TGTWR DEGREE COLLEGE (GIRLS), DAMMAPETA,
BHADRADRI KOTHAGUDEM DIST.
Mail ID: ttwrdcgirls.dammapet@gmail.com Mobile No: 7901097701

DEPARTMENT OF PHYSICS SYLLUBUS

SYLLABUS(Witheffectivefrom2019-20)

Semester	Nameofthe course	Nature of Course	Hours(Th+Pr) /Week	Credits	MaximumMarks			
					Internal	End Exam	Practical	Total Marks
I	Mechanics	DSC	Theory=4 Practical=3	(4+1) =5	20	80	25	125
II	Thermalphysics	DSC	Theory=4 Practical=3	(4+1) =5	20	80	25	125
	Fundamentals of Nanotechnology	SEC	Theory=2	2	10	40		50
III	Electromagnetic theory	DSC	Theory=4 Practical=3	(4+1) =5	20	80	25	125
IV	Wavesandoptics	DSC	Theory=4 Practical=3	(4+1) =5	20	80	25	125
V	A:Modernphysics	DSE	Theory=4 Practical=3	(4+1) 5	20	80	25	125
	B:Computational physics	DSE	Theory=4 Practical=3	(4+1) =5	20	80	25	125
VI	Electronics	DSE	Theory=4 Practical=3	(4+1) =5	20	80	25	125
	AppliedOptics	DSE	Theory=4 Practical=3	(4+1) =5	20	80	25	125

Seven hours have been allotted to each course in a week, out of those four hours for theory and three hours for Practical. Five credits are earmarked for each course. Candidate has to get

40% marks inUniversity Exam cum Internal Assessment in order to pass a course.

Students are offered one(1) **Discipline Specific Compulsory (DSC)**paperin each semester i.e Six(6) DSC papers related to Physics and AECC, SEC, GE and Project papers to gain the extensive and career based knowledge in three years/ six semester curriculum.

Two**AbilityEnhancementCompulsoryCourse(AECC)**papersareofferedtothestudentsinFirst

year.i.eone(1) paperinsemester Iand one(1)paper insemesterII.

1] **'Environmental Science'** in semester I and 2]**'Basic Computer Skills'** taught by faculty of Computer Science in II Semester. . These papers have 2 credit weightage and 2 teaching hours per week.

Four **Skill Enhancement Course (SEC)**papers are offered to the students in second year. i.e two(2) papersin semester III and two(2) papers in semester IV.

1]**'Fundamentals of Nano Technology'** taught by faculty of Physics and 2] **'Bio Statistics'** taught byfacultyofStatistics in Semester III. These papers have 2 credit weightage and 2 teaching hours per week.

3]**'Fundamentals of Python'** taught by Computer Science and 4] **'Remedial Methods of Pollution – DrinkingWater &Soil Fertility'** taught by faculty of Chemistry in semester IV. These papers have2 credit weightage and 2 teaching hours per week.

In semester V, Students are offered with one (1) **General Elective(GE)** paper **"Water Resource Management"** . It has 4 credit weightage and 4 teaching hours per week. This paper has toteachby faculty of any Science Department.

In semester IV, University designed syllabus to the studentsto participate in a project or optional paper '**Public Health & Hygiene'.** Ithas4credit weightageand4teaching hoursperweek.Thispaperhastoteach b faculty of Zoology or Botany or Biotechnology or Micro Biology.

Department lays down course outcomes for each course according to the Learning Outcome Based curriculum set by UGC. Department is striving to attain course outcomes with curricular and co-curricular activities. Course Outcomes for the academic year 2021-22 are given below.

AWARDOFGRADES:

Table shows the awardingof gradeletter andGrade pointto the studentin each course or paperin every semester by university.

DetailsofAwardofGradesunderChoiceBasedCreditSystemW.E.FAcademicyear2016-17

RangeofMarks	GradeLetter	GradePoint
≥85to100	O	10
≥70to<85	A	9
≥60to<70	B	8
≥55to<60	C	7
≥50to<55	D	6
≥40to<50	E	5
<40	F	0
Absent	AB	–

DetailsofAwardofGradesUnderChoiceBasedCreditSystemW.E.FAcademicyear 2019-20.

AwardofGrades			AwardofDivision		
Rangeof%of Marks	**Grade Letter**	**Grade Point**	**CGPA Grade**	**Rangeofmarks (%)**	**Division**
>85to100	0	8.5-10	7.00-10.00	70-100	Firstwith Distinction
>70to<85	A	7.0-8.49	6.00-6.99	60-69	FIRST
>60to<70	B	6.0-6.99	5.00-5.99	50-59	SECOND
>55to<60	C	5.5–5.99	4.00-4.99	40-49	PASS
>50to<55	D	5.0–5.49			
>40to<50	E	4.0–4.99			
<40	F	0			
Absent	AB	....			

SEMESTERGRADEPOINTAVERAGE(SGPA)

CreditPoints=Creditsassignedto thepaperxGradePointsecured

SGPA indicates the performance of a student in a given Semester. SGPA is based on the total credit points earned by the student in all the courses and the total number of credits assigned to the courses/papers in a Semester.

Note: SGPA is computed only if the candidate passes in all the papers (gets a minimum 'E' grade in all the Papers)

CUMULATIVEGRADEPOINTAVERAGE(CGPA)

CGPAreferstotheCumulativeGradePointAverageweightedacrossallthesemesters(6 Semesters).

Note:CGPAiscalculatedonly whenthecandidatepassesin allthepaperofallthesemesters.

