

# **AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD**

**27<sup>th</sup> Km. Mile Stone, Delhi-Meerut Expressway, P.O. Adhyatmik Nagar, Ghaziabad -201009**

**AKGEC/IQAC/2022-23/06**

**24 July 2023**

## **Action Taken Report (IQAC Audit) 2022-23 (Even Semester)**

As per the planning and instructions of IQAC members, the following actions have been taken for the session 2022-23 (Even Sem):

- i. The status and implementation of MoM of the IQAC meeting held on 15 February, 2023 in Director's Conference Hall, AKGEC Ghaziabad has been confirmed.
- ii. The International Conference organized by AKGEC's EN (Electrical and Electronics Engineering) Department aimed to provide a platform for researchers, academicians, and industry experts to exchange knowledge and discuss recent advancements in the field. The conference featured keynote speeches, paper presentations, and panel discussions on topics related to electrical and electronics engineering. Renowned experts from around the world participated, sharing their insights and research findings. The event also facilitated networking opportunities for participants to establish collaborations and partnerships. Overall, the conference was a successful endeavor in fostering academic and research excellence in the field of electrical and electronics engineering.
- iii. Other departments also initiate the work for organising international conferences. ECE department has planned to organised FDP on "Innovation Management and Intellectual Property Rights -2023" in collaboration with NITTR Chandigarh, from 4-8 December 2023.
- iv. To consider the review and suggest improvements for different practices to enhance employability skill enrichment and quality of student projects along with students participation in various activities.
- v. Regular Monitoring of Offline Classes was performed during the session 2022-23 (Even Sem). A part from this a CCTV monitoring was also done to insure the regularity of the classes.
- vi. Various smart boards were installed in NEW LT Block for effective offline classes.
- vii. Students & Faculty members are motivated to attend NPTEL /Swayam Courses on different topics.
- viii. T & P department is contacting more reputed multi-national companies and focusing on core companies (especially for EN, ME & CE students' placements).
- ix. FDPs has been organized by various department. And Faculty members are also attending FDPs organised by different organisations
- x. Our college is working towards the installation of more CCTV in the institute along with their proper maintenance for security purposes in the campus.
- xi. Planning of internal academic audit of the teaching-learning process.

The team for IQAC audit on the teaching-learning process was formed. The schedule is from 19<sup>th</sup> to 23<sup>rd</sup> May 2023

**Schedule of Audit held in various departments during the academic year 2022-23 (Even Sem)**

<b>S.NO.</b>	<b>NAME of AUDITOR</b>	<b>DEPARTMENT (AUDITOR)</b>	<b>DEPARTMENT (TO BE AUDITED)</b>	<b>DATE</b>
1.	Mr. Vivek Pansari Ms. Arpana Saxena	ME MCA	AS&H	19 <sup>th</sup> May 2023
2.	Dr. Anupama Sharma Mr. Abhishek Tiwari	IT ECE	EN	19 <sup>th</sup> May 2023
3.	Prof. Neelesh K. Gupta Mr. Dushyant S. Chauhan	ECE ECE	TIFAC	22 <sup>nd</sup> May 2023
4.	Dr. Seema Garg Mr. Lucknesh Dr. Neeti Maheshwari	ECE IT AS&H	CSE	22 <sup>nd</sup> May 2023
5.	Dr. Indu Verma Dr. Anupama Sharma	MCA IT	CE	22 <sup>nd</sup> May 2023
6.	Mr. Gajesh Mr. Lucknesh Mr. Anuj Diwedi	ME IT CSE	ECE	23 <sup>rd</sup> May 2023
7.	Prof. Neelesh K. Gupta Dr. Akash Kumar	ECE AS&H	ME	23 <sup>rd</sup> May 2023
8.	Mr. Dushyant S. Chauhan Mr. Abhishek Tiwari Mr. Pradeep Gupta	ECE ECE CSE	IT	23 <sup>rd</sup> May 2023

The audits were held in various departments during the academic year 2022-23 (Even Sem) as per schedule.

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

**Dr. P. K. Chopra**

**Director**

Attachments:

- i. Detailed report of Audit.

**AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD**  
27<sup>th</sup> Km. Stone, Delhi-Meerut Expressway, P.O. Adhyatmik Nagar, Ghaziabad -201009

24 May, 2023

To

**The Director General**  
**AKGEC, Ghaziabad(U.P.)**

**SUBJECT: AUDIT REPORT FOR 2022-23 (EVEN SEMESTER)**

1. An internal audit of all Engineering & MCA departments was conducted from 19<sup>th</sup> to 23<sup>rd</sup> May 2023.
2. Theory and Practical Attendance Registers along with Course Files were thoroughly checked for the duration 14 February to 19<sup>th</sup> May 2023.
3. Uploading of attendance on AKTU AMS ERP Portal and Edumarshal Portal was also verified for each department during the audit.
4. Teams comprising of two auditors (from different departments) visited various departments for the audit as per schedule.
5. General Observations which were found during the audit in various departments are mentioned as follows:
  - (a) Knowledge of CO-PO mapping has been found lacking in all the departments.
  - (b) Mapping of additional Lab experiments and theory topics with POs/PSOs needs improvement.
  - (c) One faculty member of ME department did not show the completed attendance registers, LWS and CO-PO mappings for the extra topics.
  - (d) Three faculty members of CSE department had made the extra topics related data as per old format.
  - (e) Three faculty members of CSE department had issues (Unmarking of PUT attendance & percentage and absentee counts) in their attendance registers.
  - (f) One faculty member of IT department was having incomplete attendance register.
  - (g) Absentee count was marked with black pen instead of red pen in some of attendance registers in IT and EN departments.
  - (h) Monthly attendance count, absentee count and lab grades were incomplete in the attendance register of one faculty member in ECE department.
  - (i) New documents for Quality Policy and Quality Objective were not updated in the course file of one faculty member in ECE department.
  - (j) ST-2 question paper, strings on Lecture Delivery Notes were missing and LWS was also incomplete in the course file of one faculty member in CE department.
6. The detailed report submitted by auditors for each department is attached.

*for Nupta*  
**Dr. P. K. Chopra**  
**Dean Special Projects**

*Rh*  
*25/5*

*All HoDs*

*Prof Meekes*

*Pl. forward copy of this note & respective audit reports to HoDs*

*- Pl. go through. Take care of observations and counsel / brief the concerned faculty. Let's have improved performance in*

**Ajay Kumar Garg Engineering College,  
Ghaziabad Internal Academic Audit (2022-23 Even Sem)**

Department Audited: ASH

Auditor's Name:

1 Asstt Prof Abhishek Tiwari (ECE)

2 Asstt Prof Mahendra Dutt Dwivedi (EN)

Date: 16/05/2023

S.No.	Name of Faculty	Subject Code (Theory)	Subject Code (Lab)	Arranged as per Order of Formats	Theory Course Details						Lab Course Details				Remark (if any)
					Proper formulation of Course Outcomes	Proper CO-PO Mapping	LWS Composition and Compilation	Mapping of extra topics (theory) with COs & POs	Question paper formulation as per Bloom's Taxonomy	Updation of Attendance Register (Theory)	Additional Experiments	Updated COs	Mapping of updated COs with POs & PSOs	Updation of Attendance Register (Lab)	
1	Dr B. B. Verma	KAS-203T (S-6 & 15)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
2	Dr. Shivani Singhal	KAS-202T (S-4 & 8)	KAS-252P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
3	Dr Manoj Kr Goyal	KAS-203T (S-17), KAS-402	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
4	Dr. Sandeep Gupta	KAS-202T (S-3 & 9)	KAS-252P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
5	Dr Bandana Sharma	KAS-201T (S-11 & 17)	KAS-251P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
6	Dr Meenakshi Sinha	KAS-203T (S-8 & 13)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
7	Dr Nitya Sharma	KAS-202T (S-2 & 7)	KAS-252P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
8	Dr Niti Maheshwari	KAS-202T (S-1 & 5)	KAS-252P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
9	Dr. Tarunjeet Singh	KAS-203T (S-9 & 12)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
10	Dr Ruchira Goel	KAS-203T (S-7), KAS-402	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
11	Dr Shimli Verma	KAS-203T (S-1 & 18)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
12	Mr Vikas Rath	KAS-201T (S-12 & 18)	KAS-251P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
13	Dr Akash Kumar	KHU-801 (CE-1 & 2), KNC-602 (CSE-1, 2 & 3)	NA	YES	YES	YES	YES	YES	YES	YES	NA	NA	NA	NA	

14	Mr. Vishal Gupta	KHU-801 (IT-1 & 2), KNC-602 (CE-1, 2 CS-1, ME-3)	NA	YES	YES	YES	YES	YES	YES	YES	YES	NA	NA	NA	NA
15	Dr. Sweta Prakash	KAS-201T (S-16 & 19)	KAS-251P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	YES
16	Dr. Parul Verma	KAS-202T (S-6) KOE-089	KAS-252P (S-4 & 6)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Dr. Abhishek Pathak	KAS-201T (S-13)	KAS-251P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	YES
18	Dr. Sweety Aggarwal	KAS-401 (EC-3), KNC-201 (S-19)	KAS-254P (S-11, 13 & 19)	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	YES
19	Dr. Vikas Roshan	KHU-801 (EC-3 & EI), KNC-602 (EN-1,2, IT-1, CSIT-1)	NA	YES	YES	YES	YES	YES	YES	YES	YES	NA	NA	NA	NA
20	Dr. Vimlesh Mishra	KAS-201T (S-14)	KAS-251P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	YES
21	Dr. Monika Agarwal	KAS-401 (EC-1,2), KNC-201 (S-1, 7, 8, 15)	KAS-254P (S-15)	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	YES
22	Dr. Neetu Sharma	KNC-201 (S-6, 11, 13 & 14), KAS-401 (ME-1 7 2)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	NA
23	Dr. Virendra Kumar	KAS-201T (S-15)	KAS-251P	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	YES
24	Dr. Rashi	KHU-801 (CE-1 & 2), KNC-602 (CSE-1, 2 & 3)	NA	YES	YES	YES	YES	YES	YES	YES	YES	NA	NA	NA	NA
25	Dr. Anand Tyagi	KAS-203T (S-3 & 16)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	NA
26	Dr. Sanjay Sharma	KAS-203T (S-5 & 14)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	NA

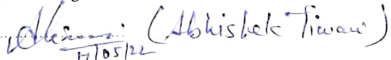

27	Dr. Mohit Kumar Tiwari	KAS-401 (IT-3), KNC-201 (S-18)	KAS-254P (S-14, 16 & 18)	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
28	Dr. Gauri Verma	KAS-401 (CSIT-1.2), KNC-201 (S-4, 5, 16, 17)	KAS-254P (S-17)	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	
29	Dr. Smrati Tripathi	KAS-402 (EN-1, 2), KAS-203T (S-11)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
30	Dr. Ekta Pandey	KAS-402 (CSE-2,3), KAS-203T (S-4)	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
31	Dr. Vandana Mishra	-	-	-	-	-	-	-	-	-	-	-	-	-	ON LEAVE
32	Dr. Rahul Pandey	KAS-203T (S-2 & 19), KAS-402	NA	YES	YES	YES	YES	YES	NA	YES	NA	NA	NA	NA	
33	Dr. Madhulika Das	KAS-401 (IT-1,2), KNC-201 (S-2, 3, 9, 12)	KAS-254P (S-12)	YES	YES	YES	YES	YES	NA	YES	YES	YES	YES	YES	

NA: Not applicable

**Overall Observations:**

1. CT question paper can also be formulate as per Bloom's Taxonomy.
2. Formatting of the course files needs improvement.

**Auditor's Signature:**

1.  (Abhishek Tiwari)  
17/05/22
2.  (Mahendra Dutt)  
17/05/22

  
Dr. Neelesh Kumar Gupta  
MR

  
Dr. P. K. Chopra  
DSP

**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Internal Academic Audit (2022-23 Even Sem)**

7/1/23

Department Audited: CIVIL ENGG

Auditor's Name:

1 Dharmendra Kumar (CSE)

2 Ms Arpana Saxena (MCA)

S.No.	Name of Faculty	Subject Code (Theory)	Subject Code (Lab)		Arranged as per Order of Formats	Theory Course Details						Lab Course Details				Remark (if any)
						Proper formulation of Course Outcomes	Proper CO-PO Mapping	LWS Composition and Compilation	Mapping of extra topics (theory) with COs & POs	Question paper formulation as per Bloom's Taxonomy	Updation of Attendance Register (Theory)	Additional Experiments	Updated COs	Mapping of updated COs with POs & PSO's	Updation of Attendance Register (Lab)	
1	Dr. Rakesh Srivastava, HOD, CE	KCE-402	—	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	—	
2	Mr. Muditi Mishra, AP	KCE-603	RCE-084	KCE-652	Yes	Yes	Yes	No		No	Yes	No			Yes	Leaf held in LWS Missing on right page, LWS not filled, 1st sheet not in OHE format, ST-2 QP missing, string on LUN
3	Ms. Anchal Negi, AP	KCE-064	KCE-651	KCE451	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
4	Mr. Priyank Srivastava, AP	KCE-064	KCE652	KCE451	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
5	Mr. Animesh Rai, AP	KCE-603	KOE-069	KCE652	Not Audited (on leave)											
6	Mr. Ashish Vishwakarma, AP	KCE-602	KCE651	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
7	Ms. Kshama Shukla, AP	KCE-601	KCE403	KCE-653	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
8	Mr. Prashant Agarwal, AP	KCE-602	KCE651		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
9	Mr. Attri Tyagi, AP	KCE653	KCE401	KCE652	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
10	Ms. Anubha Gupta, AP	KCE-601	KCE653	KCE851	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Auditor's Signature:

1.   
2. 

  
**Dr. Neelish Kumar Gupta**  
MR

  
**Dr. D. K. Chopra**  
DSP

**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Internal Academic Audit (2022-23 Even Sem)**

Department Audited: CSE

Auditor's Name:

1. Mr. Vivek Pansari

2. Dr. Neeti Maheshwari

S.No.	Name of Faculty	Subject Code (Theory)	Subject Code (Lab)	Arranged as per Order of Formats	Theory Course Details						Lab Course Details				Remark (if any)
					Proper formulation of Course Outcomes	Proper CO-PO Mapping	IWS Composition and Compilation	Mapping of extra topics (theory) with COs & POs	Question paper formulation as per Bloom's Taxonomy	Update of Attendance Register (Theory)	Additional Experiments	Updated COs	Mapping of updated COs with POs & PSO	Update of Attendance Register (Lab)	
1	Dr. Sunita Yadav	KCS-603 (CSE-3)		YES	YES	YES	YES	YES	YES	YES	-	-	-	-	
2	Dr. Sachin Kumar	KCS-603 (CS-1)	KCS-653 (CS-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
3	Dr. Shashank Sahu	KOE-469, KCS-602 (CSE-1)	KCS-652 (CSE-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
4	Dr. Indrajyoti Kaur	KCS-601 (CSE-2)	KCS-651 (CSE-2)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
5	Dr. Sonam Gupta	KOE-468	KCS-652 (CSE-1, CSE-3)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
6	Dr. Pratima Singh	KOE-494	KCS-651	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
7	Dr. Charu Agarnal	KHU-802 (CSE-2)		YES	YES	YES	YES	YES	YES	YES	-	-	-	-	
8	Mr. Akhilesh Verma	KOE-499, KVE-401 (CSE-1, CSE-2)	KCS-452 (CS-2)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
9	Mr. Ajay Kumar	KCS-601 (CS-1), KOE-468		YES	YES	YES	YES	YES	YES	YES	-	-	-	-	
10	Mr. Anuj Kumar Dwivedi	KVE-401 (CSE-3, CSE (AIML), CSE (DS))	KCS-453 (CSE (AIML))	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
11	Ms. Deepo Singh	KNC-402 (CSE (AIML), CSE (DS))	KCS-453 (CS-2), CSE (DS)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
12	Ms. Nishu Bansal	KCS-462 (CSE-2, CSE-3)	KCS-653 (CSE-1, CSE-3)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
13	Mr. Dharmendra Kumar	KCS-462 (CSE-1)	KCS-653 (CSE-1, CSE-3)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
14	Ms. Shiva Tyagi	KCS-401 (CSE-1, CSE-3)	KCS-651 (CSE-1, CSE-3)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
15	Mr. B. N. Pandey	KOE-469, KVE-401 (CS-1)		YES	YES	YES	YES	YES	YES	YES	-	-	-	-	PUT attendance not calculated
16	Mr. Kajeet Singh	KCS-401 (CSE-2)	KCS-451 (CSE-1, CSE-2, CS-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
17	Mr. Samir Kumar Upadhyay	KOE-468, KOE-493	KCS-452 (CSE-2, CSE-3), KCS-453 (CSE-3)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
18	Mr. Vilas Kumar	KOE-497 (CSE-2, CSE-3), KCS-602 (CS-1)	KCS-652 (CSE-1, CSE-2)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
19	Mr. Jai Kaur Prasad Singh Yadav	KCS-402 (CSE-1)	KCS-452 (CSE-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
20	Ms. Neha Bagwan	KCS-402 (CSE-2, CSE-3)	KCS-652 (CSE-2, CSE-3)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
21	Ms. Arti Pandey	KCS-401 (CS-2), KNC-402 (CS-2)	KCS-451 (CS-2), KCS-453 (CS-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
22	Ms. Jasbree Jain	KIU-801 (CSE-1)	KCS-451 (CSE-1), KCS-452 (CSE-1, CSE-2, CS-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
23	Mr. Pradep Gupta	KIU-801 (CSE-3)		YES	YES	YES	YES	YES	YES	YES	-	-	-	-	
24	Ms. Lakshita Sejwal	KCS-401 (CS-1), KOE-468 (IT-2)	KCS-452 (CS-2), KCS-653 (CS-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
25	Ms. Chhaya Yadav	KCS-401 (CSE-1), KNC-402 (CSE-1, CSE-2)	KCS-451 (CSE-2), KCS-453 (CSE-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Attendance percentage not calculated. Old CO-PO mapping



