RAYALASEEMA UNIVERSITY, KURNOOL

ANDHRA PRADESH

B.Sc., Physics Syllabus

Semesters - II(wef 2022-23)

B.O.S OF PHYSICS

Physics Board of Studies

S.No	Name & Designation of Person	Mobile No.	Chairman/ Member
1.	**Dr. D. Ramakrishna Reddy** **Principal** **GTRM Govt. Degree College, Yerraguntla, Nandyal District**	**9347291971**	Chairman
2.	**Sri Y. Gishnu Nag Vijay** **Lecturer in Physics** **PSC & KVSC Govt. College, Nandyal, Nandyal District**	**9395122131**	Member
3.	**Smt. R. Shashikala** **Lecturer in Physics** **PSC & KVSC Govt. College, Nandyal, Nandyal District**	**9618488128**	Member

Minutes of Meeting

The following resolutions made in the meeting of Physics BOS held on 29.09.2022

1. It is resolved to follow the Common core syllabus of APSCHE for B.Sc. Physics for the Semesters III, IV & V w.e.f from 2020-21 and Semester I & II wef 2022-23 Academic years
2. The members of the board of studies Committee thoroughly discussed the syllabi proposed by APSCHE in its Model curriculum and accordingly framed syllabi of B.Sc. Physics.
3. It is Resolved to implement Choice Based Credit System **(CBCS) f**rom 2020-21 for three year B.Sc. Physics Course.

RAYALASEEMA UNIVERSITY, KURNOOL

B.Sc. PHYSICS SYLLABUS UNDER CBCS

[For Mathematics combinations]

w.e.f. 2022-23(Revised in October 2022)

First Semester
Course I: Mechanics, Waves and Oscillations
Practical Course I (Lab-1)

Second Semester
Course II: Wave Optics
Practical Course II (Lab-2)

Third Semester
Course III: Heat and Thermodynamics
Practical Course III (Lab-3)

Fourth Semester
Course IV: Electricity, Magnetism and Electronics
Practical Course IV (Lab- 4)

Course V:Modern Physics
Practical Course V (Lab-V)

B.Sc. PHYSICS COURSE STRUCTURE UNDER CBCS

Year	*Semester*	*Course*	*Title of the Course*	*Marks*	*No.of.Hrs /Week*	*No.of Credits*
I	I	I	Mechanics, Waves and Oscillations	100	4	03
			Practical Course- I	50	2	02
	II	II	Wave Optics	100	4	03
			Practical Course – II	50	2	02
II	III	III	Heat and Thermodynamics	100	4	03
			Practical Course – III	50	2	02
	IV	IV	Electricity, Magnetism and Electronics	100	4	03
			Practical Course – IV	50	2	02
		V	Modern Physics	100	4	03
			Practical Course –V	50	2	02
Total No. of Courses : **05 (Five)**						

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CBCS w.e.f 2020-2021

B. Sc. Physics – Scheme of Instruction – 2020-21.

A - Theory

Semester	Paper	Teaching Hours/ week	Total Hours	Total Marks	University Exam	Internal Exam	Credits
I	I	4	60	**100**	75	25	**03**
II	II	4	60	**100**	75	25	**03**
III	III	4	60	**100**	75	25	**03**
IV	IV	4	60	**100**	75	25	**03**
	V	4	60	**100**	75	25	**03**

B-Internal Assessment Examination(IAE)

MID-I	MID-II	Average of Tests I & II A	Assignment B	Seminar/ Any Other Co-curricular Activity C	TOTAL Marks (A+B+C)
15	15	15	05	05	**25**

C - Practical

Semester	Practical Course	Hours/ week	Total Hours	Total Marks	Credits
I	I: Mechanics, Waves and Oscillations	2	30	**50**	**02**
II	II: Wave Optics	2	30	**50**	**02**
III	III: Heat and Thermodynamics	2	30	**50**	**02**
IV	IV: Electricity, Magnetism and Electronics	2	30	**50**	**02**
	V: Modern Physics	2	30	**50**	**02**

Question Paper Pattern

Semester End Examinations

The Pattern of Question Paper for Semester End Examination for B.Sc. Physics is as follows:

The Semester End Examination is for 75 Marks. The time duration is 3 Hours.