KAKATIYAUNIVERSITY,WARANGAL-506009
B.Sc. PROGRAMME
Under CBCS System
SchemewefA.Y:2019-20

FIRSTYEAR

SEMESTER-I

Code	Course category	TitleofthePaper	No. of Credits	Hrs PW	Max.Marks			Total Marks
					Internal Exam	End Exam	Lab	
BS101	AECC-1	EnvironmentalScience	2	2	10	40	-	50
BS102	FL-1A	English	4	4	20	80	-	100
BS103	SL-1A	SecondLanguage	4	4	20	80	-	100
BS104	DSC-1A	Optional-I	4	4	20	80	25	125
		Optional– ILab	1	3				
BS105	DSC-2A	Optional–II	4	4	20	80	25	125
		Optional–IILAB	1	3				
BS106	DSC-3A	Optional–III	4	4	20	80	25	125
		Optional–IIILAB	1	3				
		TOTAL:	25	-	110	440	75	625

SEMESTER–II

Code	Course category	TitleofthePaper	No. of Credits	Hrs PW	Max.Marks			Total Marks
					Internal Exam	End Exam	Lab	
BS201	AECC-2	BasicComputerSkills (Taughtby:ComputerScience)	2	2	10	40	-	50
BS202	FL-2B	English	4	4	20	80	-	100
BS203	SL-2B	SecondLanguage	4	4	20	80	-	100
BS204	DSC-1B	Optional-I	4	4	20	80	25	125
		Optional– ILab	1	3				
BS205	DSC-2B	Optional–II	4	4	20	80	25	125
		Optional–IILab	1	3				
BS206	DSC-3B	Optional–III	4	4	20	80	25	125
		Optional–IIILAB	1	3				
		TOTAL:	25	-	110	440	75	625

KAKATIYAUNIVERSITY,WARANGAL-506009
B.Sc. PROGRAMME
Under CBCS System
SchemewefA.Y:2020-21

SECONDYEAR

SEMESTER-III

Code	Course category	TitleofthePaper	No. of Credits	Hrs PW	Max.Marks			Total Marks
					Interna lExam	End Exam	Lab	
BS 301	SEC-1	Fundamentalsof Nano Technology (Taughtby:Physics)	2	2	10	40	-	50
BS 302	SEC-2	BioStatistics (Taught by: Statistics)	2	2	10	40	-	50
BS 303	FL-3 A	English	3	3	15	60	-	75
BS304	SL-3B	SecondLanguage	3	3	15	60	-	75
BS 305	DSC-1C	Optional-I	4	4	20	80	25	125
		Optional– ILab	1	3				
BS 306	DSC-2C	Optional–II	4	4	20	80	25	125
		Optional–IILab	1	3				
BS 307	DSC-3C	Optional–III	4	4	20	80	25	125
		Optional–IIILab	1	3				
		TOTAL:	25	-	110	440	75	625

SEMESTER-IV

Code	Course category	TitleofthePaper	No. of Credits	Hrs PW	Max.Marks			Total Marks
					Interna lExam	End Exam	Lab	
BS401	SEC-3	Fundamentals of Python (Taughtby:ComputerScience)	2	2	10	40	-	50
BS402	SEC-4	RemedialMethodsofPollution– Drinking Water & Soil Fertility (Taught by: Chemistry)	2	2	10	40	-	50
BS403	FL-4 A	English	3	3	15	60	-	75
BS404	SL-4B	SecondLanguage	3	3	15	60	-	75
BS405	DSC-1D	Optional-I	4	4	20	80	25	125
		Optional– ILab	1	3				
BS406	DSC-2D	Optional–II	4	4	20	80	25	125
		Optional–IILab	1	3				
BS407	DSC-3D	Optional–III	4	4	20	80	25	125
		Optional–IIILab	1	3				
		TOTAL:	25	-	110	440	75	625

KAKATIYAUNIVERSITY,WARANGAL-506009
B.Sc. PROGRAMME
Under CBCS System
SchemewefA.Y:2021-2022

THIRDYEAR

SEMESTER-V

Code	Course Type	TitleofthePaper	No. of Credits	Hrs PW	Max.Marks			Total Marks
					Internal Exam	End Exam	Lab	
BS 501	FL-5 A	English	3	3	15	60	-	75
BS 502	SL-5B	SecondLanguage	3	3	15	60	-	75
BS 503	G.E.	Water Resources Management (Taughtby:AnyScienceDept.)	4	4	20	80	-	100
BS 504	DSE-1E	Optional–I	4	4	20	80	25	125
		Optional– ILab	1	3				
BS 505	DSE-2E	Optional–II	4	4	20	80	25	125
		Optional–IILab	1	3				
BS506	DSE-3E	Optional–III	4	4	20	80	25	125
		Optional–IIILab	1	3				
		TOTAL:	25	-	110	440	75	625

SEMESTER-VI

Code	Course Type	TitleofthePaper	No.of *Credits*	Hrs PW	Max.Marks			Total Marks
					Internal Exam	End Exam	Lab	
BS 601	FL-6A	English	3	3	15	60	-	75
BS 602	SL-6B	SecondLanguage	3	3	15	60	-	75
BS 603	P.W/ Optional	Optional:PublicHealth&Hygiene (Taught by: Zoology / Botany / Biotechnology/MicroBiology)	4	4	20	80	-	100
BS 604	DSE-1F	Optional-I	4	4	20	80	25	125
		Optional– ILab	1	3				
BS 605	DSE-2F	Optional–II	4	4	20	80	25	125
		Optional–IILab	1	3				
BS 606	DSE-3F	Optional–III	4	4	20	80	25	125
		Optional–IIILab	1	3				
		TOTAL:	25	-	110	440	75	625