26	Ms. Ayushi Gupta	KCS-201 (S-2, S-9)	KCS-251P (S-2, S-9)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Extra topics in old format
27	Mr. Pranab Kumar Adhikari	KOE-445	—	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
28	Ms. Vanshali Rastogi	KNC-401 (CE-2), KCS-401 (CSE (AIML), KNC-401 (ECE-2)	KCS-453, KCS-451 (CSE (AIML), KCS-452 (CSE (AIML)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
29	Ms. Pooja Sharma	KCS-201T (S-3, S-5)	KCS-251P (S-3, S-5)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Extra topics in old format, CT not in format
30	Mr. Raghuraj Singh	KCS-462(CS-1),KOE-493	KCS-651(CS-1),KCS-452(CS-1 CSE-3)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
31	Mr. Pankaj Sharma	KCS-402 (CSE-2, CSE-3)	KCS-453 (CSE-1, CSE-2)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
32	Mr. Vishal Chaudhary	KNC-401 (ECE-1, ECE-3), KCS-401 (CSE-3)	KCS-451 (CSE-3), KCS-453	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
33	Mr. Vishal Jayarwal	KCS-603 (CSE-1, CSE-2)	KCS-653	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
34	Ms. Anuradha	KOE-068	KCS-452 (CS-1), KCS-452 (CSE (DS), KCS-451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
35	Mr. Anurag Gupta	KCS-201T (S-1, S-7)	KCS-251P (S-1, S-7)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
36	Ms. Anjali Chauhan	KCS-402 (CS-1, CS-2)	KCS-451 (CSE-2), KCS-453 (CS-2)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
37	Ms. Neeraja Arora	KMC-202 (S-1, S-2, S-9), KMC-201 (S-17, S-15)	—	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Attendance count not OK, LWS not OK
38	Ms. Rakha Baghel	KCS-401 (DS),KNC-402(CSE-3)	KCS-453(CSE-1,CSE-2),KCS-451(CSE DS)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
39	Mr. Yogendra Narayan Prajapati	KCS-402 (CSE (AIML), CSE (DS)	—	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Extra topics in old format
40	Ms. Prachi	KMC-202 (S-3, S-5, S-8), KMC-201 (S-14, S-18)	KCS-251P	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	

Auditor's Signature:

1. Dr. Nile Maheshwari  
2. Vivek Pantam

Nile  
V



Nyup  
Dr. Neelish Kumar Gupta  
MR

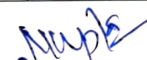
Dr. P. K. Chopra  
DSP




S.No.	Name of Faculty	Subject Code (Theory)	Subject Code (Lab)	Arranged as per Order of Formats	Theory Course Details						Lab Course Details				Remark (if any)
					Proper formulation of Course Outcomes	Proper CO-PO Mapping	LWS Composition and Compilation	Mapping of extra topics (theory) with COs & POs	Question paper formulation as per Bloom's Taxonomy	Update of Attendance Register (Theory)	Additional Experiments	Updated COs	Mapping of updated COs with POs & PSOs	Update of Attendance Register (Lab)	
18	Asstt Prof Naveen Kumar Sami	KCS-403	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	OK
19	Asstt Prof Om Krishna Gupta	KEC-402	KEC-653B	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Old Quality Policy & Quality Objectives , ISO string on QP
20	Asstt Prof Alok Kumar	KEC-602	KEC-452, KEC-652	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
21	Asstt Prof Himanshu Nagpal	KEC-603	KEC-651, KEC-652	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
22	Asstt Prof Neeraj Sharma	KEC-603	KEC-652	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
23	Asstt Prof Abhijeet Upadhyaya	KEC-403	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	OK
24	Asstt Prof Anu Goel	KEC-401	KEC-451, KEC-452	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
25	Asstt Prof Abhishek Joshi	KEC-601	KEC-451, KEC-453, KEC-651	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
26	Asstt Prof Renu Sharma	KEC-401	KEC-453, KEC-652	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
27	Asstt Prof Priyanka Sharma	KEC-201T	KEC-251P	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
28	Asstt Prof Pragya Srivastava	KEC-201T, KEC-602	KEC-251P, KEC-653B	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	OK
29	Asstt Prof Tukur Gupta	KCS-403	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	OK
30	Asstt Prof R.P.Singh	KOE069, KVE401	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	OK

Auditor's Signature:

1   
2 

  
Dr. Neelish Kumar Gupta  
MR

  
Dr. P. K. Chopra  
DSP

**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Internal Academic Audit (202-23 Even Sem)**

Department Audited: EN

Auditor's Name:

1 Associate Professor Dr. Anupama Sharma

2 Asstt. Prof. Mr. Priyank Srivastava

Date: 16/05/2023

S.No.	Name of Faculty	Subject Code (Theory)	Subject Code (Lab)	Arranged as per Order of Formats	Theory Course Details						Lab Course Details				Remark (if any)
					Proper formulation of Course Outcomes	Proper CO-PO Mapping	LWS Composition and Compilation	Mapping of extra topics (theory) with COs	Question paper formulation as per Bloom's	Update of Attendance Register (Theory)	Additional Experiments	Update COs	Mapping of updated COs	Update of Attendance Register (Lab)	
				Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	
1	Dr. A K Rai	KEE 403	—	YES	YES	YES	YES	YES	YES	YES	—	—	—	—	
2	Dr. J G Yadav	KEE 201T	KEE 251 P	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
3	Dr. S S Dhillon	KEE 061, KEE 402,	KEE 452	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
4	Dr. Sarika Kalra	KEE 061	KEE 653	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
5	Dr Vani Bhargava	KEE 603,KOE 084	KEE 653,KEE 452	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
6	Dr. Dibya Bharti	KOE 043	KEE 451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
7	Mr. Ravindra Kumar	KEE 201 T	KEE 251P	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
8	Mr. Ritesh Sharma	KOE 069, KEE 201T	KEE 651,, KEE 251P	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
9	Ms. Navjyoti Sharma	kcc 201 T	KEE 251 P	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
10	Ms. Nidhi Singh	KEE 401,	KEE 453	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
11	Mr. Dinanath Prasad	KOE 043	—	YES	YES	YES	YES	YES	YES	YES	—	—	—	—	
12	Mr. Praveen Kumar	KHU 802	—	YES	YES	YES	YES	YES	YES	YES	—	—	—	—	
13	Mr. Deepak Narang	KEE 602	KEE 652	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
14	Ms. Nupur Mittal	KHU 802, KEE 403	KEE 451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
15	Mr. Mahendra Dutt Dwivedi	KEE 603,	KEE 651, KEE 451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
16	Ms. Neeraj Gupta	KEE 602	KEE 652	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
17	Mr. Harsh Mohan Sharma	KEE 601	KEE 651	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
18	Mr. Shani Kumar Pandey	KEE 201T	KEE 251P	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	

COMMON POINTS I. IN SOME OF THE REGISTER ABSENTEE COUNT WERE MARKED WITH BLACK PEN INSTEAD OF RED PEN IN THEORY REGISTER

Auditor's Signature:

1.   
2. 

  
Dr. Neelish Kumar Gupta  
MR

  
Dr. P. K. Chopra  
DSP



25	Mr. Sarvachan Verma	KME061, KNC402	KCS-452	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
26	Ms. Payal Garg	KOE067	—	YES	YES	YES	YES	YES	YES	YES	—	—	—	—	—	
27	Ms Shilpi Gupta	KOE093, KCS401,	KCS451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
28	Dr. Abhilasha Singh	KC402, KCS401, RCS	KCS451, KCS453	YES	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES	YES	REGISTER INCOMPLETE
29	Ms. Mrijnainy Kansal	KCS401, RCS087	KCS451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
30	Mr. Santosh Kumar Mishra	KCS201T,	KCS251P	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	

Common Point: 1. In some register absentee count were marked by black pen.

2. Submission date was not mentioned in tutorial sheets.

Auditor's Signature:

1.

2.

  
Dr. Neelesh Kumar Gupta  
MR

  
Dr. P.K. Chopra  
DSP

Department Audited: MCA  
Auditor's Name:  
1. Dr. Seema (ECE)  
2. Mr. Lucknesh (IT)



S.No.	Name of Faculty	Subject Code (Theory)	Subject Code (Lab)	Arranged as per Order of Formats	Theory Course Details						Lab Course Details				Remark (if any)
					Proper formulation of Course Outcomes	Proper CO-PO Mapping	LWS Composition and Compilation	Mapping of extra topics (theory) with COs & POs	Question paper formulation as per Bloom's Taxonomy	Update of Attendance Register (Theory)	Additional Experiments	Updated COs	Mapping of updated COs with POs & PSOs	Update of Attendance Register (Lab)	
1	DR. B. K. SHARMA	KCA-201	*KCA-451	YES	YES	YES	YES	YES	YES	YES	—	—	—	YES	ok
2	Dr. Saroj Bala	KCA-205 KCA-054	KCA-253 KCA-451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	ok
3	Ms. Arpna Saxena	KCA-201 KCA-051	KCA-253 KCA-451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	ok
4	Ms. Indu Verma	KCA-204 KCA-034	KCA-252 KCA-451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	ok
5	Ms. Mani Dwivedi	KCA-202 KCA-041	KCA-251 KCA-451	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	ok
6	Ms. Aman Gupta	KCA-A01	—	YES	YES	YES	YES	YES	YES	YES	—	—	—	—	ok

\* KCA-451 (PROJECT)

**GENERAL OBSERVATION**

1. Cumulative Attendance of ST in first year is marked in ST1 column

Auditor's Signature:

1. Lucknesh   
2. 

  
Dr. Neelish Kumar Gupta  
MR

  
Dr. P. K. Chopra  
DSP





20	MR SHUBHAM CHOUDHARY	KME 602(ME1)	KME65		
		KHU802(ME3)	KCE251P		
General Remarks					On medical leave

New assignment format is not followed in most of the files.  
 Use of blooms taxonomy in question papers need improvement.

Auditor's Signature

1. *[Signature]*  
 2. *[Signature]*  
 20/5/22

*[Signature]*

Dr. Neelesh Kumar Gupta  
 MR

*[Signature]*

Dr. P. K. Chopra  
 DSP

**Ajay Kumar Garg Engineering College,  
Ghaziabad Internal Academic Audit (2022-23 Even Sem)**

Department Audited: TIFAC

Auditor's Name:

1. Prof. Neelesh Kumar Gupta (ECE)
2. Assit. Prof. Dushyant Singh Chauhan (ECE)

Date: 18/05/2023

S.No.	Name of Faculty	Subject Code (Theory)	Subject Code (Lab)	Arranged as per Order of Formats	Theory Course Details						Lab Course Details				Remark (if any)
					Proper formulation of Course Outcomes	Proper CO-PO Mapping	LWS Composition and Compilation	Mapping of extra topics (theory) with COs & POs	Question paper formulation as per Bloom's Taxonomy	Updation of Attendance Register (Theory)	Additional Experiments	Updated COs	Mapping of updated COs with POs & PSOs	Updation of Attendance Register (Lab)	
1	Mr Gaurav Srivastava	KOE-091	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
2	Mr Ajay Pratap Singh	KOE-083	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
3	Mr Rahul Dixit	KOE-091	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
4	Dr Vivek Singh	KME-061	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
5	Mr. Ankit Dixit	KOE-091	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
6	Mr Mahesh Sharma	KOE-083	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
7	Mr Abhishek Gupta	KME-603	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
8	Mr. Shantanu Singh	RME-085	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
9	Ms Gaganpreet Kaur	KOE-083	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
10	Mr. Vikram Singh Rajput	KOE-083	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
11	Mr. Manish Vohra	KIC-603	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
12	Mr. Puneet Saini	KME-603	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
13	Ms. Suvarna Majumdar	KCS-403	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-
14	Mr. Himanshu Tripathi	KCS-403	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-

Auditor's Signature:

1.....

  
Dr. Neelesh Kumar Gupta  
MR

  
Dr. P. K. Chopra  
DSP

2.....

# **AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD**

**27<sup>th</sup> Km. Stone, Delhi-Hapur Bypass Road, P.O. Adhyatmik Nagar, Ghaziabad -201009**

**AKGEC/IQAC/2022-23/05**

**17 February 2023**

## **INTERNAL QUALITY ASSURANCE CELL (IQAC) MOMs**

The IQAC meeting for the session 2022-23 (Even Sem) was held on 15<sup>th</sup> February 2023. The following members of the IQAC were present during the meeting:

1. Dr. P. K. Chopra, Director
2. Prof. Neelesh Kumar Gupta, ECE Department
3. Prof. Anil Rai, EN Department
4. Prof. Devendra Singh, ME Department
5. Prof. Inderjeet Kaur, CSE Department
6. Asso. Prof. Meenakshi Awasthi, ECE Department
7. Asso. Prof. Anupama Sharma, IT Department
8. Asst. Prof. Dushyant Singh Chauhan, ECE Department
9. Asst. Prof. Richa, ECE Department
10. Asst. Prof. Abhishek Tiwari, ECE Department
11. Mr. Rajeev Mishra, Manager Special Projects
12. Mr. Pradeep Bhardwaj, Manager Placements

### **Agenda Points**

- i. To present the Action Taken Report (ATR) of the IQAC Meeting dated 12 September 2022.
- ii. To see the progress of the International Conference on Advancements and Key Challenges in Green Energy and Computing (AKGEC 2023) which will be held on 24 & 25 February 2023 in the college.
- iii. To organize conferences and FDPs for the improvement of faculty members and students research by departments.

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

- iv. To consider the review and suggest improvements for different practices to enhance employability skill enrichment and quality of student projects along with students participation in various activities.
- v. Monitoring of Offline Classes for 2022-23 Even Sem.
- vi. Utilization of tech support for effective offline classes using smart boards.
- vii. To consider reports of NPTEL /Swayam Courses on different topics for B. Tech students.
- viii. To review placements status and prepare a strategy of placements for unplaced students by various departments.
- ix. To consider reports of FDPs organized and participated by various department faculty members.
- x. To increase the number of CCTV cameras for security purposes in the campus.
- xi. Planning of internal academic audit of the teaching-learning process.

### **Discussion Points/ Minutes of the Meeting**

#### **Agenda Point-i-**

The chairman briefly discussed the actions taken at the meeting held on 12<sup>th</sup> September 2022 and recommended to adhere to the points discussed in the meetings.

#### **Agenda Point-ii-**

The IQAC members analysed with the progress of the forthcoming International Conference on Advancements and Key Challenges in Green Energy and Computing (AKGEC 2023) by EN department and they praised the efforts of the organizing team.

#### **Agenda Point-iii-**

IQAC team motivated all the departments to plan International conferences with indexing in Scopus/IEEE/Springer etc.

#### **Agenda Point-iv-**

In order to promote employability skill enrichment, the quality of student projects, and student engagement, IQAC members took proposals into consideration and gave instructions to all departments on how to follow guidelines for changes. They specially emphasized the quality of B. Tech projects.

#### **Agenda Point-v-**

The department should deliver good quality content (PPTs, PDFs of courses, V. supervision of senior faculty members of the monitoring committee. The Aca committee should check the quality as per plan.

  
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Ghaziabad

**Agenda Point-vi-**

Modern teaching ICT tools such as smart boards are to be incorporated into taking offline classes along with black boards.

**Agenda Point-vii-**

The Team checked the reports of NPTEL /Swayam Courses completed on different topics for B. Tech students in last semester (2022-23 Odd Sem). They expressed satisfaction also for the same.

**Agenda Point-viii-**

Team members thoroughly discussed about the strategy and planning for the placement of unplaced students. Also, inform HoDs to motivate students to sit in the placement process.

**Agenda Point-ix-**

IQAC members expressed their satisfaction on reports of FDPs organized and participated by faculty members of various departments of the institute.

**Agenda Point-x-**

The Team discussed the importance of CCTVs in the institute and expressed their satisfaction with the same with respect to security purposes.

**Agenda Point-xi-**

The team for the Internal Academic Audit of the Teaching-learning process will be formed. The schedule of the next IQAC audit is as follows:

**2022- 23 (Even Sem)**

S. No	Audit Duration	Date
1.	Sessional Test Exam	As per Academic Calendar
2.	Pre-University Test	As per Academic Calendar

Following guidelines are to be strictly followed in the maintenance of both theory, practical attendance record and course file by each faculty member.

- (a) Properly formulated CO statements as per Bloom’s Taxonomy for both Theory and Lab subjects.
- (b) Mapping of COs with POs and PSOs as per NBA guidelines (DSP/NBA/2022/01 & DSP/NBA/2022/02) shared by the DSP.
- (c) Question paper of internal assessments (STs/PUT) prepared as per NBA guidelines (DSP/NBA/2022/03) with appropriate weightage given to questions from Bloom’s levels.

  
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Ajay Kumar Garg Engg. College  
Ghaziabad

- (d) Identification of theory topics beyond the syllabus and their inclusion in Lecture-Wise Schedule (LWS). Mapping of the additional topics with relevant COs and POs/PSOs is also to be documented in LWS.
- (e) Additionally, the details of the Lab(s) taken by respective faculty to be appended after the theory subject details in the same course file. The following details regarding the Lab subjects to be documented:
  - (i) List of Experiments as per AKTU Syllabus.
  - (ii) Identification of experiments beyond the syllabus and their relevance to COs and POs/PSOs.
  - (iii) Updated COs after including additional experiments.
  - (iv) Updated CO-PO/PSO mapping of the respective Lab Course.
- (f) Ensuring filling attendance on AKTU AMS/Edu Marshal portal.
- (g) Only P (Present), A (Absent) and Ac (Present with college duty) should be marked in the attendance register, no dot should be put & overwriting is to be avoided.
- (h) Topper, Bottomer, Hostlers, Discipline and Not registered cases to be marked.
- (i) Ensuring all entries on attendance registers (Theory and Lab).
- (j) All documents should be arranged as per the order of format with their proper strings.
- (k) Lecture wise schedule should be updated upto ST exam and signed by HoD.



**Dr. P. K. Chopra**  
**Director**

Copy to:

- i. All HoDs, faculty members
- ii. Industry members
- iii. Alumni



**Director**  
**Ajay Kumar Garg Engg. College**  
**Ghaziabad**

# **AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD**

27<sup>th</sup> Km. Stone, Delhi-Hapur Bypass Road, P.O. Adhyatmik Nagar, Ghaziabad -201009

AKGEC/IQAC/2022-23/02

21<sup>st</sup> September 2022

## **INTERNAL QUALITY ASSURANCE CELL (IQAC) MOMs**

The IQAC meeting for the session 2022-23 (Odd Sem) was held on 12<sup>th</sup> September 2022. The following members of the IQAC were present during the meeting:

1. Dr. P.K. Chopra, Director (Chairman, IQAC)
2. Prof. Neelesh Kumar Gupta, ECE Department
3. Prof. Anil Rai, EN Department
4. Prof. Devendra Singh, ME Department
5. Prof. Inderjeet Kaur, CSE Department
6. Asso. Prof. Meenakshi Awasthi, ECE Department
7. Asso. Prof. Anupama Sharma, IT Department
8. Asst. Prof. Dushyant Singh Chauhan, ECE Department
9. Asst. Prof. Richa, ECE Department
10. Asst. Prof. Abhishek Tiwari, ECE Department
11. Mr. Rajeev Mishra, Manager Special Projects
12. Mr. Pradeep Bhardwaj, Manager Placements

### **Agenda Points**

- (a) To present the Action Taken Report (ATR) of the IQAC Meeting held on 07 March 2022.
- (b) To plan research activities, organize International Conferences and FDPs for the development of faculty members and students and for promoting research at the College Level.
- (c) To consider and review the different ongoing practices and also to suggest improvements required to be done for enhancing the employability skill enrichment and quality of students' projects along with students' participation in various National Level activities such as SIH-2022.

