 Å.
   (where $h = 6.625 \times 10^{-34}$ Js, $c = 3 \times 10^{8}$ m s, rest mass of electron $= 9.1 \times 10^{-31}$ kg)

   0.32 Å तरंग दैर्घ्य के इलेक्ट्रॉन उत्पन्न करने के लिए इलेक्ट्रॉन माइक्रोस्कोप पर कौन सा वोल्टेज लगाया जाना चाहिए।

Section-B   (5*5=25)

6. Derive time independent Schrodinger's wave equation. Explain physical significance of wave function.

   समय से स्वतंत्र श्रोडिंगर तरंग समीकरण व्युत्पन्न करें। तरंग फलन का भौतिक महत्व समझाइये।

7. A particle is enclosed in one dimensional infinite potential box of width L. Find the energy eigen values and eigen functions for this particle. A particle is moving in 1D potential box of width 1nm.

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Paper Id: | 199101 | Roll No: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]   Sub Code:KAS101

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B. TECH.
(SEM-I) THEORY EXAMINATION 2019-20
PHYSICS

Time: 3 Hours   *Total Marks: 100*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.   2 x 10 = 20

a.	What are inertial and non-inertial frames of reference? Is an aircraft in steady flight an inertial frame or non-inertial frame?
b.	Show that massless particle can exit only if they move with the speed of light and their energy E and momentum p must be related as $E = pc$.
c.	What do you mean by impedance of a wave?
d.	What is the difference between electromagnetic wave and matter wave?
e.	Interpret Bohr's quantization rule on the basis of de-Broglie concept of matter wave.
f.	Two independent sources could not produce interference, why?
g.	What is dispersive power of plane transmission grating?
h.	Why model dispersion is negligible in single mode fiber?
i.	Why population inversion is necessary for laser action?
j.	How can you say that He-Ne laser is superior to Ruby laser?

SECTION B

2. Attempt any *three* of the following: 10x3=30

a.	What is time dilation? Aman leaves the earth in a rocket ship that makes a round trip to the nearest star which is 4 light years away at speed of 0.8c. How much younger will he be on his return than that of his twin brother who preferred to stay behind?
b.	The sunlight strikes the upper atmosphere of earth with energy flux 1.38kWm^{-2}. What will be the peak values of electric and magnetic field at the points?
c.	Calculate the de-Broglie wavelength of a neutron having kinetic energy of 1eV. (Mass of the neutron = 1.67×10^{-27} kg, h= 6.62×10^{-34} joule sec)
d.	A plane transmission grating has 16,000 lines to an inch over a length of 5 inches. Find in the wavelength region of 6000 Å, in the second order (i) the resolving power of grating and (ii) the small wavelength difference that can be resolved.
e.	Calculate the relative population of two states of the laser that produces light of wavelength 5461 Å at 300K. (Boltzmann constant K= 8.6×10^{-5} eV/K).

SECTION C

3. Attempt any *one* part of the following: 10x1=10

a.	State the fundamental postulates of special theory of relativity and deduce the Lorentz transformation equations from them and discuss how these equations account for the phenomenon of length contraction.
b.	Derive Einstein's mass-energy relation and show that relativistic kinetic energy of a particle is given by: $$k = (m - m_0)c^2 = m_0 c^2 \left[\left(1 - \frac{v^2}{c^2} \right)^{-\frac{1}{2}} - 1 \right].$$

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Paper Id: | 199101 |

Roll No: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Sub Code:KAS101

4. Attempt any *one* part of the following:

10x1=10

a.	Deduce four Maxwell equations in free space. Explain the concept of displacement current and show how it led to modification of Ampere law.
b.	State and deduce poynting theorem for the flow of energy in an electromagnetic field.

5. Attempt any *one* part of the following:

10x1=10

a.	Write down Schrodinger wave equation for particle in a one-dimensional box and solved it to find out the Eigen value and Eigen function.
b.	What is Compton Effect? How does it support the photon nature of light?

6. Attempt any *one* part of the following:

10x1=10

a.	Describe and explain the formation of Newton's rings in reflected monochromatic light. Deduce the necessary expression for bright and dark rings.
b.	Discuss the phenomenon of Fraunhofer diffraction at a single slit. Show that the intensity of the first subsidiary maximum is about 4.5% of the principal maximum.

7. Attempt any *one* part of the following:

10x1=10

a.	Explain acceptance angel and acceptance cone of a fiber? Define numerical aperture.
b.	Describe the construction and working of a Ruby laser with the help of a well labeled diagram.

Physical Constants

Rest mass of electron	m_o	$= 9.1 \times 10^{-31}$ kg
Rest mass of Proton	m_p	$= 1.67 \times 10^{-27}$ kg
Speed of light	c	$= 3 \times 10^{8}$ m/s
Planck's Constant	h	$= 6.63 \times 10^{-34}$ J-s
Charge on electron	e	$= 1.6 \times 10^{-19}$ C
Boltzmann's Constant	k	$= 1.38 \times 10^{-23}$ J-K^{-1}

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Printed pages: 02

Paper ID: | 1 | 9 | 9 | 1 | 0 | 2 |

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Roll No.

Sub Code: KAS 101

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B. Tech.

(SEM I) THEORY EXAMINATION 2018-19

PHYSICS

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data: then choose suitably.