Section. A: 25 Marks

I. Multiple choice Questions - 10 TWO from each unit. Each carries one mark. Total 10Marks.

II. Fill in the Blanks - 5 ONE from each unit. Each carries one mark. Total 5 Marks

III. Short answer questions - 5 One from each unit. Each carries two marks. Total 10 Marks.

Section. B: Essay type Questions: One Question from each unit with Internal choice. Each carries 10 marks. 5x10M = 50 Marks

Internal Assessment Examinations

Pattern Of Internal Assessment Examination for B.Sc. Physics is as follows:

The **Internal Assessment** is for **25** marks. The Internal Assessment consists of two Midterm theory examination for **15** marks with1 Hour duration.

5 marks for **Assignment** and **5** marks for **Seminar / Project Work /Field Trip / Any other Co-curricular activity**

Average of Two Midterms is taken for Final Evaluation: In each course / paper two internaltheory examinations for 15 marks are to be conducted per semester and the average oftwo examinations should be taken for final evaluation for 15 marks.

Practical Examinations

Scheme of valuation for Practical Examination

External Practical Examination	50 Marks
Formula and explanation of symbols, Tabular forms with circuit diagram(wherever necessary)	10 Marks
Observations	10 Marks
Calculation and graph	10 Marks
Result with Units	05 Marks
Viva-voce	05 Marks
Practical Record	10 Marks

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B.Sc. PHYSICS SYLLABUS UNDER CBCS
For Mathematics Combinations

[2022-23 Batch onwards]

I Year B.Sc.-Physics: II Semester

Course II: WAVE OPTICS

Work load:60 hrs per semester **4 hrs/week**

Course outcomes:

On successful completion of this course, the student will be able to:

CO1*: Understand the phenomenon of interference of light and its formation in (i) Lloyd's single mirror due to division of wave front and (ii) Thin films, Newton's rings and Michelson interferometer due to division of amplitude.*

CO2*:Distinguish between Fresnel's diffraction and Fraunhoffer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating.*

CO3*:Describe the construction and working of zone plate and make the comparison of zone plate with convex lens.*

CO4*: Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity..*

CO5*: Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.*

CO6*: Explain about the different aberrations in lenses and discuss the methods of minimizing them.*

CO7*: Understand the basic principles of fibreoptic communication and explore the field of Holography and Nonlinear optics and their applications.*

UNIT-I

Interference of light: (12hrs)

Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude, Phase change on reflection, Lloyd's single mirror, Interference in thin films: Plane parallel and wedge- shaped films, colours in thin films, Newton's rings in reflected light-Theory and experiment, Determination of wavelength of monochromatic light, Michelson interferometer anddetermination of wavelength.

UNIT-II

Diffraction of light: (12hrs)

Introduction, Types of diffraction: Fresnel and Fraunhoffer diffractions, Distinction between Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction at a single slit, Plane diffraction grating, Determination of wavelength of light using diffraction grating, Resolving power of grating, Fresnel's half period zones, Explanation of rectilinear propagation of light, Zone plate, comparison of zone plate with convex lens.

UNIT-III

Polarization of light: (12hrs)

Polarized light: Methods of production of plane polarized light, Double refraction, Brewster's law, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Optical activity, Laurent's half shade polarimeter: determination of specific rotation.

UNIT-IV

Aberrations and Fibre Optics: (12hrs)

Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion; Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance.

Fibre optics: Introduction to Fibers, different types of fibers, rays and modes in an optical fiber, Principles of fiber communication (qualitative treatment only), Advantages of fiber optic communication.