NSS/NCC/Sports/Extra Curricular	**Credits under Non – CGPA 6**	**Upto6 (2 ineachYear)**	**Upto6 (2 ineachYear)**	**Upto6 (2 ineachYear)**
Summer internship	**4**	**Upto4(2ineach,afterI&II years**	**Upto4(2ineach,afterI& II years**	**Upto4(2ineach,afterI&II years**

F.L :First Language;
S.L :SecondLanguage;
A.E.C.C:AbilityEnhancementCompulsoryCourse;
S.E.C :SkillEnhancementCourse;
D.S.C :DisciplineSpecificCourse;
D.S.E :DisciplineSpecificEffective;
G.E :GenericElective;
P.W :Project Work;

B.Sc. (Physics)Semester I-Theory Syllabus
Paper – I: Mechanics

56 hrs

(w. e. from academic year 2019-20)
(CBCS)

Unit – I

1. Vector Analysis (14)

Scalar and vector fields, gradient of a scalar field and its physical significance.Divergence and curl of a vector field and related problems.Vector integration, line, surface and volume integrals.Stokes, Gauss and Greens theorems-simple applications.

Unit – II

2. Mechanics of Particles (07)

Laws of motion, motion of variable mass system, motion of a rocket, multi-stage rocket, conservation of energy and momentum. Collisions in two and three dimensions, concept of impact parameter, scattering cross-section.

3. Mechanics of rigid bodies (07)

Definition of Rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum and inertial tensor.Euler's equation, precession of a top, Gyroscope.

Unit – III

4. Centralforces (14)

Central forces – definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, gravitational potential and gravitational field, motion under inverse square law, derivation of Kepler's laws, Coriolis force and its expressions.

Unit – IV

5. Special theory of relativity (14)

Galilean relativity, absolute frames, Michelson-Morley experiment, Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.Concept of four vector formalism.

NOTE: Problems should be solved at the end of every chapter of all units.

Chairperson
BOARDS OF STUDIES
DEPARTMENT OF PHYSICS
KAKATIYA UNIVERSITY
WARANGAL-506 009 (T.S.)

Textbooks

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008.*
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007.*
3. **First Year Physics** - *Telugu Academy.*
4. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill.*
5. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition.*
6. **Theory of relativity - Resnick**

Reference Books

1. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
2. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005.*
3. **An introduction to Mechanics** by Daniel Kleppner& Robert Kolenkow. *The McGraw Hill Companies.*
4. **Mechanics**. Hans &Puri. *TMH Publications.*

Chairperson
BOARDS OF STUDIES

Question paper pattern

FIRST SEMESTER PRACTICALS **36 hrs**
(3 hrs / week)

Practical Paper – I : Mechanics

1. Study of a compound pendulum determination of 'g' and 'k'.
2. Y' by uniform Bending
3. Y by Non-uniform Bending.
4. Moment of Inertia of a fly wheel.
5. Measurement of errors –simple Pendulum.
6. 'Rigidity moduli by torsion Pendulum.
7. Determine surface tension of a liquid through capillary rise method.
8. Determination of Surface Tension of a liquid by different methods.
9. Determine of Viscosity of a fluid.
10. Calculation of slope and intercept of a Y= mX +C by theoretical method

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. "Practical Physics" R.K Shukla, AnchalSrivastava

Chairperson
BOARD OF STUDIES
DEPARTMENT OF PHYSICS
KAKATIYA UNIVERSITY
WARANGAL-506 009 (A.P.)

Subject: Physics

B.Sc. Semester II-Theory Syllabus
Paper – II : Thermal Physics
(W.E.F the academic year 2019-2020)

56 hrs

Unit – I

1. **Kinetic theory of gases: (6)**

   Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

2. **Thermodynamics: (8)**

   Basics of thermodynamics-Kelvin's and Claussius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature-Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

Unit – II

3. **Thermodynamic potentials and Maxwell's equations: (7)**

   Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas.Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

4. **Low temperature Physics: (7)**

   Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type.

Unit – III

5. **Quantum theory of radiation: (14)**

   Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of

Chairperson
BOARDS OF STUDIES
DEPARTMENT OF PHYSICS

radiation - Planck's law – deduction of Wein'sdistribution law, Rayleigh-Jeans law, Stefan's law from Planck's law.
Measurement of radiation using pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

Unit – IV

6. Statistical Mechanics: (14)

Introduction, postulates of statistical mechanics. Phase space, concept of ensembles and some known ensembles ,classical and quantum statistics and their differences, concept of probability, Maxwell-Boltzmann's distribution law -Molecular energies in an ideal gas-Maxwell-Boltzmann's velocity distribution law, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws, Application of B-E distribution to Photons-planks radiation formula, Application of Fermi-Dirac statistics to white dwarfs and Neutron stars.

Textbooks

1. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007.*
2. **Second Year Physics** – *Telugu Academy.*
3. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co.*
4. **Heat and Thermodynamics** by Mark W.Zemansky 5th edition McGraw - Hill
5. **Heat and Thermodynamics** by D.S. Mathur.