SECTION A

1. **Attempt *all* questions in brief.**   2 x10 = 20

    a. Write down the postulates of special theory of relativity.   [CO 1]
    b. How will you show that no particle can move with a velocity greater than the velocity of light in an inertial frame?   [CO 1]
    c. Why Maxwell proposed that Ampere's law require modification?   [CO 2]
    d. What do you mean by depth of penetration?   [CO 2]
    e. Determine the de-Broglie wavelength of a photon.   [CO 3]
    f. Discuss the physical significance of a wave function.   [CO 3]
    g. Why two independent sources cannot be coherent?   [CO 4]
    h. What do you mean by resolving power of an optical instrument?   [CO 4]
    i. Distinguish between spontaneous and stimulated emissions. Which one is required for laser?   [CO 5]
    j. What is the principle of operation of an optical fiber?   [CO 5]

SECTION B

2. **Attempt any *three* parts of the following:**   10 x 3 = 30

    a. Deduce the relativistic velocity addition theorem. Show that it is consistent with Einstein's second postulate.   [CO 1]
    b. Write the Maxwell's equations in integral as well as in differential form and explain their physical significance. Show that the velocity of plane electromagnetic wave in the free space is given by $c = 1/\sqrt{(\mu_0 \varepsilon_0)}$.   [CO 2]
    c. Obtain time independent and time dependent Schrodinger's wave equations. [CO 3]
    d. Discuss the phenomenon of Fraunhfofer diffraction at a single slit and show that the relative intensities of the successive maximum are nearly   [CO 4]

$$1 : \frac{4}{9\Pi^2} : \frac{4}{25\Pi^2} : \frac{4}{49\Pi^2} \ldots\ldots\ldots$$

    e. Discuss the structure of an optical fiber. What are various types of optical fibers? Explain their advantages and disadvantages.   [CO 5]

SECTION C

3. **Attempt any *two* parts of the following:**   5 x 2 = 10

    (a) What do you mean by length contraction? Deduce the necessary expression for this.   [CO 1]
    (b) Obtain the volume of a cube, the proper length of each edge of which is *lo* when it is moving with velocity v along one edge of   [CO

the cube.

(c) Deduce an expression for the variation of mass with velocity.   [CO 1]

4. **Attempt any *two* parts of the following:** $5 \times 2 = 10$

(a) What is Poynting vector? Derive and explain Poynting theorem.   [CO 2]

(b) Deduce Coulomb's law of electro-statistics from Maxwell's first
equation.   [CO 2]

(c) · Calculate the magnitude of Poynting vector at the surface of the
sun. Given that power radiated by sun is 5.4×10^{28} watt and   [CO 2]
radius of sun is 7×10^8 m.

5. **Attempt any *two* parts of the following:** $5 \times 2 = 10$

(a) A particle is in motion along a line $x = 0$ and $x = L$ with zero
potential energy. At points for which $x < 0$ and $x > L$, the
potential energy is infinite. Solving Schrodinger equation, obtain   [CO 3]
energy eigen values & normalized wave function for the particle.

(b) What is Compton effect? Derive the necessary expression for
Compton shift.   [CO 3]

(c) Show that $\psi(x, y, z, t) = \psi(x, y, z)e^{-iwt}$ is a wave function of   [CO 3]
a stationary state.

6. **Attempt any *two* parts of the following:** $5 \times 2 = 10$

(a) Explain the formation of Newton's ring. Prove that in reflected
light the diameter of dark rings are proportional to the square   [CO 4]
root of natural numbers.

(b) Light of wavelength 6000 Å falls normally on a thin wedge-shaped
film of refractive index 1.4 forming fringes that are 2.0 mm apart. Find [CO 4]
the angle of wedge in seconds.

(c) In a grating spectrum, which spectral line in 4th order will
overlap with 3rd order line of 5461 Å.   [CO 4]

7. **Attempt any *two* parts of the following:** $5 \times 2 = 10$

(a) Describe the construction and working of Ruby Laser with neat   [CO 5]
diagram.

(b) Calculate the population ratio of two states in He-Ne laser that
produces light of wavelength 6000Å at 27°C.   [CO 5]

(c) Calculate the numerical aperture, acceptance angle, and the
critical angle of the optical fiber if the refractive index of the   [CO 5]
core is 1.50 and refractive index of cladding is 1.45.

AKGEC|IОAC| Printed Page: 1 of 2

Subject Code: KAS101T

Roll No:

BTECH
(SEM I) THEORY EXAMINATION 2021-22
ENGINEERING PHYSICS

Time: 3 Hours

Total Marks: 100

Note: Attempt all the sections. If require any missing data, then choose suitably.

Section A

1. Attempt all questions in brief: 2 x 10 = 20

Q.N.	Question	Marks	CO
a.	Differentiate between inertial and non-inertial frames.	2	1
b.	Show that the rest mass of a photon is zero.	2	1
c.	Write the similarities and dissimilarities between conduction and displacement current.	2	2
d.	Define the Poynting vector and write its unit.	2	2
e.	State the Wien's displacement law.	2	3
f.	Distinguish between modified and unmodified x-rays.	2	3
g.	The light rays from two independent bulbs do not show interference. Give the reason.	2	4
h.	State the Rayleigh criteria of resolution.	2	4
i.	What is an optical fibre? How does a light signal propagate through it?	2	5
j.	Write the essential requirements for the laser action.	2	5

