FEDERAL UNIVERSITY OYE-EKITI,

EKITI STATE, NIGERIA

FACULTY OF SCIENCE

DEPARTMENT OF PHYSICS

UNDERGRADUATE ACADEMIC PROSPECTUS

2017 – 2020

Revised Edition 2017

First Published 2015
A publication of the Department of Physics

Faculty of Science, Federal University Oye-Ekiti, Nigeria.
P.M.B.373, Oye Ekiti. Ekiti State.

Prof. O. S. Lawal
Dean,
Faculty of Science

Dr Olusayo Olubosede
Ag. HOD Physics

Forward

This Handbook updates information, which includes aim and objectives, Course structure, Course description and extracts from the University Regulations governing First degree Programme in Physics Department. It should be of great value to students and staff of the department as well as to other persons who may wish to obtain information on the undergraduate academic programme of the Department of Physics.

Dr Olubosede Olusayo
Ag. HOD Physics

Table of Content

ABOUT THE DEPARTMENT

Name of the Program
Bachelor of Science Degree (B.Sc honours) in Physics.

Programme Code: PHY

History of the Programme

The Department of Physics is one of the nine (9) Departments established in the Faculty of Science of the University at inception in September 2011 with fifteen (15) students who were admitted through UTME and Post-UTME conducted by the University. The undergraduate Physics programme at the Federal University, Oye Ekiti is designed to provide a solid background in the classical and modern Physics for students with career objectives in pure Physics research, Electronics, Condensed Matter Physics, Nuclear Energy and Power, Medicine, Biophysics, Geophysics, Astrophysics and Astronomy, Space Physics and Satellite Communication, Computer Science, Secondary School Teacher, Meteorology, diverse field of applied Physics.

Presently, the department has 29 staff members out of which seven (15) are academics, Ten (10) are academic non-teaching (laboratory) while 4 are non-academics (i.e the administrative officers). The Academic Programme is designed/structured in line with the Nigerian University Commission (NUC) specification.

PROGRAMME PHILOSOPHY

The undergraduate Physics programme at the Federal University Oye Ekiti is designed to provide a solid academic background in all areas of classical and modern Physics for students with career interest in Pure Physics, Electronics, Nuclear Energy and Power, Medicine, Biophysics, Geophysics, Theoretical Physics, Astrophysics and Astronomy, Space

Physics and Satellite Communication, Computer Science, Meteorology and other diverse fields of applied Physics. The distinctive feature of the programme is the practical orientation and industrial training to which the students are exposed to ensure a high level of competence and also increase the flexibility of our graduates in fitting into diverse careers and industries

AIM AND OBJECTIVES OF THE PROGRAMME

Our aim is to run a four **(**4)-year full time undergraduate degree programme leading to the award of Bachelor of Science Degree (B.Sc. Honours) in Physics and the objectives of the programme are to:

a. To impact sound knowledge in pure and applied physics that will thoroughly equip students to take advantage of modern scientific advances and contribute meaningfully to global development.
b. To give opportunity to interested students to specialize in any minor areas viz. Electronics, Meteorology, and others as listed under introduction.
c. To produce well grounded and competent physicists with creative and analytical skills to function effectively in diverse world market.
d. To give the necessary foundation knowledge in physics for students to pursue career objectives in other disciplines in the manufacturing, processing or ICT industries.

ENTRY REQUIREMENTS: (UTME & DIRECT ENTRY)

Admission into the Federal University Oye-Ekiti shall be open to candidates with the requisite qualifications and subject to written and/or oral examination as the University may determine. The admission requirements into the undergraduate programme, Department of Physics of the Federal University Oye –Ekiti shall be as follows:

UTME Admission

i. For admission to 100 Level (via UTME), candidates must: obtain five (5) credits at SSCE or GCE O' level or NECO in English language, Mathematics, Physics, Chemistry and Biology or Agricultural Science at not more than 2 sittings and attain acceptable point in UTME in relevant subjects.

Direct Entry Admission

ii. For admission by direct entry (200 Level), candidates shall, in addition to having five (5) credit in SSCE, GCE O' level or NECOobtain at least two (2) A' level passes in physics& mathematics or Applied mathematics subject, or possess ND, NCE, HND, with credit passes, or possess a good first degree in another field as the case may be;
iii. Those who meet the requirements for admission shall be subjected to screening interview to be conducted by the University; and
iv. The University shall not accept transfer students until after at least the first two years of its existence.

PROGRAMME STRUCTURE (REQUIREMENTS FOR GRADUATION)

The Federal University Oye-Ekiti shall require its undergraduate students to take and pass all courses specified and offered, including industrial attachment where applicable, as deemed fit by the Faculty/Department and approved by the senate before graduating from the chosen programme of study. An undergraduate full-time student of the Federal University Oye-Ekiti shall be required to register for a minimum of fifteen (15) credit units and a maximum of twenty-four (24) credit units per semester. The minimum number of units required for graduation and for the completion of class of degree is 169 credit units which must be passed at 100 to 400 levels plus the normal University and Faculty of

science requirements. The minimum pass mark shall be 40% for all courses offered in the Federal University Oye-Ekiti, except in selected professional courses where the pass mark shall be 50%. A student shall repeat a course in which he failed to obtain the minimum pass grade. Other undergraduate graduation requirements are:

