Andhra Pradesh State Council of Higher Education : Hyderabad

Foundation Courses under CBCS; Revised Syllabi

For All Degree Programmes

w.e.f. 2015-16 (Revised in May 2016)

As a part of curriculum upgradation, Semester and CBCS systems were introduced in all affiliated colleges in Andhra Pradesh from 2015-16. As an effective part of the overall curriculum, Foundation Courses were introduced with an aim to prepare students in the required basic skills and values in diverse areas. Hence, courses covering a broad spectrum were introduced. The following are the revised syllabi of the ten Foundation Courses, each with 30 teaching hours per semester and worth 2 credits. They were spread in the first four semesters.

Sno	Foundation Course	Sem	Hrs/ Week	Total Hrs	Credits	Marks
1	Human Values and Professional Ethics	I	2	30	2	50
2	Environmental Studies	I	2	30	2	50
3	Information and Communication Technology (ICT) – 1	II	2	30	2	50
4	Communication and Soft Skills (CSS)-1	II	2	30	2	50
5	Information and Communication Technology (ICT) – 2	III	2	30	2	50
6	Communication and Soft Skills (CSS)-2	III	2	30	2	50
7	Communication and Soft Skills (CSS)-3	IV	2	30	2	50
8	Analytical Skills	IV	2	30	2	50
9	Entrepreneurship	IV	2	30	2	50
10	Leadership Education	IV	2	30	2	50

The objective of the foundation courses is to create awareness among students and train them in the skills of the course concerned. Hence, teaching learning may be focused, and limited to the hours prescribed.

Foundation Course – 1

I. HUMAN VALUES AND PROFESSIONAL ETHICS
Common for BA/BCom/BSc/BBA/BCA Programmes

I Semester (Total 30 Hrs)

Unit-I : Introduction to Value Education

1. Value Education, Definition, Concept and Need for Value Education
2. The Content and Process of Value Education
3. Self-Exploration as a means of Value Education
4. Happiness and Prosperity as parts of Value Education

Unit-II : Harmony in the Human Being

1. Human Being is more than just the Body
2. Harmony of the Self ('I') with the Body
3. Understanding Myself as Co-existence of the Self and the Body
4. Understanding Needs of the Self and the Needs of the Body

Unit-III : Harmony in the Family and Society and Harmony in the Nature

1. Family as a basic unit of Human Interaction and Values in Relationships
2. The Basics for respect and today's Crisis : Affection, Care, Guidance, Reverence, Glory, Gratitude and Love
3. Comprehensive Human Goal : The Five dimensions of Human Endeavour

Unit-IV : Social Ethics

1. The Basics for Ethical Human conduct
2. Defects in Ethical Human Conduct
3. Holistic Alternative and Universal order
4. Universal Human Order and Ethical Conduct

Unit-V : Professional Ethics

1. Value Based Life and Profession
2. Professional Ethics and Right Understanding
3. Competence in Professional Ethics
4. Issues in Professional Ethics – The Current scenario
5. Vision for Holistic Technologies, Production System and Management Models

Reference Books :

1. A.N.Tripaty, Human Values, New Age International Publishers, 2003
2. Bajpai.B.L., Indian Ethos and Modern Management, New Royal Book Co., Lucknow, Reprinted, 2004
3. Bertrand Russell, Human Society in Ethics and Politics
4. Corliss Lamont, Philosophy of Humanism
5. Gaur.R.R., Sangal.R, Bagaria.G.P., A Foundation Course in Value Education, Excel Books, 2009
6. Gaur.R.R., Sangal.R, Bagaria.G.P., Teacher's Manual, Excel Books, 2009
7. I.C.Sharma, Ethical Philosophy of India, Nagin & Co., Julundhar
8. Mortimer.J.Adler, What Man has Made of Man
9. R.Subramanian, Professional Ethics, Oxford University Press
10. Text Book for Intermediate Ethics and Human Values, Board of Intermediate Education & Telugu Academy, Hyderabad
11. William Lilly, Introduction to Ethics, Allied Publishers

Foundation Course – 2

ENVIRONMENTAL STUDIES

Common for BA/BCom/BSc/BBA/BCA Programmes

Semester – I (Total 30 Hours)

Unit-I : Natural Resources: 6 Hrs

Definition, scope and importance. Need for public awareness.
Brief description of;

- Forest recourses: Use and over-exploitation. Deforestation; timber extraction, mining, dams. Effect of deforestation environment and tribal people
- Water resources: Use and over–utilization. Effects of over utilisation of surface and ground water. Floods, drought.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- Food resources: World food problems, Effects of modern agriculture; fertilizer-pesticide, salinity problems.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- Land resources: Land as resources, land degradation, man induced landslides, soil erosion and desertification

Unit-II : Ecosystems, Biodiversity and its conservation 6 Hrs

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Food chains, food webs and ecological pyramids
- Characteristic features of the following ecosystems:-

Forest ecosystem, Desert ecosystem, Aquatic ecosystem.

- Value of biodiversity: Consumptive use, productive use. Biodiversity in India.
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity

Unit-III : Environmental Pollution 6 Hrs

- Definition
- Causes, effects and control measures of :-
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Noise pollution
- Solid waste management; Measures for safe urban and industrial waste disposal
- Role of individual in prevention of pollution
- Disaster management: Drought, floods and cyclones

Unit-IV : Social Issues and the Environment **6 Hrs**

- From Unsustainable to Sustainable development
- Water conservation, rain water harvesting, watershed management.
- Climate change, global warming, ozone layer depletion,
- Environment protection Act
- Wildlife Protection Act, Forest Conservation Act

Unit-V : Human Population and the Environment **6 Hrs**

- Population explosion, impact on environment.
- Family welfare Programme
- Environment and human health
- Women and Child Welfare
- Value Education
- Role of Information Technology in Environment and humanhealth.

Reference Books :

1. Environmental Studies by Dr.M.Satyanarayana, Dr.M.V.R.K.Narasimhacharyulu, Dr.G. Rambabu and Dr.V.VivekaVardhani, Published by Telugu Academy, Hyderabad.
2. Environmental Studies by R.C.Sharma, Gurbir Sangha, published by Kalyani Publishers.
3. Environmental Studies by Purnima Smarath, published by Kalyani Publishers.