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education.*
2. B.B. Laud **"Introduction to statistics Mechanics"**(Macmillan 1981)
3. F.Reif: **"Statistical Physics "**(Mcgraw-Hill,1998)
4. K.Haung: "**Statistical Physics "**(Wiley Eastern 1988)

Chairperson
BOARD OF STUDIES
DEPARTMENT OF PHYSICS
KAKATIYA UNIVERSITY
WARANGAL-506 009 (A.P.)

42 hrs
(3 hrs / week)

II SEMESTERPracticals Paper – II :
Thermal Physics

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Determination of Thermo emf
6. Cooling Curve of a metallic body (Null method)
7. Resistance thermometer. To Determine temp coeff resistance
8. Thermal expansion of solids
9. Study ofconversionof mechanical energy into heat.
10. Determine the Specific of a solid (graphite rod)
11. Thermistor Characteristics. Calculation of A and B

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, AnchalSrivastava

Chairperson
BOARD OF STUDIES
DEPARTMENT OF PHYSICS
KAKATIYA UNIVERSITY
WARANGAL-506 009 (A.P.)

Subject: Physics

B.Sc. Semester II-Theory Syllabus
Paper – II : Thermal Physics
(W.E.F the academic year 2019-2020)

56 hrs

Unit – I

1. **Kinetic theory of gases: (6)**

   Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

2. **Thermodynamics: (8)**

   Basics of thermodynamics-Kelvin's and Claussius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature-Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

Unit – II

3. **Thermodynamic potentials and Maxwell's equations: (7)**

   Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas.Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

4. **Low temperature Physics: (7)**

   Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type.

Unit – III

5. **Quantum theory of radiation: (14)**

   Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of

Chairperson
BOARDS OF STUDIES
DEPARTMENT OF PHYSICS

radiation - Planck's law – deduction of Wein'sdistribution law, Rayleigh-Jeans law, Stefan's law from Planck's law.
Measurement of radiation using pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

Unit – IV

6. Statistical Mechanics: (14)

Introduction, postulates of statistical mechanics. Phase space, concept of ensembles and some known ensembles ,classical and quantum statistics and their differences, concept of probability, Maxwell-Boltzmann's distribution law -Molecular energies in an ideal gas-Maxwell-Boltzmann's velocity distribution law, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws, Application of B-E distribution to Photons-planks radiation formula, Application of Fermi-Dirac statistics to white dwarfs and Neutron stars.

Textbooks

1. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007.*
2. **Second Year Physics** – *Telugu Academy.*
3. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co.*
4. **Heat and Thermodynamics** by Mark W.Zemansky 5th edition McGraw - Hill
5. **Heat and Thermodynamics** by D.S. Mathur.

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education.*
2. B.B. Laud **"Introduction to statistics Mechanics"**(Macmillan 1981)
3. F.Reif: **"Statistical Physics "**(Mcgraw-Hill,1998)
4. K.Haung: "**Statistical Physics "**(Wiley Eastern 1988)

Chairperson
BOARD OF STUDIES
DEPARTMENT OF PHYSICS
KAKATIYA UNIVERSITY
WARANGAL-506 009 (A.P.)

42 hrs
(3 hrs / week)

II SEMESTERPracticals Paper – II :
Thermal Physics

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Determination of Thermo emf
6. Cooling Curve of a metallic body (Null method)
7. Resistance thermometer. To Determine temp coeff resistance
8. Thermal expansion of solids
9. Study ofconversionof mechanical energy into heat.
10. Determine the Specific of a solid (graphite rod)
11. Thermistor Characteristics. Calculation of A and B

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (PragatiPrakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, AnchalSrivastava

Chairperson
BOARD OF STUDIES
DEPARTMENT OF PHYSICS
KAKATIYA UNIVERSITY
WARANGAL-506 009 (A.P.)

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA
B.Sc.ProgrammeunderCBCS
With effect from the A.Y: 2019
Skill Enhancement Course- I
IIYear
(CommontoallScienceCourses)
SEMESTER– III

FUNDAMENTALSOFNANOTECHNOLOGY

Theory: 2 Hours/Week; Credits:2 Marks:50(Internal:10;External:40)

UNITI:

BackgroundtoNanotechnology:
Scientific revolution, molecular and atomic size, emergence of Nanotechnology, ChallengesinNanotechnology,Carbonage:(newformsofcarbongraphenesheettoCNT)

Nucleation:
Macroscopic to microscopic crystals and nanocrystals, large surface to volume ratio, top-down and bottom-up approaches, self-assembly process, grain bounda volume in nanocrystals, defects in nanocrystals, surface effects on the properties.

UNIT-II:

Nanomaterialsand properties:
Types of Nanostructure: one dimensional (ID), two dimensional (2D), three dimensional (3D) Nanostructured materials, Quantum dots, Quantum wire, Quantum sheet structures.

Carbon nanotubes (CNT), Metals (Au, Ag), Metal oxides(TiO2,Zno), semiconductors (Si, Ge, CdS, ZnSe), Ceramics and composites, Biological system, DNA, RNA, Lipids, Size dependent properties, mechanical, physical and chemical properties.

Applicationsof Nanomaterials:
Molecularelectronicsandnanoelectronics,Quantumelectronicdevices,CNTbasedtransistorand Field emission Display, biological applications, Biochemical sensor, Membrane based water purification.