i. The Federal University Oye-Ekiti shall award its degrees on the authority of Senate only to students who have been found worthy in character and in learning;
ii. Students shall successfully complete and pass all prescribed examinations for courses required for a degree programme;
iii. Students shall not be involved in gross misconduct, such as, but not limited to: examination malpractice; conviction on felony; other convicted criminal offences; and association with or membership of secret cult or of any organization proscribed by the university or government;
iv. Students shall submit a research project which shall, as much as possible, develop the research skills of students;
v. Students shall be required to complete their studies in not more than one and a half times the normal duration of the programme to qualify for an Honours degree except in cases of ill-health or as determined by Senate;
vi. For a student to be in good academic standing, the student must obtain a minimum cumulative grade point average (CGPA) of 1.0 at the end of each session. A student who fails to do so shall be placed on academic probation. If at the end of the probation year the CGPA still fall below 1.0, such a student shall be asked to withdraw from the programme registered without prejudice to being admitted into another programme in the University;
vii. Students who attain a CGPA of less than 1.0 shall first register their backlog of required courses before they can, within the ceiling of 48 credit units, be allowed to register for other courses;

viii. Students who absent themselves for two consecutive semesters without a valid reason may be asked to withdraw from the University, irrespective of their CGPA;
ix. Students, for good reason and with the approval of Senate and upon recommendation by the Dean, may suspend their programme of study for a maximum of one calendar year; and
x. Students who transfer from one programme to another or from another University may be credited with those course credit units earned which are relevant to the curriculum of the new programme.

Level	Semester	Compulsory courses		Required courses		Electives		Total	
		No. of courses	No. of credit units	No. of courses	No. of credit units	No. of courses	No. of credit units	No. of courses	No. of credit unit
100	First	7	14	3	10	0	0	10	**24**
	Second	8	12	3	10	0	0	9	**22**
200	First	8	19	2	2	0	0	10	**21**
	Second	8	17	3	5	0	0	11	**22**
300	First	6	18	1	3	0	0	7	**21**
	Second	7	17	0	0			7	**17**
400	First	4	12	1	6	2	6	8	**24**
	Second	4	15	-	-	1	3	6	**18**
	TOTAL	**50**	**124**	**13**	**36**	**3**	**9**	**68**	**169**

Grading System and Requirements for Graduation for Programme

The Grading System adopted is as stipulated by the National Universities Commission. Under this system, continuous assessment (including assignments, quizzes and mid-semester tests) accounts for 40% and Examinations 60%:

Description	Grade
Continuous Assessment	40%
Examination	60%
TOTAL	100%

The grading format is as follows:

Measurement of performance: performance in a course is measured in terms of:

a) The result of prescribed theory and practical examination and/or
b) Assessment of such essays, practical exercises and reports prescribed for each course.

The rating of grades (grading system) obtained in a course in terms of credit points per load unit is as follows:

Level of performance	Grade	Rating (credit points per unit)
70-100%	A = Excellent	5.0
60-69%	B = Very Good	4.0
50-59%	C = Good	3.0
45-49%	D = Satisfactory	2.0
40-44%	E = Poor	1.0
0-39%	F = Failure	0.0

Based on the above, a student who obtained a grade of' ‘A' in a 4-unit course will score 20 (4x5) credit points and another who obtained a grade of C will score 12 (3x4) credit points.

A credit point is thus the product of the course units and the rating in each course. The Sum of all credit points for the semester is the Total Credit Point (TCP).

Using the example of a student who took 4 courses of 5 units each and obtained C, B, F, D grades respectively, the TCP will be 5x3 + 5x4 + 5x0 +5x2 = 45. The Grade Point Average (GPA) is the TCP divided by the Total Credit Units (TCU). Hence, this student has a GPA of 45 divided by 20, which is 2.5.

The highest GPA that can be earned is 5.0 and the lowest is 0 (zero). The Cumulative Grade Point Average (CGPA) is the summation of the TCP for all semesters divided by the summation of TCU's for the said semesters. Like the GPA, the CGPA obtained range from 0 to 5. The CGPA is calculated from all courses taken, including First year (i.e. 100 level).

Class Groups

CGPA	**Class**
>=4.5	First Class
>=3.5-4.49	Second Class Upper
>=2.5-3.49	Second Class Lower
>=1.5-2.49	Third Class

Student Admission and Graduation Policy

The minimum entry requirements for admission into Federal University Oye-Ekiti are 'O' Level GCE/SSCE/NECO/NABTEB Credit level passes in five (5) subjects. The five subjects must include English Language, Mathematics, Physics, Chemistry and one of the following: Economics, Agricultural Science, Biology, or Geography. The five credits requirements should be obtained at one or two sittings.

Candidates applying to Federal University Oye-Ekiti are expected to sit for the year JAMB Examinations and attain the prescribed cut-off marks in it. This is a statutory requirement for entry into Nigerian Universities.

However, Federal University Oye-Ekiti conducts screening exercise for all candidates seeking admission into the University and applicants may not be admitted without fulfilling the demands of the screening exercise. Potential students must, in addition to meeting the general admission requirements, also satisfy the faculty and departmental requirements detailed below

Programme	**Admission Requirements**		**Remarks**
	UTME	**Direct Entry**	
Physics	Five Credits at SSCE (or its equivalent) including English, Mathematics, Physics and Chemistry.	Two 'A' level passes in Physics, Mathematics or Chemistry.	UTME subjects are; English, Physics, Mathematics and Chemistry.