Andhra Pradesh State Council of Higher Education

B.Sc. Chemistry Syllabus under CBCS

w.e.f. 2015-16 (revised in April 2016)

Structure of Chemistry Syllabus Under CBCS

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Inorganic and Organic	100	03
			Practical – I	50	02
	II	II	Physical and General Chemistry	100	03
			Practical – II	50	02
II	III	III	Inorganic and organic	100	03
			Practical – III	50	02
	IV	IV	Spectroscopy and Physical	100	03
			Practical – IV	50	02
III	V	V	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – V	50	02
		VI	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – VI	50	02
	* Any one Paper from VII A, B and C ** Any one cluster from VIII, A, B and C	VII (A)*	Elective	100	03
			Practical - VII A	50	02
		VII (B)*	Elective	100	03
			Practical - VII B	50	02
		VII (C)*	Elective	100	03
			Practical - VII C	50	02
		VIII (A)**	**Cluster Electives - I :** VIII-A-1	100 100	03 03
		VIII (B)**	**Cluster Electives - II ::** VIII-B-1	100 100	03 03
		VIII (C)**	**Cluster Electives - III ::** VIII-C-1	100 100	03 03

SEMESTER-VI

ELECTIVE PAPER – VII-(B) : ENVIRONMENTAL CHEMISTRY

45 hrs (3 h / w)

UNIT-I

Introduction **9h**

Concept of Environmental chemistry-Scope and importance of environment in now a days – Nomenclature of environmental chemistry – Segments of environment - Natural resources – Renewable Resources – Solar and biomass energy and Nonrenewable resources – Thermal power and atomic energy – Reactions of atmospheric oxygen and Hydrological cycle.

UNIT-II

Air Pollution **9h**

Definition – Sources of air pollution – Classification of air pollution – Acid rain – Photochemical smog – Green house effect – Formation and depletion of ozone – Bhopal gas disaster – Controlling methods of air pollution.

UNIT-III

Water pollution **9h**

Unique physical and chemical properties of water – water quality and criteria for finding of water quality – Dissolved oxygen – BOD, COD, Suspended solids, total dissolved solids, alkalinity – Hardness of water – Methods to convert temporary hard water into soft water – Methods to convert permanent hard water into soft water – eutrophication and its effects – principal wastage treatment – Industrial waste water treatment.

UNIT-IV

Chemical Toxicology **9h**

Toxic chemicals in the environment – effects of toxic chemicals – cyanide and its toxic effects – pesticides and its biochemical effects – toxicity of lead, mercury, arsenic and cadmium.

UNIT-V

Ecosystem and biodiversity

9h

Ecosystem

Concepts – structure – Functions and types of ecosystem – Abiotic and biotic components – Energy flow and Energy dynamics of ecosystem – Food chains – Food web – Tropic levels – Biogeochemical cycles (carbon, nitrogen and phosporus)

Biodiversity

Definition – level and types of biodiversity – concept - significance – magnitude and distribution of biodiversity – trends - biogeographical classification of india – biodiversity at national, global and regional level.

List of Reference books

1. Fundamentals of ecology by M.C.Dash

2. A Text book of Environmental chemistry by W. Moore and F.A. Moore

3. Environmental Chemistry by Samir k. Banerji

SEMESTER-VI

ELECTIVE PAPER – VII-(C) GREEN CHEMISTRY

45 hrs (3 h / w)

UNIT-I **10h**

Green Chemistry: Introduction- Definition of green Chemistry, need of green chemistry, basic principles of green chemistry. Green synthesis- Evalution of the type of the reaction i) Rearrangements (100% atom economic), ii) Addition reaction (100% atom economic). Organic reactions by Sonication method: apparatus required examples of sonochemical reactions (Heck, Hundsdiecker and Wittig reactions).

UNIT-II **10h**

Selection of solvent: i) Aqueous phase reactions ii) Reactions in ionic liquids, Heckreaction, Suzuki reactions, epoxidation. iii) Solid supported synthesis

Super critical CO_2: Preparation, properties and applications, (decaffeination, dry cleaning)

UNIT-III **10h**

Microwave and Ultrasound assisted green synthesis: Apparatus required, examples of MAOS (synthesis of fused anthro quinones, Leukart reductive amination of ketones) - Advantages and disadvantages of MAOS. Aldol condensation-Cannizzaro reaction-Diels-Alder reactions-Strecker's synthesis

UNIT-IV **5h**

Green catalysis: Heterogeneous catalysis, use of zeolites, silica, alumina, supported

UNIT V **10h**

Examples of green synthesis / reactions and some real world cases: 1. Green synthesis of the following compounds: adipic acid , catechol , disodium imino di acetate (alternative Strecker's synthesis) 2. Microwave assisted reaction in water – Hoffmann elimination – methyl benzoate to benzoic acid – oxidation of toluene and alcohols – microwave assisted reactions in organic solvents. Diels-Alder reactions and decarboxylation reaction. 3. Ultrasound assisted reactions – sonochemical Simmons –Smith reaction(ultrasonic alternative to iodine)

Reference books:

1. Green Chemistry Theory and Practice. P.T.Anatas and J.C. Warner
2. Green Chemistry V.K. Ahluwalia Narosa, New Delhi.
3. Real world cases in Green Chemistry M.C. Cann and M.E. Connelly

4. Green Chemistry: Introductory Text M.Lancaster: Royal Society of Chemistry (London)
5. Green Chemistry: Introductory Text, M.Lancaster
6. Principles and practice of heterogeneous catalysis, Thomas J.M., Thomas W.J., John Wiley

7. Green Chemistry: Environmental friendly alternatives R S Sanghli and M.M.Srivastava, Narosa Publications

LABORATORY COURSE – VII
GREEN CHEMISTRY

Practical Paper – Elective VII C (at the end of semester VI) 30 hrs (2 h/W)

1. Determination of specific reaction rate of hydrolysis for methyl acetate catalysed by hydrogen ion at room temperature.