  
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Ghaziabad

- (d) Monitoring of offline classes for the session 2022-23 (Odd Sem) and put up suggestions for further improvements of Teaching-Learning practices.
- (e) Review of the ongoing Outcome Based Teaching, Learning, and Evaluation methodologies.
- (f) To review and analyze the status of admission in B.Tech. 1<sup>st</sup> year for the academic year 2021-22.
- (g) To consider proposals and suggestions regarding field projects/internships.
- (h) To review the status of on-campus placements.
- (i) To review and increase the number of CCTV cameras installed in the campus for surveillance and security purposes.
- (j) Planning of internal academic audit of the teaching-learning process.

### Discussion Points/ Minutes of the Meeting

#### **Agenda Point-a**

The chairman briefly discussed the action taken on the agenda points of meeting held on 7<sup>th</sup> March 2022 and recommended these points for further discussion in the meeting.

#### **Agenda Point-b**

A proper plan was presented and IQAC Members gave suggestions on the same. IQAC suggested that, every year at least 2 research papers should be published in UGC CARE/SCOPUS/SCI indexed journals by each faculty member and the institute should also organize international conferences (Sponsored by IEEE, Springer, Elsevier and other reputed organizations) & encourage students also to work on research paper publication. IQAC members expressed their satisfaction on reports of FDPs organized and FDPs attended by faculty members.

#### **Agenda Point-c**

To consider suggested improvements for different practices to enhance employability, skill enrichment and quality of projects made by B. Tech students along with participation of students in various activities such as SIH-2022 through Idea Lab of the college.

#### **Agenda Point-d**

The department should provide good quality content (PPTs, PDFs of courses, Videos) to the students under the supervision of senior faculty members of the monitoring committee. The Academic Motoring Committee should check the quality as per plan and members accepted all the received reviews for adopting technical teaching pra

  
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Ghaziabad



for further improvements. Modern teaching ICT tools such as smart boards are to be incorporated while taking offline classes along with chalk boards.

**Agenda Point-e**

Members of IQAC expressed their satisfaction on the already ongoing outcome-based teaching learning and evaluation processes and appreciated for proper implementation of the outcome-based education system in the college.

**Agenda Point- f**

IQAC expressed satisfaction on the status of admissions in B.Tech 1<sup>st</sup> year for the academic year 2021-22 and it was suggested that the admission cell is required to be more focused for quality admissions and increasing the admissions in traditional core branches.

**Agenda Point- g**

IQAC members accepted proposals and suggestions regarding the on field projects/internships by the students and instructed all HoDs for the same and asked them to maintain quality in this regard.

**Agenda Point-h**

Members of the IQAC discussed their thoughts/reviews regarding placements and made recommendations to the Training and Placement Cell for further improving the on-campus placements with better package.

**Agenda Point-i**

The team discussed the importance of CCTVs installed in the college for surveillance & security purposes and expressed their satisfaction with the same.

**Agenda Point-j**

The team for the Internal Academic Audit of the Teaching-Learning process will be framed. The schedule of the next IQAC audit will be as follows:

**2022- 23 (Odd Sem)**

S. No.	Audit Duration	Date
1.	Sessional Test Exam	As per Academic Calendar
2.	Pre-University Test	As per Academic Calendar

Following guidelines are to be strictly followed in the maintenance of both theory, practical attendance record and course file by each faculty member:

- (a) Properly formulated CO statements as per Bloom's Taxonomy for both The subjects.

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

- (b) Mapping of COs with POs and PSOs as per NBA guidelines (DSP/NBA/2022/01 & DSP/NBA/2022/02) shared by the DSP.
- (c) Question paper of internal assessments (STs/PUT) prepared as per NBA guidelines (DSP/NBA/2022/03) with appropriate weightage given to questions from all possible Bloom's levels.
- (d) Identification of theory topics beyond the syllabus and their inclusion in Lecture-Wise Schedule (LWS). Mapping of the additional topics with relevant COs and POs/PSOs is also to be documented in LWS.
- (e) Additionally, the details of the Lab(s) taken by respective faculty to be appended after the theory subject details in the same course file. The following details regarding the Lab subjects to be documented:
  - (i) List of Experiments as per AKTU Syllabus.
  - (ii) Identification of experiments beyond the syllabus and their relevance to COs and POs/PSOs.
  - (iii) Updated COs after including additional experiments.
  - (iv) Updated CO-PO/PSO mapping of the respective Lab Course.
- (f) Ensuring filling attendance on AKTU AMS/Edu Marshal portal.
- (g) Only P (Present), A (Absent) and A<sub>c</sub> (Present with college duty) should be marked in the attendance register, no dot should be put & overwriting is to be avoided.
- (h) Topper, Bottomer, Hostlers, Discipline and Not registered cases to be marked.
- (i) Ensuring all entries on attendance registers (Theory and Lab).
- (j) All documents should be arranged as per the order of format with their proper strings.
- (k) Lecture wise schedule should be updated upto ST/PUT exam and signed by HoD.

  
**Dr. P. K. Chopra**  
**Director**

Copy to:

- i. All HoDs, faculty members
- ii. Industry members
- iii. Alumni

  
**Director**  
**Ajay Kumar Garg Engg. College**  
**Ghaziabad**

# Ajay Kumar Garg Engineering College, Ghaziabad

September 30,2021

## NBA accreditation status of the Courses and branches being run by the College.

As of now M.Tech., MCA, B.Tech. Civil Engineering and all newly introduced branches namely, Computer Science, Computer Science and Information Technology, Computer Science & Engineering (Data Science), Computer Science and Engineering (AI&ML), Artificial Intelligence and Machine Learning and Computer Science & Engineering (Hindi) are not accredited.

The courses and branches accredited by NBA up to June 2022 are stated below:

Sl. No.	Name of the Program	Accreditation Status
1.	Computer Science & Engineering	Accredited
2.	Electronics & Communication Engineering	Accredited
3.	Electrical & Electronics Engineering	Accredited
4.	Information Technology	Accredited
5.	Mechanical Engineering	Accredited



(Dr. R. K. Agarwal)  
Director General



Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

File No. \_\_\_\_\_



# AJAY KUMAR GARG ENGINEERING COLLEGE

27<sup>th</sup> Km. Stone, NH-24, Delhi-Hapur ByPass Road, Adhyatmik Nagar, Ghaziabad-201009  
Phones : 8744052891 to 94, 7290034976, 7290034978

AKGEC/MOD/WI/07

## COURSE FILE

**DEPARTMENT:** APPLIED SCIENCES & HUMANITIES

**NAME OF FACULTY:** Dr. BANDANA SHARMA

**SUBJECT & SUBJECT CODE:** ENGINEERING PHYSICS, BAS101

**SECTION & SEMESTER:** (S-2, S-7) & FIRST

**SESSION:** ODD SEMESTER, 2022-23

*A/S*

Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

## ORDER OF FORMATS

- |   |                   |
|---|-------------------|
| 1. Quality Policy   | AKGEC/IQAC/QY/01  |
| 2. Quality Objectives   | AKGEC/IQAC/QY/02  |
| 3. Program Educational Objectives, Program Outcomes & Course Outcomes               | AKGEC/IQAC/OBE/01 |
| 4. Extra Topic CO PO Mapping with Justification                                     | AKGEC/IQAC/OBE/02 |
| 5. Course Correlation Chart   | AKGEC/IQAC/OBE/03 |
| 6. Time Table   | AKGEC/IQAC/LDP/01 |
| 7. University Syllabus  | AKGEC/IQAC/LDP/02 |
| 8. Lecture Delivery Schedule, Its compliance dates & Target (Attendance & Academic) | AKGEC/IQAC/LDP/03 |
| 9. Lab Course Details   | AKGEC/IQAC/LDP/04 |
| 10. Handouts and Lecture Delivery Notes   | AKGEC/IQAC/LDP/05 |
| 11. List of Toppers & Bottomers   | AKGEC/IQAC/AR/01  |
| 12. Absentee Report of ST/PUT   | AKGEC/IQAC/AR/02  |
| 13. Attendance Record of Debarred Students in Extra Classes                         | AKGEC/IQAC/AR/03  |
| 14. Attendance Register (Theory & Lab)  | AKGEC/LDP/FM/04   |
| 15. Tutorial Sheets   | AKGEC/IQAC/QP/01  |
| 16. Class Test Papers   | AKGEC/IQAC/QP/02  |
| 17. Sessional Test Papers   | AKGEC/IQAC/QP/03  |
| 18. Pre- University Test Papers   | AKGEC/IQAC/QP/04  |
| 19. Previous Year University Question Papers  | AKGEC/IQAC/QP/05  |

*N Gupta*  
12/08/2022  
**Prof. Neelesh Kumar Gupta**  
MR

*D Chauhan*  
18/08/2022  
**Asst. Prof. Dushyant Singh**  
DMR

*Alim*  
13/08/2022  
**Asst. Prof. Abhishek Tiwari**  
DMR

*P. K. C*  
**Prof. P. K. C**  
**Dean Special**

*A. K. Garg*  
**Director**  
**Ajay Kumar Garg Engg. College**  
**Ghaziabad**

AKGEC/IQAC/QY/01

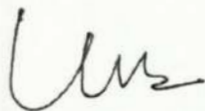
# Ajay Kumar Garg Engineering College, Ghaziabad

27<sup>th</sup> KM Milestone, Delhi - Meerut Expy, Ghaziabad, Uttar Pradesh 201009

06/04/2022

## 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.



Director



Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

QUALITY  
POLICY  
AKGEC/IQAC/01

QUALITY  
DIRECTIVES  
AKGEC/IQAC/02

PEO, PO  
&  
CO  
AKGEC/IQAC/03

COURSE  
CORRELATION  
CHART  
AKGEC/IQAC/04

TIME  
TABLE  
AKGEC/IQAC/05

SYLLABUS  
AKGEC/IQAC/  
LDP/02

LMS  
AKGEC/IQAC/  
LDP/03

AKGEC/IQAC/  
LDP/04

Handouts  
and  
Notes  
AKGEC/IQAC/  
LDP/05

REPORT  
ST/PU  
AKGEC/IQAC/

PAPER  
SECTION/EP/

SESSIONAL  
TEST  
PAPER

AKGEC/IQAC/06

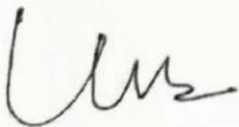
# Ajay Kumar Garg Engineering College, Ghaziabad

27<sup>th</sup> KM Milestone, Delhi - Meerut Expy, Ghaziabad, Uttar Pradesh 201009


06/04/2022

## Quality Objectives

S.No	Quality Objectives	Measurements
1.	Enhancing satisfaction of customers.	<ul style="list-style-type: none"> <li>• Rating on feedback taken from students, parents, and organizations.</li> </ul>
2.	Enhancing academic environment.	<ul style="list-style-type: none"> <li>• Results of examinations.</li> <li>• Class attendance.</li> <li>• Merit position in university examination.</li> <li>• Higher qualification by faculty.</li> </ul>
3.	Provide additional learning resources	<ul style="list-style-type: none"> <li>• Development of teaching resources for students.</li> <li>• Use of ICT tools.</li> </ul>
4.	Developing students as mature and competent professionals.	<ul style="list-style-type: none"> <li>• Participation in professional courses organized by AKGEC.</li> <li>• Selection in leading organizations.</li> </ul>
5.	Excellence in all processes	<ul style="list-style-type: none"> <li>• Compliances to all requirements that we follow for high-quality rating.</li> </ul>
6.	Growth in placements of students.	<ul style="list-style-type: none"> <li>• Selection of students in leading organizations.</li> <li>• Addition of new organization for placements.</li> </ul>
7.	Encourage research, innovation, and consultancy projects.	<ul style="list-style-type: none"> <li>• Research seminar &amp; publication by faculty members and students.</li> </ul>



**Director**



**Director**  
Ajay Kumar Garg Engg. College  
Ghaziabad

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

**PROGRAM EDUCATIONAL OBJECTIVES: 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 (POs)**

**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.

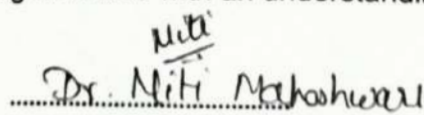
**2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

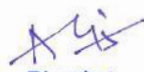
**3. Design/development of solutions:** Design solutions for complex Computer Science & Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**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.

**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

  
 Dr. Bandana Sharan  
 (SUBJECT TEACHER)

  
 Dr. Niti Maheshwari  
 NBA COORDINATOR

  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad  
 (DE/...)





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.

  
 Dr. Bandana Sharma  
 (SUBJECT TEACHER)

  
 Dr. Niti Maheshwari  
 NBA COORDINATOR

  
 PRO  
 (DEA)  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

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

Sub. Name: Engineering Physics	Sub Code: BAS101	NBA course code: C101	Sem: I
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Course Outcomes w.e.f: 2022-23	
C101.1	To explain the distribution of energy in black body radiation and to <b>differentiate</b> 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 <b>examine</b> 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 <b>interpret</b> the concepts of grating and resolving power.
C101.4	To describe the functioning of optical fiber, its properties, and to <b>distinguish</b> between different types of optical fiber. To understand the concept, properties, and applications of lasers.
C101.5	To <b>describe</b> the properties and applications of superconducting materials and nanomaterials.

**CO-PO/PSO Mapping: (CSE)**

		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
	Learning Level	2	2	3	2	2	2	2	2	2	2	2	2	2	3
C101.1	2	3	3	2	3	3							3	3	2
C101.2	2	3	3	2	3	3							3	3	2
C101.3	1	1	1	1	1	1							1	1	1
C101.4	2	3	3	2	3	3							3	3	2
C101.5	1	1	1	1	1	1							1	1	1

3 : If,  $CO \geq PO$ , Then the weightage 3

2, 1 : If,  $CO < PO$ , Then the weightage of CO as it is.

*Dr. Bandana Sharma*  
 (SUBJECT TEACHER)

*Dr. Niti Maheshwari*  
 NBA COORDINATOR

*Prof. Ajay Kumar Garg*  
 (DEAN,

*Ajy*  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

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

Sub. Name: Engineering Physics	Sub Code: BAS101	NBA course code: C101	Sem: I
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**CO-PO/PSO Mapping: CSE(DS)**

		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
	Learning Level	2	2	3	2	2	2	2	2	2	2	2	2	2	3
<b>C101.1</b>	2	3	3	2	3	3							3	3	2
<b>C101.2</b>	2	3	3	2	3	3							3	3	2
<b>C101.3</b>	1	1	1	1	1	1							1	1	1
<b>C101.4</b>	2	3	3	2	3	3							3	3	2
<b>C101.5</b>	1	1	1	1	1	1							1	1	1

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 (SUBJECT TEACHER)

*Dr. Niti Maheshwari*  
 NBA COORDINATOR

*Prof. (DEAN)*

*Director*  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

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

Sub. Name: Engineering Physics	Sub Code: BAS101	NBA course code: C101	Sem: I
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Course Outcomes w.e.f: 2022-23	
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**CO-PO/PSO Mapping: CSE(AI&ML)**

	Learning Level	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
		2	2	3	2	2	2	2	2	2	2	2	2	2	3
C101.1	2	3	3	2	3	3							3	3	2
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 (SUBJECT TEACHER)

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 NBA COORDINATOR

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 PROI  
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*[Signature]*  
 Director  
 Ajay Kumar Garg Engg. College  
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**AJAY KUMAR GARG ENGINEERING COLLEGE GHAZIABAD**  
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Sub. Name: Engineering Physics	Sub Code: BAS101	NBA course code: C101	Sem: I
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**CO-PO/PSO Mapping: (AI&ML)**

		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
	Learning Level	2	2	3	2	2	2	2	2	2	2	2	2	2	3
C101.1	2	3	3	2	3	3							3	3	2
C101.2	2	3	3	2	3	3							3	3	2
C101.3	1	1	1	1	1	1							1	1	1
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 (SUBJECT TEACHER)

*Dr. Niti Maheshwari*  
 NBA COORDINATOR

*PRO*  
 (DEA)

*Director*  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

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

**PROGRAM EDUCATIONAL OBJECTIVES: 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 (POs)**

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.

**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.

*Dr. Bandana Sharma*  
 .....  
 (SUBJECT TEACHER)

*Niti*  
 .....  
 Dr. Niti Maheshwari  
 .....  
 NBA COORDINATOR

*A. G.*  
 .....  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

**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.

  
Do. Bandana Sharma  
(SUBJECT TEACHER)

  
Do. Niti Maheshwari  
NBA COORDINATOR

  
PROF  
DEAN

  
Director  
Ajay Kumar Garg Engg. College  
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**AJAY KUMAR GARG ENGINEERING COLLEGE GHAZIABAD**  
**DEPARTMENT OF APPLIED SCIENCES & HUMANITIES**

Sub. Name: Engineering Physics	Sub Code: BAS101	NBA course code: C101	Sem: I
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W.E.F: 2022-23

Course Outcomes	
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**CO-PO/PSO Mapping: (EN)**

		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
	Learning Level	2	2	3	2	2	2	2	2	2	2	2	2	2	3
C101.1	2	3	3	2	3	3							3	3	2
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(SUBJECT TEACHER)

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NBA COORDINATOR

PROF.  
(DEAN,

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## AJAY KUMAR GARG ENGINEERING COLLEGE GHAZIABAD

### PROGRAM EDUCATIONAL OBJECTIVES: **ME**

**PEO 1:** The graduates of the mechanical engineering programme 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.

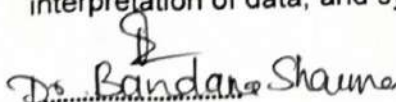
### PROGRAM OUTCOMES (POs)

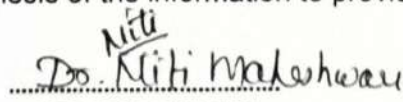
**PO 1:Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**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 the specified needs with appropriate consideration for the public health and safety, and 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.