To graduate from the 4-year Bachelor of Science (B.Sc.) degree programme in Physics, students must have successfully completed a minimum of 169 Credit Units as shown below. For direct entry, students must have successfully completed a minimum of 123 Credit Units.

Department of Physics Courses

100 LEVEL FIRST SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
GST 101	Communication in English I	C	Nil	2	0	0	2	GST Unit
GST 103	Use of Library & ICT	C	Nil	2	0	0	2	GST Unit
GST 105	Introduction to Entrepreneurship	C	Nil	1	0	0	1	GST Unit
BIO 101	General Biology I	R	Nil	3	0	0	3	Animal & Environmental Biology
BIO 107	Experimental Biology I	R	Nil	0	0	1	1	Animal & Environmental Biology
CHM 101	General Chemistry I	R	Nil	3	0	0	3	Industrial Chemistry
CHM 107	Practical Chemistry I	R	Nil	0	0	1	1	Industrial Chemistry
MTH 101	Elementary Mathematics I	C	Nil	3	0	0	3	Mathematics
CSC 101	Introduction to Computing I	R		2	0	0	2	Computer Science
PHY 101	General Physics I	C	Nil	3	0	0	3	Physics
PHY 103	General Physics III	C	Nil	2	0	0	2	Physics
PHY 107	Experimental Physics I	C	Nil	0	0	1		Physics
	Total Credit Units						**24**	

C- Compulsory, E- Elective, R-Required

100 LEVEL SECOND SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
GST 102	Communication in English II	C	Nil	2	0	0	2	**General Studies**
GST 106	Evaluating Opportunities & Business Concept	C	Nil	1	0	0	1	General Studies
GST 108*	Government, Society and Economy	C	Nil	2	0	0	2	General Studies
GST 110*	African Culture & Civilization	C	Nil	2	0	0	2	General Studies
MTH 102	Elementary Mathematics II	C	Nil	3	0	0		Mathematics
CSC 102	Introduction to Computing II	R	Nil	2	0	0		Computer Science
CHM 102	General Chemistry II	R	Nil	3	0	0		Industrial Chemistry
CHM 108	Practical Chemistry II	R	Nil	0	0	1		Industrial Chemistry
BIO 102	General Biology II	R	Nil	3	0	0		Animal & Environmental Biology
BIO 108	Experimental Biology II	R	Nil	0	0	1		Animal & Environmental Biology
PHY 102	General Physics II	C	Nil	3	0	0		Physics
PHY 108	Experimental Physics II	C	Nil	0	0	1		Physics
	Total Credit Units						**24**	

C- Compulsory, E- Elective, R- Required

***Student can either take GST 108 or 110**

200L FIRST SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
GST 205	Introduction to Philosophy, Logic & Human Existence	**C**	Nil	2	0	0	2	**General Studies**
GST 203	Feasibility Planand InvestmentDecision	C	Nil	1	0	0	1	**General Studies**
MTH 201	Mathematical Method I	C	MTH 101	3	0	0	3	Mathematics
CSC 201	Computer Programming1	R	CSC 101	2	0	0	2	Computer Science
GPY 201	Introduction to Earth Physics	C	Nil	3	0	0	3	Geophysics
PHY 201	Modern Physics & Special Relativity	C	PHY 101	3	0	0	3	Physics
PHY 203	Electric Circuit & Basic Electronics	C	PHY 102	3	0	0	3	Physics
PHY 205	Thermal Physics	C	Nil	3	0	0	3	Physics
PHY 207	Experimental Physics III	C	Nil	0	0	1	1	Physics
	Total Credit Units						**21**	

C- Compulsory, E- Elective, R- Required

200L SECOND SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
GST 202	Peace Studies & Conflict Resolution	**C**	Nil	2	0	0	2	**General Studies**
GST 204	Resources Management and Organizational Behaviour	C	Nil	1	0	0	1	**General Studies**
MTH 202	Elementary Differential Eqn.	C	MTH 102	3	0	0	3	Mathematics
MTH 234	Statistics for Physical Sciences & Engineering	R	Nil	3	0	0	3	Mathematics
CSC 208	Computer Programming II	R	CSC 201	2	0	0	2	Computer Science
PHY 202	Classical Mechanics	C	HY 101	3	0	0	3	Physics
PHY 204	Waves and Optics	C	Nil	3	0	0	3	Physics
PHY 206	Energy & Environment	C	PHY 102	2	0	0	2	Physics
PHY 208	Experimental Physics IV	C	PHY 207	0	0	1	1	Physics
PHY 210	Introduction to Space Science	C	Nil	2	0		2	Physics
	Total Credit Units						**22**	

C- Compulsory, E- Elective, R- Required

300L FIRST SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
MTH 303	Vector and Tensor Analysis	C	MTH 101	3	0	0	3	Mathematics
MTH 305	Complex Analysis I	R	Nil	3	0	0	3	Mathematics
PHY 301	Analytical Mechanics I	C	PHY 202	3	0	0	3	Physics
PHY 303	Electromagnetic theory I	C	PHY 204	3	0	0	3	Physics
PHY 305	Quantum Physics	C	PHY 201	3	0	0	3	Physics
PHY 307	Experimental Physics V	C	Nil	0	0	1	1	Physics
PHY 311	Mathematical Methods in Physics I	C	Nil	3	0	0	3	Physics
PHY 315	Electronics I	C	PHY 203	1	0	1	2	Physics
	Total Credit Units						**21**	

