



RISE Krishna Sai Gandhi Group of Institutions::Ongole (Autonomous)

(Approved by AICTE-New Delhi, Affiliated to JNTUK, Kakinada)

Accredited by NAAC & Recognized under UGC 2(f)

NH-16, Valluru-523272, Ongole, Prakasam District, A.P

DEPARTMENT OF SCIENCE & HUMANITIES

Minutes of Board of Studies Meeting

Date: 27-09-2024

The First External Board of Studies Meeting of the Department of Science and Humanities was held online on 27.09.2024 at 03:00 PM via Zoom platform to finalize the Course structure for the first and second semesters of RG24 (Autonomous) regulation as well as finalizing the syllabus for first semester. The following members were present:

S.N	Name of the Member	Designation	Position	Signature
1	Mrs. P. Sridevi	Head of The Department	Chairman	<i>P. Sridevi</i>
2	Dr. G. Padmaja rani	Professor, Physics Department UCEK, JNTUK, Kakinada.	University Nominee, External BoS Member	<i>G. Padmaja rani</i> 8/10/24
3	Dr. Swapna Koneru	HOD & Associate professor, Department of physics, KL-University	Subject expert, External BoS Member	Approved via E-mail
4	Dr. N.V. Srihari	HOD & Department of Physics, T.R.R. Government Degree College, Kandukur	Subject expert, External BoS Member	Approved via E-mail
5	Mr. A. Venkata Rao	Asst. Professor, Physics	Faculty Member	<i>A. Venkata Rao</i>
6	Mr. A. Anil Kumar	Asst. Professor, Physics	Faculty Member	<i>A. Anil Kumar</i>
7	Dr. K. Jayachandra	Regional Director of Center for Environment and Development, Hyderabad.	Industry	Approved via E-mail
8	Miss. Y. Divya	Software Employee	Alumni	<i>Y. Divya</i>

At the onset of the meeting, the Chairman of BoS, P.Sridevi, welcomed all the members and introduced members to the External Subject Experts. The meeting began with the presentation of the Course structure by the chair for semesters I-I and I-II under RG24 regulations. She then



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presented the syllabus of **Engineering Physics and Engineering Physics Lab** of I-I semester under RG24 regulations prepared by the internal BOS members.

Resolutions in Meeting

Agenda 1: To discuss and finalize the course structure of RG24 (Autonomous) regulations for 1st year

Resolutions: Course Structure of B.Tech Programme of R-24 (Autonomous) regulations is approved by the Board of Studies Committee.

Agenda 2: To discuss and finalize the syllabus of **Engineering Physics and Engineering Physics Lab** under RG24 (Autonomous) regulations for 1st year I semester.

Resolutions: The syllabus of **Engineering Physics and Engineering Physics Lab** under RG24 (Autonomous) regulations is approved by the Board of Studies Committee

Encl: Annexure –I

General Comments

The University Nominee **Dr. G. Padmaja rani** suggested to

- Mention the number of hours required for each unit to ensure proper time management and syllabus coverage.(incorporated)
- Align the external question paper with Bloom's Taxonomy levels for comprehensive assessment.(will be done in the model paper)
- Suggest question paper setter to include more problems in the external question paper.(will be suggested)
- Encourage students to do at least two labs using virtual methods.
- [Remove some topics, aiming to lessen the difficulty in mathematical analysis.(topics removed)]

Subject expert comments

1. **Dr. Swapna Koneru Madam** suggested to-

- Maintain the lab manual.(Manual is prepared)
- Update the Text books to latest editions. (Incorporated in the syllabus).

2) **Dr. N. V. Srihari sir** suggested to

- To reduce some diffraction topics, as it becomes more complex because of the mathematical derivations.