2. Determination of molecular status and partition coefficient of benzoicacidin Benzene and water.

3. Surface tension and viscosity of liquids.

4. Adsorption of acetic acid on animal charcoal, verification of Freundlisch isotherm.

Andhra Pradesh State Council of Higher Education

Curriculum of B.Sc Botany under CBCS

w.e.f. 2015-16 (Revised in April, 2016)

Year	*Semester*	*Paper*	*Title*	*Hours*	*Marks*	*Credits*
I	**I**	**I**	Microbial Diversity , Algae and Fungi	**4**	**100**	**03**
			Practical –I	**2**	**50**	**02**
	II	**II**	Diversity Of Archaegoniates & Anatomy	**4**	**100**	**03**
			Practical –II	**2**	**50**	**02**
II	**III**	**III**	Plant taxonomy &Embryology	**4**	**100**	**03**
			Practical –III	**2**	**50**	**02**
	IV	**IV**	Plant physiology & Metabolism	**4**	**100**	**03**
			Practical –IV	**2**	**50**	**02**
III	**V**	**V**	Cell Biology, Genetics &Plant breeding	**3**	**100**	**03**
			Practical –V	**2**	**50**	**02**
		VI	Plant Ecology & Phytogeography	**3**	**100**	**03**
			Practical –VI	**2**	**50**	**02**
	*Any one paper from (A), (B) and (C) can be selected **VI** **Any one cluster (Set of Three Papers) from VIII-A or VIII-B can be selected	**VII (A)***	Elective	**3**	**100**	**03**
			Lab	**2**	**50**	**02**
		VII (B)*	Elective			
			Lab			
		VII (C)*	Elective			
			Lab			
		** **VIII-A**	**Cluster Elective-A** **VIII-A-1** **VIII-A-2** **VIII-A-3** **Or**	**3** **3** **3** **2** **2** **2**	**100** **100** **100** **50** **50** **50**	**03** **03** **03** **02** **02** **02**
		** **VIII-B**	**Cluster Elective-B** **VIII-B-1** **VIII-B-2** **VIII-B-3**			

III B. Sc - SEMESTER- V: BOTANY SYLLABUS

PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY

Total hours of teaching 60 hrs @ 3 hrs per week

UNIT – I. Elements of Ecology (12 hrs)

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

UNIT– II. Ecosystem Ecology (12 hrs)

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

UNIT – II Population &Community Ecology (12 hrs)

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover,life forms, competition.
3. Interaction between plants growing in a community.

UNIT – IV Phytogeography (12 hrs)

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

UNIT- V: Plant Biodiversity and its importance (12 hrs)

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (*In-situ* and *ex-situ* methods).
4. Seed banks - conservation of genetic resources and their importance

Suggested activity: Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.

Books for Reference:

1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York
2. Puri, .G.S. (1960): Indian Forest Ecology (Vol.I & II) Oxford Book Co., New Delhi &Calcutta.
3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.
4. Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta
5. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders & Co., Philadelphia &Natraj Publishers, Dehradun.
6. Odum E.P. (1975): Ecology By Holt, Rinert & Winston.
7. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.
8. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.,
9. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., NewDelhi.
10. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing Co Ltd. New Delhi.
10. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K.
11. Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). CambridgeUniversity Press, U.K.
12. Cain, S.A . (1944): Foundations of Plant Geography Harper & Brothers, N.Y.
13. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque

Good, R. (1997): The Geography of flowering Plants (2nd Edn.) Longmans

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Andhra Pradesh State Council of Higher Education

B.Sc. PHYSICS SYLLUBUS UNDER CBCS

w.e.f. 2015-16 (Revised in April 2016)

First Semester
Paper I : Mechanics& Properties of Matter
Practical I (Lab-1)

Second Semester
Paper II: Waves & Oscillations
Practical 2 (Lab2)

Third Semester
Paper III: Wave Optics
Practical 3.(Lab 3)

Fourth Semester
Paper IV: Thermodynamics & Radiation Physics
Practical 4.(Lab 4)

Fifth Semester
Paper V: Electricity, Magnetism& Electronics
Paper VI: Modern Physics
Practical 5.(Lab 5)
Practical 6.(Lab 6)

Sixth Semester
PaperVII:Elective (One)
Paper VIII:Cluster Electives (Three)
Practical 7(Lab 7)
Practical 8.(Lab 8)

Proposed Electives in Semester - VI

Paper – VII (one elective is to be chosen from the following0
Paper VII-(A): Analog and Digital Electronics
Paper VII-(B): Materials Science
Paper VII-(C): Renewable Energy
Paper – VIII (one cluster of electives (A-1,2,3 or B-1,2,3 or C-1,2,3) to be chosen *preferably*relating to the elective chosen under paper – VII (A or B or C)

Cluster 1.

Paper VIII-A-1. Introduction to Microprocessors and Microcontrollers
Paper VIII-A-2.Computational Physics and Programming
Paper VIII-A-3.Electronic Instrumentation

Cluster 2

Paper VIII-B-1.Fundamentals of Nanoscience
Paper VIII-B-2.Synthesis and Characterization of Nanomaterials
Paper VIII-B-3.Applications of Nanomaterials and Devices

Cluster 3
Paper VIII-C-1.Solar Thermal and Photovoltaic Aspects
Paper VIII-C-2.Wind, Hydro and Ocean Energies
Paper VIII-C-3.Energy Storage Devices

B.Sc. (Physics) (Maths Combinations)

Scheme of instruction and examination to be followed w.e.f. 2015-2016

S. No	Semester	Title of the paper	Instruc-tion hrs/week	Duration of exam(hrs)	Max Marks (external)
		Thoery			
1	First	Paper I: Mechanics& Properties of Matter	4	3	75
2	Second	Paper II: Waves & Oscillations	4	3	75
3	Third	Paper III: Wave Optics	4	3	75
4	Fourth	Paper IV: Thermodynamics & Radiation Physics	4	3	75
5	Fifth	Paper V:Electricity, Magnetism& Electronics Paper VI: Modern Physics	4 4	3 3	75 75
6	Sixth	PaperVII :Elective (One) Paper VIII: Cluster Electives (Three)	4 4	3 3	75 75
		Practicals			
1	First	Practical 1	2	3	50
2	Second	Practical II	2	3	50
3	Third	Practical III	2	3	50
4	Fourth	Practical IV	2	3	50
5	Fifth	Practical V	2	3	50
6		Practical VI	2	3	50
7	Sixth	Practical VII	2	3	50
8		Practical VIII	2	3	50

Elective VII-(C) :(Renewable Energy)

Semester –VI
Elective Paper –VII-(C) :Renewable Energy

No. of Hours per week: 04 **Total Lectures:60**

UNIT-I (12 hrs)

1. Introduction to Energy: Definition and units of energy, power, Forms of energy, Conservation of energy, second law of thermodynamics, Energy flow diagram to the earth. Origin and time scale of fossil fuels, Conventional energy sources, Role of energy in economic development and social transformation.