C- Compulsory, E- Elective, R- Required

300L SECOND SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
PHY 302	Analytical Mechanics II	C	PHY 301	3	0	0	3	Physics
PHY 304	Electromagnetic Theory II	C	PHY 303	3	0	0	3	Physics
PHY 306	Statistical & Thermal Physics	C	PHY 205	3	0	0	3	Physics
PHY 320	Workshop Practice	C	Nil	1	0	1	2	Physics
PHY 314	Solid State Physics I	C	Nil	3	0	0	3	Physics
PHY 316	Electronics II	C	Nil	1	0	1	2	Physics
PHY 308	Experimental Physics VI	C	Nil	0	0	1	1	Physics
	Total Credit Units						**17**	

C- Compulsory, E- Elective, R- Required

400L FIRST SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
PHY 401	Quantum Mechanics I	C	PHY 305	3	0	0	3	Physics
PHY 403	Mathematical Methods in Physics II	C	PHY 311	3	0	0	3	Physics
PHY 405	Statistical Physics	C	PHY 306	3	0	0	3	Physics
PHY 407	Computational Physics	C	Nil	3	0	0	3	Physics
PHY 399	Industrial Training (SIWES)	R	Nil	0	0	6	6	Industry
	Total Credit Units						**18**	

C- Compulsory, R- Required

E- Elective, Pick any 6 units from first semesters (2 electives)

PHY 411	Nuclear & Particle Physics I	E	Nil	3	0	0	3	Physics
PHY 415	Radiation Instruments	E	Nil	3	0	0	3	Physics
PHY 417	Aeronomy	E	Nil	3	0	0	3	Physics
PHY 419	Stellar Structure & Evolution	E	Nil	3	0	0	3	Physics
PHY 421	Biophysics I	E	Nil	3	0	0	3	Physics

400L SECOND SEMESTER COURSES

Course Code	Course Title	Status	Pre-req.	L	T	P	Units	Servicing Departments
PHY 402	Quantum Mechanics II	C	PHY 401	3	0	0	3	Physics
PHY 432	Solid State Physics II	C	PHY 314	3	0	0	3	Physics
PHY 424	Atomic & Molecular Spectroscopy	C	Nil	3	0	0	3	Physics
PHY 499	Research Project	C	Nil	0	0	6	6	Physics
	Total Credit Units						**15**	

C- Compulsory,R- Required

E- Elective, Pick any3 units from second semesters (1 elective)

PHY 412	Nuclear & Particle Physics II	E	Nil	3	0	0	3	Physics
PHY 414	Industrial Geophysics	E	Nil	3	0	0	3	Physics
PHY 416	Medical Physics	E	Nil	3	0	0	3	Physics
PHY 418	Meteorology	E	Nil	3	0	0	3	Physics
PHY 420	Modern Cosmology	E	Nil	3	0	0	3	Physics
PHY 422	Biophysics II	E	Nil	3	0	0	3	Physics

COURSE DESCRIPTIONS

DetailedCourseDescription–100Level

PHY 101 GENERAL PHYSICS I: (3 Units) L 30: PO: T 15)

Space and Time, frame of reference, Invariance of physical law, relativity of simultaneity, relativity of time interval, relativity of length, Units and dimension, standard and units, unit consistency and conversions, Kinematics; `displacement, Time, and average velocity, instantaneous velocity, average acceleration, motion with constant acceleration, freely falling bodies, position and velocity vector, acceleration vector, projectile motion, motion in a circle and relative velocity. Vectors: units vectors, addition vectors, products vectors. Fundamental Laws of Mechanics; forces and interaction, Newton's laws of motion, mass and weight. Statics and dynamics: application of Newton's laws, dynamics of particles, frictional forces dynamics of circular motion. Galilean invariance; Universal gravitational; work and energy; Rotational dynamics and angular momentum; Conservation laws.

PHY 102 GENERAL PHYSICS II: (3 Units) L 30: PO: T 15)

Electrostatics; conservation law of electric charges, electrons and electrostatics, Coulomb's law, electric field and forces, electric field line, electric dipoles charged particles in an electric field, charge and electric flux, Gauss's law and its applications, electric potential, electric potential due to a single charge, electric potential due to a dipole, electric potential due to continuous charge distribution equipotential surfaces. Conductors and currents: electric current, resistors and resistance, electric power, capacitors in series and parallel energy storage in capacitors and electric field energy, Gauss's law in dielectrics. Magnetism: magnetic field, magnetic force on a current carry conductor, Ampere's law, Bio-Savart law, electromagnetic induction, inductance, self-inductance, mutual inductance, Maxwell's equations; electromagnetic oscillations and waves; Applications.

PHY 103 GENERAL PHYSICS III (2 Units)
Molecular treatment of properties of matter; elasticity; Hooke's law, Young's shear and bulk moduli, Hydrostatics; Pressure; buoyance, Archimedes' Principles, hydrodynamics; streamline Bernoulli and continuity equations.Turbulence; Reynolds's number; viscosity; laminar flow, Poiseuille's equation.Surface tension; adhesion, cohesion, capillarity, drops and bubbles.Temperature; zeroth law of thermodynamics, heat; gas laws; laws of thermodynamics; kinetic theory of gases. Sound, Applications

PHY 107 EXPERIMENTAL PHYSICS I: (1 Units)
This introductory course emphasizes quantitative measurements, the treatment of measurement errors, and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, etc., covered in PHY 101, PHY 102 and PHY 103.