Signature
8/10/24



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3) Dr. K. Jayachandra sir -Industry person Suggested to

- To add a topic for Fundamentals of Space physics. Which all members has given their thoughts and decided to think of this in the next year



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Encl: Annexure –I

I B.TECH. – COURSE STRUCTURE – RG24

(Applicable from the Academic Year 2024-25 onwards)

Group-A Branches: CSE

Group-B Branches: ECE & CSE (DS)

B.TECH. – I Year I Semester (for Group-A Branches)

S.No	Category	Course Title	L	T	P	Credits
1	BS&H	Communicative English	2	0	0	2
2	BS&H	Chemistry	3	0	0	3
3	BS&H	Linear Algebra & Calculus	3	0	0	3
4	ES	Basic Civil & Mechanical Engineering	3	0	0	3
5	ES	Introduction to Programming	3	0	0	3
6	BS&H	Communicative English Lab	0	0	2	1
7	BS&H	Chemistry Lab	0	0	2	1
8	ES	Engineering Workshop	0	0	3	1.5
9	ES	Computer Programming Lab	0	0	3	1.5
10	BS&H	Health and wellness, Yoga and Sports	0	0	1	0.5
Total Credits			14	00	11	19.5

B.TECH. – I Year I Semester (for Group-B Branches)

S.No	Category	Course Title	L	T	P	Credits
1	BS&H	Engineering Physics	3	0	0	3
2	BS&H	Linear Algebra & Calculus	3	0	0	3
3	ES	Basic Electrical & Electronics Engineering	3	0	0	3
4	ES	Engineering Graphics	1	0	4	3
5	ES	Introduction to Programming	3	0	0	3
6	ES	IT Workshop	0	0	2	1
7	BS&H	Engineering Physics Lab	0	0	2	1
8	ES	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	ES	Computer Programming Lab	0	0	3	1.5
10	BS&H	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5
Total Credits			13	00	15	20.5



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B.TECH. – I Year II Semester (for Group-A Branches)

S.No	Category	Course Title	L	T	P	Credits
1	BS&H	Engineering Physics	3	0	0	3
2	BS&H	Differential Equations & Vector Calculus	3	0	0	3
3	ES	Basic Electrical & Electronics Engineering	3	0	0	3
4	ES	Engineering Graphics	1	0	4	3
5	Professional Core	Data Structures	3	0	0	3
6	ES	IT Workshop	0	0	2	1
7	BS&H	Engineering Physics Lab	0	0	2	1
8	ES	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	Professional Core	Data Structures Lab	0	0	3	1.5
10	BS&H	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5
Total Credits			13	00	15	20.5

B.TECH. – I Year II Semester (for Group-B Branches)

S.No	Category	Course Title	L	T	P	Credits
1	BS&H	Communicative English	2	0	0	2
2	BS&H	Chemistry	3	0	0	3
3	BS&H	Differential Equations & Vector Calculus	3	0	0	3
4	ES	Basic Civil & Mechanical Engineering	3	0	0	3
5	Professional Core	Network Analysis	3	0	0	3
6	BS&H	Communicative English Lab	0	0	2	1
7	BS&H	Chemistry Lab	0	0	2	1
8	ES	Engineering Workshop	0	0	3	1.5
9	Professional Core	Network Analysis Lab	0	0	3	1.5
10	BS&H	Health and wellness, Yoga and Sports	0	0	1	0.5
Total Credits			14	00	11	19.5



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Department of Science & Humanities

ENGINEERING PHYSICS SYLLABUS

(Common for all branches of Engineering)

L	T	P	C
3	0	0	3

Course Objectives:

- To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses.
- To identifying the importance of the optical phenomenon like interference, diffraction and polarization etc.,
- To enlighten the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics.
- To understand the properties of dielectric and magnetic materials.
- To give the glimpses of Physics of semiconductors and introduction to Space Physics.

Course Outcomes:

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.

CO2: Familiarize with the basics of crystals and their structures.

CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials

CO4: Applying the basic concepts of Quantum Mechanics to motion of the particles

CO5: Identify the type of semiconductor using Hall Effect.

Unit-I: Wave Optics

12hrs

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

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Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative)- Diffraction Grating -Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction -Types of polarization - Polarization by reflection, and Double refraction- Nicol's Prism -Half wave and Quarter wave plates.

Unit II: Crystallography

8hrs

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (h,k,l) planes. Bragg's law - X-ray Diffractometer.