Referencebooks:

1. Nanotechnology:Basicscienceandemergingtechnologies,M.Wilson,K.Kannangara,G. Smith, Overseas Press India PVT.LTD,NEW DELHI:
2. ThechemistryofNanomaterials:Synthesis,properties&applications.C.N.R.Rao,A.Muller, Wiley
3. NanostructuresandNanomaterials:Synthesis,propertiesandapplicationsbyGuozhongCao, Imperial College press.
4. HariSinghNalwa,Handbookofnanostructured materials&nanotechnologyopticalproperties.
5. Nanofabricationtowardsbiomedicalapplications,C.S.S.R.Kumar,Wiley-VCHVerlagGmbH & Co, Weinheim.

Mrs.G.Manjula,Chairperson,BoS

Prof.B.VenkatramReddy, HoD

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2020–2021onwards)

B.Sc.PHYSICSIIYear SEMESTER

– IV

PAPER–IV::WAVESANDOPTICS

Theory:	**4 Hours/Week;**	**Credits:4**	**Marks:100(Internal:20;External:80)**
Practical:	**3 Hours/Week**	**Credits:1**	**Marks:25**

UNIT-I:

Waves

Fundamentals of Waves -Transverse wave propagation alonga stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones, energy transport, transverse impedance.

Longitudinal vibrations in bars- wave equation and its general solution, Special cases: (i) bar fixed at both ends, ii) bar fixed at the midpoint, iii) bar free at both ends, iv) bar fixed at one end, Transverse vibrations in a bar - wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

UNITII:

Interference

Principleofsuperposition–coherence–temporalcoherenceandspatialcoherence–conditionsfor Interference of light.

Interference by division of wave front: Fresnel's biprism – determination of wave length of light. Determinationofthicknessofa transparentmaterialusingbiprism–change ofphase onreflection–Lloyd's mirror experiment.

Interference bydivision of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non-reflecting films – interference by a plane parallel film illuminated by a point source – Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire-Newton's rings in reflected light with andwithout contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes)– Determination of wave length of monochromatic light – Michelson Interferometer – types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1,D_2 lines and thickness of a thin transparent plate.

UNIT III:

Diffraction:

Introduction – Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhofer diffraction due to double slit – Fraunhofer diffraction pattern with N slits (diffraction grating).

Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel diffraction-Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zoneplatewithconvexlens–Phasereversalzoneplate–diffractionatastraightedge –differencebetween interference and diffraction.

UNITIV:

Polarization

Polarized light : Methods of Polarization, Polarization by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewster's law – Malus law – Nicol prism polarizer and analyzer – Refraction ofplane wave incident onnegative and positive crystals(Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

NOTE:*Problemsshouldbe solvedattheendofevery chapterofallunits.*

Suggestedbooks

1. **Optics**byAjoyGhatak.*TheMcGraw-Hillcompanies.*
2. **Optics**bySubramaniyamandBrijlal.*S.Chand& Co.*
3. **FundamentalsofPhysics**.Halliday/Resnick/Walker.*C.WileyIndiaEdition 2007.*
4. **OpticsandSpectroscopy**.R.MurugeshanandKiruthigaSivaPrasath.*S.Chand&Co.*
5. **SecondYearPhysics**–*TeluguAcademy.*
1. **ModernEngineering Physics**byA.S. Vasudeva.*S.Chand&Co. Publications.*
2. **Feyman'sLectureson Physics**Vol.1,2,3&4.*NarosaPublications.*
3. **Fundamentalsof Optics**byJenkinsA.FrancisandWhiteE.Harvey,*McGrawHillInc.*
4. K.Ghatak,**PhysicalOptics**'
5. D.P.Khandelwal,**OpticalandAtomicPhysics'**(HimalayaPublishingHouse,Bombay,1988)

11. JenkinsandWhite:**'FundamentalofOptics'**(McGraw-Hill)
12. SmithandThomson:**'Optics'**(JohnWileyand sons).

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2020–2021onwards)

B.Sc.PHYSICSIIYear SEMESTER

– IV

PAPER–IV::WAVESANDOPTICS PRACTICALS

1. Thicknessofawireusingwedgemethod.
2. DeterminationofwavelengthoflightusingBiprism.
3. DeterminationofRadius ofcurvatureofa givenconvexlensbyformingNewton'srings.
4. Resolvingpowerofgrating.
5. Studyofoptical rotation-polarimeter.
6. Dispersivepowerofaprism
7. Determinationofwavelengthoflightusingdiffractiongratingminimumdeviationmethod.
8. Wavelengthoflightusingdiffraction grating–normalincidence method.
9. Resolvingpowerofatelescope.
10. Refractiveindex ofaliquidandglass (BoysMethod).
11. Pulfrichrefractometer– determinationofrefractiveindex of liquid.
12. WavelengthofLaserlightusingdiffraction grating.
13. VerificationofLawsofa stretchedstring(ThreeLaws).
14. VelocityofTransversewavealongastretched string
15. Determinationoffrequencyofabar-Melde"s experiment

***Note**: Minimum of eight experiments should be performed Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.*

SuggestedBooks

1.D.P.Khandelwal,"Alaboratorymanualforundergraduateclasses"(Vani Publishing House, New Delhi).
2. S.P.Singh,"AdvancedPracticalPhysics"(PragatiPrakashan,Meerut).
3. WorsnopandFlint-AdvancedPracticalphysicsfor students.
4. "PracticalPhysics"R.KShukla,Anchal Srivastav.

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – V

PAPER–V::(A)MODERNPHYSICS

(DSE-1:ELECTIVE)

Theory:	**4 Hours/Week;**	**Credits:4**	**Marks:100(Internal:20;External:80)**
Practical:	**3 Hours/Week**	**Credits:1**	**Marks:25**

UNIT-I

SPECTROSCOPY

AtomicSpectra: Introduction-DrawbacksofBohr'satomicmodel–Sommerfeld'sellipticalorbits -relativistic correction (no derivation). Stern & Gerlach experiment, Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes. Spectral terms, selection rules, intensity rules – spectra of alkali atoms, doublet fine structure, Zeeman Effect, Paschen-Back Effect and Stark Effect (basic idea).