PHY 108 EXPERIMENTAL PHYSICS II: (1Units)
This introductory course emphasizes quantitative measurements, the treatment of measurement errors, and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, etc., covered in PHY 101, PHY 102 and PHY 103.

PHY 201 MODERN PHYSICS AND SPECIAL RELATIVITY: (3 Units) Pre-requisite -PHY 102
Special Relativity; Defects in Newtonian Mechanics; the speed of light; the Lorentz transformation; transformation of velocities. Experimental basis of quantum theory: Black body radiation; electrons and quanta;

Bohr's theory of atomic structure; De-Broglie hypothesis the uncertainty principle; Schrodinger's equation and simple applications. Galilean transformation and limitation of Newtonian mechanics, constancy of speed of light. Michelson-Morley experiment. Lorentz-Einstein transformations. Space-time diagram event and world. Proper time and time dilation. Proper distance and length contraction. Simultaneity of events, relativistic addition of events. Doppler effect, relativistic kinematics and dynamics, mass-energy equivalence, four vectors, space time and energy-momentum, invariants, relativity and electric & magnetic fields. Invariance of Maxwell equation.

PHY 202 CLASSICAL MECHANICS: (3 Units) Pre-requisites PHY 101

Newtonian Mechanics; motion of a particle in one, two and three dimensions; systems of particles and collision theory; Newtonian gravitation; conservative forces and potentials, oscillations, central force problems; accelerated frames of reference; rigid body dynamics; generalized motion; mechanics of continuous media.

PHY 203 ELECTRIC CIRCUITS AND BASIC ELECTRONICS; (3 Units) Pre-requisite -PHY 102

D.C. Circuits; Kirchhoff’s Laws, sources of eddy current, A.C. Circuits. Inductance, capacitance, the transformer, sinusoidal waveforms runs and peak values, power, impedance and admittance series, RLC circuit, Q factor, resonance, Network analysis and circuit theorems, filters. Electronics; semiconductors, the pn-junction, field effect transistors, bipolar transistors, Characteristics and equivalent circuits, amplifiers, feedback, oscillators.

PHY 204 WAVES AND OPTICS: (3 Units) Pre-requisites -PHY 101, PHY 102, and MTH 102

Wave phenomena; Acoustical waves; the harmonic oscillator; damped oscillator; forced oscillation; resonance; equations of simple harmonics oscillation; waves on a string; waves in pipes; closed and opened pipes; end correction. Energy in wave motion; longitudinal waves; standing waves; group and phase velocity; Doppler effect; Physical Optics; Spherical waves; interference and diffraction, thin films; Diffraction; Franhhofer diffraction, crystal diffraction, holography; dispersion and scattering. Geometrical Optics; Waves and rays; reflection at a spherical surface, thin lenses, optical lenses; mirrors and prisms.

PHY 205 THERMAL PHYSICS: (3 Units) Pre- requisites -PHY 103
The Foundations of classical thermodynamics including the Zeroth and definition of temperature; the first law, work heat and internal energy; Carrot cycles and the second law; entropy and irreversibility, thermodynamic potentials and the Maxwell relations. Application: Qualitative discussion of phase transitions: third law of thermodynamics; ideal and real gases. Elementary kinetic theory of gases including Boltzman couting, Maxwell-Boltzman Law of distribution of velocities, simple applications of the distribution law.

PHY 206 ENERGY & ENVIRONMENT: (2 Units)
Energy and Power: Principles, demands and outlook; transformation of energy and its costs; thermal pollution; electrical energy from fossil fuels; hydroelectric generation: Principles and problems. Costs, capacity, storage, reserves, efficiency, new environmental effects. Electrical energy from nuclear, reactors; energy in the future breeder reactors; fusion power, solar power, geothermal power, tidal power, etc. Principle, prospects and problems: Energy terminology and concept; energy in surroundings, kinds of energy and its conversion, mechanical energy, electrical energy, waves energy, thermal energy. Energy use; alternative energy: wind energy, biomass, solar energy, nuclear energy, and energy from the oceans, Energy efficiency, saving energy, renewable and non-

renewable energy, energy conservation and energy crisis. Relationship between energy and environment, the element which gives an effect to living things; temperature, light, water, ecology and adaptation; hospitable environment, ecology and ecological equilibrium, pollution, preservation of environment. Pollution problems, mechanism about pollution as biological magnification, avid rain, greenhouse effect.
Lectures (15)/Excursions

PHY 207 EXPERIMENTAL PHYSICS III: (1 Units) Pre-requisite - PHY 107

The laboratory course consists of a group of experiments drawn from diverse areas of Physics (Optics, Electromagnetism, Mechanics, Modern Physics, etc.) It is accompanied by seminar studies of standard experimental technique and the analyses of famous and challenging experiments.

PHY 208 EXPERIMENTAL PHYSICS IIV: (1 Units) Pre-requisite -PHY108

The laboratory course consists of a group of experiments drawn from diverse areas of Physics (Optics, Electromagnetism, Mechanics, Modern Physics, etc.) It is accompanied by seminar studies of standard experimental technique and the analyses of famous and challenging experiments.

GPY 201 EARTH PHYSICS: (2 Units)

Origin, shape, structure and major divisions of the earth. The Earth's main magnetic field and its distribution. Electrical theory of the earth's core and origin of the magnetic field, seafloor spreading, continental drift and plate tectonics.