Unit-III: Dielectric and Magnetic Materials

8hrs

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius-Mossotti equation.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability - Classification of magnetic materials: Dia, para, Ferro, Antiferro & Ferri magnetic materials - Domain concept for Ferromagnetism (Qualitative) - Hysteresis - soft and hard magnetic materials.

Unit-IV: Quantum Mechanics and Free electron theory

10hrs

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution and its temperature dependence.

Unit – V: Semiconductors

10hrs

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Extrinsic semiconductors: density of charge carriers (Qualitative) - Drift and diffusion currents – Einstein's equation - Hall Effect and its applications.

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Textbooks:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - D. K. Bhattacharya and Poonam Tandon, Oxford press (2015)
3. "Engineering Physics" - P.K. Palanisamy SciTech publications.

Reference Books:

1. Engineering Physics - B. K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources: <https://www.loc.gov/rr/scitech/selected-internet/physics.html>



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ENGINEERING PHYSICS LAB

(Common to All Branches of Engineering)

L	T	P	C
0	0	2	1

Course Objectives:

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes:

CO1: Operate optical instruments like travelling microscope and spectrometer.

CO2: Estimate the wavelengths of different colours using diffraction grating.

CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.

CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.

CO5: Calculate the band gap of a given semiconductor.

CO6: Identify the type of semiconductor using Hall Effect.

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.



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7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by nonuniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any **TEN** of the listed experiments are to be conducted.

Out of which any **TWO** experiments must be conducted in virtual mode.

References:

- A Textbook of Practical Physics-S. Balasubramanian, M. N. Srinivasan, S. Chand Publishers, 2017.

Web resources:

- www.vlab.co.in
- <https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype>

John
8/12/24



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B.Tech I Year I Semester Regular Examinations (Regulation 24) Engineering Physics (Subject Code)

Date:

Time:

Max Marks:70

Enter your Hall Ticket No here

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Instructions:

1. Question paper consists of **PART-A& PART-B**.
2. In **PART-A(20Marks)** Question 2 consists of 10 short answer questions of 2 Marks each.
3. In **PART-B (50Marks)**, Question 2 to 11 are either/or type of 10 marks each.

PART-A(Answer *all* the questions)

			Marks	BT level
1.	i.	Define interference and Principle of superposition.	2M	L1
	ii.	Distinguish between half and quarter wave plate.	2M	L4
	iii.	Find the atomic radius of the SCC whose lattice parameter is $4A.U$	2M	L3
	iv.	Find the inter planar spacing of BCC of the plane(111)with lattice parameter $2A.U$	2M	L3
	v.	Give the relation between electric susceptibility and dielectric constant.	2M	L4
	vi.	Define the terms “magnetic susceptibility”and“magnetic induction”.	2M	L1
	vii.	State Heisenberg’s Uncertainty principle in terms of position-momentum and energy-time.	2M	L2
	viii.	What are the draw backs of classical free electron theory?	2M	L2
	ix.	Draw the band diagram for conductors, insulator and semiconductor.	2M	L2
	x.	Define drift and diffusion current.	2M	L1

PART-B (Answer any **ONE** question from each **UNIT**)

UNIT-I				
2.	A.	How do you obtain circular rings in Newton’s rings experiment? With necessary theory, explain the experimental procedure and derive the conditions for diameter of bright and dark ring.	7M	L2
	B.	Find the wave length of the incident light if the diameter of the 5 th and 25 th rings are 0.3 cm and 0.8 cm respectively and the radius of curvature of the Plano-convex lens is 10cm.	3M	L3



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(OR)

3.	A. Define a quarter and half wave plate and derive the expressions for its thickness.	6M	L1
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	B. The refractive index of a double refracting material for O-ray and E-ray are 1.586 and 1.592 for the wave length $5460\text{\AA}$. Calculate the required thickness of the material for the quarter wave plate.	4M	L3
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UNIT-II

4.	A. Describe elaborately the seven crystal system and 14 Bravais lattice with unit cell diagram indicating atomic positions.	6M	L4
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	B. What are miller indices and how they are finding? Give its salient features	4M	L2
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(OR)