Molecular Spectroscopy: Types of molecular spectra, pure rotational energies and spectrum of diatomic molecule. Determination of inter nuclear distance. Vibrational energies and spectrum of diatomic molecule. Raman effect, classical theory of Raman effect. Experimental arrangement for Raman effect and its applications.

UNIT–II

QuantumMechanics

Inadequacy of classical Physics: Spectral radiation - Planck's law (only discussion). Photoelectriceffect - Einstien's photoelectric equation. Compton's effect - experimental verification.

Matter waves & Uncertainty principle: de Broglie's hypothesis - wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment. Double slit experiment. Standing de Brogile waves of electron in Bohr orbits. Heisenberg's uncertainty principle for position and momentum (x and p_X), Energyand time (E and t). Gamma raymicroscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Complementary principle of Bohr.

SchrodingerWaveEquation

Schrodinger time independent and time dependent wave equations. Wave function properties - Significance. Basic postulates of quantum mechanics. Operators, eigen functions and eigen values, expectation values.

UNIT-III

NuclearPhysics

Nuclear Structure: Basic properties of nucleus - size, charge, mass, spin, magnetic dipole moment and electric quadrupole moment. Binding energy of nucleus, deuteron binding energy, p-p, n-n, andn-p scattering (concepts), nuclear forces. Nuclear models - liquid drop model, shell model.

Alpha and Beta Decays: Range of alpha particles, Geiger – Nuttal law. Gammow's theory of alpha decay. Geiger – Nuttal law from Gammow's theory. Beta spectrum - neutrino hypothesis,

ParticleDetectors:GMcounter,proportionalcounter,scintillationcounter.

UNIT:IV

SolidStatePhysics&Crystalography

Crystal Structure: Crystalline nature of matter, Crystal lattice, Unit Cell, Elements of symmetry. Crystal systems, Bravais lattices. Miller indices. Simple crystal structures (S.C., BCC, FCC, CsCl, NaCl, diamond and ZincBlende)

X-rayDiffraction: DiffractionofX-raysbycrystals,Bragg'slaw,Experimentaltechniques-Laue's method and powder method.

Bonding in Crystals: Types of bonding in crystals - characteristics of crystals with different bondings. Lattice energy of ionic crystals- determination of Madelung constant for NaCl crystal, Calculation of Born Coefficient and repulsive exponent. Born-Haber cycle.

Suggestedbooks:

1. ModernPhysicsbyG.Aruldhas&P.Rajagopal.EasternEconomyEdition.
2. ConceptsofModernPhysicsbyArthurBeiser.TataMcGraw-HillEdition.
3. ModernPhysicsbyR.MurugeshanandKiruthigaSivaPrasath.S.Chand&Co.
4. NuclearPhysicsbyD.C.Tayal,HimalayaPublishingHouse.
5. MolecularStructureandSpectroscopybyG.Aruldhas.PrenticeHallofIndia,NewDelhi.
6. Spectroscopy-AtomicandMolecularbyGurdeepRChatwalandShyamAnand-HimalayaPublishing House.
7. ThirdYearPhysics–TeluguAcademy.
8. ElementsofSolidStatePhysicsbyJ.P.Srivastava.(forchapteronnanomaterials)-Prentice-hallofIndiaPvt. Ltd.

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – V

PAPER–V::(A)MODERNPHYSICSPRACTICALS

(DSE-1:ELECTIVE)

1. MeasurementofPlanck's constantusingblackbodyradiationandphoto-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
3. TodeterminethePlanck'sconstantusingLEDsof atleast4differentcolors.
4. Todeterminetheionizationpotentialof mercury.
5. Todeterminetheabsorptionlinesintherotationalspectrumof Iodine vapour.
6. Todeterminethevalueofe/mby(a)Magneticfocusingor(b) Barmagnet.
7. TosetuptheMillikanoildrop apparatusand determinethechargeofanelectron.
8. Toshowthetunnelingeffect intunneldiodeusingI-Vcharacteristics.
9. Todeterminethewavelengthoflasersourceusingdiffractionofsingleslit.
10. Todeterminethewavelengthoflasersourceusingdiffraction ofdoubleslits.
11. Todetermine(1)wavelengthand(2)angularspreadofHe-Nelaserusingplanediffraction grating
12. Todeterminethevalueofe/m forelectron bylongsolenoid method.
13. PhotoCell–DeterminationofPlanck'sconstant.
14. Toverifytheinversesquarelawofradiation using aphoto-electriccell.
15. Tofindthevalueofphotoelectricworkfunction ofamaterialofthecathodeusingaphoto- electric cell.
16. Measurementofmagneticfield–Hallprobe method.
17. Todeterminethedead timeofa givenG.M. tube usingdoublesource.
18. Hydrogenspectrum–DeterminationofRydberg's constant
19. Energygapofintrinsicsemi-conductor
20. G.M.Counter– Absorptioncoefficientsofamaterial.
21. Todrawtheplateaucurvefora GeigerMullercounter.
22. TofindthehalfFlifeperiodofagivenradioactivesubstanceusingaG.M. Counter.