2. Environmental Effects: Environmental degradation due to energy production and utilization, air and water pollution, depletion of ozone layer, global warming, biological damage due to environmental degradation. Effect of pollution due to thermal power station, nuclear power generation, hydroelectric power stations on ecology and environment.

UNIT-II (12 hrs)

3. Global Energy Scenario: Energy consumption in various sectors, projected energy consumption for the next century, exponential increase in energy consumption, energy resources, coal, oil, natural gas, nuclear and hydroelectric power, impact of exponential rise in energy usage on global economy.

4. Indian Energy Scene: Energy resources available in India, urban and rural energy consumption, energy consumption pattern and its variation as a function of time, nuclear energy - promise and future, energy as a factor limiting growth, need for use of new and renewable energy sources.

UNIT-III (12 hrs)

5.Solar energy: Solar energy, Spectral distribution of radiation, Flat plate collector, solar water heating system, Applications, Solar cooker. Solar cell, Types of solar cells, Solar module and array, Components of PV system, Applications of solar PV systems.

6. Wind Energy: Introduction, Principle of wind energy conversion, Components of wind turbines, Operation and characteristics of a wind turbine, Advantages and disadvantages of wind mills, Applications of wind energy.

UNIT-IV (12 hrs)

7. Ocean Energy: Introduction, Principle of ocean thermal energy conversion, Tidal power generation, Tidal energy technologies, Energy from waves, Wave energy conversion, Wave energy technologies, advantages and disadvantages.

8. Hydrogen Energy: History of hydrogen energy - Hydrogen production methods - Electrolysis of water, Hydrogen storage options – Compressed and liquefied gas tanks, Metal hydrides; Hydrogen safety - Problems of hydrogen transport and distribution - Uses of hydrogen as fuel.

UNIT-V (12 hrs)

9. Bio-Energy

Energy from biomass – Sources of biomass – Different species – Conversion of biomass into fuels – Energy through fermentation – Pyrolysis, gasification and combustion – Aerobic and anaerobic bio-conversion – Properties of biomass – Biogas plants – Types of plants – Design and operation – Properties and characteristics of biogas.

References:

1. Solar Energy Principles, Thermal Collection &Storage, S.P.Sukhatme: Tata McGraw Hill Pub., New Delhi.
2. Non-Conventional Energy Sources, G.D.Rai, New Delhi.
3. Renewable Energy, power for a sustainable future, Godfrey Boyle, 2004,
4. The Generation of electricity by wind, E.W. Golding.
5. Hydrogen and Fuel Cells: A comprehensive guide, Rebecca Busby, Pennwell Corporation
6.Hydrogen & Fuel Cells: Emerging Technologies & Applications, B.Sorensen, Acad Press
7. Non-Conventional Energy Resources by B.H. Khan, Tata McGraw Hill Pub., 2009.
8. Fundamentals of Renewable Energy Resources byG.N.Tiwari, M.K.Ghosal, Narosa Pub., 2007.

Elective Paper-VII-C: Practical: Renewable Energy
2hrs/Week

Minimum of 6 experiments to be done and recorded

1. Preparation of copper oxide selective surface by chemical conversion method.
2. Performance testing of solar cooker.
3. Determination of solar constant using pyrheliometer.
4. Measurement of I-V characteristics of solar cell.
5. Study the effect of input light intensity on the performance of solar cell.
6. Study the characteristics of wind.

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AP STATE COUNCIL OF HIGHER EDUCATION

ZOOLOGY COURSE STRUCTUREUNDER CBCS (w.e.f. 2015-16, Revised)

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Biology of Non-chordates	100	03
			Practical - I	50	02
	II	II	Biology of Chordates	100	03
			Practical - II	50	02
II	III	III	Cell biology, Genetics and Evolution	100	03
			Practical - III	50	02
	IV	IV	Embryology, Physiology and Ecology	100	03
			Practical - IV	50	02
III	V	V	Animal Biotechnology	100	03
			Practical - V	50	02
		VI	Animal Husbandry	100	03
			Practical - VI	50	02
	*Any one Paper from A, B and C ** Any one cluster from I, II and III VI	VII (A)*	Immunology	100	03
			Practical - VII (A)	50	02
		VII (B)*	Cellular Metabolism and Molecular Biology	100	03
			Practical - VII (B)	50	02
		VII (C)*	Bioinformatics	100	03
			Practical - VII (C)	50	02
		Cluster VIII-A**	**Cluster Electives –VIII-A : Medical Diagnostics**		
			1. Clinical Biochemistry	100	03
			2. Haematology	100	03
			3. Clinical Microbiology	100	03
			Practical – VIII: 1	50	02
			Practical – VIII: 2	50	02
			Project Work	50	02
		Cluster VIII-B**	**Cluster Electives –VIII-B : Aquaculture**		
			1. Principles of Aquaculture	100	03
			2. Aquaculture Management	100	03
			3. Postharvest Technology	100	03
			Practical – VIII: 1	50	02
			Practical – VIII: 2	50	02
			Project Work	50	02
		Cluster VIII-C**	**Cluster Electives – VIII-C : Sericulture**		
			1. Gen. Sericulture, Mulberry cultivation and Management	100	03
			2. Biology of Mulberry Silkworm and Silkworm rearing Technology	100	03
			3. Silk Technology, Silk Marketing and Extension	100	03
			Practical – VIII: 1	50	02
			Practical – VIII: 2	50	02
			Project Work	50	02

ZOOLOGY SYLLABUS FOR IV SEMESTER

ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Periods:60 **Max. Marks: 100**