PHY 210 INTRODUCTION TO SPACE SCIENCE: (2 Units)
Introduction to Astronomy and Astrophysics, Satellite Communication, Introduction to atmospheric Science, Space Environment, Space craft systems and Dynamics, Aero/Astrodynamic Engineering, Rocket Engineering, Cosmology, Origin of universe and life, Space Law and Business development.

PHY 301 ANALYTICAL MECHANICS II: (3 Units) Pre-requisite - PHY 301
Degrees of freedom; Generalized coordinates and constraint, work and potential energy. Lagrange's formulation of mechanics and applications. The Calculus of variations and the action principle. Hamilton's formulation of mechanics and application. Hamilton-Jacobi equation and waves constant action, free space application. Invariance and conservation laws. Oscillatory systems, including damped, forced and coupled oscillations; Normal modes stability and normal modes of vibration.

PHY 303 ELECTROMAGNETIC THEORY I: (3 Units) Pre-requisites -PHY 201 and MTH 204
Field: Vector and scalar field, Electrostatics and magnetostatics, Electric field; electric field due to a line displacement and displacement density. Coulomb’s law, electric potential, potential due to distribution of charges, electric potential due to a dipole, earth’s potential, equipotential surfaces, electric properties of materials. Gauss’s law. Laplace's equation and boundary value problems; Multiple expansions, dielectric and magnetic materials. Faraday's law. Motional emf, electromagnetic induction, Biot-Savart law, Ampere’s law. Energy in magnetic field. A.C. Circuits. Lorentz covariance and special relativity. Maxwell's equations.

PHY 304 ELECTROMAGNETIC THEORY II: (3 Units) Pre-requisite -PHY 303 Maxwell's equations and electromagnetic potentials. Implications of Maxwell equations. The wave equation. Propagation of plane waves. Reflection and refraction. Conductor and dielectrics, plane waves in conducting medium, plane waves in perfect dielectric with small loss, propagation in good conductor, pointing vector, skin or penetration depth. Transmission lines, wave's guides and resonant cavities; Radiation, Geometrical optics, Interference of waves. Diffraction. Transmission line classification: lobbless line, low-less line, low frequency line, high frequency line, distortionless lines. Phase and group delay.

PHY 305 QUANTUM PHYSICS: (3 Units) Pre-requisite-PHY201
Wave-particle duality and the Uncertainty Principle; basic principles of the quantum theory; the time dependent and time independent Schrödinger equation, application of Schrodinger equation to free particle, particle in finite and infinite potential well, three dimensional box and its application, energy levels in potential wells; reflection and transmission of potential barriers; finite potential barrier and their applications. The simple harmonic oscillator and its applications. Atomic and molecular structure and reactions, fission and fusion; magnetic resonance; elementary particles.

PHY 306 STATISTICAL AND THERMAL PHYSICS (3 UNITS) PRE-REQUISITE: PHY 205
Thermodynamic systems, thermodynamic potentials, free expansion of gases and throttling process, phase transition, low temperature physics, statistical ensemble, probability, microstates and macrostates statistical mechanics, Boltzmann distribution, Curies law, partition function, systems in contact with a heat reservoir.

PHY 307 EXPERIMENTAL PHYSICS V: (1Units) Pre-requisite-PHY207/208

A year-long series of mini courses on important experimental techniques. Topics covered include electronics, optics, electricity, atomic, molecular nuclear and low temperature physics, statistics and data handling and scientific writing.

PHY 311 MATHEMATICAL METHODS IN PHYSICS I: (3 Units) **Pre-requisites -MTH 202, MTH 204**

Linear Algebra and Functional Analysis; Transformations in linear vector spaces and matrix theory. Hilbert space and complete sets of orthogonal functions. Special Functions of Mathematical Physics. The gamma function; hypergeometric functions; Legendre functions; Bessel functions. Hermite and Laguerre function, The Dirac Delta function

PHY 314 SOLID STATE PHYSICS I Pre-requisite: PHY 202 (3 units)

Crystalline state, two and three dimensional lattice types, crystal structures, Lattice defects, binding forces in solids, bulk modulus, ionic crystals, lattice vibrations, thermal properties of solids, Einstein and Debye theories of heat, capacity of solids, Fermi-Dirac distribution function, electrical and thermal conductivity of metals.

PHY 315 ELECTRONICS I Pre-requisite: PHY 203 (2 units)

Junction diodes, power supplies, network analysis, junction transistor, common emitter amplifier, feedback and operational amplifiers, filters, oscillators.

PHY 316 ELECTRONICS II Pre-requisite: PHY 315 (2 units)

Field effect transistor, transistor as voltage switch, basic switching circuits, monostable and bistable multivibrator circuits, binary divider

(Ecclees-Jordan circuit).Schmitt trigger, astable multivibrator, current switching FET as a gate, choppers, phase sensitive detetion.

PHY 320: WORKSHOP PRACTICE
Soldering, Welding, measurements of length, angles, shapes, hand and machine tools, carpentry, workshop health and safety.

PHY 399 INDUSTRIAL TRAINING (SIWES) (6 UNITS)
All B. Sc. Degree in Physics must undergo a minimum of six months Industrial Training with a minimum of 3 credits units. Students should be assessed using the Log Book, a report and a seminar.

PHY 401 QUANTUM MECHANICS I: (3 Units) Pre-requisites - PHY 305 and MTH 202
The formulation of quantum mechanics in terms of state vectors and linear operators. Three-dimensional spherically symmetric potentials. The theory of angular momentum and spin. Identical particles and the exclusion principle. Methods of approximation. Multielectron atoms.