ReferenceBooks:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia PublishingHouse
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. ATextBookofPracticalPhysics,I.Prakash&Ramakrishna,11thEdn,2011,KitabMahal

Note:Minimumofeight experimentsshouldbe performed.

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – V

PAPER–V::(B)COMPUTATIONALPHYSICS

(DSE-1:Elective)

Theory:	**4 Hours/Week;**	**Credits:4**	**Marks:100(Internal:20;External:80)**
Practical:	**3 Hours/Week**	**Credits:1**	**Marks:25**

UNITI

ProgramminginC

Flow charts, algorithms, Integer and floating-point arithmetic, precision, variable types, arithmetic statements, input and output statements, control statements, executable and non-executable statements, arrays, Repetitive and logical structures, Subroutines and functions, operation with files, operating systems, Creation of executable programs.

UNITII

NumericalmethodsofAnalysis

Solution of algebraic and transcendental equation, Newton Ramphan method, Solution of simultaneous linear equations. Matrix inversion method, Interpolation, Newton and Lagrange formulas, Numerical differentiation. Numerical integration, Trapezoidal, Simpson and gaussian quadrature methods, Least square curve fitting, Straight line and Polynomial fits.

UNITIII

Numericalsolutionofordinarydifferentialequations

Eulars and Runge kutta methods, simulation. Generation of uniformly distributed random integers, statistical tests of randomness. Monte-Carlo evaluation of integrals and error analysis, Non-uniform probability distributions, Importance sampling, Rejection method.

UNITIV

Computationalmethods

Metropolis algoritham, Molecular diffusion and Brownian motions, Random walk problems and their Montecarlo simulation. Finite element and Finite difference methods. Boundary value and initial value problems, density functional methods.

Note:Problemsshouldbesolvedattheendofeverychapterofallunits Suggested

Books:

1. **ComputationalmethodsinPhysicsandEngineering: Wong**
2. **ComputerOrientedNumerical methods:Rajaraman**
3. **ComputerProgramminginFortran77:Rajaraman**
4. **AppliedNumericalAnalysis:Gerald**
5. **AGuidetoManto-CarlosimulationsiStatisticalPhysics:Land**

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – V

PAPER–V::(B)COMPUTATIONALPHYSICSPRACTICALS

(DSE-1:Elective)

1. JacobiMethodofMatrix diagonalization
2. SolutionofTranscendentalorPolynomialequationsbytheNewtonRaphson metho
3. Linearcurvefittingandcalculationoflinear correlationcoefficients
4. MatrixSimulation:Subtractionand Multiplication.
5. MatrixInversionandsolutionofsimultaneousequations
6. Lagrangeinterpolationbasedongiveninputdata
7. NumericalintegrationusingtheSimpsonsmethod.
8. NumericalintegrationusingtheGaussianquadrature method.
9. SolutionoffirstorderDifferentialEquationusingRunge-kutta method.
10. Numericalfirstorderdifferentiationofagiven function.
11. FastFouriertransform
12. MonteCarloIntegration
13. Useofapackagefordata generationandgraph plotting.
14. TestofRandomnessfor randomnumbersgenerators.

Note:Minimumofeightexperimentsshouldbeperformed.Maximumof15studentsperbatchand maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – VI

PAPER–VI::(A)ELECTRONICS

(DSE-2:ELECTIVE)

Theory:	**4 Hours/Week;**	**Credits:4**	**Marks:100(Internal:20;External:80)**
Practical:	**3 Hours/Week**	**Credits:1**	**Marks:25**

Unit-I

Band theory of P-N junction: Energyband in solids (band theory), valence band, conduction band andforbidden energygapinsolids,insulators,semiconductorsandpureorintrinsicsemiconductors and impure or extrinsic semi-conductors.N-type semi-conductors, P-type semi-conductors, Fermi level, continuity equation.

Diodes: P-N junction diode, Half-wave, full-wave and bridge rectifier. Zener diode & its characteristics. Zener diode as voltage regulator.

UNIT-II

Bipolar Junction Transistor (BJT) – p-n-p and n-p-n transistors, current components in transistors, CB, CE and CC configurations – transistor as an amplifier -RC coupled amplifier – Frequency response (Qualitative analysis).

Feedback concept & Oscillators: Feedback, General theory of feedback–Concepts of oscillators, Barkhausen's criteria, Phase shift oscillator – Expression for frequency of oscillation.

UNIT-III

Special devices- Construction and Characteristics: Photo diode - Shockley diode -Solar cell, Opto-couplers - Field Effect Transistor (FET)- FET as an Amplifier - Uni Junction Transistor (UJT), UJT as a relaxation oscillator - Silicon controlled rectifier (SCR) - SCR as a switch.

UNIT-IV

Digital Electronics

Binary number system, conversion of binary to decimal and vice-versa.Binary addition and subtraction (1's and 2's complement methods).Hexadecimal number system.Conversion frombinary to hexadecimal and vice-versa, Decimal to hexadecimal and vice-versa.

Logicgates:

OR,AND,NOTgates,truthtables,realizationofthesegatesusingdiscretecomponents.NAND, NOR as universal gates, Exclusive – OR gate (EX-OR). De Morgan's Laws – Verification.

NOTE: Problems shouldbesolved fromeverychapterofall units.