Unit - I

1.1 Developmental Biology and Embryology

1.1.1 Gametogenesis

1.1.2 Fertilization

1.1.3 Types of eggs

1.1.4 Types of cleavages

1.2 Development of Frog upto formation of primary germ layers

1.3 Formation and functions of Foetal membrane in chick embryo

1.4 Development, types and functions of Placenta in mammals

Unit - II

2.1 Physiology - I

2.1.1 Elementary study of process of digestion

2.1.2 Absorption of digested food

2.1.3 Respiration - Pulmonary ventilation, transport of oxygen and carbondioxide

2.1.4 Circulation - Structure and functioning of heart, Cardiac cycle

2.1.5 Excretion - Structure of nephron, urine formation, counter current mechanism

Unit - III

3.1 Physiology - II

3.1.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibers

3.1.2 Muscle contraction - Ultra structure of muscle fibre, molecular and chemical basis of muscle contraction

3.1.3 Endocrine glands - Structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal glands and pancreas

3.1.4 Hormonal control of reproduction in a mammal

Unit - IV

4.1 Ecology - I

4.1.1 Meaning and scope of Ecology

4.1.2 Important abiotic factors of Ecosystem - Temperature, light, water, oxygen and CO_2

4.1.3 Nutrient cycles - Nitrogen, carbon and phosphorus

4.1.4 Components of Ecosystem (Example:lake), food chains and food web, energy flow in ecosystem

Unit - V

5.1 Ecology - II

5.1.1 Habitat and ecological niche

5.1.2 Community interactions - Mutualism, commensalism, parasitism, competition, predation

5.1.3 Ecological succession

5.1.4 Population studies

5.2 Zoogeography

5.2.1 Zoogeographical regions

5.2.2 Study of physical and faunal peculiarities of Oriental, Australian and Ethiopian regions

Andhra Pradesh State Council of Higher Education

GENERAL ENGLISH SYLLABUSFOR B.A/B.Com/B.Sc COURSESunder CBCS

w.e.f. 2015-16 (Revised in April, 2016)

SEMESTER – I

1. Every unit shall state the objectives and expected deliverables.
2. Every lesson shall have
   - i) Questions on subject comprehension, paragraph, short note, single sentence answer types
   - ii) Exercises on vocabulary, syntax, and pronunciation
   - iii) Language exercises shall include exercises in paraphrasing, note-making and report writing wherever possible
   - iv) Pre -reading and post- reading activities.

Unit – I PROSE

1. A.P. J. Abdul Kalam: The Knowledge Society (from *Ignited Minds*)
2. NgugiWaThiong'o: The Language of African Literature (from *Decolonizing the Mind*)

Unit – II POETRY

1. Robert Frost: The Road Not Taken
2. Nissim Ezekiel: Night of the Scorpion

Unit – III SHORT STORY

1. Mulk Raj Anand : The Lost Child
2. Henry Lawson: The Loaded Dog

Unit – IV ONE - ACT PLAY

William Shakespeare: The Merchant of Venice (Court Scene – Act IV Scene -1)

Unit – V LANGUAGE ACTIVITY

1. Classroom and Laboratory Activities
   - i. Single Sentence Answer Questions on Vocabulary (spelling), sound(pronunciation), sense (meaning), and syntax (usage)
2. Classroom Activity
   - i. Exercises in Articles and Prepositions
   - ii. Exercises in Tenses, Interrogatives and Question tags

Note: In classroom instruction it may be ensured that the theoretical and practical components of CSS-I complement the language activity in this semester.

Andhra Pradesh State Council of Higher Education

GENERAL ENGLISH SYLLABUS FOR B.A/B.Com/B.Sc COURSESunder CBCS

w.e.f. 2015-16 (Revised in April, 2016)

SEMESTER – II

Unit – I PROSE

1. J. B.S Haldane: The Scientific Point of View
2. A.G. Gardiner : On Shaking Hands

Unit – II POETRY

1. John Keats: Ode to Autumn
2. Kishwar Naheed : I am not that Woman (from *An Anthology of Commonwealth Poetry* edited by C.D. Narasimhaiah)

Unit –III SHORT STORY

1. Ruskin Bond : The Boy Who Broke the Bank
2. R. K. Narayan : Half a Rupee Worth

Unit – IV ONE ACT PLAY

Anton Chekhov: The Proposal

Unit – V LANGUAGE ACTIVITY

1. Classroom and Laboratory Activities
   - i. Transformation of Sentences (Voice, Speech and Degrees)
   - ii. Dialogue Practice (Oral)
   - iii. Listening Comprehension

2. Classroom Activity
   - i. Guided Composition
   - ii. Dialogue Writing
   - iii. Reading Comprehension

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GENERAL ENGLISH SYLLABUSFOR B.A/B.Com/B.Sc COURSESunder CBCS

w.e.f. 2015-16 (Revised in April, 2016)

SEMESTER –III

Unit – I PROSE

1. M.K. Gandhi: Shyness My Shield (from *The Story of My Experiments with Truth)*
2. Alexis C. Madrigal: Why People Really Love Technology: An Interview with Genevieve Bell

Unit – II POETRY

1. Gabriel Okara: Once upon a Time
2. Seamus Heaney: Digging

Unit – III SHORT STORY

1. JhumpaLahiri: The Interpreter of Maladies
2. Shashi Deshpande: The Beloved Charioteer

Unit – IV ONE ACT PLAY

GurajadaAppa Rao: *Kanyasulkam*, translated by C. Vijayasree& T. VijayaKumar (Acts I & II)

Unit – V LANGUAGE ACTIVITY

1. Classroom and Laboratory Activities
   - i. JAM Sessions
   - ii. Note Taking
   - iii. Reporting for the Media
   - iv. Expansion of an idea
2. Classroom Activity
   - i. Transformation of sentences (Simple-Complex-Compound Sentences)
   - ii. Note Making
   - iii. Report Writing
   - iv. Writing for the Media

Note: ***In classroom instruction it may be ensured that the theoretical and practical components of CSS-II complement the language activity in this semester.***

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General Telugu Syllabus for B.A/ B.Com/B.Sc., Courses Under CBCS
W.e.f. 2015-16 (Revised in April - 2016)
SEMESTER - I

I. ప్రాచీన కవిత్వం:

(అ) నన్నయ – గంగాశంతనుల కథ
ఆంధ్రమహాభారతం–ఆదిపర్వం–నాల్గవ ఆశ్వాసం (120–165)
"నరవరుడగు శంతనునకు" నుండి "దివ్య భూషణాలంకృత" వరకు

(ఆ) తిక్కన – ద్రౌపది పరిదేవనం – ఆంధ్రమహాభారతం – ఉద్యోగపర్వం – తృతీయ ఆశ్వాసం – (100–125)
"ధర్మనందను పలుకులు" నుండి "అని యూఱడిలగ బలికిన" వరకు

II ఆధునిక కవిత్వం

(అ) గురజాడ – కన్యక

(ఆ) శ్రీశ్రీ – దేశచరిత్రలు

III కథానికలు

(అ) పాపినేని శివశంకర్ – చింతల తోపు

(ఆ) బండి నారాయణస్వామి – సావుకూడు

IV వ్యాకరణం

(అ) సంధులు – సవర్ణదీర్ఘ, గుణ, వృద్ధి, యణాదేశ, త్రిక, గ.స.డ.ద.వాదేశ, రుగాగమ, టుగాగమ, ఆమ్రేడిత, అత్వ, ఇత్వ, ఉత్వ, సంధులు.