  
 Dr. Bandana Sharma  
 (SUBJECT TEACHER)

  
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 NBA COORDINATOR

  
 PRO  
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 Director  
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 Ghaziabad

**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.

**PO6: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.

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**PO9:Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: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.

**PO11: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.


**PO12: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): ME

**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.

  
Dr. Bandana Sharma  
(SUBJECT TEACHER)

  
Dr. Niti Maheshwari  
NBA COORDINATOR

  
Ajay Kumar Garg Engg. College  
Ghaziabad  
(DEAN, FIRST YEAR)

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

Sub. Name: Engineering Physics	Sub Code: BAS101	NBA course code: C101	Sem: I
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W.E.F: 2022-23

Course Outcomes	
C101.1	To explain the distribution of energy in black body radiation and to <b>differentiate</b> 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 <b>examine</b> 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 <b>interpret</b> the concepts of grating and resolving power.
C101.4	To describe the functioning of optical fiber, its properties, and to <b>distinguish</b> between different types of optical fiber. To understand the concept, properties, and applications of lasers.
C101.5	To <b>describe</b> the properties and applications of superconducting materials and nanomaterials.

**CO-PO/PSO Mapping: (ME)**

	Learning Level	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO 12	PS O1	PSO 2	PSO 3
C101.1	2	3	3	2	3	3							3	3	2	3
C101.2	2	3	3	2	3	3							3	3	2	3
C101.3	1	1	1	1	1	1							1	1	1	1
C101.4	2	3	3	2	3	3							3	3	2	3
C101.5	1	1	1	1	1	1							1	1	1	1

3 : If,  $CO \geq PO$ , Then the weightage 32, 1 : If,  $CO < PO$ , Then the weightage of CO as it is.

Dr. Banalata Sharma  
(SUBJECT TEACHER)

Dr. Niti Maheshwari  
NBA COORDINATOR

PROI  
(DEAN, FIRST YEAR)

Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

**EXTRA TOPIC CO-PO MAPPING WITH JUSTIFICATION: ENGINEERING PHYSICS**

S. No.	Topic	Related Unit	Relevance to COs	Relevance to POs/PSOs	Justification
1	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.

Dr. Bandana Sharma

Faculty Name & Signature

Dr. Niti Maheshwari

NBA Coordinator

Prof. S. L. Kapoor

HOD Signature

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# COURSE CORRELATION

## B.TECH EN

AKGEC / IOAC /  
OBE / 03

**1<sup>st</sup> Year**

**2<sup>nd</sup> Year**

**3<sup>rd</sup> Year**

**4<sup>th</sup> Year**

**1<sup>st</sup> & 2<sup>nd</sup> Sem**

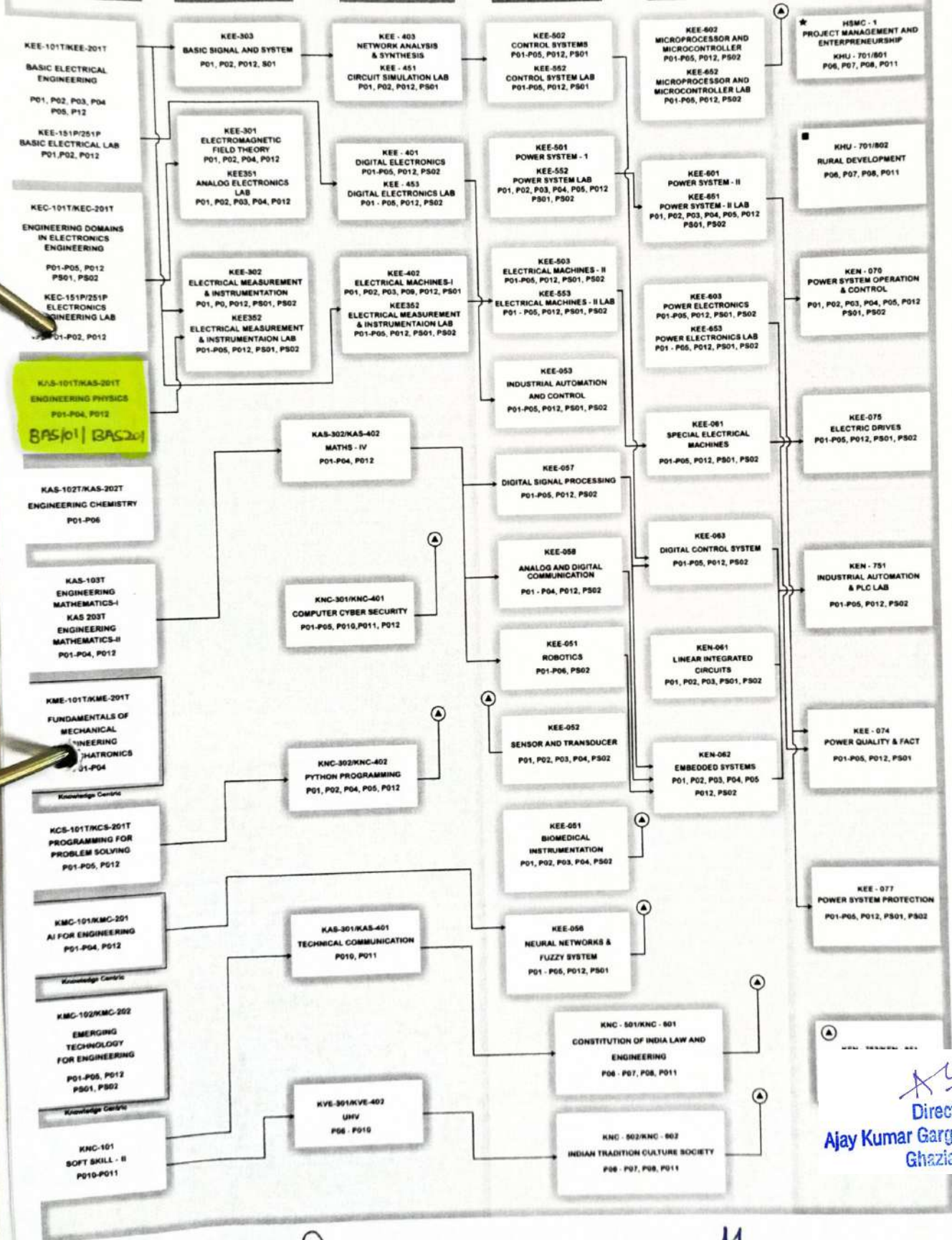
**3<sup>rd</sup> Sem**

**4<sup>th</sup> Sem**

**5<sup>th</sup> Sem**

**6<sup>th</sup> Sem**

**7<sup>th</sup> & 8<sup>th</sup> Sem**



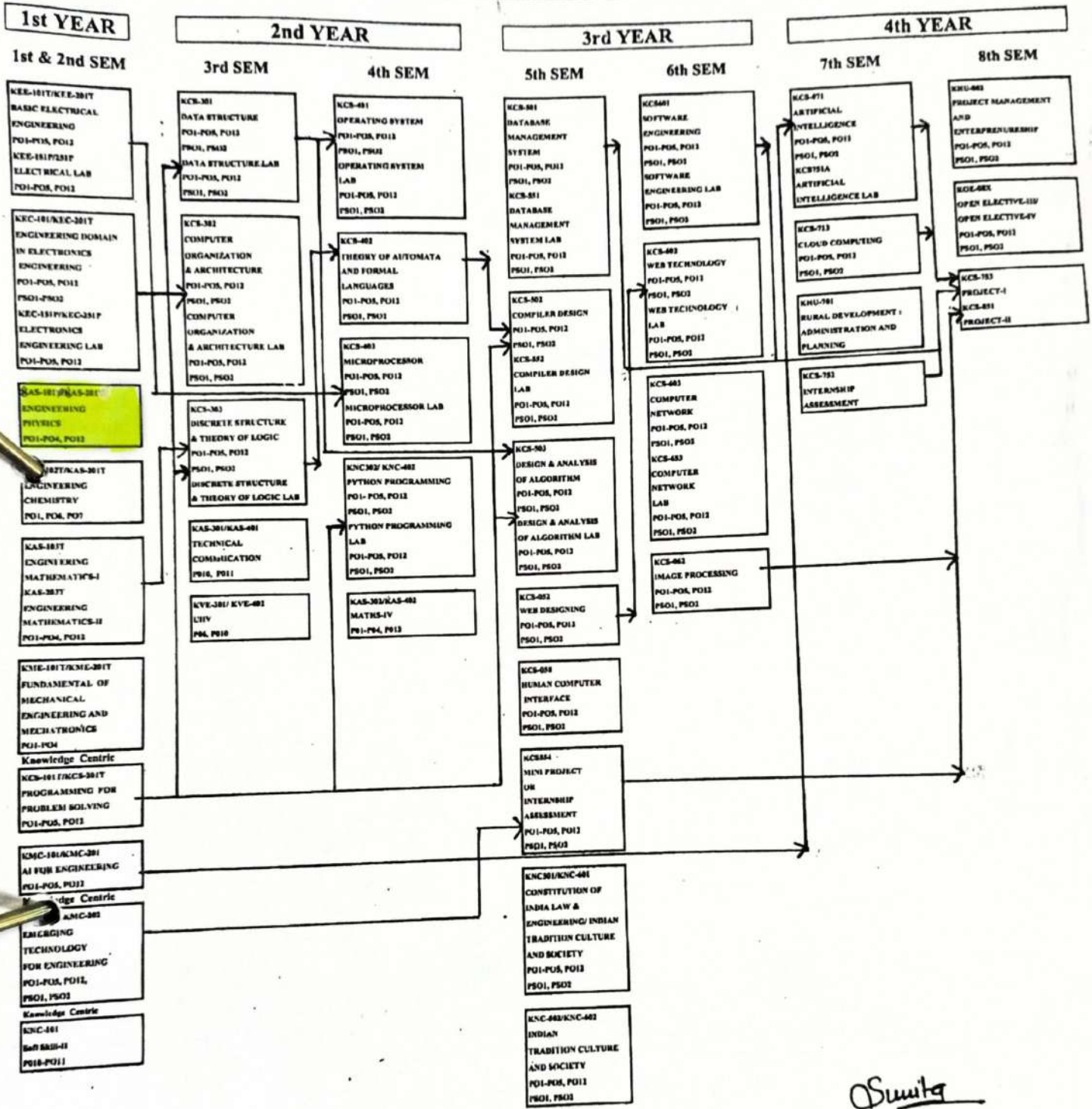
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# COURSE CORRELATION B.TECH CSE-2022

AKGEC/IOAC/OBE/03



ISO Incharge

Bidano

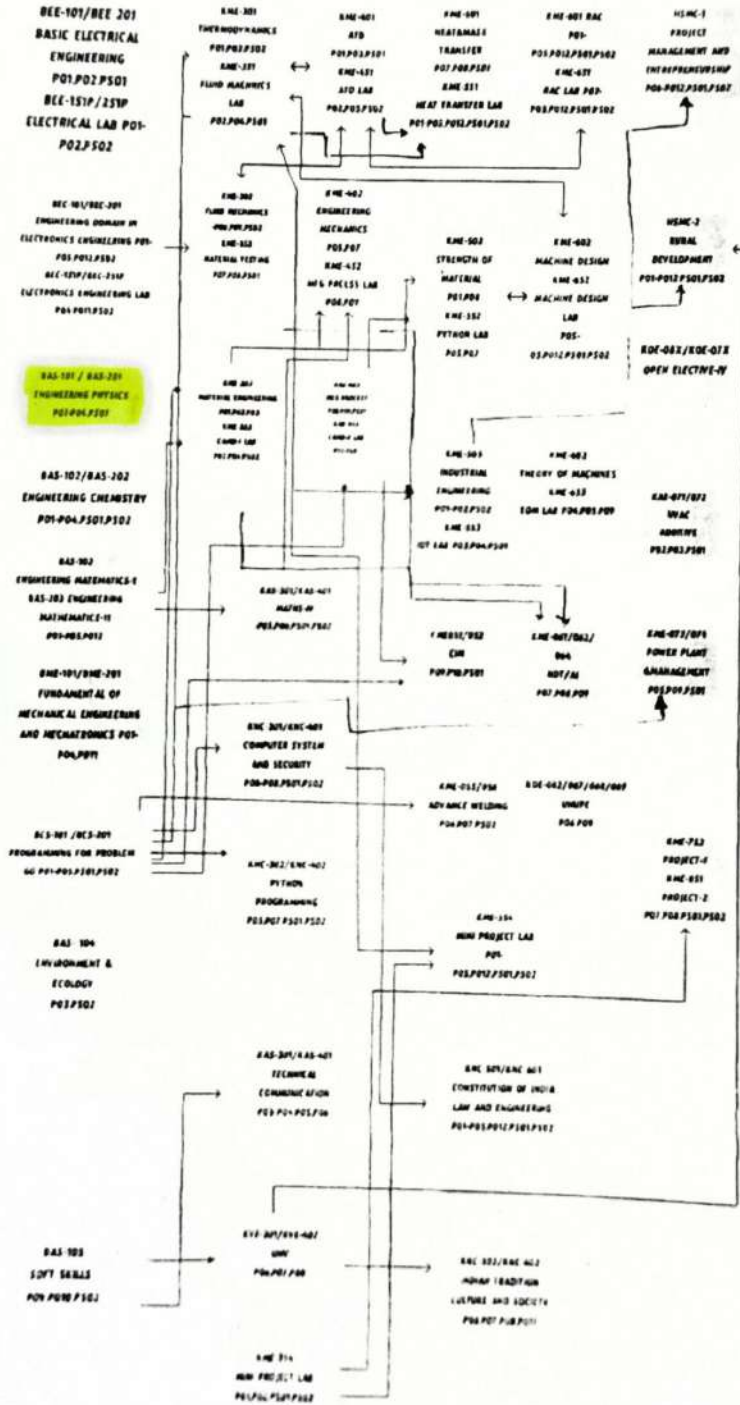
Sunita

Dr. Sunita Yadav  
HOD CSE

Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

# COURSE CORRELATION B.TECH ME

I YEAR	II YEAR	III YEAR	IV YEAR
1st & 2nd SEM	3rd SEM	4th SEM	5th SEM
	6th SEM	7th & 8th SEM	



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**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Faculty Wise Time Table**

Year/Session  
First | 2022-23


Sem. : I


Department : AS&HUM

Name of the Faculty : Dr. Bandana Sharma  
: 2022-23

PERIOD/D AY	1		2		3		4		5		6		7		8		9		Total L+P/2						
	8:30-9:20	9:20-10:10	10:10-11:00	11:00-11:50	11:50-12:40	12:40-1:30	1:30-2:20	2:20-3:10	3:10-4:00	L	T	P													
MONDAY	S-2	S-2A																11	8	15					
TUESDAY	S-7	S-2	S-7A																FACULTY SIGNATURE						
WEDNESD AY	S-7B		S-2	S-7	S-7											Target	ST-1	ST-2	PUT	UT					
THURSDAY						S-2B	S-2											Pass %	80	90	90	100			
FRIDAY	S-7																	Class Avg	50	50	55	60			
SATURDAY			S-2	S-7																	I/C TT	[Signature]			12/10/2022
																				HOD					

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-2	NLT-2
	BAS101/BAS151	Engineering Physics/Engineering Physics Lab	B.TECH	I	S-7	NLT-7

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

3- WEEKS STUDENT INDUCTION PROGRAMME in the beginning of the session													
SN	Subject Code	Subject Name	Type	Category	Period			Sessional Component		Evaluation Scheme		Total	Credit
					L	T	P	CT	TA	Sessional (SW) (TS/PS)	End Semester Examination (ESE)		
					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
					<b>13</b>	<b>5</b>	<b>12</b>			<b>350</b>	<b>550</b>	<b>900</b>	<b>22</b>

**Abbreviation Used:**

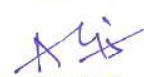
BS: Basic Science Course

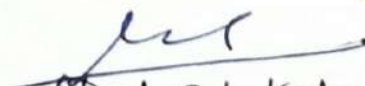
ES: Engineering Science Course

HS: Humanities and Social Science Course

VA: Value Added Course

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**BAS101 / BAS201: ENGINEERING PHYSICS**

Content	Contact Hours
<b>Unit-1: Quantum Mechanics</b>	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.	
<b>Unit-2: Electromagnetic Field Theory</b>	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.	
<b>Unit-3: Wave Optics</b>	10
Coherent sources, Interference in uniform and wedge shaped thin films, Necessity of extended sources, Newton's Rings and its applications, Introduction to diffraction, Fraunhofer 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.	
<b>Unit-4: Fiber Optics &amp; Laser</b>	9
<b>Fibre Optics:</b> 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. <b>Laser:</b> 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.	
<b>Unit-5: Superconductors and Nano-Materials:</b>	8
<b>Superconductors:</b> 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. <b>Nano-Materials:</b> 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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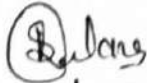
(Prof. S.L. Kapoor)

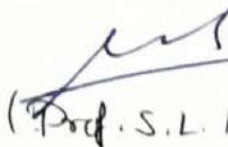
**Course Outcomes:**


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

  
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**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	SESSIONAL TEST-1	Once a Semester	College level	25
2	SESSIONAL TEST-2	Once a Semester	College level	50
3	PRE-UNIVERSITY TEST	Once in a Semester	College level	70
4	END SEMESTER EXAMS	Once in a Semester	University level	70

UNIT	No of Topics	No of lectures	No of lectures held (Section: S)
1	9	11	17
2	9	10	19
3	10	12	15
4	9	9	16
5	8	8	12
Extra topic	5	5	05
<b>Total units- Five</b>	<b>Total Topics- 50</b>	<b>Total Lectures- 55</b>	<b>86</b>

\* (CT-1 - 1 Lect)  
ST-1 - 2 Lect

\* (CT-2 - 1 Lecture)  
ST-2 - 2 Lecture

\* (PUT : 02 Lec)

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	95	

  
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**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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## 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-7....**

UNIT 1: QUANTUM MECHANICS					
Sl. 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	14/11 15/11	
2	Compton's Effect	2	2	16/11 17/11	
3	De-Broglie concept of matter waves	1	1	18/11	
4	Davisson and Germer Experiment	1	2	22/11 23/11	
5	Phase velocity and group velocity	1	2	24/11 25/11	
6	Time-dependent Schrodinger's wave equations	1	2	26/11 28/11	
7	Time-independent Schrodinger's wave equations	1	2	28/11 29/11	
8	Physical interpretation of wave function and conditions fulfilled by wave function	1	1	30/11	
9	Particle in a one-Dimensional box	2	3	1/12, 2/12 5/12	
<b>Lectures Scheduled = 11</b>				<b>Lectures held = 17</b>	

  
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LECTURE WISE SCHEDULESECTION: S-7.