Section B

3 x 10 = 30

2. Attempt any three of the following:

Q.N.	Question	Marks	CO
a.	Show that $E^2 = p^2c^2 + m_0^2c^4$	10	1
b.	Find the skin depth δ at a frequency of 3.0×10^6 Hz in aluminium where $\sigma = 38.0 \times 10^6$ S/m and $\mu_r = 1$.	10	2
c.	An electron is bound in one dimensional potential box which has width 2.5×10^{-10} m. Assuming the height of the box to be infinite, calculate the lowest permitted energy values of the electron.	10	3
d.	White light is incident on a soap film at an angle $\sin^{-1}(4/5)$ and the reflected light is observed with a spectroscope. It is found that two consecutive dark bands correspond to wavelengths 6.1×10^{-5} cm and 6.0×10^{-5} cm. If the refractive index of the film is 4/3, calculate the thickness.	10	4
e.	A communication system uses a 10 km fiber having a loss of 2.5dB/km. Compute the output power if the input power is 500µW.	10	5

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Roll No: ☐☐☐☐☐☐☐☐☐☐☐☐☐

BTECH
(SEM I) THEORY EXAMINATION 2021-22
ENGINEERING PHYSICS

Section C

3. Attempt ant one of the following:

$1 \times 10 = 10$

Q.N.	Question	Marks	CO
a.	State the postulates of special theory of relativity and derive the Lorentz transformation equations. When Lorentz transformation equations get reduced to Galilean transformation equations?	10	1
b.	State and prove the velocity addition theorem. Show that the theorem is consistent with the Einstein's second postulate.	10	1

4. Attempt any one of the following:

$1 \times 10 = 10$

Q.N.	Question	Marks	CO
a.	Establish the e-m waves' equations in free space and solve them to show that they travel with the speed of light in free space and are transverse in nature.	10	2
b.	State and prove the Poynting theorem. Show that E/H = 377 Ohm.	10	2

5. Attempt any one of the following:

$1 \times 10 = 10$

Q.N.	Question	Marks	CO
a.	What is the Planck's theory of black body radiations? Obtain an expression for the average energy of the oscillators and derive the Planck's radiation law.	10	3
b.	Write the Schrodinger's wave equation for a particle in one-dimensional box and solve it to obtain the eigen values and eigen functions.	10	3

6. Attempt any one of the following:

$1 \times 10 = 10$

Q.N.	Question	Marks	CO
a.	What do you mean by a wedge-shaped film? Discuss the interference due to it and obtain the expression for the fringe width.	10	4
b.	Discuss the formation of Newton's rings. Show that the diameters of the bright rings are proportional to the square root of odd natural numbers.	10	4

7. Attempt any one of the following:

$1 \times 10 = 10$

Q.N.	Question	Marks	CO
a.	What do you mean by acceptance angle and numerical aperture? Derive the expressions for acceptance angle and numerical aperture.	10	5
b.	What do you understand by the stimulated emission? Discuss the He-Ne laser by giving its construction and working. How He-Ne laser is superior to the Ruby laser?	10	5

Physical Constants:
Rest mass of electron m_0 = 9.1 x 10⁻³¹kg, Speed of light c = 3 x 10⁸ m/s
Planck 's Constant h = 6.63 x 10⁻³⁴ J-s, Charge on electron e = 1.6 x 10⁻¹⁹Coulomb

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Roll No: ☐☐☐☐☐☐☐☐☐☐☐☐☐

BTECH
(SEM I) THEORY EXAMINATION 2021-22
PHYSICS

Time: 3 Hours   **Total Marks: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.   2 x 10 = 20

Qno.	Question	Marks	CO
a.	What is inertial and non-inertial frame of references?	2	1
b.	Show that the massless particle can exist only if they move with the speed of light and their energy E and momentum p must have the relation E= pc.	2	1
c.	Write Maxwell's equations in non-conducting medium.	2	2
d.	Define skin depth.	2	2
e.	Distinguish electromagnetic waves and matter waves?	2	3
f.	What is de-Broglie hypothesis?	2	3
g.	What are coherent sources?	2	4
h.	State Rayleigh's criterion of resolution.	2	4
i.	Explain the propagation mechanism of optical fiber.	2	5
j.	What are the main components of laser?	2	5

SECTION B

2. Attempt any *three* of the following:

Qno.	Question	Marks	CO
a.	What is length contraction? Derive the necessary expression for it. Show that $x^2+y^2+z^2- c^2t^2$ is invariant. under Lorentz transformation.	10	1
b.	Show that the radiation pressure exerted by an electromagnetic wave is equal to the energy density. For a medium, conductivity $\sigma = 58 \times 10^6$ seimen/m, $\epsilon_r =1$. Find out the conduction and displacement current densities if the magnitude of electric field intensity is given by $E = 150 \sin (10^{10} t)$ Volt/m.	10	2
c.	Define wave function with its physical significance. Derive Schrodinger's time independent wave equation.	10	3
d.	Prove that reflection and transmission are complimentary in thin film interference.	10	4
e.	Develop the expressions for acceptance angle and numerical aperture of an optical fiber. A step index fiber has core refractive index 1.466, cladding refractive index 1.46. If the operating wavelength of the rays is 0.85 μm, calculate the cut – off parameter and the number of modes, which the fibre will support. The diameter of the core = 50 μm.	10	5

SECTION C

3. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	By using Lorentz transformation equations, derive time dilation. Show that time dilation is a real effect.	10	1
b.	Derive Einstein's mass-energy relation Calculate the amount of work to be done to increase the speed of an electron from 0.6C to 0.8C. Given that the rest mass energy of electron= 0.5 MeV.	10	1

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4. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Derive the Poynting or work-energy theorem for the flow of energy in an electromagnetic field. Also give the physical interpretation.	10	2
b.	With the help of Maxwell's equations for free space, derive electromagnetic wave equation in free space and prove that electromagnetic waves are transverse in nature.	10	2

5. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Solve Schrodinger's wave equation for a particle in one dimensional infinite potential box. Compute the energy difference between the ground state & the first excited state for an electron in a one-dimensional rigid box of length 100 A°.	10	3
b.	Define Compton effect and apply it to find an expression for the Compton shift ($\Delta\lambda$).	10	3

6. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Explain and describe the formation of Newton's rings in reflected light. Solve it for reflected light to prove that the diameters of dark rings are proportional to the square roots of natural numbers. Light of wavelength 6000 A^0 falls normally on a thin wedge-shaped film of refractive index 1.4 forming fringes that are 2.0 mm apart. Find the angle of wedge in seconds.	10	4
b.	Discuss single slit Fraunhofer's diffraction and make use to show that the relative intensities of successive maximum are nearly 1: 1/22 : 1/62 : 1/121:.....	10	4

7. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	With the help of diagram, classify and describe various types of optical fibers based on modes and core refractive index.	10	5
b.	With the help of diagram describe the process of spontaneous and stimulated emission of radiation. Also obtain an expression for Einstein's coefficients of spontaneous and stimulated emission of radiation. Analyze the value of population of two states in He-Ne laser that produces light of wavelength 6000 $\mathring{A}$ at 27°C.	10	5

Subject Name: Engineering Physics **Subject Code:** BAS101

Name of the Student: **Roll No.:**   **Sem/Section:** I/S1-S10

Aggregate %:

This course exit survey is aimed to improve the quality of content delivery in forthcoming academic sessions based on your self-assessment of the learning outcomes. Assess yourself on the basis of learnings derived after the completion of the above mentioned course. Ratings between 1 to 3 are to be assigned depending on achievement of the learning levels mentioned below:

3: Development of complete ability to accomplish the mentioned objective.
2: Development of ability to accomplish the mentioned objective with minor assistance.
1: Development of ability to accomplish the mentioned objective with major assistance.
0: Inability to accomplish the mentioned objective.

S. No.	Objective	Relevance to CO	Rating (3/2/1/0)
1.	Able to describe Schrodinger's wave function and Schrodinger's wave equations to understand the concepts of quantum mechanics	CO1/UNIT1	
2.	Able to describe Compton's effect and derive an expression for Compton's shift		
3	Able to describe Maxwell's equations, their integral and differential form, and their physical significance in electromagnetic field theory.	CO2/UNIT2	
4.	Able to describe Poynting's theorem and electromagnetic wave propagation in free space, conducting and non-conducting media.		
5.	Able to find the diameter of bright and dark rings in Newton's ring experiment and learn to use this to find the wavelength of an unknown source and the refractive index of an unknown liquid.	CO3/UNIT3	
6.	Able to describe the phenomena of diffraction in single slit and N-slit arrangements.		
7.	Able to explain fundamental laser ideas, operating principle, and types of lasers.	CO4/UNIT4	
8.	Able to describe basic concepts, construction, working principle, types and applications of optical fibres.		
9.	Able to describe critical temperature, critical magnetic field, Meissner's effect and Type-I, Type-II superconductors	CO5/UNIT5	
10.	Able to get basic idea about nanomaterial and their methods of synthesis by Top-down and Bottom-up approaches		

Dr. Bandana Sharma
(Subject Faculty)

HoD, AS & Humanities

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AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

SUBJECT	ENGINEERING PHYSICS
SUBJECT CODE	BAS101
SESSION	2022-23

INDIRECT ATTAINMENT
CSE: CO ATTAINMENT FOR PHYSICS (BAS101)