(ఆ) సమాసాలు – తత్పురుష, కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి.

(ఇ) అక్షర దోషాలు – దోషాలు సరిదిద్ది సాధు రూపాలు రాయాలి.

విద్యార్థి కృత్యాలు:

1. శ్రీశ్రీ కవిత దేశ చరిత్రలకు సంబంధించిన పేరడీలు సేకరించండి.
2. ముత్యాల సరాలు ఛందస్సులో రచనలు చేసే ప్రయత్నం చేయండి.
3. ఆనాటి ద్రౌపది పరిస్థితిని ప్రస్తుత సమాజ పరిస్థితికి అన్వయించండి.

(పైన సూచించిన విద్యార్థి కృత్యాలు కొన్ని ఉదాహరణలు మాత్రమే. ఇటువంటివి మరిన్ని ప్రయత్నించగలరు.)

Andhra Pradesh State Council of Higher Education

General Telugu Syllabus for B.A/ B.Com/B.Sc., Courses Under CBCS

W.e.f. 2015-16 (Revised in April - 2016)

SEMESTER - II

I. ప్రాచీన కవిత్వం:

(అ) ధూర్జటి – సాయుజ్యము

శ్రీకాళహస్తి మహాత్మ్యము – ద్వితీయాశ్వాసం (109–139)

త్రేతాంబుననొక్క .... నుండి పన్నగంబు .... వరకు

(ఆ) చేమకూర వేంకటకవి– సుభద్రా పరిణయం

విజయ విలాసం – 3వ ఆశ్వాసం – (93–139)

"తనయుని పెండ్లికేగ వలె ధాత్రికి"నుండి

"తేరెక్కి దంపతులరుగ" వరకు.

II ఆధునిక కవిత్వం

(అ) జాషువా – పిరదౌసి లేఖ

("ఆ సుల్తాను" ... నుండి "అనుచు లిఖించె" వరకు)

(ఆ) గెడ్డాపు సత్యం – 'చెట్టు' ఖండిక 1 నుండి 25 పద్యాలు

("శ్రీనిధానం" నుండి "మహిమ నీది" పద్యం వరకు)

(కవితా వైజయంతి పద్య సంకలనం నుండి)

III కథానికలు

(అ) కేతు విశ్వనాథ రెడ్డి – నమ్ముకున్న నేల

(ఆ) ముప్పాళ్ళ రంగనాయకమ్మ– అమ్మకు ఆదివారం లేదా?

IV నవల

డా॥ వి.ఆర్. రాసాని – బతుకాట

విద్యార్థి కృత్యాలు:

1. సుభద్ర వివాహ ఆచారాలు – ఈనాటి వివాహ ఆచారాలు తులనాత్మకంగా పరిశీలించండి.
2. మీకు నచ్చిన ఒక చెట్టుకు సంబంధించిన పూర్తి సమాచారాన్ని సేకరించండి.
3. మీ ఇంటి నేపథ్యంలో అమ్మలకు ఆదివారం ఉందో లేదో ఒక సంఘటన ఆధారంగా కథ రాయండి.
4. నమ్ముకున్న నేల కథలోని రైతుల గాథలను చిత్రాలతో దినపత్రికల ఆధారంగా సేకరించండి.

Andhra Pradesh State Council of Higher Education

General Telugu Syllabus for B.A/ B.Com/B.Sc., Courses Under CBCS

W.e.f. 2015-16 (Revised in April - 2016)

SEMESTER - III

I. ప్రాచీన కవిత్వం:

(అ) పోతన – వామనావతారం

ఆంధ్రమహాభాగవతం – ఎనిమిదవ స్కంధం (582–621)

("కులమున్ రాజ్యము" నుండి "రవిబింబంబుపమింప" వరకు)

(ఆ) కొఱవిగోపరాజు – శాలివాహన విజయం

సింహాసన ద్వాత్రింశిక – ఒకటవ ఆశ్వాసం (115–165)

("సజ్జిత దానధర్మ" నుండి "ఇట్లు విక్రమార్కుడీల్గిన" వరకు)

II అధునిక కవిత్వం

(అ) కుసుమ ధర్మన్న – హరిజన శతకము (1–20)

"శ్రీహరినుత నీదు" నుండి "నీకులంబువారు" వరకు

(ఆ) రాయప్రోలు సుబ్బారావు– సంక్రాంతి సంబరము – మిశ్రమంజరిలోంచి – "అయిదు లక్షల అరవదేడులు" నుండి "మంగళము సంక్రాంతి సామికి" వరకు

III గద్యభాగం (వ్యాస సంపుటి)

(అ) ఆచార్య గుజ్జర్లమూడి కృపాచారి – తెలుగు భాష

(ఆ) ఆచార్య రాచపాళెం చంద్రశేఖర రెడ్డి– వ్యక్తిత్వ వికాసం

IV ఛందస్సు – అలంకారాలు

(అ) ఛందస్సు – ఉత్పలమాల, చంపకమాల, శార్దూలం, మత్తేభం, కందం, తేటగీతి, ఆటవెలది

(ఆ) అలంకారాలు – ఉపమ, రూపక, ఉత్ప్రేక్ష, స్వభావోక్తి, అతిశయోక్తి, అర్థాంతరన్యాస, దృష్టాంతం, శబ్దాలంకారాలు.