UNIT-V

Lasers and Holography: (12hrs)

Lasers: Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser principle, Types of lasers-He-Ne laser, Ruby laser, Applications of lasers; Holography: Basic principle of holography, Applications of holography

REFERENCE BOOKS:

- BSc Physics, Vol.2, Telugu Akademy, Hyderabad
- A Text Book of Optics-N Subramanyam, L Brijlal, S.Chand& Co.
- Optics-Murugeshan, S.Chand& Co.
- Unified Physics Vol.IIOptics, Jai PrakashNath&Co.Ltd., Meerut
- Optics,F.A. Jenkins and H.G.White, McGraw-Hill
- Optics, AjoyGhatak,TataMcGraw-Hill.
- Introduction of Lasers – Avadhanulu, S.Chand& Co.
- Principles of Optics- BK Mathur, Gopala Printing Press, 1995

Practical Course II: Wave Optics

Work load: 30hrs **2 hrs/week**

Course outcomes (Practicals):

On successful completion of this practical course the student will be able to,

1. *Gain hands-on experience of using various optical instruments like spectrometer, polarimeter and making finer measurements of wavelength of light using Newton Rings experiment, diffraction grating etc.*
2. *Understand the principle of working of polarimeter and the measurement of specific rotatory power of sugar solution*
3. *Know the techniques involved in measuring the resolving power of telescope and dispersive power of the material of the prism.*
4. *Be familiar with the determination of refractive index of liquid by Boy's method andthe determination of thickness of a thin wire by wedge method.*

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.
2. Resolving power of grating.
3. Study of optical rotation –polarimeter.
4. Dispersive power of a prism.
5. Determination of wavelength of light using diffraction grating-minimum deviation method.
6. Determination of wavelength of light using diffraction grating-normal incidencemethod.
7. Resolving power of a telescope.
8. Refractive index of a liquid-hallow prism
9. Determination of thickness of a thin wire by wedge method
10. Determination of refractive index of liquid-Boy's method.
11. Determination of wavelength of He-Ne LASER

RECOMMENDED ASSESSMENT METHODS

Some of the following suggested assessment methodologies could be adopted;

- The oral and written examinations (Scheduled and surprise tests),
- Practical assignments and laboratory reports,
- Efficient delivery using seminar presentations,
- Viva voce interviews

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B.Sc. PHYSICS

[For Mathematics combinations]

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MODEL QUESTION PAPER PATTERN FOR END SEMESTER EXAMINATION FOR ALL THE ABOVE COURSES

Time: 3 hrs. **Max. marks: 75**

SECTION - A

I. Answer ALL questions. Marks: 5x2M = 10M

1. Short answer type question from Unit-I
2. Short answer type question from Unit-II
3. Short answer type question from Unit-III
4. Short answer type question from Unit-IV
5. Short answer type question from Unit-V

II. Multiple Choice Questions - 10 Marks: 1x10 = 10M

TWO from Each Unit Q.No. from 6 to 15

III. Fill in the Blanks - 5 Marks: 1x5 = 5M

ONE from Each Unit. Q.No. from 16 to 20

SECTION-B

Answer all the following questions Marks: 5x10M = 50M

21. Essay type question from Unit-I
OR
Essay type question from Unit-I

22. Essay type question from Unit-II
OR
Essay type question from Unit-II

23. Essay type question from Unit-III
OR
Essay type question from Unit-III

24. Essay type question from Unit-IV
OR
Essay type question from Unit-IV

25. Essay type question from Unit-V
OR
Essay type question from Unit-V

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MODEL QUESTION PAPER PATTERN FOR MID TERM EXAMINATION FOR ALL THE ABOVE COURSES

Time: 1 hrs. **Max. marks: 15**

SECTION - A

I. Answer ALL questions.

Marks: 2x2M = 4 M 1. Short answer type question

2. Short answer type question

II. Multiple Choice Questions - 4 Marks: 1x4 = 4M

TWO from Each Unit Q.No. from 3 to 6

III. Fill in the Blanks - 2 Marks: 1x2 = 2M

ONE from Each Unit. Q.No from 7 to 8

SECTION-B

Answer all the following questions

Marks: 1x5M = 5M

9. Essay type question

OR

Essay type question

PHYSICS BOARD OF STUDIES

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