SuggestedBooks:

1. Electronicdevicesand circuits–MillmanandHalkias.*Mc.Graw-Hill Education.*
2. PrinciplesofElectronicsbyV.K.Mehta–*S.Chand&Co.*
3. BasicElectronics(Solidstate)–B.L.Theraja,S.Chand&Co.
4. AFirstCourseinElectronics-AnwarA.Khan&KanchanK. Dey,PHI.
5. PhysicsofSemiconductorDevices-S.M.Sze
6. PhysicsofSemiconductors- Streetman.
7. BasicElectronics– Bernod Grob.
8. BasicElectronicsforB.Sc(Physics) IIIYear,2019,TeluguAcademy
9. DigitalPrinciples&Applications–A.P.MalvinoandD.P.Leach

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – VI

PAPER–VI::(A)ELECTRONICSPRACTICALS

(DSE-2:ELECTIVE)

1. Constructionoflogicgates(AND,OR,NOT,gates)withdiscretecomponents–Truth table Verification
2. AND,OR,NOT–gates constructionsusinguniversalgates–Verification oftruthtables.
3. ConstructionofNANDandNORgateswithdiscretecomponents andtruthtable verification
4. CharacteristicsofaTransistorinCEconfiguration
5. R.C.coupledamplifier–frequencyresponse.
6. VerificationofDeMorgan'sTheorem.
7. ZenerdiodeV-Icharacteristics.
8. P-njunctiondiodeV- Icharacteristics.
9. Zenerdiode asavoltage regulator
10. ConstructionofamodelD.C.power supply
11. RCphaseshiftOscillator–determinationofoutput frequency

Note:Minimumofeight experimentsshouldbe performed.

SuggestedBooks:

1. B.Sc.PracticalPhysics– C. L.Arora–S.Chand &Co.
2. Viva-voceinPhysics–R.C.Gupta,PragathiPrakashan,Meerut.
3. Laboratorymanual forPhysics CoursebyB.P. Khandelwal.
4. PracticalPhysicsbyM.ArulThakpathibyComptexPublishers.
5. B.Sc.practicalphysics– SubbiReddy.

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – VI

Paper–VI::(B)APPLEDOPTICS

(DSE-2:ELECTIVE)

Theory:	**4 Hours/Week;**	**Credits:4**	**Marks:100(Internal:20;External:80)**
Practical:	**3 Hours/Week**	**Credits:1**	**Marks:25**

UNITI

PrinciplesofLASER

Emission and absorption of Radiation, -Einstein Relations- Pumping Mechanism- optical feedback- Laser rate equation for two, three and Four level Lasers, pumping threshold condition- Principle ofLasebeams.Classificationof LASER Systems-Gas, LiquidandSolid LasersHe-NeandArgon Lasers, their energy level schemes- Ruby Laser and YAG laser, GA-As Laser and their applications in various fields.

UNITII

Holography

Basic principle of Holography- Recording of amplitude and phase. The recording medium- reconstruction of original wave front- Image formation bywave front reconstruction- Gaber Hologram- limitations of Gaber Hologram-Fourier Transform Hologram-Volume Hologram- Applications of holograms.

UNITIII

Fourier and Non-Linear Optics: Thin lens as phase transformation-thickness function-various types of lenses- Fourier transforming properties of lenses-Object placed In front of the lens- Object placed behind the lens.

Non-LinearOptics:harmonicgeneration-secondhormonicgeneration-phasematchingcondition-
Optical mixing- parametric generation of Light- Self focusing of light.

UnitIV:OpticalFibers (14Hrs)

Fiber types and their structures. Ray optic representation, Acceptance angle and numerical aperture. Step index and graded index fibers. Sigle mode and multi-mode fibers. Fiber materials for glass fibers and plastic fibers. Signal attenuation in optical fibers. Absorption, Scattering and bending losses in fibers, core and cladding losses. Material dispersion, wave guide dispersion, inter modes distortion and pulse broadening.

Note:-Problemsshouldbesolvedat theendofeverychapterofall units

SuggestedBooks:

1. Optoelectronics an Introduction-Wilson&JFBHawkes2nd edition
2. IntroductiontoFourieroptics-JWGoodman
3. LasersandNonlinearOptics--BBLaud
4. Opticalelectronics–GhatakandThyagarajan
5. PrinciplesofLasers-O. Svelto
6. Opticalfibercommunication-ByGeradkeiser
7. Opticalfiber communication-byJohnM Senior(PHI)

KAKATIYAUNIVERSITY-WARANGAL-TELANGANA

UnderGraduateCourses(UnderCBCS2021–2022onwards)

B.Sc.PHYSICSIIIYear

SEMESTER – VI

Paper–VI::(B)APPLEDOPTICSPRACTICALS

(DSE-2:ELECTIVE)

1. StudyoftheProfile ofalaser beam
2. Determinationofthediameterofathin wireusinglaser
3. Determinationofwavelength ofHe-Nelaserbytransmission grating
4. Constructionandrecordingof a Hologram
5. StudyofFouriertransformingproperties oflenses
6. Studyof second harmonic generation byKDPcrystal
7. Measurementofnumericalapertureofanopticalfiber
8. Measurementofcouplinglossesinoptical fiber
9. Measurementofbendinglossesinoptical fiber
10. Studyofaudiosignal transmissionthrough optical fiber
11. Tostudytheinterferenceoflight usingoptical fiber

Note:Minimumofeightexperimentsshouldbe performed.

SuggestedBooks:

1. IntroductiontofourierOptics-JGoodman
2. OpticalFiberCommunication-johnMsenior
3. Principlesof Lasers-byO.Svelto
4. ModernOptics byGrant Fowles
5. PrinciplesofOpticsbyBorn&Wolf
6. Fundamentalsof OpticsbyJekins& White