PHY 402 QUANTUM MECHANICS II: (3 Units) Pre-requisites - PHY 401 and MTH 202.
Time-independent and time-dependent perturbation theory. Scattering theory: elastic potential scattering; Green's function and partial wave methods. Selected phenomena from each of atomic physics, molecular physics, solid-state physics, and nuclear physics are described and then interpreted using quantum mechanical models.

PHY 403 MATHEMATICAL METHODS IN PHYSICS II: (3 Units) Pre-requisites- MTH 202, PHY 403, MTH 204
Integral Transforms and Fourier Series: Fourier series and fourier transforms; Laplace transform. Applications of transform methods to the solution of elementary differential equations of interest in physics and

engineering. Partial Differential Equations: Solution of boundary value problems of partial differential equations by various methods which include: Separation of variables, the method of integral transforms. Sturm-Liouville theory; Uniqueness of solutions. Calculus of residues and applications to evaluation of integrals and summation of series. Applications to various physical situations, which may include - electromagnetic theory, quantum theory, diffusion phenomena.

PHY 405 STATISTICAL PHYSICS: (3 Units) Pre-requisites -PHY 103 and PHY 305

Basic concept of statistical mechanics; microscopic basis of thermodynamics and applications to macroscopic systems, equilibrium of an isolated system and system in heat bath, perfect classical gas, probability theory, quantum mechanics ensemble, velocity distribution, identical particles and symmetry requirements, grand canonical ensemble, phase space, Femi Dirac distribution function, application of Femi Dirac statistics, Femi energy, Bose-Einstein distribution function, condensed states, phase transformations, quantum distributions; elementary kinetic theory of transport processes, fluctuation phenomena. Applications.

PHY 407 COMPUTATIONAL PHYSICS; (3 Units) Pre-requisite – MTH 201

Use of numerical methods such as Trapezoidal rule, Gaussian quadrature linear interpolation, Finite difference, self-consist solution of some problems in Physics, various methods of numerical integration, differentiation, Finite difference approximation. Numerical solutions of some differential equations in physics, Statistical analysis of experimental data, Concept of error and statistical analysis in Physics. Computer programming in Fortran, Basic and Visual Basic.

PHY 411 NUCLEAR AND PARTICLE PHYSICS I: (3 Units) Pre-requisite -PHY 305

Nuclear structure: Nuclear properties, nuclear size, nuclear masses; Nuclear forces, nuclear -nucleon scattering; the deuteron, Nuclear models. Radio-active Decay: Alpha, beta, gamma decays, Nuclear reactions.

PHY 412 NUCLEAR AND PARTICLE PHYSICS II: (3 Units) Pre-requisite -PHY 411

Nuclear Instrumentations and radiation detection techniques; detectors. Nuclear spectroscopy. Neutron physics: Production and detection of neutrons. Fission and fussion, Nuclear reactor and nuclear energy. Elementary particles: Conservation laws, particle classification. Strong, Electromagnetic and weak interactions. Resonances.

PHY 414 INDUSTRIAL GEOPHYSICS (3 Units)

Seismic, gravitational, magnetic/electrical induced polarization, protecting for economic minerals, solution of civil engineering problems.

PHY 415 RADIATION INSTRUMENTS (3 Units)

Ionization Chamber, Geigercounter, scinctillation counter, X-ray equipment, Solid state detectors, Gammer ray Cameras.

PHY 416 MEDICAL PHYSICS (3 Units)

Production of Isotopes, nuclear scanning and tracers, Nuclear magnetic resonance) Interaction of Radiation with matter, (X-ray and gammar rays, Thomson scattering photoelectric effect, Compton scattering, pair production, attenuation.

PHY 417 AERONOMY (3 Units)

Composition of atmosphere, solar terrestrial interactions magnetic fields and storms

PHY 418 METEOROLOGY (3 Units)
Meteorological parameters and their measurement temperature, pressure, wind etc. Weather and climate.

PHY 419 STELLAR STRUCTURE AND EVOLUTION (3 Units)
Hydrostatic and thermal equilibrium, Energy transport, stellar models

PHY 420: MODERN COSMOLOGY AND HIGH ENERGY ASTROPHYSICS (3 Units)
Hubble's law, gravity, Luminosity and redshift, High energy particles, cosmic rays, solar wind shock waves, supernovae, neutron stars, pulsars.

PHY 421 BIOPHYSICS I (3 Units)
Ionization of bio-molecules, Thermodynamic Principles Energy transfer in living systems Bioelectricity -ion channels, action potentials nerve impulse transmission. Study of the electric cell.

PHY 422 BIOPHYSICS II (3 Units)
Optics of the eye, photo energy transduction in vision, sound waves receive and the ear learning aids, Human voice, Ultrasound/applications Fluid flow and viscosity applications blood pressure, osmotic pressure, centrifugation, surface tension and applications.

PHY 424 ATOMIC AND MOLECULAR SPECTROSCOPY: (3 Units) Pre-requisite -PHY 201.
The hydrogen atom, relativistic effects and spin. Identical particles and symmetry. Many electron atoms. Coupling schemes and vector model,Zeeman effects,Stack effects, Hyperfine structure. The diatomic molecule; the Frank-Condon principle. X-ray diffraction. Microwave methods. Resonance phenomena; ESR, NMR, and optical pumping and Mossbauer scattering.