విద్యార్థి కృత్యాలు:

1. తెలుగు వారాలు, తిథులు, నక్షత్రాలు, సంవత్సరాల పేర్లు నేర్చుకోండి.
2. మీ వ్యక్తిత్వాన్ని మీరు ఏ విధంగా మెరుగుపరుచుకుంటున్నారో వ్యాసం రాయండి.
3. అంత్యానుప్రాసాలంకారంలో ఒక కవిత సొంతంగా రాయండి.

LIST OF LIFE SKILL COURSES

Semester	No. of Courses	Choices	Preferred Teaching Dept.
I	**01**	Computer Applications	Computers
		Human Values and Professional Ethics	English/Telugu/Any Dept
		Entrepreneurship	Commerce
II	**01**	Information and Communication Technology	Computers
		Indian Culture and Science	History/Telugu
		Elementary Statistics	Statistics/Maths/Economics/ Commerce
III	**02**	Health and Hygiene	Zoology/Botany
		Personality Development and Leadership	English/ Any Dept
		Analytical Skills	Maths/Statistics
		Environmental Education	Botany/Zoology/Environmental Sciences/Any Dept.

List of Skill Development Courses along with their Semester-wise allotment with choices. Preferred Teaching Departments are given in the parenthesis.

Sem	No. of Courses	**Stream – A (Arts)**	**Stream – B (Commerce)**	**Stream – C (Science)**
I	**01**	Tourism Guidance (History) Public Relations (Pol Sci /English)	Secretaryship Insurance Promotion	Electrical Appliances (Physics) Plant Nursery (Botany)
II	**02**	Journalistic Reporting (English) Survey & Reporting (Economics/History) Social Work Methods (Pol Sci) Performing Arts (Telugu)	Agricultural Marketing Business Communication (English) Advertising Logistics & Supply Chain	Solar Energy (Physics) Fruit & Vegetable Preservation (Botany) Dairy Techniques (Zoology) Food Adulteration (Chemistry)
III	**01**	Financial Markets (Economics) Disaster Management (English /Telugu)	Online Business Retailing	Environment Audit (Chemistry) Poultry Farming (Zoology)

A.P. STATE COUNCIL OF HIGHER EDUCATION
B A, B Com & B Sc Programmes

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

SCIENCE STREAM

Syllabus of
ENVIRONMENTAL AUDIT
Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:
By successful completion of the course, students will be able to;

1. *Understand the basic concepts Environmental health*
2. *Learn and identify the industrial pollution*
3. *Explain the highlights in the regulatory aspects of Environmental law and policy*
4. *Understand the various phases of Environmental Audit*

UNIT – I
Industrial Pollution and its effects 06h
Climate – Weather and Air Pollution – Classification of water and water bodies – Water Quality Parameters – Water Pollution – Sources – Classification, nature and Toxicology of water pollutants. - Soil parameters –Soil pollution and impacts – Soil conservation

UNIT - II
Environmental Law & Policy: 09h
Highlights of the Acts, Institutional arrangements for: (1) The Water (Prevention & Control of Pollution) Act, 1974 amended in 1988; (2) The Air (Prevention and Control of Pollution) Act, 1981 amended in 1987; (3) The Water (Prevention and Control of Pollution) Cess Act, 1977 amended in 1991; (4) The Environment (Protection) Act, 1986; (5) The Public Liability Insurance Act, 1991; – Indian Policy Statement for abatement of Pollution, 1992.

UNIT - III
Environmental Audit - Scope & Requisites: 10h
Environmental Audit: Definition; Objectives; Scope, Coverage - GOI Notification on Environmental Audit - Benefits to Industry. Reporting Environmental Audit Findings - Importance of Environmental Audit Report to industry, public and the governments.

Co-curricular Activities Suggested: 05h

1. Visit to understand Institutional arrangements and functioning of Pollution Control Boards.
2. Visiting different Ecosystems
3. **Soil analysis**: Determination of soil type and texture, pH, Soil Moisture, Nitrogen, Potassium and Phosphorous.
4. **Water analysis:** Determination of pH, Dissolved solids and suspended solids, Dissolved Oxygen, COD, BOD.
5. Assignments, Group discussion, Quiz etc.

Reference books and websites:

1. Environmental Education in India by K.R. Gupta
2. Environmental Legislation in India by K.R. Gupta
3. https://parivesh.nic.in/
4. https://www.cpcb.nic.in/
5. https://www.free-ebooks.net/environmental-studies-academic

AP State Council of Higher Education

Revised Syllabus under CBCS Pattern
(w.e.f. 2020-'21 Academic Year)

A Mandatory Course for BA/BCom/BSc etc.

ENVIRONMENTAL EDUCATION

(Total hours of Teaching – 30 Hrs. @ 02 Hrs. per Week)

Course objective: A Generic Course intended to create awareness that the life of human beings is an integral part of environment and to inculcate the skills required to protect environment from all sides.

Learning outcomes: On completion of this course the students will be able to …..

1. Understand the nature, components of an ecosystem and that humans are an integral part of nature.
2. Realize the importance of environment, the goods and services of a healthy biodiversity, dependence of humans on environment.
3. Evaluate the ways and ill effects of destruction of environment, population explosion on ecosystems and global problems consequent to anthropogenic activities.
4. Discuss the laws/ acts made by government to prevent pollution, to protect biodiversity and environment as a whole.
5. Acquaint with international agreements and national movements, and realize citizen's role in protecting environment and nature.

Unit 1: Environment andNatural Resources **06 Hrs.**

1. Multidisciplinary nature of environmental education; scope and importance.
2. Man as an integral product and part of the Nature.
3. A brief account of land, forest and waterresources in India and their importance.

4. Biodiversity : Definition; importance of Biodiversity - ecological,consumptive, productive, social, ethical and moral, aesthetic, and option value.
5. Levels of Biodiversity: genetic, species and ecosystem diversity.

Unit-2: Environmental degradation and impacts **10Hrs**

1. Human population growth and its impacts on environment; land use change, land degradation, soil erosion and desertification.
2. Use and over-exploitation of surface and ground water, construction of dams, floods, conflicts over water (within India).
3. Deforestation: Causes and effects due to expansion of agriculture, firewood, mining, forest fires and building of new habitats.
4. Non-renewable energy resources, their utilization and influences.
5. A brief account of air, water, soil and noise pollutions; Biological, industrial and solid wastes in urban areas. Human health and economic risks.
6. Green house effect - global warming; ocean acidification, ozone layer depletion, acid rains and impacts on human communities and agriculture.
7. Threats to biodiversity: Natural calamities, habitat destruction and fragmentation, over exploitation, hunting and poaching, introduction of exotic species, pollution, predator and pest control.