5.	A. State and Explain the Bragg's law of X-ray diffraction with neat diagram.	6M	L2
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	B. Mono chromatic X-rays of wavelength $1.5\text{\AA}$ are incident on a crystal face having an interplanar spacing of $1.6\text{\AA}$. Find the highest order for which Bragg's reflection maximum can be seen.	4M	L3
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UNIT-III

6.	A. Obtain an expression for electronic polarizability in terms of radius of the atom.	6M	L2
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	B. Derive Clausius-Mossotti Equation.	4M	L3
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(OR)

7.	A. Explain the Hysteresis curve of ferromagnetic materials.	7M	L2
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	B. Distinguish between hard and soft magnetic materials.	3M	L4
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UNIT-IV

8.	A. Derive time dependent Schrödinger's wave equation for a free particle.	6M	L3
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	B. Define matter waves. Obtain an expression for De-Broglie wave length.	4M	L1
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(OR)

9.	A. Obtain an expression for electrical conductivity by considering the quantum Effects.	6M	L2
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	B. What are the drawbacks of classical free electron theory?	4M	L2
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UNIT-V

10.	A. Obtain an expression for carrier concentration in intrinsic semiconductor.	6M	L2
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	B. What are the differences between intrinsic and extrinsic semiconductors	4M	L4
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(OR)

11.	A. Explain Hall effect. Derive the expression for Hall coefficient of P-type semiconductor.	7M	L2
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	B. What are the applications of Hall effect.	3M	L2
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SH HOD <shhod@risekrishnasaigandhi.edu.in>

Request for Approval of BoS minutes- RGAN (8B)-Regarding

Padmaja Rani Gottipati <padmajaranig@yahoo.co.in>

Tue, Oct 1, 2024 at 1:36 PM

To: SH HOD <shhod@risekrishnasaigandhi.edu.in>

Madam, I am approving the attached syllabus. Arrange to send the hard copies at the earliest and get them signed.

*Dr. G. Padmaja Rani, M.Sc., Ph.D.
Professor in Physics
UCEK, JNTUK, Kakinada - 533003
mobile: 9440463002*

[Quoted text hidden]



SH HOD <shhod@risekrishnasaigandhi.edu.in>

Applied Physics BoS Minutes of meeting - Approval reg.

Koneru Swapna <kswapna80@gmail.com>

Mon, Sep 30, 2024 at 4:50 PM

To: SH HOD <shhod@risekrishnasaigandhi.edu.in>

Cc: padmajaranig@yahoo.co.in, "nvsrihariphysics@gmail.com" <nvsrihariphysics@gmail.com>

Dear sir,
Greetings,

All suggestions are included and there are no corrections from my side. Approved sir.
with Regards

Dr K Swapna
Principal Investigator (DST-SERB/ECRA/2015/000335)
Associate Professor & HOD
Department of Physics
(DST-FIST Sponsored Department)
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SH HOD <shhod@risekrishnasaigandhi.edu.in>

Applied Physics BoS Minutes of meeting - Approval reg.

Nv Srihari <nvsrihariphysics@gmail.com>

Mon, Sep 30, 2024 at 3:28 PM

To: SH HOD <shhod@risekrishnasaigandhi.edu.in>

Cc: padmajaranig@yahoo.co.in, Koneru Swapna <kswapna80@gmail.com>

Approved.

[Quoted text hidden]



SH HOD <shhod@risekrishnasaigandhi.edu.in>

Applied Physics BoS Minutes of meeting - Approval reg.

Jayachandra Kannemadugu <dr.jc.git@gmail.com>
To: SH HOD <shhod@risekrishnasaigandhi.edu.in>

Mon, Sep 30, 2024 at 3:33 PM

Dear Sir

I hereby approve the minutes

Regards

Dr.K.Jayachandra

[Quoted text hidden]

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Dr.K.Jayachandra | CEO

Global Information Technologies

#316/2RT, PS Nagar, 2nd Lane Behind Heritage

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GIS development | Training | Consultancy



SH HOD <shhod@risekrishnasaigandhi.edu.in>

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Divya <ydivya392@gmail.com>

To: SH HOD <shhod@risekrishnasaigandhi.edu.in>

Mon, Sep 30, 2024 at 3:07 PM

Approved.

Regards,

Y.Divyasree

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