S.NO.	STUDENT NO	NAME OF STUDENT	B	SEC	CO1	CO1	CO2	CO2	CO3	CO3	CO4	CO4	CO6	CO6
1	2210175	Aayansh Gupta	CSE	S1	3	3	3	3	3	3	3	3	3	3
2	2210032	Abhi Verma	CSE	S1	3	3	3	3	3	3	3	3	3	3
3	2210049	Abhinandan Pandey	CSE	S1	3	2	3	3	3	2	3	3	3	3
4	2210103	Abhinav Mishra	CSE	S1	3	3	3	3	3	3	3	3	3	3
5	2210040	Abhineet Yadav	CSE	S1	2	3	3	3	3	3	3	2	3	2
6	2210114	Abhishek Anand	CSE	S1	3	3	3	3	3	3	3	3	3	3
7	2210176	Abhishek siddhu	CSE	S1	2	2	2	2	2	2	2	2	2	2
8	2210205	Adarsh Sharma	CSE	S1	3	3	3	3	3	3	3	3	3	3
9	2210078	Aditya kumar	CSE	S1	3	3	3	3	3	3	3	3	3	3
10	2210005	Aditya singh	CSE	S1	3	3	3	3	3	0	2	2	2	3
11	2210093	AKHAND PRATAP SINGH	CSE	S1	3	2	3	3	3	3	3	3	2	2
12	2210177	Akshay Pandey	CSE	S1	3	3	3	3	3	2	3	3	3	3
13	2210099	AMAN VERMA	CSE	S1	3	3	3	3	3	3	3	3	3	2
14	2210178	ANANYA SINGHAL	CSE	S1	3	3	3	3	3	2	3	3	3	2
15	2210017	Ankit varshney	CSE	S1	3	3	3	3	3	3	3	3	3	3
16	2210046	Nikunj Tyagi	CSE	S1	3	3	3	3	3	2	3	3	3	2
17	2210045	Rahul Yadav	CSE	S1	3	3	3	3	3	3	3	3	3	3
18	2210047	SARTHAK RASTOGI	CSE	S1	3	3	3	3	3	3	3	3	3	3
19	2210048	YASH GUPTA	CSE	S1	3	3	3	3	3	3	3	3	3	3
20	2210123	Adit Tripathi	CSE	S2	3	1	3	2	3	1	3	2	2	2
21	2210121	Ajay kumar yadav	CSE	S2	2	2	3	3	3	3	3	3	3	3
22	2210179	Aniket Pravesh Singh	CSE	S2	3	3	3	3	3	3	3	3	3	3
23	2210180	Anjana Goel	CSE	S2	3	3	3	3	3	3	3	3	3	3
24	2210020	Ansh Gupta	CSE	s2	3	3	3	3	3	3	3	3	3	3
25	2210015	Ansh Jaiswal	CSE	S2	3	3	3	3	3	3	3	3	3	3
26	2210031	Ansh Nipra	CSE	S2	3	3	3	3	3	3	3	3	3	3
27	2210181	Anshika singh	CSE	S2	3	2	2	2	3	3	3	3	3	2
28	2210101	ANSHUL RAJ	CSE	S2	3	3	3	2	3	3	3	3	3	3
29	2210086	Anubhav chaudhary	CSE	S2	3	3	3	3	3	1	2	3	3	2
30	2210097	Apurv Maurya	CSE	S2	3	3	3	3	2	2	3	3	2	2
31	2210022	Arjit Yadav	CSE	S2	3	3	3	3	3	3	3	3	3	3
32	2210182	Arpit Deshwal	CSE	S2	3	3	3	3	3	3	3	3	3	3
33	2210019	Aryan Jaiswal	CSE	S2	3	1	3	3	1	2	3	3	3	3
34	2210051	Kritika Agrawal	CSE	S2	3	3	3	2	3	3	3	3	3	3
35	2210054	Kushagra Mishra	CSE	S2	3	3	3	3	3	3	3	3	3	3
36	2210052	PRAKHAR SRIVASTAVA	CSE	S2	3	3	3	3	3	3	3	3	3	3
37	2210053	Shivam Srivastava	CSE	S2	3	3	3	2	3	3	3	3	3	3
38	2210050	Tarun Kumar Singh	CSE	S2	2	3	3	3	3	3	3	3	3	3
39	2210072	Aditya kumar shah	CSE	S3	3	2	3	2	3	2	3	2	3	2
40	2210057	Anurag Upadhyay	CSE	S3	3	3	3	3	3	3	3	3	3	3
41	2210108	Ashutosh Singh	CSE	S3	3	3	3	3	3	3	3	3	3	3
42	2210116	Ayush Gupta	CSE	S3	3	3	3	2	3	3	3	3	3	3