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	2	6/12 8/12	7/12 (CT)
2	Continuity equation for current density	1	1	8/12	
3	Displacement current, Maxwell equations in integral and differential form	1	1	9/12	13/12 (STI)
4	Maxwell equations in vacuum and plane electromagnetic wave equations in vacuum	1	2	20/12 21/12	
5	Transverse nature of electromagnetic wave in free space.	2	3	22/12 23/12 27/12	
6	Maxwell equations in conducting medium	1	2	27/12 27/12	
7	Plane electromagnetic waves in conducting medium, Skin depth	1	2	28/12 28/12	
8	Poynting vector and Poynting theorem	1	1	29/12	
9	Relation between electric and magnetic fields of an electromagnetic wave	1	2	29/12 29/12	
Lectures Scheduled = 10				Lectures held = 16+3=19	

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**LECTURE WISE SCHEDULE****SECTION: S-7..**

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	30/12	
2	Interference in uniform thin films	1	2	3/1 3/1	
3	Interference in wedge shaped thin films	1	1	4/1	
4	Necessity of extended sources	1	1	4/1	
5	Newton's Ring experiment and its applications	2	2	5/1 5/1	
6	Introduction to diffraction, Fraunhofer's diffraction at single slit	1	2	6/1 6/1	
7	Double slit diffraction and absent spectra	1	1	6/1	
8	Diffraction grating Spectra, missing order and maximum possible order with grating	2	2	7/1 9/1	
9	Dispersive power, Resolving power, Rayleigh's criterion of resolution	1	1	10/1	
10	Resolving power of grating	1	2	10/1, 11/1	
<b>Lectures Scheduled = 12</b>		<b>Lectures held =</b>		<b>15</b>	

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**LECTURE WISE SCHEDULE****SECTION: S-7.**

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	1	11/1	
2	Acceptance angle, Numerical aperture, Acceptance cone	1	2	12/01 13/01	
3	Step index and graded index fibers	1	2	16/01 17/01	
4	Attenuation, Dispersion, Application of fiber	1	2	18/01 19/01 (ET)	
5	Absorption of radiation, Spontaneous and stimulated emission of radiation	1	2	20/01 20/01	
6	Einstein's Coefficients and Einstein's relation	1	2	24/01 25/01	
7	Population inversion, Principles of laser action	1	1	27/01	31/01 01/07 (ST)
8	Solid state Laser (Ruby laser)	1	1	6/2	
9	Gas Laser (He-Ne laser), Laser applications.	1	1	07/02	
Lectures Scheduled = 09				Lectures held = 14+2 = 16	

  
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
  
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**LECTURE WISE SCHEDULE****SECTION: S-7..**

<b><u>UNIT 5: SUPERCONDUCTORS AND NANOMATERIALS</u></b>					
Sl. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Temperature dependence of resistivity in superconducting materials	1	2	7/2 8/2	
2	Meissner effect, Temperature dependence of critical field, Persistent current	1	2	8/2 9/2	
3	Type I and Type II superconductors	1	1	10/2	
4	High temperature superconductors, Properties and Applications of Super-conductors	1	2	11/2 13/2	
5	Nano-Materials: Introduction and properties of nano materials	1	1	14/2	
6	Basics concept of Quantum Dots, Quantum wires and Quantum well	1	2	14/2 15/2	
7	Fabrication of nano materials -Top Down approach (CVD) and Bottom-Up approach (Sol Gel)	1	1	15/2	
8	Properties and Application of nano materials	1	1	16/2	$\frac{25}{2}, \frac{25}{2}$ (PUT)
<b>Lectures Scheduled = 08</b>				<b>Lectures held = 12 + 2 = 14</b>	

  
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EXTRA TOPICS COVERAGE							
S.No	Topic	No. of Lectures Required	Related Unit	No. of Lectures Held	Held on Date	Remarks	
1	Heisenberg Uncertainty principle and its application	1	1	1	26/11		
2	Radiation pressure and momentum	1	2	1	30/12		
3	Young's double slit experiment and Fresnel's Biprism experiment	1	3	1	2/1		
4	Main components of a laser system	1	4	1	23/1		
5	Carbon nanotubes (CNTs)	1	5	1	13/2		
<b>Total Lectures Scheduled.....</b>		<b>55.....</b>		<b>Total Lectures held.....</b>			<b>86.....</b>

**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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**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	SESSIONAL TEST-1	Once a Semester	College level	25
2	SESSIONAL TEST-2	Once a Semester	College level	50
3	PRE-UNIVERSITY TEST	Once in a Semester	College level	70
4	END SEMESTER EXAMS	Once in a Semester	University level	70

UNIT	No of Topics	No of lectures	No of lectures held (Section: 5%)	
1	9	11	17*	(* CT1 - 1 lect)
2	9	10	16*	(* ST1 - 2 lect)
3	10	12	16*	(* CT2 - 1 lect)
4	9	9	11*	(* ST2 - 2 lect)
5	8	8	10*	(* PUT - 2 lect)
Extra topic	5	5	05	
<b>Total units- Five</b>	<b>Total Topics- 50</b>	<b>Total Lectures- 55</b>	<b>75</b>	

**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	95	

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

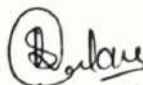
- 1 Classical Mechanics
- 2 Electrostatics and Magnetostatics
- 3 Optics (interference and diffraction)
- 4 Light-matter interactions
- 5 Materials and Their Characteristics

**Pre-requisite for the following courses:**

Electromagnetic Field Theory

Optical Communication

Material Science

  
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Prof. S. L. Kapoor  
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## 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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Ajay Kumar Garg Engg. College  
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**LECTURE WISE SCHEDULE****SECTION: S-2....**

UNIT 1: QUANTUM MECHANICS					
Sl. 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	14/11 15/11	
2	Compton's Effect	2	2	16/11 17/11	
3	De-Broglie concept of matter waves	1	2	21/11 22/11	
4	Davisson and Germer Experiment	1	1	23/11	
5	Phase velocity and group velocity	1	2	24/11 25/11	
6	Time-dependent Schrodinger's wave equations	1	2	28/11 29/11	
7	Time-independent Schrodinger's wave equations	1	2	30/11 01/12	
8	Physical interpretation of wave function and conditions fulfilled by wave function	1	1	05/12	
9	Particle in a one-Dimensional box	2	3	06/12, 06/12 08/12	07/12 (CT)
<b>Lectures Scheduled = 11</b>				<b>Lectures held = 17</b>	

Dr. Bandana Chandra

Faculty Name & Signature

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LECTURE WISE SCHEDULESECTION: 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	1	9/12	$\frac{13}{2}$ $\frac{13}{2}$ ST 1
2	Continuity equation for current density	1	1	21/12	
3	Displacement current, Maxwell equations in integral and differential form	1	2	21/12 22/12	
4	Maxwell equations in vacuum and plane electromagnetic wave equations in vacuum	1	2	22/12 23/12	
5	Transverse nature of electromagnetic wave in free space.	2	3	27/12 28/12 28/12	
6	Maxwell equations in conducting medium	1	2	29/12 29/12	
7	Plane electromagnetic waves in conducting medium, Skin depth	1	1	30/12	
8	Poynting vector and Poynting theorem	1	1	2/1	
9	Relation between electric and magnetic fields of an electromagnetic wave	1	1	3/1	
Lectures Scheduled = 10				Lectures held = 14 + 2 = 16	

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Ghaziabad

LECTURE WISE SCHEDULESECTION: S-2

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	4/1	
2	Interference in uniform thin films	1	1	6/1	
3	Interference in wedge shaped thin films	1	2	7/1 9/1	
4	Necessity of extended sources	1	1	10/01	
5	Newton's Ring experiment and its applications	2	2	11/01 11/01	
6	Introduction to diffraction, Fraunhofer's diffraction at single slit	1	1	12/01	
7	Double slit diffraction and absent spectra	1	2	13/01 13/01	
8	Diffraction grating Spectra, missing order and maximum possible order with grating	2	3	16/01 17/01 18/01	
9	Dispersive power, Resolving power, Rayleigh's criterion of resolution	1	1	19/01	
10	Resolving power of grating	1	1	19/01	20/01 (CTR)
Lectures Scheduled = 12		Lectures held = 15+01 = 16			

Dr. Bandana Shaema

Faculty Name & Signature

D. D. D.

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S. S.

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LECTURE WISE SCHEDULESECTION: S-2.

<u>UNIT 4 : FIBER OPTICS &amp; LASER</u>					
Sl. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Principle and construction of optical fiber	1	1	23/01	
2	Acceptance angle, Numerical aperture, Acceptance cone	1	1	24/01	
3	Step index and graded index fibers	1	1	25/01	31/01, 31/01 ST2
4	Attenuation, Dispersion, Application of fiber	1	1	27/01	
5	Absorption of radiation, Spontaneous and stimulated emission of radiation	1	1	6/2	
6	Einstein's Coefficients and Einstein's relation	1	1	7/2	
7	Population inversion, Principles of laser action	1	1	7/2	
8	Solid state Laser (Ruby laser)	1	1	8/2	
9	Gas Laser (He-Ne laser), Laser applications.	1	1	9/2	
<b>Lectures Scheduled = 09</b>				<b>Lectures held = 9+2 = 11</b>	

  
Do. Bandana Sharma

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


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LECTURE WISE SCHEDULESECTION: S-2

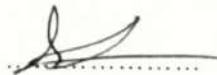
<u>UNIT 5: SUPERCONDUCTORS AND NANOMATERIALS</u>					
Sl. No.	Topic	No. of Lectures required	No. of Lectures held	Held on date	Remarks
1	Temperature dependence of resistivity in superconducting materials	1	1	10/2	
2	Meissner effect, Temperature dependence of critical field, Persistent current	1	1	10/2	
3	Type I and Type II superconductors	1	1	11/2	
4	High temperature superconductors, Properties and Applications of Super-conductors	1	1	12/2	
5	Nano-Materials: Introduction and properties of nano materials	1	1	13/2	
6	Basics concept of Quantum Dots, Quantum wires and Quantum well	1	1	14/2	
7	Fabrication of nano materials –Top Down approach (CVD) and Bottom-Up approach (Sol Gel)	1	1	15/2	
8	Properties and Application of nano materials	1	1	16/2	$\frac{25}{2}, \frac{25}{2}$ PUT
<b>Lectures Scheduled = 08</b>				<b>Lectures held = 08</b> 2 = 10	

  
Dr. Sandana Sharma

Faculty Name & Signature



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Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

EXTRA TOPICS COVERAGE						
S.No	Topic	No. of Lectures Required	Related Unit	No. of Lectures Held	Held on Date	Remarks
1	Heisenberg Uncertainty principle and its application	1	1	1	26/11	
2	Radiation pressure and momentum	1	2	1	4/1	
3	Young's double slit experiment and Fresnel's Biprism experiment	1	3	1	5/1	
4	Main components of a laser system	1	4	1	8/2	
5	Carbon nanotubes (CNTs)	1	5	1	15/2	
Total Lectures Scheduled.....55.....			Total Lectures held.....75.....			

**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)

  
 Dr. Bandana Sharma  
 Faculty Name & Signature

  
 Syllabus Monitoring Team

  
 HOD Signature

  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

# AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD

## DEPARTMENT OF APPLIED SCIENCES & HUMANITIES

### LAB COURSE DETAILS

**LAB NAME WITH LAB CODE:** ENGINEERING PHYSICS LAB: BAS151/BAS251  
**SECTIONS TAUGHT:** B.TECH. FIRST YEAR (S-1 to S-10)

### SUGGESTIVE LIST OF EXPERIMENTS AS PER AKTU

#### Group A

1. To determine the wavelength of sodium light by Newton's ring experiment.
2. To determine the wavelength of different spectral lines of mercury light using plane transmission grating.
3. To determine the specific rotation of cane sugar solution using polarimeter.
4. To determine the focal length of the combination of two lenses separated by a distance and verify the formula for the focal length of combination of lenses
5. To measure attenuation in an optical fiber.
6. To determine the wavelength of He-Ne laser light using single slit diffraction.
7. To study the polarization of light using He-Ne laser light.
8. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.
9. To determine the coefficient of viscosity of a given liquid.
10. To determine the value of acceleration due to gravity (g) using compound pendulum.

#### Group B

1. To determine the energy band gap of a given semiconductor material.
2. To study Hall Effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To verify Stefan's law by electric method.
5. To determine resistance per unit length and specific resistance of a given resistance using Carey Foster's Bridge.
6. To study the resonance condition of a series LCR circuit.
7. To determine the electrochemical equivalent (ECE) of copper.
8. To calibrate the given ammeter and voltmeter by potentiometer.
9. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
10. To measure high resistance by leakage method.

#### Additional Experiments

S.NO	Experiment Title	Relevance to CO	Relevance to POs
1	To find the magnetic susceptibility of paramagnetic solution $FeCl_3$ .	CO4, CO5	PO1-PO5, PO-12, PSO1, PSO2
2	To find the moment of inertia of a fly wheel.	CO5	PO1-PO5, PO-12, PSO1, PSO2

*Dr. Bandana Sharma*  
 Lab Faculty

*Dr. Niti Maheshwari*  
 NBA Coordinator

*Prof. S*  
 HoD, A

*A. G.*  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

**Course Outcomes as per AKTU syllabus:**

CO1: Apply the principle of interference and diffraction to find the wavelength of monochromatic and polychromatic light.

CO2: Compute and analyze various electrical and electronic properties of a given material by using various experiments.

CO3: Verify different established laws with the help of optical and electrical experiments.

CO4: Determine and calculate various physical properties of a given material by using various experiments.

CO5: Study and estimate the performance and parameter of given equipment by using graphical and computational analysis.

**Updated Course Outcomes after including additional Experiments:**

CO1: To implement the basic principles and concepts of optics (interference, diffraction, and polarization) to find the wavelength of monochromatic and polychromatic light.

CO2: To examine and differentiate various electrical and electronic properties of a material by using various experiments.

CO3: To execute different established laws with the help of optical and electrical experiments.

CO4: To demonstrate and determine various physical properties of a given material by using various experiments.

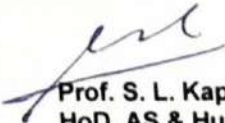
CO5: To evaluate and study the performance and parameters of given equipment by using graphical and computational analysis.

**Final CO-PO/PSO Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	1							1	1	1
CO2	3	3	2	3	3							3	3	2
CO3	1	1	1	1	1							1	1	1
CO4	1	1	1	1	1							1	1	1
CO5	3	3	2	3	3							3	3	2

  
Dr. Bandana Sharma  
Lab Faculty

  
Dr. Niti Maheshwari  
NBA Coordinator

  
Prof. S. L. Kapoor  
HoD, AS & Hum.

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

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

**UPDATION OF COs AFTER INCLUDING ADDITIONAL EXPERIMENTS**

**B.Tech. First Year (Common)**

**ENGINEERING PHYSICS LAB (BAS151/BAS251)**


**SUGGESTIVE LIST OF EXPERIMENTS AS PER AKTU.**

**Group A**


1. To determine the wavelength of sodium light by Newton's ring experiment.
2. To determine the wavelength of different spectral lines of mercury light using plane transmission grating.
3. To determine the specific rotation of cane sugar solution using polarimeter.
4. To determine the focal length of the combination of two lenses separated by a distance and verify the formula for the focal length of combination of lenses
5. To measure attenuation in an optical fiber.
6. To determine the wavelength of He-Ne laser light using single slit diffraction.
7. To study the polarization of light using He-Ne laser light.
8. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.
9. To determine the coefficient of viscosity of a given liquid.
10. To determine the value of acceleration due to gravity (g) using compound pendulum.

**Group B**

1. To determine the energy band gap of a given semiconductor material.
2. To study Hall Effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To verify Stefan's law by electric method.
5. To determine resistance per unit length and specific resistance of a given resistance using Carey Foster's Bridge.
6. To study the resonance condition of a series LCR circuit.
7. To determine the electrochemical equivalent (ECE) of copper.
8. To calibrate the given ammeter and voltmeter by potentiometer.
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10. To measure high resistance by leakage method.

