RAYALASEEMA UNIVERSITY, KURNOOL

ANDHRA PRADESH

B.Sc., Physics Syllabus

Semesters - III

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 I, II, III, IV & V w.e.f from 2020-21 Academic year

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. 2020-21 (Revised in May 2020)

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)**						

RAYALASEEMA UNIVERSITY, KURNOOL
ANDHRA PRADESH
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**	70	30	**03**
II	II	4	60	**100**	70	30	**03**
III	III	4	60	**100**	70	30	**03**
IV	IV	4	60	**100**	70	30	**03**
	V	4	60	**100**	70	30	**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)
20	20	20	05	05	**30**

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 70 Marks. The time duration is 3 Hours.

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

Section. B: Short Answer types Questions: At least one from each unit. Five to be answered out of Eight. Each carries 4 marks. 5x4M = 20 Marks

Internal Assessment Examinations

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

The **Internal Assessment** is for **30** marks. The Internal Assessment consists of two Midterm theory examination for **20** 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 internal theory examinations for 20 marks are to be conducted per semester and the average of two examinations should be taken for final evaluation for 20 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

RAYALASEEMA UNIVERSITY, KURNOOL
B.Sc. PHYSICS SYLLABUS UNDER CBCS
For Mathematics Combinations
[2020-21 Batch onwards]

II Year B.Sc.-Physics: III Semester
Course III: HEAT AND THERMODYNAMICS

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 basic aspects of kinetic theory of gases, Maxwell-Boltzmandistribution law, equipartition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases*

CO2: *Gain knowledge on the basic concepts of thermodynamics, the first and the second law of thermodynamics, the basic principles of refrigeration, the concept of entropy ,the thermodynamic potentials and their physical interpretations.*

CO3: *Understand the working of Carnot's ideal heat engine, Carnot cycle and its efficiency*

CO4: *Develop critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell's equations and its applications.*

CO5: *Differentiate between principles and methods to produce low temperature and liquefy air and also understand the practical applications of substances at low temperatures.*

CO6: *Examine the nature of black body radiations and the basic theories.*

UNIT-I

Kinetic Theory of gases: **(12 hrs)**

Kinetic Theory of gases-Introduction, Maxwell's law of distribution of molecular velocities (qualitative treatment only) and its experimental verification, Mean free path, Degrees of freedom, Transport phenomenon in ideal gases: viscosity, Thermal conductivity and diffusion of gases.

UNIT-II

Thermodynamics: (12hrs)

Introduction- Isothermal and Adiabatic processes, Reversible and irreversible processes, Carnot's engine and its efficiency, Carnot's theorem, Thermodynamic scale of temperature and its identity with perfect gas scale, Second law of thermodynamics: Kelvin's and Clausius statements, Entropy, Physical significance, Change in entropy in reversible and irreversible processes; Entropy and disorder-Entropy of Universe; Temperature-Entropy (T-S) diagram and its uses ; change of entropy when ice changes into steam.

UNIT-III

Thermodynamic Potentials and Maxwell's equations: (12hrs)

Thermodynamic potentials-Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy and their significance, Derivation of Maxwell's thermodynamic relations from thermodynamic potentials, Applications to (i) Clausius-Clayperon's equation (ii) Value of C_P-C_V (iii) Value of C_P/C_V

UNIT-IV

Low temperature Physics: (12hrs)

Principle of refrigeration, Methods for producing very low temperatures, Joule Kelvin effect, Porous plug experiment ,Joule expansion, Distinction between adiabatic and Joule Thomson expansion, Expression for Joule Thomson cooling, Production of low temperatures by adiabatic demagnetization (qualitative), Practical applications of substancesat low temperatures.

UNIT-V

Quantum theory of radiation: (12 hrs)

Blackbody and its spectral energy distribution of black body radiation, Kirchoff's law, Wein's displacement law, Stefan-Boltzmann's law and Rayleigh-Jean's law (No derivations), Planck's law of black body radiation-Derivation, Deduction of Wein's law and Rayleigh- Jean's law from Planck's law, Solar constant and its determination using Angstrom pyroheliometer, Estimation of surface temperature of Sun.

REFERENCE BOOKS

❖ BSc Physics, Vol.2, Telugu Akademy, Hyderabad

❖ Thermodynamics, R.C.Srivastava, S.K.Saha&AbhayK.Jain, Eastern Economy Edition.

❖ Unified Physics Vol.2, Optics & Thermodynamics, JaiPrakash Nath&Co.Ltd., Meerut

❖ Fundamentals of Physics. Halliday/ Resnick/Walker. C.Wiley India Edition 2007

❖ Heat and Thermodynamics -N BrijLal, P Subrahmanyam, S.Chand& Co.,2012

❖ Heat and Thermodynamics- MS Yadav, Anmol Publications Pvt. Ltd, 2000

❖ University Physics, HD Young, MW Zemansky,FW Sears, Narosa Publishers, NewDelhi

Practical Course-III: Heat and Thermodynamics

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

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

➢ *Perform some basic experiments in thermal Physics, viz., determinations of Stefan's constant, coefficient of thermal conductivity, variation of thermo-emf of athermocouple with temperature difference at its two junctions, calibration of a thermocouple and Specific heat of a liquid.*

Minimum of 6 experiments to be done and recorded

1. Specific heat of a liquid –Joule's calorimeter –Barton's radiation correction

2. Thermal conductivity of bad conductor-Lee's method

3. Thermal conductivity of rubber.

4. Measurement of Stefan's constant.

5. Specific heat of a liquid by applying Newton's law of cooling correction.

6. Heating efficiency of electrical kettle with varying voltages.

7. Thermoemf- thermo couple - Potentiometer

8. Thermal behavior of an electric bulb (filament/torch light bulb)

9. Measurement of Stefan's constant- emissive method

10. Study of variation of resistance with temperature - Thermistor.

RECOMMENDED ASSESSMENT METHODS

Some of the following suggested assessment methodologies could be adopted;

❖ The oral and written examinations (Scheduled and surprise tests),

❖ Problem-solving exercises,

❖ Efficient delivery using seminar presentations,

❖ Viva voce interviews.

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B.Sc. PHYSICS

[For Mathematics combinations]

w.e.f. 2020-21 (Revised in May 2020)

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

Time: 3 hrs.   **Max. marks: 70**

SECTION-A

Answer all the following questions

Marks: 5x10M = 50M

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

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

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

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

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

SECTION - B

Answer any five out of the following eight questions.

Marks: 5x4M = 20M

6.   Short answer type question from Unit-I
7.   Short answer type question from Unit-II
8.   Short answer type question from Unit-II
9.   Short answer type question from Unit-III
10. Short answer type question from Unit-III
11. Short answer type question from Unit-IV
12. Short answer type question from Unit-IV
13. Short answer type question from Unit-V

PHYSICS BOARD OF STUDIES

1. Dr. D. Ramakrishna Reddy
   Principal
   GTRM Govt. Degree College,
   Yerraguntla, Nandyal District

2. Sri Y. Gishnu Nag Vijay
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