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#	ID	Name	Branch	Sec										
43	2210102	AYUSH VERMA	CSE	S3	3	3	3	3	3	3	3	3	3	3
44	2210055	Balihaar Kaur	CSE	S3	3	3	3	3	3	3	3	3	3	3
45	2210120	Bhavesh Gautam	CSE	S3	3	3	3	3	3	3	3	3	3	3
46	2210183	Bhavya Mittal	CSE	S3	3	3	3	3	3	3	3	3	3	3
47	2210113	Bushra	CSE	S3	3	3	3	3	3	2	2	3	2	3
48	2210023	Chhavi Gautam	CSE	S3	1	1	2	1	3	3	2	2	2	2
49	2210184	Chhavi Pachauri	CSE	S3	1	3	2	2	3	2	3	3	3	1
50	2210026	Chinmay mittal	CSE	S3	3	3	3	3	3	3	3	3	3	3
51	2210209	Dakshita Saxena	CSE	S3	3	3	3	3	3	3	3	3	3	3
52	2210024	Devyansh chaudhary	CSE	S3	3	3	3	3	3	3	2	2	2	2
53	2210104	Dikshant Mudgal	CSE	S3	3	3	3	3	3	3	3	3	3	3
54	2210008	Dishant singh	CSE	S3	3	3	3	3	3	3	3	3	3	3
55	2210185	Eitisha Jain	CSE	S3	2	3	3	3	3	3	2	2	1	0
56	2210058	Keshav bagla	CSE	S3	3	3	3	3	3	3	3	3	3	3
57	2210059	Prashant kushwaha	CSE	S3	3	2	1	2	2	3	3	3	2	3
58	2210164	Rishabh singh	CSE	S3	3	3	3	3	3	3	3	3	2	2
59	2210056	Sovit Singh	CSE	S3	3	2	2	2	0	0	0	0	1	1
60	2210042	ADITYA SINGH	CSE	S4	3	3	3	3	3	3	3	3	3	3
61	2210062	Aman Sagar	CSE	S4	2	2	3	2	3	3	3	3	3	3
62	2210067	Aparna Singh	CSE	S4	3	3	3	3	3	2	3	3	3	3
63	2210061	Apurva Krishna Singh	CSE	S4	3	3	3	2	3	3	3	3	3	3
64	2210112	Chahat singh	CSE	S4	3	3	3	3	3	3	3	3	3	3
65	2210018	Gaurav Kumar Rai	CSE	S4	2	3	3	2	3	3	3	3	3	3
66	2210037	Harsh Vardhan	CSE	S4	2	3	3	3	3	2	3	3	3	2
67	2210006	Harshit Yadav	CSE	S4	3	3	3	3	3	3	3	2	3	3
68	2210186	Harshwardhan singh	CSE	S4	3	3	3	3	3	3	3	3	3	3
69	2210187	Himani Goel	CSE	S4	3	3	3	3	2	3	3	3	3	3
70	2210188	ISHITA GUPTA	CSE	S4	3	3	3	3	3	3	3	3	3	3
71	2210004	Itika Goel	CSE	S4	3	3	3	3	2	2	2	1	2	2
72	2210118	Khushi Arya	CSE	S4	3	3	3	3	3	3	3	3	3	3
73	2210088	Mahak khan	CSE	S4	3	3	3	3	3	3	3	3	3	3
74	2210080	Manas Srivastava	CSE	S4	3	3	3	3	3	3	3	3	3	3
75	2210012	Megha Singh	CSE	S4	3	3	3	3	3	3	3	3	3	3
76	2210009	MOHD ANAS KHAN	CSE	S4	3	3	3	3	3	3	3	3	3	3
77	2210060	Priyanshu	CSE	S4	3	3	3	3	3	3	3	3	3	3
78	2210063	Shreyash chaurasia	CSE	S4	3	2	3	2	3	3	3	3	2	3
79	2210159	TUSHAR	CSE	S4	3	3	3	3	3	3	3	3	3	3
80	2210163	Verma ritik mukesh	CSE	S4	1	1	1	1	1	1	1	1	1	1
81	2210122	Amrita Yadav	CSE	S5	3	2	2	1	3	2	3	3	3	3
82	2210153	ARCHIT TIWARI	CSE	S5	3	3	3	3	3	3	3	3	3	3
83	2210069	Arpita Yadav	CSE	S5	3	3	3	3	3	3	3	3	3	3
84	2210066	Devansh Agrawal	CSE	S5	3	3	3	3	3	3	3	3	3	3
85	2210064	Durgendra Singh	CSE	S5	3	3	3	3	3	3	3	3	2	1
86	2210210	Khushi Kaushik	CSE	S5	3	3	3	3	3	3	3	3	3	3
87	2210189	Kunj Tyagi	CSE	S5	3	3	3	3	3	3	3	3	3	3
88	2210065	Kushagra Gupta	CSE	S5	3	3	3	3	3	3	3	3	3	3
89	2210211	Lokendra Kumar	CSE	S5	3	3	3	3	3	3	3	3	3	3
90	2210190	Manasvi Agarwal	CSE	S5	3	3	3	3	3	3	3	3	3	3
91	2210191	Mohd Shahid	CSE	S5	3	3	3	3	3	3	3	3	3	3
92	2210207	Mohit bharti	CSE	S5	3	3	3	3	3	2	3	3	3	3
93	2210089	Mohit keshari	CSE	S5	3	3	3	3	3	3	3	3	3	3
94	2210035	Mradul Soni	CSE	S5	3	2	3	3	3	1	3	3	3	3
95	7.668E+09	Mukul singh	CSE	S5	3	3	3	3	3	3	3	3	3	3
96	2210083	Naman	CSE	S5	3	3	3	3	3	3	3	3	3	3
97	2210094	Niraj	CSE	S5	3	3	3	3	3	3	3	3	3	3
98	2210108	Nishant Kumar	CSE	S5	3	2	3	3	3	3	2	3	2	2
99	2210105	Omdeep Tyagi	CSE	S5	3	3	3	3	3	2	3	3	3	1
100	2210018	Prachi Singh	CSE	S5	2	2	3	3	3	3	3	3	3	3