  
**Dr. Sandhya Shasme**  
 Lab Faculty

  
**Dr. Niti Maheshwari**  
 NBA Coordinator

  
**Prof. S. L. Kapoor**  
 HoD, AS & Hum.

  
**Director**  
**Ajay Kumar Garg Engg. College**  
**Ghaziabad**

Handouts  
and  
Notes

AKGEC/IQAC/LDP/04

REPORT  
ST/PUT

AKGEC/IQAC/LDP/04

PAPER  
SECTION/EP/02

SESSIONAL

SECTION  
PAPER

AKGEC/IQAC/LDP/04



## Experiments available on virtual lab:

Group A	Virtual Lab Link	Alternate Lab Link
1 To determine the wavelength of sodium light by Newton's ring experiment.	<a href="https://vlab.amrita.edu/?sub=1&amp;brch=189&amp;sim=335&amp;cnt=1">https://vlab.amrita.edu/?sub=1&amp;brch=189&amp;sim=335&amp;cnt=1</a>	<a href="http://vlabs.iitb.ac.in/vlabsdev/abs/mit_bootcamp/engg_physics/labs/exp1/simulation/simulator4.htm?medium=1">http://vlabs.iitb.ac.in/vlabsdev/abs/mit_bootcamp/engg_physics/labs/exp1/simulation/simulator4.htm?medium=1</a>
2 To determine the wavelength of different spectral lines of mercury light using plane transmission grating.	<a href="http://vlab.amrita.edu/?sub=1&amp;brch=281&amp;sim=334&amp;cnt=1">http://vlab.amrita.edu/?sub=1&amp;brch=281&amp;sim=334&amp;cnt=1</a>	
3 To determine the specific rotation of cane sugar solution using polarimeter	<a href="http://vlabs.iitb.ac.in/vlabsdev/labs/physics-basics/labs/canesugar-rotation-iitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/labs/physics-basics/labs/canesugar-rotation-iitk/simulation.html</a>	
4 To determine the focal length of the combination of two lenses separated by a distance and verify the formula for the focal length of combination of lenses.	<a href="http://vlabs.iitb.ac.in/vlabsdev/labs/physics-basics/labs/focallength-measurementiitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/labs/physics-basics/labs/focallength-measurementiitk/simulation.html</a>	
5 To measure attenuation in an optical fiber.	<a href="http://vlab.amrita.edu/index.php?sub=59&amp;brch=269&amp;sim=1369&amp;cnt=2873">http://vlab.amrita.edu/index.php?sub=59&amp;brch=269&amp;sim=1369&amp;cnt=2873</a>	<a href="http://vlabs.iitb.ac.in/vlabsdev/abs/physicsbasics/labs/numerical-aperturemeasurement-iitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/abs/physicsbasics/labs/numerical-aperturemeasurement-iitk/simulation.html</a>
6 To determine the wavelength of He-Ne laser light using single slit diffraction.	<a href="http://vlab.amrita.edu/index.php/index.php?sub=1&amp;brch=189&amp;sim=334&amp;cnt=1">http://vlab.amrita.edu/index.php/index.php?sub=1&amp;brch=189&amp;sim=334&amp;cnt=1</a>	<a href="https://youtu.be/0qIN2qHCvvs">https://youtu.be/0qIN2qHCvvs</a> (Laser diffraction grating)
7 To study the polarization of light using He-Ne laser light.	<a href="http://vlabs.iitb.ac.in/vlabsdev/labs/physics-basics/labs/helaser-polarizationiitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/labs/physics-basics/labs/helaser-polarizationiitk/simulation.html</a>	
8 To determine the wavelength of sodium light with the help of Fresnel's biprism	<a href="http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/fresnel-biprismiitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/fresnel-biprismiitk/simulation.html</a>	
9 To determine the coefficient of viscosity of a given liquid.	<a href="https://amrita.olabs.edu.in/?sub=1&amp;brch=5&amp;sim=225&amp;cnt=2">https://amrita.olabs.edu.in/?sub=1&amp;brch=5&amp;sim=225&amp;cnt=2</a>	
10 To determine the value of acceleration due to gravity (g) using compound pendulum.	<a href="http://vlab.amrita.edu/?sub=1&amp;brch=280&amp;sim=210&amp;cnt=2">http://vlab.amrita.edu/?sub=1&amp;brch=280&amp;sim=210&amp;cnt=2</a>	
Group B	Virtual Lab Link	Alternate Lab Link
1 To determine the energy band gap of a given semiconductor material.	<a href="http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/energy-band-gap-iitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/energy-band-gap-iitk/simulation.html</a>	<a href="http://vlabs.iitb.ac.in/vlabsdev/abs/physics-basics/labs/energyband-gap-iitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/abs/physics-basics/labs/energyband-gap-iitk/simulation.html</a>
2 To study Hall effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.	<a href="https://vlab.amrita.edu/?sub=1&amp;brch=282&amp;sim=879&amp;cnt=1">https://vlab.amrita.edu/?sub=1&amp;brch=282&amp;sim=879&amp;cnt=1</a>	<a href="https://youtu.be/IUugrqMOY7E">https://youtu.be/IUugrqMOY7E</a> (Hall Effect)
3 To determine the variation of magnetic field with the distance along	<a href="http://vlab.amrita.edu/?sub=1&amp;brch=192&amp;sim=972&amp;cnt=1">http://vlab.amrita.edu/?sub=1&amp;brch=192&amp;sim=972&amp;cnt=1</a>	<a href="https://youtu.be/y2B0QyW8XJ0">https://youtu.be/y2B0QyW8XJ0</a> (Variation of Magnetic Field)

Dr. Bandaru S  
Lab Faculty

Dr. Niti Maheshwari  
NBA Coordinator

Prof. S. I. Kanoor  
HoD, AS

A. K. Garg  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

the axis of a current carrying coil and estimate the radius of the coil.		along the axis of circular coil carrying current)
4 To verify Stefan's law by electric method.	<a href="http://vlabs.iitb.ac.in/vlabsdev/vlab_bootcamp/bootcamp/vlabs_recbanda/labs/exp1/index.html">http://vlabs.iitb.ac.in/vlabsdev/vlab_bootcamp/bootcamp/vlabs_recbanda/labs/exp1/index.html</a>	<a href="https://youtu.be/qyFQ31sbAw">https://youtu.be/qyFQ31sbAw</a> ( Stefans law verification)
5 To determine resistance per unit length and specific resistance of a given resistance using Carey Foster's Bridge.	<a href="https://vlab.amrita.edu/?sub=1&amp;brch=192&amp;sim=346&amp;cnt=1">https://vlab.amrita.edu/?sub=1&amp;brch=192&amp;sim=346&amp;cnt=1</a>	<a href="http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/carey-foster-bridge-iitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/carey-foster-bridge-iitk/simulation.html</a>
6 To study the resonance condition of a series LCR circuit.	<a href="https://vlab.amrita.edu/?sub=1&amp;brch=75&amp;sim=330&amp;cnt=1">https://vlab.amrita.edu/?sub=1&amp;brch=75&amp;sim=330&amp;cnt=1</a>	
7 To determine the electrochemical equivalent (ECE) of copper.	<a href="http://learnphysicsdhruv.blogspot.com/2015/03/copper-voltmeter-to-determine-electro.html">http://learnphysicsdhruv.blogspot.com/2015/03/copper-voltmeter-to-determine-electro.html</a>	<a href="https://youtu.be/drV2nbDjR1k">https://youtu.be/drV2nbDjR1k</a> (ECE of Copper experiment)
8 To measure high resistance by leakage method	<a href="http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/carey-foster-bridge-iitk/simulation.html">http://vlabs.iitb.ac.in/vlabsdev/labs/physicsbasics/labs/carey-foster-bridge-iitk/simulation.html</a>	

### Additional Experiments

1. To find the magnetic susceptibility of paramagnetic solution  $\text{FeCl}_3$ .
2. To find the moment of inertia of a fly wheel.

### Course Outcomes as per AKTU syllabus:

CO1: Apply the principle of interference and diffraction to find the wavelength of monochromatic and polychromatic light.

CO2: Compute and analyze various electrical and electronic properties of a given material by using various experiments.

CO3: Verify different established laws with the help of optical and electrical experiments.

CO4: Determine and calculate various physical properties of a given material by using various experiments.

CO5: Study and estimate the performance and parameter of given equipment by using graphical and computational analysis.

### Updated Course Outcomes after including additional Experiments:

CO1: To implement the basic principles and concepts of optics (interference, diffraction, and polarization) to find the wavelength of monochromatic and polychromatic light.

CO2: To examine and differentiate various electrical and electronic properties of a material by using various experiments.

*Dr. Bandana*  
Lab Faculty

*Niti Maheshwari*  
Dr. Niti Maheshwari  
NBA Coordinator

*Prof. S. L. Kapoor*  
Prof. S. L. Kapoor  
HoD, AS & Hum


*Ajay Kumar Garg*  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

**AKGEC/IQAC/LDP/04**


CO3: To execute different established laws with the help of optical and electrical experiments.

CO4: To demonstrate and determine various physical properties of a given material by using various experiments.

CO5: To evaluate and study the performance and parameters of given equipment by using graphical and computational analysis.

  
**Dr. Saralata Sharma**  
Lab Faculty

  
**Dr. Niti Maheshwari**  
NBA Coordinator

  
**Prof. S. L. Kapoor**  
HoD, AS & Hum.

  
**Director**  
Ajay Kumar Garg Engg. College  
Ghaziabad

Handouts  
and  
Notes

AKGEC/IQAC

REA  
S

AKGEC

PAPER  
SECTION

SESSION  
TEST  
PAPER  
SECTION

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

Course : B.Tech.

Year: I

Sem: I

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

Section: S-2, S-7

Subject: ENGINEERING PHYSICS


Subject Code: BAS-101

No. of Units: 5


No. of Topics:50

**Reference Books**

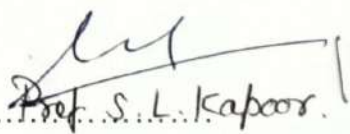
1. Concepts of Modern Physics - Aurthur Beiser (Mc-Graw Hill)
2. Optics - Brijlal & Subramanian (S. Chand )
3. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)
4. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)
5. Engineering Physics-Malik HK and Singh AK (Mc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

  
Dr. Banalata Shasmo

Faculty Sign

  
Dr. Niti Maheshwari

ISO In-Charge Sign

  
Prof. S. L. Kapoor

HOD Sign

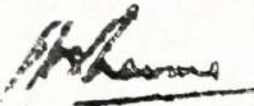
  
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Ajay Kumar Garg Engg. College  
Ghaziabad

AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD (027)


B.TECH - I SEM (SEC: S-2)

Absentee Details (ST-1. ODD SEM 2022-23)

S.NO.	Student ID	Name of the Student	BAS103	BAS101	BEE101	BAS104	BCS101
			Nil				

  
Prof. I.P. Sharma  
Centre Supdt  
AKGEC Ghaziabad  
(027)

ABSENT  
REPORT  
ST-1  
AKGEC/IT  
PAPER  
SECTION  
SESSION  
TEST  
PAPER  
AKGEC/IT

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD (027)


B.TECH - I SEM (SEC: S-7)

Absentee Details (ST-1 ODD SEM 2022-23)

S.NO.	Student ID	Name of the Student	BAS103	BAS101	BEE101	BAS104	BCS101
NIL							



Prof. I.P. Sharma  
Centre Supdt.  
AKGEC Ghaziabad  
(027)




Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD (027)  
ABSENTEE DETAILS (ST-2 ODD SEMESTER : 2022-23)

I SEM SEC: S-7

Sl. No.	Student No.	Name of Students	30/01/2023	31/01/2023	1/2/2023	2/2/2023	3/2/2023
			BAS103	BAS101	BEE101	BAS104	BCS101
	2210076	NIKHIL VASHISHTH		ABSENT			
	22153074	ARYAN AGNIHOTRI					
	22153086	DEEPANSHU KUMAR	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT
	22153006	SHIVAM KUMAR JHA			ABSENT		
	22153035	SHREYA ARYA	ABSENT				
	22154102	PUSHPENDRA KUMAR		ABSENT	ABSENT		
	2221077	SARTHAK MITTAL					ABSENT

  
Prof. I.P. Sharma  
Centre Supdt.  
AKGEC Ghaziabad  
(027)

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD (027)  
 ABSENTEE DETAILS (ST-2 ODD SEMESTER : 2022-23)

I SEM SEC: S-2

Sl. No.	Student No.	Name of Students	30/01/2023	31/01/2023	1/2/2023	2/2/2023	3/2/2023
			BAS103	BAS101	BEE101	BAS104	BCS101
	2210131	ANSH NIPRA					ABSENT
	22153026	ANSH YADAV			ABSENT		ABSENT
	22153123	ANUVA SINGH			ABSENT		



Prof. I.P. Sharma  
 Centre Supdt.  
 AKGEC Ghaziabad  
 (027)

  
 Director  
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 Ghaziabad

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 AKGEC  
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 PAP  
 AKGEC



**Ajay Kumar Garg Engineering College, Ghaziabad****Department of Applied Sciences & Humanities****Attendance record of debarred students in extra class : ST1**

Course: B.Tech  
 Session: 2022-23  
 Subject: Engineering Physics

Semester: I  
 Sections: S2, S7  
 Sub. Code: BAS-101

S.NO	Name	Student Number	12/12	13/12	14/12	15/12	16/12	19/12
1	Harsh Dubey	22153043	S2	A	P	P	A	P
2	Divya Agarwal	22154123	S2	A	A	P	P	P
3	Ansh Yadav	22153026	S2	P	P	P	P	P
4	Anubhav Chaudhary	2210086	S2	P	P	P	P	P
5	Harsh Kumar	2210124	S7	P	P	P	P	A
6	Shriya Mittal	22154137	S7	P	P	P	P	P
7	Shashwat Mishra	22169007	S7	P	P	P	P	P

Do. Bandana Sharma

NAME &amp; SIGNATURE OF FACULTY

Prof. S.L. Kapoor

HOD SIGNATURE

DEBARRED STUDENT  
 EXTRA CLASS  
 ATTENDANCE  
 AKGEC/10AC/AR/03  
 PAPER  
 AKGEC/10AC/EP/02

SESSIONAL  
 TEST  
 PAPER

Director

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(Vikas Rathi)

# ST-1 Debarred students Engg. Physics

BAS-101

AKGEC/IOAC/AR/63

Course: B.Tech

Sem: First

Sub-code: BAS101

Engg.  
Physics.

STUDENTS WHOSE ATTENDANCE IS LESS THAN 74.45% IN ST-1 (14-11-22 TO 08-12-2022)

Sl. No.	Roll No.	Name	12/12	13/12	14/12	15/12	16/12	17/12	Group
1	22164013	AKARSH SAHLOT	P	P	P	P	P	(A)	S-1
2	22154060	ANAND SHAH	P	P	P	P	P	(A)	
3	22154038	ABHINAV YADAV	P	P	P	P	P	(A)	
4	2210017	ANKIT VARSHNEY	P	P	P	(A)	(A)	(A)	
5	22153043	HARSH DUBEY	(A)	P	P	(A)	P	(A)	S-2
6	22154123	DIVYA AGARWAL	P	P	P	(A)	P	(A)	
7	22153026	ANSH YADAV	P	(A)	P	P	P	(A)	
8	2210086	ANUBHAV CHAUDHARY	P	P	P	P	P	(A)	
9	22154106	ANURAG NAGYAN	P	P	P	P	P	P	
10	22154032	KAPIL KUMAR SINGH	P	P	P	P	P	(A)	S-3
11	22154012	HIMIT NARAYAN	P	P	P	P	P	P	
12	22153047	KHUSHI RANI	P	P	P	P	P	P	
13	22154065	AMAN YADAV	P	P	P	P	P	P	
14	2210164	RISHABH SINGH	P	P	P	P	P	(A)	
15	22154104	MOHD AYAAN	P	P	P	P	(A)	(A)	
16	22153007	KHUSHAL GUPTA	P	P	P	P	P	(A)	
17	2210152	AMAN SANKHWAR	P	P	P	P	(A)	(A)	
18	2240069	KUSHAGRA SAXENA	P	P	P	P	P	P	S-4
19	2210157	AMIT YADAV	P	P	P	P	P	P	
20	2210155	ARISHA FATIMA	P	P	(A)	(A)	(A)	(A)	S-5
21	22153008	SANDEEP GUPTA	P	P	P	P	P	P	S-6
22	2210124	HARSH KUMAR	P	P	P	P	P	(A)	S-7
23	22154137	SHRIYA MITTAL	P	P	P	P	P	P	
24	22164007	SHASHWAT MISHRA	P	P	P	P	P	P	
25	2210158	HARSH VARDHAN GUPTA	P	P	P	P	P	P	S-8
26	22164011	NIKIT KUMAR KUSHWAHA	P	P	P	P	P	P	
27	2210160	ANUJ KUMAR	P	P	P	P	P	P	
28	22154082	SANJIT SINHA	P	P	P	P	P	P	
29	22153105	ROHIT YADAV	P	P	(A)	P	(A)	(A)	
30	22154049	TANUJ KUMAR SHARMA	(A)	P	P	P	P	(A)	
31	2210092	SURYA PRATAP	(A)	P	P	P	P	P	
32	22153092	SHAURYA GUPTA	(A)	P	(A)	P	P	(A)	S-9
33	22154109	HARSHDEEP SINGH	(A)	P	P	P	P	P	
34	22164047	NAMAN JAIN	P	P	P	P	P	P	
35	22154059	RAMENDRA PANDEY	P	P	P	P	P	P	
36	22154051	UDDESHYA TYAGI	P	P	P	P	P	P	

DEBARRED STUDENTS  
BY CLASS ATTENDANCE  
AKGEC/IOAC/AR/63  
CLASS TEST PAPER  
AKGEC/IOAC/EP/02  
SESSIONAL TEST PAPER

  
(Dr. Sandeep Shrivastava)

Vikas Rathi

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

## AJAY KUMAR GARG ENGG.COLLEGE GHAZIABAD TUTORIAL SHEET 1

DEPARTMENT: AS &amp; HUMANITIES

COURSE: B.TECH

SEMESTER: I

SUBJECT- ENGINEERING PHYSICS


SUB.CODE: BAS101

OBE REMARKS:

Q.NO	a-j	k-t	u-z
CO NO	CO1	CO2	CO3

Submission Date: ....8/12/2022.....

- Explain wave-particle duality. What are matter waves? Find the de-Broglie wavelength associated with an electron which is accelerated through 50 volt.
- 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.
- What is black body radiation? Describe the distribution of energy in the spectrum of black body radiation.
- 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.
- What is Compton's effect? Derive an expression for Compton's shift.
- Define phase velocity. Derive expression for them. Prove that phase velocity of de-Broglie wave is greater than speed of light. (with necessary diagram)
- What is the physical significance of wave function  $\Psi$ ? What conditions must it fulfill?
- Describe Davisson Germer experiment to describe wave nature of electron.
- Calculate the wavelength associated with 1MeV electron, 1MeV proton, 1MeV photon.
- An X-ray of wavelength  $1.1\text{\AA}$  is incident on a calcite crystal. Find the wavelength of X-ray scattered at  $45^\circ$  angle.
- 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.
- Derive Maxwell's equations and explain their physical significance.