PHY 432 SOLID STATE PHYSICS II: (3 Units) Pre-requisite - PHY 314

Wave equation of electron in a periodic potential, band theory of metals, semiconductors and insulators, introduction to electrical, magnetic and optical properties of materials, superconductivity, Introduction to dielectric properties of materials.

PHY 499 SUPERVISED INDIVIDUAL RESEARCH: (6 Units)

The course offers students the opportunity to do research in contemporary physics and under the supervision of staff. A detailed report on the research is presented by the students when the project is completed.

Correction of Results

Results are only corrected after the Senate has given approval. The HOD collects and collates students result complaints form through the departmental level advisers. The lecturer is required to enter the corrections on the Student Result Complaint Form and the HOD, the Dean of Faculty and the Senate Examination Committee must endorse the student result correction, in writing, before it is updated on the student database.

Academic Atmosphere

Academic atmosphere is cordial and encourages freedom of expression.

STAFF PROFILE

S/N	NAME	STAFF NO	RANK/DESIG NATION	SEX	*QUALIFICATION*	AREA OF SPE-CIALIZATION	Other Duties	REMARKS
Academic Staff								
1	Olubosede O. (Ph.D.)	SS1018	Senior Lecturer	M	*B.Tech. (Akure), M.Sc. (BENIN), Ph.D (Akure)*	Condensed Matter Physics	Ag. HOD	Tenure
2	Prof. Osazuwa I.B		Professor	M	*B.Sc M.Sc Ph.D*	Earth Physics		Associate
3	Prof. Mrs Akintayo C.O		Professor		*B.Sc, M.Sc , Ph.D (Ado)*	Industrial Chemistry		Associate
4.	Prof. Ojelabi Mathew F	SS0928	Professor	F	*B.Sc (Ado), M.Sc (Ibadan), Ph.D (Benin),*	Theoretical Physics		On Adjunct
5.	Prof. Mukolu I.A	SS1266	Professor	M	*B.Sc (Benin), M.Sc. Ph.D (Ibadan),*	Condensed Matter Physics		On Adjunct
6.	ODO E.A (Ph.D.)	SS1059	Senior Lecturer	M	*B.Sc. (Ife), M.Tech. (Akure), Ph.D.. (Cape Town)*	Condensed Matter Physics		Tenure
7	Dr Hammed O.S	SS1209	Senior Lecturer	M	*B.Tech (Ogbomosho), M. Sc. Ph.D (Ibadan),*	Solid Earth Physics	NAPS student Adviser	

8.	Oketayo O.O. (Ph.D.)	SS0699	Senior Lecturer	M	*B.Sc. (UNAAB), M.Sc., Ph.D. (Ife)*	Health &Environmental Physics	Science Journal Editor	Tenure
9.	Dr W.N Igboama	SS1260	Lecturer I	M	*B.Sc (Enugu), M.Sc , Ph.D (Ibadan)*	Solid Earth Physics	Seminar Coordinator	Tenure
10	Dr Oluwadare O. J.	SS0351	Lecturer II	M	*B.Sc. (Ed.), M.Sc. Ph.D (Ilorin), MNIM*	Theoretical Physics	Time table / Accreditation Committee	Tenure
11	Dr Abe O.E.	SS0350	Assistant Lecturer	M	*B.Sc. (Ago Iwoye), M.Tech. Ph.D (Futa)*	Space / Ionospheric Physics	100 Level Adviser	Tenure
12	Dr Ibiyemi A.A	SS1264	Lecturer II	M	*B.Sc., M.Sc , Ph.D (Lautech)*	Solid State Physics	Departmental secretary	Tenure
13.	Mrs Ezeh Chioma Vivian	SS0956	Assistant Lecturer	F	*B.Sc. (Nsukka) M.Sc (Sheffield, UK)*	Material Science	400 Level coordinator	Tenure
Non-Teaching Staff								
14	Ige M. O.	SS0659	Admin. Officer II	M	*B.Sc.Ed.(Nssukka)*			Tenure
15	Adesuyi O.T	SS0144	Admin. Officer II	F	*B.Sc Ed (Ado)*			Tenure
16	Opaluwa Achenyo P	SS0187	Executive Officer	F	*ND*			Tenure
17	Owoeye J.E	SS0031	SCO	F	*SSCE*			Tenure

Technical Staff								
18.	Asadu C. K.	SS0206	Technologist II	F	*B.Sc. (Nssukka), NATT*			Tenure
19.	Babafemi. O.D	SS0211	Technologist II	M	*HND (Offa), NILST*			Tenure
20.	Adeniyi M.T	SS0220	Technologist II	F	*HND (Ede), NILST*			Tenure
21.	OmokeE P.	SS0391	Technologist II	M	*B.Sc.(Ekpoma), PGDE (Ado), NATT*			Tenure
22.	Rotimi D.O	SS0462	Technologist II	M	*B.Sc.Ed. (Ado), NATT*			Tenure
23.	Bolaji E. A.	SS0632	Technologist II	M	*B.Sc. (Ado), NATT*			Tenure
24.	Oluwatimilehin S.O	SS1105	Technologist II	M	*OND, HND (Akure) (NILST)*			Tenure
25	Olaoye A.S	SS1104	Technologist II	M	*B.Sc. (Ado), NILST*			Tenure
26.	Olowolagba T. A.	JS0206	Lab Assistant	M	*SSCE (Aramoko)*			Tenure
27.	Shittu B.M	JS0281	Lab Assistant	M	*OND (Ibadan)*			Tenure