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S.No	Roll No	Name	Branch	Sec										
101	2210096	Prakhar jwell chaturvedi	CSE	S5	2	2	2	2	2	2	2	2	2	2
102	2210126	Purnima Ahalawat	CSE	S5	3	3	3	3	3	3	3	3	3	3
103	2210028	Satish Kumar	CSE	S5	2	3	3	3	2	2	2	2	1	0
104	2210162	Yogendra dayal	CSE	S5	2	2	2	2	2	2	2	2	2	2
105	2210128	Abhishek Mishra	CSE	S6	3	3	3	3	3	3	3	3	3	3
106	2210039	Anshika Jain	CSE	S6	3	3	3	3	3	3	3	3	3	3
107	2210041	Disha ranjan	CSE	S6	3	3	3	3	3	3	3	3	3	3
108	2210129	Harsh	CSE	S6	3	3	3	3	3	3	3	3	3	3
109	2210075	Harsh singh	CSE	S6	3	3	3	3	3	3	3	3	3	3
110	2210073	Kartik gupta	CSE	S6	3	3	3	3	3	3	3	3	3	3
111	2210127	Kavita Yadav	CSE	S6	3	3	3	3	3	3	3	3	3	3
112	2210077	Kirti singh chahar	CSE	S6	3	3	3	3	3	3	3	3	3	3
113	2210148	Manish Shrivas	CSE	S6	3	3	3	3	3	3	3	3	3	3
114	2210130	Manisth Singh	CSE	S6	3	3	3	3	3	3	3	3	3	3
115	2210192	Naman Garg	CSE	S6	3	3	3	3	3	3	3	3	2	2
116	22153139	Palak	CSE	S6	3	3	3	3	3	3	3	3	3	3
117	2210193	Paridhi Bhardwaj	CSE	S6	2	3	3	3	3	1	3	2	3	2
118	2210109	Praveen Verma	CSE	S6	3	3	3	3	3	3	3	3	3	3
119	2210025	Priyanshu Chaudhary	CSE	S6	3	3	3	3	3	3	3	3	3	3
120	2210085	Rahul joshi	CSE	S6	3	3	3	3	3	3	3	3	3	3
121	2210194	Rakshit Sharma	CSE	S6	3	3	3	3	3	3	3	3	3	3
122	2210014	Rashi Goel	CSE	S6	3	3	3	3	3	3	3	3	3	3
123	2210084	Rishi Agarwal	CSE	S6	3	3	3	3	3	3	3	3	2	2
124	2210091	Samridhi Gupta	CSE	S6	3	2	3	2	3	3	3	3	3	3
125	2210161	Satyam pandey	CSE	S6	3	3	3	3	3	3	3	3	3	3
126	2210115	Saurabh Shukla	CSE	S6	3	3	3	3	3	3	3	3	3	3
127	2210119	Shaurya kumar	CSE	S6	3	3	3	2	3	3	2	3	2	3
128	2210124	Harsh Kumar	CSE	S7	0	0	2	3	1	1	1	1	3	1
129	2210043	Hritik Swarup	CSE	S7	2	2	2	2	2	2	2	3	2	3
130	2210133	Mohd Rashid	CSE	S7	3	3	3	3	3	3	3	3	3	3
131	2210070	Nikhil Kumar	CSE	S7	3	3	3	3	3	3	3	3	3	3
132	2210076	Nikhil Vashistha	CSE	S7	3	3	3	3	3	3	3	3	3	3
133	2210147	Nishant tiwari	CSE	S7	3	3	3	3	3	2	3	3	3	3
134	2210132	Piyush kumar	CSE	S7	3	3	3	3	3	3	3	3	3	3
135	2210154	Pratyush Raj Singh	CSE	S7	3	3	3	3	3	3	3	3	3	3
136	2210195	Ritika goel	CSE	S7	2	2	3	1	2	2	2	2	2	2
137	2210131	Ritwik Goswami	CSE	S7	3	3	3	3	3	3	3	3	3	3
138	2210137	Saloni Maheshwari	CSE	S7	3	3	3	3	3	3	3	3	3	3
139	2210021	Sangram singh	CSE	S7	3	2	3	2	3	1	2	2	2	2
140	2210095	Sanskar singh	CSE	S7	3	3	3	3	3	3	3	3	3	2
141	2210098	Sarthak jain	CSE	S7	3	3	3	3	3	3	3	3	3	2
142	2210002	Shivam Adhana	CSE	S7	3	3	3	3	3	3	3	3	3	3
143	2210081	Shreshthi Srivastava	CSE	S7	3	3	3	3	3	3	3	3	3	3
144	2210010	Shreyansh yadav	CSE	S7	2	3	3	3	3	2	3	3	2	3
145	2210136	Singh anandkumar anuj	CSE	S7	3	3	3	3	3	2	3	3	2	3
146	2210196	Suyash	CSE	S7	3	3	3	3	2	2	1	1	2	3
147	2210197	Tanishka sharma	CSE	S7	3	3	3	3	3	3	3	3	3	3
148	2210033	Upendra Kumar	CSE	S7	3	3	3	3	3	3	3	2	2	2
149	2210160	Anuj Kumar	CSE	S8	3	3	3	3	2	2	1	1	2	2
150	2210141	KARTIKEY KUMAR	CSE	S8	3	2	3	3	2	3	3	3	3	3
151	2210139	Mansi saini	CSE	S8	3	3	3	3	3	3	3	3	3	3
152	2210208	Mayank Choudhary	CSE	S8	3	3	3	3	3	3	3	3	3	3
153	2210156	Prerna Kumari	CSE	S8	3	3	3	2	3	1	3	3	3	3
154	2210044	Rishabh Kumar	CSE	S8	3	3	3	3	3	3	3	3	3	3
155	2210146	SATYAM SANGAL	CSE	S8	3	3	3	3	3	3	3	3	3	3
156	2210071	Shivi Sharma	CSE	S8	3	3	3	3	3	3	3	3	3	3
157	2210212	Shubh Gupta	CSE	S8	3	3	3	3	3	3	3	3	3	2
158	2210090	Siddharth Panchal	CSE	S8	2	2	2	2	2	2	2	2		

S.No	ID	Name	Branch	Sec										
159	2210125	Sunny	CSE	S8	3	3	3	3	3	3	3	3	3	3
160	2210150	Suraj yadav	CSE	S8	3	3	3	3	3	3	3	3	3	3
161	2210138	Tanish Raghuvanshi	CSE	S8	3	3	3	3	3	3	3	3	3	3
162	2210107	Tarun kumar malik	CSE	S8	3	3	3	3	2	3	3	3	3	1
163	2210027	Tejas Sharma	CSE	S8	3	3	3	3	3	3	3	3	3	3
164	2210198	Trapti Jindal	CSE	S8	3	3	3	3	3	3	3	3	3	3
165	2210007	Uday Tyagi	CSE	S8	3	3	3	3	3	3	3	3	3	3
166	2210110	Utkarsh Singh	CSE	S8	1	1	1	1	1	2	1	3	3	1
167	2210199	Utsav chauhan	CSE	S8	3	3	3	3	3	2	3	3	3	3
168	2210200	Vandit jain	CSE	S8	3	3	3	3	3	3	3	3	3	3
169	2210036	Vidita Singh	CSE	S8	3	3	3	3	3	3	3	3	3	3
170	2210030	Vijay Krishna	CSE	S8	3	3	3	3	3	3	3	3	3	3
171	2210135	AMAN PALIWAL	CSE	S9	0	0	0	0	1	1	0	1	0	0
172	2210079	Aman Rai	CSE	S9	3	3	3	3	3	3	3	3	3	3
173	2210145	Ashish kumar	CSE	S9	3	3	3	3	3	3	3	3	3	3
174	2210143	Asmit Yadav	CSE	S9	3	3	3	3	3	3	3	3	2	2
175	2210013	Ayush Agrawal	CSE	S9	3	3	3	3	3	3	3	3	3	2
176	2210001	Divyanshu rajput	CSE	S9	2	2	3	2	2	2	2	2	2	2
177	2210082	Karnick Singh	CSE	S9	2	2	2	2	2	2	2	2	2	2
178	2210144	Kartik	CSE	S9	2	2	3	3	3	2	3	3	3	2
179	2210111	Kartikey Mishra	CSE	S9	2	2	1	2	1	2	1	2	1	2
180	2210134	Pranjal	CSE	S9	3	3	3	2	3	2	3	3	3	3
181	2110078	Pranjal kumar	CSE	S9	3	3	3	3	3	3	3	3	3	3
182	2210034	Shubham Pratap Singh	CSE	S9	3	3	3	3	3	3	3	3	3	3
183	2510074	utkarsh mishra	CSE	S9	3	3	3	3	3	3	3	3	3	3
184	2210149	Utkarsh Upadhyay	CSE	S9	3	3	3	3	3	3	3	3	3	2
185	2210201	Vandit Mittal	CSE	S9	3	2	3	3	3	2	3	3	2	2
186	2210202	Vansh Chaudhary	CSE	S9	2	2	2	2	3	1	2	3	2	2
187	2210087	Vidhi	CSE	S9	3	3	3	3	3	3	3	3	3	3
188	2210068	Vijay Kumar	CSE	S9	1	2	3	3	2	2	2	2	2	2
189	2210151	Vineet Chaudhary	CSE	S9	3	3	3	3	3	3	3	3	3	3
190	2210100	Yash Singhal	CSE	S9	3	3	3	3	3	3	3	3	3	3
					2.8	2.76	2.87	2.78	2.83	2.67	2.79	2.81	2.77	2.66