  
Dr. Bandana Sharma  
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Ghaziabad

- m. Derive plane electromagnetic wave equations in free space. And prove that velocity of electromagnetic wave is equal to speed of light. Prove that E M wave are transverse in nature.
- n. Derive wave equations in conducting medium. Show that EM wave propagating in conducting medium is an attenuated wave. Derive an expression for skin depth.
- o. Define Poynting vector. Deduce Poynting theorem for the flow of energy in an electromagnetic field and explain its physical significance.
- p. Find the skin depth  $\delta$  at a frequency of  $3.0 \times 10^6$  Hz in aluminium where  $\sigma = 38.0 \times 10^6$  S/m and  $\mu_r = 1$ .
- q. For a conducting medium,  $\sigma = 5.8 \times 10^6$  Siemens/m and  $\epsilon_r = 1$ . 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.
- r. The sunlight strikes the upper atmosphere of earth with energy flux  $1.38 \text{ kWm}^{-2}$ . What will be the peak values of electric and magnetic field at the points?
- s. The energy flux of  $10 \text{ watt/m}^2$  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.
- t. A 100W sodium lamp radiating its power. Calculate the electric and magnetic field strength at a distance of 5m from the lamp.
- u. White light falls normally on a thin film of soapy water whose thickness is  $1.5 \times 10^{-5} \text{ cm}$  and refractive index is 1.33. Which wavelength in the visible region will be reflected strongly?
- v. A soap film of refractive index 1.43 is illuminated by white light at an angle of  $30^\circ$ . The refracted light is examined by a spectroscope in which dark band corresponding to the wavelength  $6 \times 10^{-7} \text{ m}$  is observed. Calculate the thickness of the film.
- w. 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  $6.1 \times 10^{-5} \text{ cm}$  and  $6.0 \times 10^{-5} \text{ cm}$ . if the refractive index of the film be  $4/3$ , calculate the thickness.
- x. In Newton's ring experiment the diameter of 4<sup>th</sup> and 12<sup>th</sup> dark rings are 0.400 cm and 0.700 cm respectively. Deduce the diameter of 20<sup>th</sup> dark ring. (0.906)
- y. Newton's rings are formed in reflected light of wavelength  $6000 \text{ \AA}$  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.
- z. A diffraction grating used at normal incidence gives a yellow line ( $\lambda = 6000 \text{ \AA}$ ) in a certain spectral order superimposed on a blue line ( $\lambda = 4800 \text{ \AA}$ ) of next higher order. If the angle of diffraction is  $\sin^{-1}(3/4)$ , calculate the grating element.

Dr. Bandana Sharma  
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pg. 2

  
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Director  
Ajay Kumar Garg Engg. College  
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CLASS TEST  
PAPER  
AKGEC/IQAC/QP/01

SESSIONAL  
TEST  
PAPER  
AKGEC/IQAC/QP/03

## AJAY KUMAR GARG ENGG.COLLEGE GHAZIABAD TUTORIAL SHEET 2

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

COURSE: B.TECH  
SUBJECT- ENGINEERING PHYSICS

OBE REMARKS:

Q.NO	a-h	i-p	q-w
CO NO	CO3	CO4	CO5

Submission Date: (a-h): 8/12/2022  
(i-w): 15/2/2023

- Derive an expression for diameters of bright and dark rings in reflected light.
- In Newton's ring experiment the diameter of 4<sup>th</sup> and 12<sup>th</sup> dark rings are 0.400 cm and 0.700 cm respectively. Deduce the diameter of 20<sup>th</sup> dark ring. (0.906)
- 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.
- Derive an expression for maximas and minimas in single slitt diffraction.
- A diffraction grating used at normal incidence gives a yellow line ( $\lambda=6000\text{\AA}$ ) in a certain spectral order superimposed on a blue line ( $\lambda=4800\text{\AA}$ ) of next higher order. If the angle of diffraction is  $\sin^{-1}(3/4)$ , calculate the grating element.
- 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?
- 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.
- Derive an expression for resolving power of a grating.
- What is the basic principle of communication in optical fibres. Describe its main components
- Define acceptance angle and numerical Aperture in optical fibers. Derive an expression for acceptance angle and Numerical Aperture with suitable diagram.
- 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.
- 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?
- A laser has two states at 300K. If it emits radiation of wavelength 6000 Å, then calculate population ratio  $N_2/N_1$ .
- What is the importance of metastable states in laser action? Explain with suitable diagram.
- 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.
- Describe construction, working and energy level diagram of Ruby lase

*Dr. Baidana Sharma*  
NAME & SIGNATURE OF FACULTY

*[Signature]*  
HOD SIGNATU

*[Signature]*  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

- q. What is critical magnetic field? Describe the dependence of temperature on magnetic field in superconductors.
- r. What is Meissner effect? Describe type-1 and type-2 superconductors.
- s. What are the properties of High TC superconductors?
- t. 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.
- u. 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  $H = 6.5 \times 10^4 \text{ A m}^{-1}$ .
- v. 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  $7.9 \times 10^3 \text{ A m}^{-1}$ .
- w. Calculate the critical current which can flow through a long thin superconducting wire of diameter 1 mm. The critical magnetic field is  $7.9 \times 10^3 \text{ Amp m}^{-1}$ .

  
Dr. Bandana Sharma  
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pg. 4

  
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Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Department of Applied Sciences & Humanities**

**CLASS TEST-1**


Course: B.Tech  
Session: 2022-23  
Subject: Engineering Physics  
Max Marks: 10

Semester: II  
Sections: S2  
Sub. Code: BAS-101  
Time: 40 Min

**OBE Remarks:** All questions are related to CO1.

**Note:** Answer all questions

1. Derive time independent Schrodinger's wave equation. (5)
2. Calculate de-Broglie wavelength associated with a proton of energy 16.6eV. (3)
3. An X-ray of wavelength  $1 \text{ \AA}$  is incident on a calcite crystal. Find the wavelength of X-ray scattered at  $30^\circ$  angle. (2)

  
Dr. Bandana Sharma  
NAME & SIGNATURE OF FACULTY

  
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Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Department of Applied Sciences & Humanities**

**CLASS TEST-I**

Course: B.Tech  
Session: 2022-23  
Subject: Engineering Physics  
Max Marks: 10

Semester: I  
Sections: S7  
Sub. Code: BAS-101  
Time: 40 Min

**OBE Remarks:** All questions are related to CO1.

**Note:** Answer all questions

1. Solve Schrodinger's equation for a particle in one dimensional infinite potential box of width 'a'. Derive an expression for energy eigen values and energy eigen functions. (5)
2. Calculate de-Broglie wavelength associated with a neutron of energy 26.6eV. (3)
3. An X-ray of wavelength  $1 \text{ \AA}$  is incident on a calcite crystal. Find the wavelength of X-ray scattered at  $30^\circ$  angle. Find the kinetic energy of electron. (2)

  
Dr. Bandana Sharma  
NAME & SIGNATURE OF FACULTY

  
HOD SIGNATUI

  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad



**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Department of Applied Sciences & Humanities**

**CLASS TEST-2**

Course: B.Tech  
 Session: 2022-23  
 Subject: Engineering Physics  
 Max Marks: 10

Semester: I  
 Sections: S2.....  
 Sub. Code: BAS-101  
 Time: 40 Min

**OBE Remarks:** All questions are related to CO1.

**Note: Answer all questions**

1. Derive an expression for diameters of bright and dark rings in reflected light. In Newton's ring experiment the diameter of 4<sup>th</sup> and 12<sup>th</sup> dark rings are 0.400 cm and 0.700 cm respectively. Deduce the diameter of 20<sup>th</sup> dark ring. (0.906)
2. 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.

  
 Dr. Banwari S. Kaur  
 NAME & SIGNATURE OF FACULTY

  
 HOD SIGNATURE

  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

SESSIONAL  
 TEST  
 PAPER

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

**Course:** B.Tech  
**Session:** 2022-23  
**Subject:** Engineering Physics  
**Max Marks:** 25

**Semester:** I  
**Sections:** S1-S9  
**Sub. Code:** BAS-101  
**Time:** 1 hour

**OBE Remarks:** All questions are related to CO1.  
**Note:** Answer all questions.

Q.NO	1	2	3	4	5	6	7
CO No.	CO1	CO1	CO1	CO1	CO1	CO1	CO1
Bloom's level* (L1 to L6)	L5	L5	L2	L3	L4	L3	L5

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

**SECTION A**

(3X2=6)

**A. Attempt all the parts.**

1. Explain the concept of de-Broglie's matter wave. Find the de-Broglie wavelength associated with an electron which is accelerated through 50 volt.
2. What is phase velocity? Derive relation between phase velocity and group velocity.
3. An X-ray of wavelength  $1.1\text{\AA}$  is incident on a calcite crystal. Find the wavelength of X-ray scattered at  $45^\circ$  angle.

**SECTION B**

(3X4=12)

**B. Attempt all the parts.**

4. What is the physical significance of wave function? Derive time independent Schrodinger's wave equation.
5. Describe Davisson-Germer experiment to show that de-Broglie wavelength is associated with the beam of electrons.
6. Describe black body radiation spectrum with a proper diagram. What are the postulates of Planck's quantum theory? Also write Planck's radiation formula.

**SECTION C**


(1X7=7)


**C. Attempt all the parts.**

7. Solve Schrodinger's equation for a particle in one dimensional infinite potential box of width 'a'. Derive an expression for energy eigen values and energy eigen functions. What is the energy difference between ground and first excited state for an electron trapped in one dimensional infinite potential box of width 10nm?

**PHYSICAL CONSTANTS:**

Mass of electron =  $9.1 \times 10^{-31}$  Kg,  
 Speed of light =  $3 \times 10^8$  m/s,  
 Planck's constant:  $h = 6.62 \times 10^{-34}$  J-s

  
 Dr. Bandana Sharma

  
 (Prof. S.L.)

  
 Director  
 Ajay Kumar Garg Engg. College  
 Ghaziabad

AKGEC/IQAC/QP/03

**Ajay Kumar Garg Engineering College, Ghaziabad**  
**Department of Applied Sciences & Humanities**

**SESSIONAL TEST-2**

**Course:** B.Tech  
**Session:** 2022-23  
**Subject:** Engineering Physics  
**Max Marks:** 50

**Semester:** I  
**Sections:** S-1 to S-9  
**Sub. Code:** BAS101  
**Time:** 2 hours

**OBE Remarks:**

Q.NO	1	2	3	4	5	6	7	8	9	10	11	12
CO No.	CO2	CO2	CO2	CO3	CO3	CO2	CO2	CO3	CO3	CO3	CO2	CO3
Bloom's level* (L1 to L6)	L2	L2	L3	L4	L5	L4	L3	L5	L5	L5	L4	L5

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

**NOTE: Answer all the sections.**

**SECTION A**

**A. Attempt all the parts.**

(5X2=10)

1. Write equation of continuity and explain its physical significance.
2. A 1000W sodium lamp radiating its power. Calculate the electric and magnetic field strength at a distance of 4.5 m from the lamp.
3. Write the integral and differential form of Maxwell's equations.
4. Why an excessively thin film will appear dark in reflected system?
5. If the width of opaque part is equal to twice of width of transparent part in a grating, then which orders will be missing from the spectra?

**SECTION B**

**B. Attempt all the parts.**

(5X5=25)

6. Define Poynting vector. Deduce Poynting theorem for the flow of energy in an electromagnetic field and explain its physical significance.
7. Derive plane electromagnetic wave equations in conducting medium. Show that EM wave propagating in conducting medium is an attenuated wave. Derive an expression for skin depth.
8. Derive an expression for interference in thin films of uniform thickness in reflected system. Light of wavelength  $5893\text{\AA}$  is reflected at nearly normal incidence from a soap film of refractive index 1.6. what is the least thickness of the film that will appear i) dark ii) bright?
9. Describe the formation of Newton's rings in reflected monochromatic light. Prove that in reflected light i) diameters of dark rings are proportional to square root of natural numbers and ii) diameter of bright rings are proportional to square root of odd numbers.
10. Explain Rayleigh's criteria for resolution. Derive an expression for resolving power of a grating. How many orders will be visible if the wavelength of incident radiation is  $6000\text{\AA}$  and the number of lines on the grating is 2610 to an inch.



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

AKGEC/IOAC/09/05

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:  $2 \times 10 = 20$

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**

2. Attempt any three of the following:

$3 \times 10 = 30$

Q.N.	Question	Marks	CO
a.	Show that $E^2 = p^2c^2 + m_0^2c^4$	10	1
b.	Find the skin depth $\delta$ at a frequency of $3.0 \times 10^6$ 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 width $2.5 \times 10^{-10}$ 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 $6.1 \times 10^{-5}$ cm and $6.0 \times 10^{-5}$ 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 2.5 dB/km. Compute the output power if the input power is $500 \mu$ W.	10	5

(Dr)   
 Dr. Bandana Sharma

Prof. S.L. Kapoor.

A.K.   
 Director   
 Ajay Kumar Garg Engg. College   
 Ghaziabad



PAPER ID-411329

AKGECTIISACIOP105

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Subject Code: KAS101T

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

**Section C**

3. Attempt any one of the following:

1 x 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 x 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 $E/H = 377 \text{ Ohm}$ .	10	2

5. Attempt any one of the following:

1 x 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 x 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 x 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  $m_e = 9.1 \times 10^{-31} \text{ kg}$ , Speed of light  $c = 3 \times 10^8 \text{ m/s}$   
Planck's Constant  $h = 6.63 \times 10^{-34} \text{ J-s}$ , Charge on electron  $e = 1.6 \times 10^{-19} \text{ Coulomb}$

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PAPER ID-421047

AKAEC/IOAC/OP/05

Printed Page: 1 of 2  
Subject Code: KAS201T

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**BTECH**  
**(SEM II) THEORY EXAMINATION 2021-22**  
**ENGINEERING PHYSICS**

Time: 3 Hours

Total Marks: 100

Notes:

- Attempt all Sections and assume any missing data.
- Appropriate marks are allotted to each question, answer accordingly.

SECTION-A	Attempt All of the following Questions in brief	Marks(10X2=20)	
Q1(a)	What is frame of reference in motion?	1	1
Q1(b)	Show that massless particles can exist only if they move with the speed of light and their energy E and momentum p must have the relation $E=pc$ .	1	1
Q1(c)	In an electromagnetic wave, the electric and magnetic fields are 100V/m and 0.265A/m. What is the maximum energy flow	2	2
Q1(d)	Define the concept of Skin depth for high and low frequency waveforms.	2	2
Q1(e)	What is Compton effect and Compton shift?	3	3
Q1(f)	Why is black the best emitter?	3	3
Q1(g)	Why the center of Newton's ring in reflected system is dark?	4	4
Q1(h)	Explain Rayleigh's criterion of resolution.	4	4
Q1(i)	What do you mean by acceptance angle and cone for an optical fiber?	5	5
Q1(j)	Differentiate spontaneous emission and stimulated emission.	5	5

SECTION-B	Attempt ANY THREE of the following Questions	Marks(3X10=30)	
Q2(a)	What is special theory of relativity? Derive Lorentz transformation equation.	1	1
Q2(b)	Assuming that all the energy from a 1000 watt lamp is radiated uniformly; calculate the average values of the intensities of electric and magnetic fields of radiation at a distance of 2m from lamp.	2	2
Q2(c)	Calculate the energy difference between the ground state and the first excited state for an electron in a one-dimensional rigid box of length $25\text{\AA}$ .	3	3
Q2(d)	Newton's rings are observed in reflected light of wavelength $5900\text{\AA}$ . The diameter of $10^{\text{th}}$ dark ring is 0.50cm. Find the radius of curvature of the lens.	4	4
Q2(e)	A step index fibre has $\mu_1 = 1.466$ and $\mu_2 = 1.46$ where $\mu_1$ and $\mu_2$ are refractive indices of core and cladding respectively. If the operating wavelength of the rays is $0.85\ \mu\text{m}$ and the diameter of the core = $50\ \mu\text{m}$ , calculate the cut-off parameter and the number of modes which the fibre will support.	5	5

SECTION-C	Attempt ANY ONE following Question	Marks (1X10=10)	
Q3(a)	What was the object of conducting Michelson-Morley experiment? Illustrate the experiment with proper diagram and necessary mathematical derivations. Also state the outcomes.	1	1
Q3(b)	Deduce Einstein's mass-energy relation $E=mc^2$ . Give some evidence showing its validity.	1	1

SECTION-C	Attempt ANY ONE following Question	Marks (1X10=10)	
Q4(a)	Deduce the Maxwell's equations for free space and prove that electromagnetic waves are transverse in nature.	2	2
Q4(b)	Define radiation pressure and momentum of electromagnetic wave. Also deduce an expression for radiation pressure and momentum.		