CO WISE ATTAINMENT(Indirect)	CO1	CO2	CO3	CO4	CO5
	2.78	2.83	2.75	2.8	2.72

Dr. Banelana Sharma
FACULTY NAME & SIGNATURE

HOD SIGNATURE

AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

SUBJECT: ENGINEERING PHYSICS
SUBJECT CODE: BAS101
SESSION: 2022-23

INDIRECT ATTAINMENT
EN: CO ATTAINMENT FOR PHYSICS (BAS101)

S.NO.	STUDENT NO	NAME OF STUDENT	B	SEC	CO1	CO1	CO2	CO2	CO3	CO3	CO4	CO4	CO6	CO6
1	2221058	Aayush Bisht	EN	S1	3	3	3	3	3	3	3	3	3	3
2	2221001	Abhay yadav	EN	S1	3	3	1	2	3	3	3	3	3	3
3	2221060	Adhiraj Tomar	EN	S1	3	3	3	3	3	3	3	3	3	3
4	2221086	Mehak Monga	EN	S1	2	2	2	2	2	2	1	1	1	1
5	2221002	Nikesh Yadav	EN	S1	3	3	3	3	3	3	3	3	3	3
6	2221061	ADITYA TRIPATHI	EN	S2	3	3	3	3	3	3	3	3	3	3
7	22211063	Ashutosh Kumar	EN	S2	3	3	3	3	3	3	3	3	3	3
8	2221004	Vaibhav Srivastava	EN	S2	3	2	3	3	2	2	3	3	2	2
9	2221065	Devansh Agarwal	EN	S3	3	3	3	3	3	3	3	3	3	3
10	2221067	Manya Aggarwal	EN	S4	3	3	3	3	3	3	3	3	3	3
11	2221068	Mayank Sagar	EN	S4	3	3	3	3	3	3	3	3	3	3
12	2221069	Naman Tyagi	EN	S4	3	3	3	3	3	3	3	3	3	3
13	2221070	Nikhil Pal	EN	S5	3	3	3	3	3	3	3	3	3	3
14	2221071	Om goswami	EN	S5	3	3	3	3	3	3	3	3	3	3
15	2221072	PRASHANT KUMAR	EN	S5	3	3	3	3	3	3	3	3	3	3
16	2221073	Rudra	EN	S6	3	3	3	3	3	3	3	3	3	3
17	2221075	Samarth Gupta	EN	S6	3	3	3	3	3	3	3	3	3	3
18	2221084	Charvi gupta	EN	S7	3	3	3	2	3	3	3	3	2	2
19	2221076	Sanjana	EN	S7	3	3	3	3	3	3	3	3	3	3
20	2221077	SARTHAK MITTAL	EN	S7	1	2	3	3	3	2	2	3	2	2
21	2221078	Shatakshi	EN	S7	3	3	3	3	3	3	3	3	3	3
22	2221060	Stuti Srivastava	EN	S8	3	3	3	3	3	3	3	3	3	3
23	2221081	Tushar Tiwari	EN	S8	2	3	2	3	3	2	3	3	3	3
24	2221003	Nitin Sharmmi	EN	S9	2	3	3	3	3	3	3	3	2	3
25	2221007	Ojasva Tripathi	EN	S9	3	3	3	3	3	3	3	3	3	3
26	2221085	Prakhar Saxena	EN	S9	1	2	3	3	1	0	3	3	2	1
27	2221082	Vasudev Chaudhary	EN	S9	3	3	3	3	3	3	3	3	3	3
					2.74	2.85	2.85	2.89	2.85	2.74	2.89	2.93	2.74	2.74

CO WISE ATTAINMENT(Indirect)	CO1	CO2	CO3	CO4	CO5
	2.8	2.87	2.8	2.91	2.74

Dr- Bajnotana Sharma
FACULTY NAME & SIGNATURE

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Director
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