  
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PAPER ID-421047

AKAEC/IOAC/OP/105 Printed Page: 2 of 2  
Subject Code: KAS201T

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**BTECH**  
**(SEM II) THEORY EXAMINATION 2021-22**  
**ENGINEERING PHYSICS**

SECTION-C	Attempt ANY ONE following Question	Marks (1X10=10)
Q5(a)	What is the physical significance of a wave function? Derive Schrodinger time independent wave equation.	3
Q5(b)	What is Compton effect? Deduce an expression for Compton shift.	3

SECTION-C	Attempt ANY ONE following Question	Marks (1X10=10)
Q6(a)	What is Rayleigh criterion of resolution how one can increase the resolving power of a diffraction grating? Using Rayleigh criterion for just resolution show that the resolving power of grating is equal to $nN$ , where $n$ is the order of the spectrum, and $N$ is total no of lines on the grating.	4
Q6(b)	Discuss the phenomena of Fraunhofer diffraction at a single slit and show that the relative intensities of the successive maximum are nearly 1: $4/9\pi^2$ : $4/25\pi^2$ : $4/49\pi^2$ : .....	4

SECTION-C	Attempt ANY ONE following Question	Marks (1X10=10)
Q7(a)	A silicon optical fibre with a core diameter large enough has a core refractive index of 1.50 and a cladding refractive index 1.47. Determine (i) the critical angle at the core cladding interface, (ii) the numerical aperture for the fibre (iii) the acceptance angle in air for the fibre.	5
Q7(b)	What do you mean by population inversion? Describe the principle and working of Ruby laser system with the help of neat diagram.	5

  
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PAPER ID-311171

AKGEC | IOAC | OP105 Printed Page: 1 of 2

Subject Code: KAS101

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**B- TECH**  
**(SEM I) THEORY EXAMINATION 2020-21**  
**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 are inertial and non-inertial frames of reference? Is an earth is inertial or non-inertial frame?	2	1
b.	If one photon has a speed $c$ in one reference frame, can it be at rest in some other frame of reference explain?	2	1
c.	Give the physical significance of equation of continuity.	2	2
d.	Calculate radiation pressure exerted by electromagnetic waves.	2	2
e.	Explain Black body radiation spectrum graph on the basis of quantum physics.	2	3
f.	Explain why a thick film shows no color in reflected white light.	2	4
g.	Differentiate between $\psi$ and $ \psi ^2$	2	3
h.	What is dispersive power of plane transmission grating?	2	4
i.	Why population inversion is necessary for laser action?	2	5
j.	What do you mean by dispersion in optical fiber?	2	5

**SECTION B**

2. Attempt any three of the following:

Qno.	Question	Marks	CO
a.	A man 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 that is twin brother who preferred to stay behind	10	1
b.	A 100 watt sodium lamp radiating its power. Calculate the electric field and magnetic field strength at a distance of 5 m from the lamp.	10	2
c.	Show that the de-Broglie wavelength for a material particle of rest mass $m_0$ and charge $q$ accelerated from rest through a potential difference $V$ , relativistically is given by: $\lambda = \frac{h}{\sqrt{2 m_0 qV \left( 1 + \frac{qV}{2 m_0 c^2} \right)}}$	10	3
d.	Interference fringes are produced by a monochromatic light falling normally on a wedge shaped film whose refractive index is 1.4. The angle of the wedge is 20 second of an arc and the distance between the successive fringes is 0.25cm. Calculate the wavelength of light used.	10	4
e.	A glass clad fiber is made with core glass of refractive index 1.5 and the cladding is doped to give a fractional index difference of 0.0005. Find: (a) The cladding index. (b) The critical internal reflection angle (c) The numerical aperture.	10	5

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## SECTION C

3. Attempt any one part of the following:

Qno.	Question	Marks	CO
a.	Describe Michelson Morley experiment and explain physical significance of its negative results.	10	1
b.	Show that the mass of a body depends on its velocity. Deduce an expression for the Variation of mass with velocity.	10	1

4. Attempt any one part of the following:

Qno.	Question	Marks	CO
a.	Derive the Maxwell equations in differential form and integral form with physical significance.	10	2
b.	What is Poynting vector? How is the Poynting theorem derived from Maxwell equations?	10	2

5. Attempt any one part of the following:

Qno.	Question	Marks	CO
a.	What are the conditions and limitations, a wave function must obey? Derive time independent Schrodinger equations.	10	3
b.	Discuss Compton effect and derive an expression for Compton shift with the help of suitable diagram	10	3

6. Attempt any one part of the following:

Qno.	Question	Marks	CO
a.	Discuss the phenomenon of interference of light due to thin films and find the condition of maxima and minima. Show that the interference patterns of reflected and transmitted monochromatic source of light are complementary	10	4
b.	Discuss the phenomenon of Fraunhofer diffraction at a single slit and show that the relative intensities of successive maximum are nearly $1:4/9\pi^2:4/25\pi^2:4/49\pi^2$ .	10	4

7. Attempt any one part of the following:

Qno.	Question	Marks	CO
a.	Analyse and describe the process of spontaneous and stimulated emission of radiation with the help of diagram. Obtain an expression for Einstein's coefficients of spontaneous and stimulated emission of radiation	10	5
b.	Draw a neat diagram of He-Ne laser and describe its method of working? How is it superior to a Ruby laser?	10	5

  
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**B. TECH.**  
**(SEM-II) 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 x 10 = 20

- a. Explain the negative results of Michelson-Morley experiments.
- b. What is length contraction?
- c. Define inertial and non-inertial frames.
- d. What are massless particles?
- e. What is displacement current?
- f. What is Poynting theorem?
- g. Write the assumptions of Planck's hypothesis
- h. Explain the necessity of extended sources.
- i. What are the Newton's rings?
- j. Define dispersive power of grating.

**SECTION B**

2. Attempt any *three* of the following:

10x3=30

- a. Drive an expression for time dilation. A clock measures the proper time. With what speed it should move relative to an observer so that it appears to go slow by 30s in 24 hours.
- b. Discuss the phenomenon of interference of light due to thin films and find the conditions of maxima and minima. Show that the interference patterns of reflected and transmitted monochromatic light are complementary.
- c. What do you understand by 3 and 4 levels LASER? What are the advantages of 3 level over 4 level LASER?
- d. What do you understand by an optical fiber and discuss its classification. Calculate the numerical aperture, acceptance angle and the critical angle of the fiber from the following data:  $\mu_1$  (core refractive index) = 1.50 and  $\mu_2$  (cladding refractive index) = 1.45.
- e. Derive a suitable expression for continuity equation. Give its physical significance. A 100 watt sodium lamp radiating its power. Calculate the electric field and magnetic field strength at a distance of 5m from the lamp.

**SECTION C**

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

5x2=10

- a. Deduce Einstein's mass-energy relation  $E = mc^2$ . Give some evidence showing its validity. A particle of rest mass  $m_0$  moves with speed  $\frac{c}{\sqrt{2}}$ . Calculate its mass, momentum energy and kinetic energy.
- b. Discuss the phenomenon of Fraunhofer's diffraction at a single slit and show th relative intensities of the successive maximum are nearly  $1 : \frac{4}{9\pi^2} : \frac{4}{25\pi^2} : \dots$

*AJ*  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

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

- a. Prove that electromagnetic waves are transverse in nature. For a conducting medium,  $\sigma = 5.8 \times 10^6$  Siemens/m and  $\epsilon_r = 1$ . 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.
- b. Explain the construction and working of Ruby laser. In a Ruby laser, total of  $\text{Cr}^{3+}$  ions is  $2.8 \times 10^{19}$ . If the laser emits radiation of wavelength  $7000 \text{ \AA}$ . Calculate energy of the laser pulse.

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

5x2=10

- a. Derive Planck's law of radiation. How does it explain Wien's displacement and Rayleigh-Jeans laws? Calculate the energy of an oscillator of frequency  $4.2 \times 10^{12}$  Hz at  $27^\circ\text{C}$  treating it as (a) classical oscillator (b) Planck's oscillator.
- b. Deduce four Maxwell's equations in free space. Show how the concept of Maxwell's displacement current leads to the modification of Ampere's law.

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

5x2=10

- a. Derive a suitable expression for Momentum and radiated pressure of an EM wave.
- b. What is Compton effect? Derive a suitable expression for Compton Shift ( $\lambda' - \lambda = \frac{h}{m_0 c} (1 - \cos\phi)$ ). X-rays of wavelength  $2 \text{ \AA}$  are scattered from a black body and X rays are scattered at an angle  $45^\circ$ . Calculate Compton shift ( $\Delta\lambda$ ), wavelength of the scattered Photons ( $\lambda'$ ).

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

5x2=10

- a. Derive time-dependent and time-independent Schrodinger's wave equation.
- b. What do you understand by grating? Explain its spectra. What particular spectra would be absent if the width of the transparencies and opacities of the grating are equal. Find the angular separation of  $5048 \text{ \AA}$  and  $5016 \text{ \AA}$  wavelength in second order spectrum obtained by a plane diffraction grating having 15000 lines per inch.

**B. TECH.**  
**(SEM I) THEORY EXAMINATION 2022-23**  
**ENGINEERING PHYSICS**

Time: 3 Hours

Total Marks: 70

समय 03 घण्टे

पूर्णांक: 70

Note:

1. Attempt all Sections. If require any missing data; then choose suitably.
  2. The question paper may be answered in Hindi Language, English Language or in the mixed language of Hindi and English, as per convenience.
- नोट: 1. सभी प्रश्नों का उत्तर दीजिए। किसी प्रश्न में, आवश्यक डेटा का उल्लेख न होने की स्थिति में उपयुक्त डेटा स्वतः मानकर प्रश्न को हल करें।
2. प्रश्नों का उत्तर देने हेतु सुविधानुसार हिन्दी भाषा, अंग्रेजी भाषा अथवा हिन्दी एवं अंग्रेजी की मिश्रित भाषा का प्रयोग किया जा सकता है।

## SECTION A

1. Attempt all questions in brief.

2 x 7 = 14

निम्न सभी प्रश्नों का संक्षेप में उत्तर दीजिए।

- (a) Write down the Planck's expression (formula) for spectral energy density in Black Body radiation.  
कृष्णिका विकिरण में वर्णक्रमीय ऊर्जा घनत्व के लिए प्लैंक का सूत्र लिखिए।
- (b) What do you understand by phase velocity and group velocity of waves?  
तरंगों के फेज वेग एवं समूह वेग से क्या अभिप्राय है?
- (c) Write down the expression for Continuity Equation in differential form.  
सतत समीकरण के व्यंजक को अवकल रूप में लिखें।
- (d) What do you understand by coherent sources?  
सुसंगत स्रोतों से आप क्या समझते हैं?
- (e) Define the population inversion in LASER.  
LASER में जनसंख्या व्युत्क्रमण को परिभाषित कीजिए।
- (f) Write down any two applications of the Nano materials.  
नैनो पदार्थों के कोई दो अनुप्रयोग लिखिए।
- (g) State any two differences between single mode and multi-mode step index fiber.  
सिंगल मोड और मल्टी-मोड स्टेप इंडेक्स फाइबर के बीच कोई दो अंतर बताएं।

## SECTION B

2. Attempt any three of the following:

7 x 3 = 21

निम्न में से किसी तीन प्रश्नों का उत्तर दीजिए।

- (a) Explain the physical significance of wave function given by Max Born.  
मैक्स बोर्न द्वारा दिए गए तरंग क्रिया के भौतिक महत्व की व्याख्या करें।
- (b) What do you understand by Displacement current and skin depth?  
विस्थापन धारा और स्किन डेप्थ (skin depth) से आप क्या समझते हैं?

*AJ*  
Director  
Ajay Kumar Garg Engg. College  
Ghaziabad

- फ्रानहॉफर विवर्तन की परिघटना से आप क्या समझते हैं ? अधिकतम सिद्धांत की तीव्रता की तुलना में उत्तरोत्तर द्वितीयक उच्चिष्ठ की तीव्रता का अनुपात ज्ञात कीजिए।
- (d) Describe briefly any three applications of optical fiber.  
ऑप्टिकल फाइबर के किन्हीं तीन अनुप्रयोगों का संक्षेप में वर्णन कीजिए।
- (e) Explain Type I and Type II superconductors briefly.  
टाइप I और टाइप II सुपरकंडक्टर्स को संक्षेप में समझाइए।

### SECTION C

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

7 x 1 = 7

निम्न में से किसी एक प्रश्न का उत्तर दीजिए।

- (a) Derive an expression for Compton wavelength shift ( $\Delta\lambda$ ) for a Compton scattering experiment. The wavelength of an X-ray photon is doubled on being scattered through  $90^\circ$  with a carbon block in a Compton Experiment. Find out the wavelength of the incident photon. (Electron mass  $m_e = 9.1 \times 10^{-31}$  kg, Planck's constant  $h = 6.63 \times 10^{-34}$  m<sup>2</sup>kg/s, speed of light  $c = 3.0 \times 10^8$  m/s).

कॉम्पटन स्कैटरिंग प्रयोग में कॉम्पटन वेवलेंथ शिफ्ट ( $\Delta\lambda$ ) के लिए व्यंजक व्युत्पन्न कीजिए। एक कॉम्पटन प्रयोग में कार्बन ब्लॉक के साथ  $90^\circ$  के माध्यम से बिखरने पर एक एक्स-रे फोटॉन की तरंग दैर्घ्य दोगुनी हो जाती है। आपतित फोटॉन की तरंगदैर्घ्य ज्ञात कीजिए। (इलेक्ट्रॉन द्रव्यमान  $m_e = 9.1 \times 10^{-31}$  kg, प्लैंक का नियतांक  $h = 6.63 \times 10^{-34}$  m<sup>2</sup> kg/s, प्रकाश की गति  $c = 3.0 \times 10^8$  m/s)।

- (b) Derive time independent Schrodinger wave equation. Write down the time independent Schrodinger equation for a particle in one-dimensional box (infinitely deep potential well) and find out energy eigenvalues (energy levels) and the corresponding energy eigenfunctions (normalized wavefunctions) of the particle.

समय स्वतंत्र श्रोडिंगर तरंग समीकरण को व्युत्पन्न कीजिए। एक आयामी बॉक्स (अनंत रूप से गहरी क्षमता वाले कुएं) में एक कण के लिए समय स्वतंत्र श्रोडिंगर समीकरण लिखें और कण के ऊर्जा आइजेन मानों (ऊर्जा स्तर) और संबंधित ऊर्जा आइजेन फंक्शन (सामान्यीकृत वेवफंक्शन) को ज्ञात कीजिए।

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

7 x 1 = 7

निम्न में से किसी एक प्रश्न का उत्तर दीजिए।

- (a) Derive equation for simple plain electromagnetic wave starting from Maxwell's equations in free space. Show that the electromagnetic wave in free space is transverse in nature.

मुक्त अंतरिक्ष में मैक्सवेल के समीकरणों से प्रारंभ करते हुए सरल समतल विद्युतचुंबकीय तरंग के लिए समीकरण व्युत्पन्न कीजिए। दिखाएँ कि मुक्त अंतरिक्ष में विद्युत चुंबकीय तरंग की प्रकृति अनुप्रस्थ होती है।

- (b) Prove the Poynting theorem in electrodynamics and explain the physical significance of each of the term appearing in the final expression of the theorem.

विद्युतगतिकी में पॉयंटिंग प्रमेय को सिद्ध कीजिए और प्रमेय के अंतिम व्यंजक होने वाले प्रत्येक पद के भौतिक महत्व की व्याख्या कीजिए।

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

7 x 1 = 7

निम्न में से किसी एक प्रश्न का उत्तर दीजिए।

- (a) (i) Describe the phenomenon of interference in thin film (uniform thickness)

  
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परिघटना का वर्णन कीजिए तथा रचनात्मक तथा विनाशी व्यतिकरण के लिए शर्तों को लिखिए।

(ii) A light source of wavelength  $6000 \text{ \AA}$  is used along with plano-convex lens with radius of curvature equal to  $100 \text{ cm}$  in a Newton's ring arrangement. Find out the diameter of the  $15^{\text{th}}$  dark ring.

$6000 \text{ \AA}$  तरंग दैर्घ्य का एक प्रकाश स्रोत, न्यूटन के वलय व्यवस्था में  $100$  सेमी के बराबर की वक्रता त्रिज्या के समतलीय-उत्तल लेंस का प्रयोग किया जाता है।  $15^{\text{वें}}$  अदीप्त वलय का व्यास ज्ञात कीजिए।

(b) Explain briefly the Rayleigh criterion of resolution. Discuss the resolving power of plane transmission grating and find the relation between resolving and dispersive power of the grating.  
विभेदन की रैले मानदंड को संक्षेप में समझाइए। समतल संचरण ग्रेटिंग की विभेदन क्षमता की विवेचना कीजिए और ग्रेटिंग की विभेदन क्षमता और वर्ण-विक्षेपण क्षमता के बीच संबंध स्थापित कीजिए।

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

$7 \times 1 = 7$

निम्न में से किसी एक प्रश्न का उत्तर दीजिए।

(a) (i) Find out the expressions for acceptance angle and numerical aperture of an optical fiber in terms of the refractive index of core and cladding.

कोर और क्लैडिंग के अपवर्तक सूचकांक के संदर्भ में एक ऑप्टिकल फाइबर के स्वीकृति कोण और संख्यात्मक एपर्चर के लिए व्यंजक ज्ञात कीजिए।

(ii) Explain briefly the attenuation in optical fiber.

ऑप्टिकल फाइबर में क्षीणन को संक्षेप में समझाइए।

(b) Describe the absorption, spontaneous emission, stimulated emission of radiation by matter and derive the relation between Einstein's coefficients related to three phenomena.

पदार्थ द्वारा विकिरण के अवशोषण, स्वतः स्फूर्त उत्सर्जन, तथा उत्प्रेरित उत्सर्जन का वर्णन करें और तीनों परिघटनाओं से संबंधित आइंस्टीन के गुणांकों के बीच संबंध स्थापित करें।

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

$7 \times 1 = 7$

निम्न में से किसी एक प्रश्न का उत्तर दीजिए।

(a) Explain the Meissner effect and persistent current in superconductivity.

अतिचालकता के संदर्भ में मीस्सर प्रभाव और दीर्घस्थायी धारा की व्याख्या कीजिए।

(b) What are Nano materials? Explain briefly the basic concepts of Quantum Dots, Quantum wires and Quantum well.

नैनो पदार्थ किसे कहते हैं? क्वांटम डॉट्स, क्वांटम वायर्स और क्वांटम वे अवधारणाओं को संक्षेप में समझाइए।



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**B. TECH.**  
**(SEM I) THEORY EXAMINATION 2022-23**  
**ENGINEERING 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 the negative results of the Michelson-Morley experiment?
  - (b) What are the massless particles?
  - (c) What do you understand by displacement current?
  - (d) Define the Poynting vector.
  - (e) What do you understand by a black body?
  - (f) State Wein's displacement law.
  - (g) What are the coherent sources?
  - (h) What is Rayleigh's criterion of resolution?
  - (i) Define population inversion.
  - (j) What is the dispersion in optical fibers?

**SECTION B**

- 2. Attempt any three of the following: 10x3=30**
- (a) Show that momentum of a particle (p) of rest mass ( $m_0$ ) and energy (E) is given by  $E^2 = m_0^2 c^4 + p^2 c^2$ .
  - (b) If the magnitude of H in a plane wave is 1 amp/meter, find the magnitude of E for a plane wave in free space. (Where  $\mu_0 = 4\pi \times 10^{-7}$  Weber/amp-m and  $\epsilon_0 = 8.85 \times 10^{-12}$  C/N-m<sup>2</sup>).
  - (c) Calculate the de-Broglie wavelength associated with a proton moving with a velocity equal to 1/20<sup>th</sup> of the velocity of light.
  - (d) Calculate the wavelength of light whose first diffraction maximum in the diffraction pattern due to a single slit falls at 30° and coincides with the first minimum of red light of wavelength 6500Å.
  - (e) Calculate the numerical aperture, acceptance angle, and critical angle of the fiber from the following data:  $\mu_1$  (core refractive index) = 1.50 and  $\mu_2$  (cladding refractive index) = 1.45.

**SECTION C**

- 3. Attempt any one part of the following: 10x1=10**
- (a) Derive the Lorentz Transformation equations and show that Lore Transformation approaches to Galilean Transformation when the velocity (v)  $\ll$
  - (b) Derive a suitable expression for time dilation and show that time dilation is a real effect.

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

- (a) Derive the expression for the Poynting theorem in electromagnetic waves.
- (b) Show that electromagnetic waves are transverse in nature.

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

- (a) Derive the time-independent Schrodinger equation, for matter waves.
- (b) Derive a suitable expression for Planck's radiation law.

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

- (a) What are Newton's rings? How they are formed? Derive the expressions for the diameter of bright and dark rings in reflected monochromatic light.
- (b) Derive the conditions of principal maxima and minima for the diffraction due to a grating.

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

- (a) What is an optical fiber? Derive the expression for the numerical aperture, acceptance angle, and critical angle of an optical fiber.
- (b) Discuss the construction and working of the He-Ne laser and give its advantages over the Ruby laser.

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