Unit 3: Conservation of Environment **10 Hrs**

1. Concept of sustainability and sustainable development with judicious use of land, water and forest resources; afforestation.
2. Control measures for various types of pollution; use of renewable and alternate sources of energy.
3. Solid waste management: Control measures of urban and industrial waste.
4. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
5. Environment Laws: Environment Protection Act; Act; Wildlife Protection Act; Forest Conservation Act.
6. International agreements: Montreal and Kyoto protocols; Environmental movements: Bishnois of Rajasthan, Chipko, Silent valley.

Suggested activities to learner: (4 hours)

1. Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc
2. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural site.
3. Study of common plants, insects, birds and basic principles of identification.
4. Study of simple ecosystems-forest, tank, pond, lake,mangroves etc.
5. Case study of a Forest ecosystem or a pond ecosystem.

Suggested text book :

- ErachBarucha (2004) *Text book of Environmental Studies for Undergraduate courses* (Prepared for University Grants Commmission) Universities Press.
- PurnimaSmarath (2018) *Environmental studies* Kalyani Publishers, Ludhiana

Reference books :

- Odum, E.P., Odum, H.T. & Andrews, J. (1971) *Fundamentals of Ecology*. Philadelphia: Saunders.
- Pepper, I.L., Gerba, C.P. &Brusseau, M.L. (2011). *Environmental and Pollution Science*. Academic Press.
- Raven, P.H., Hassenzahl, D.M. & Berg, L.R. (2012) *Environment. 8th edition*. John Wiley & Sons.
- Singh, J.S., Singh, S.P. and Gupta, S.R. (2014) *Ecology, Environmental Science and Conservation.* S. Chand Publishing, New Delhi.
- Sengupta, R. (2003) Ecology and economics: An approach to sustainable development. OUP.
- Wilson, E. O. (2006) *The Creation: An appeal to save life on earth.* New York: Norton.
- Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll (2006) *Principles of Conservation Biology.* Sunderland: Sinauer Associates,

A.P. STATE COUNCIL OF HIGHER EDUCATION
B.A, B.Com & B.Sc. PROGRAMMES

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

Science Stream

Syllabus of

SOLAR ENERGY

Total 30 hrs (02h/wk), *02 Credits & Max Marks: 50*

Learning Outcomes:
After successful completion of the course, students will be able to:

1. *Acquire knowledge onsolarradiation principles with respect to solar energy estimation.*
2. *Get familiarized with various collecting techniques of solar energy and its storage*
3. *Learn the solar photovoltaic technology principles and different types of solar cells for energy conversion and different photovoltaic applications.*
4. *Understand the working principles of several solar appliances like Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses*

SYLLABUS:

UNIT-I – Solar Radiation: (6 hrs)

Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Measurement of Solar radiation-Pyroheliometer, Pyranometer, Sunshine recorder, Prediction of available solar radiation, Solar energy-Importance, Storage of solar energy, Solar pond

UNIT-II – Solar Thermal Systems: (10 hrs)

Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses.

UNIT-III – Solar Photovoltaic Systems: (10 hrs)

Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, domestic lighting, street lighting and water pumping

Co-curricular Activities (Hands on Exercises): (04 hrs)
[Any four of the following may be taken up]

1. *Plot sun chart and locate the sun at your location for a given time of the day.*
2. *Analyse shadow effect on incident solar radiation and find out contributors.*
3. *Connect solar panels in series & parallel and measure voltage and current.*
4. *Measure intensity of solar radiation using Pyranometer and radiometers.*
5. *Construct a solar lantern using Solar PV panel (15W)*
6. *Assemble solar cooker*
7. *Desigining and constructing photovoltaic system for a domestic house requiring 5kVA power*
8. Assignments/Model Exam.

Reference Books:

1. Solar Energy Utilization, G. D. Rai, Khanna Publishers
1. Solar Energy- Fundamentals, design, modeling & applications, G.N. Tiwari, Narosa Pub., 2005.
2. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata Mc-Graw Hill Publishers, 1999.
3. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
4. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

HUMAN VALUES AND PROFESSIONAL ETHICS (HVPE)

(SYLLABUS)

Learning Outcome:

On completion of this course, the UG students will be able to

- ✓ Understand the significance of value inputs in a classroom and start applying them in their life and profession
- ✓ Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- ✓ Understand the value of harmonious relationship based on trust and respect in their life and profession
- ✓ Understand the role of a human being in ensuring harmony in society and nature.
- ✓ Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

UNIT: 1 Introduction – Definition, Importance, Process & Classifications of Value Education

- ❖ Understanding the need, basic guidelines, content and process for Value Education
- ❖ Understanding the thought provoking issues; need for Values in our daily life
- ❖ Choices making – Choosing, Cherishing & Acting
- ❖ Classification of Value Education: understanding Personal Values, Social Values, Moral Values & Spiritual Values.

UNIT: 2 Harmony in the Family – Understanding Values in Human Relationships

- ✓ Understanding harmony in the Family- the basic unit of human interaction
- ✓ Understanding the set of proposals to verify the Harmony in the Family;
- ✓ Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
- ✓ Present Scenario: Differentiation (Disrespect) in relationships on the basis of body, physical facilities, or beliefs.
- ✓ Understanding the Problems faced due to differentiation in Relationships
- ✓ Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
- ✓ Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyawastha*)- from family to world family.

UNIT: 3Professional Ethics in Education

- ✓ Understanding about Professional Integrity, Respect & Equality, Privacy, Building Trusting Relationships.
- ✓ Understanding the concepts; Positive co-operation, Respecting the competence of other professions.
- ✓ Understanding about Taking initiative and Promoting the culture of openness.
- ✓ Depicting Loyalty towards Goals and objectives.

Text Books:

R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

Bhatia, R. & Bhatia, A (2015) Role of Ethical Values in Indian Higher Education.

References:

- Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, U
- E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
- Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
- Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
- A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.
- P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
- A N Tripathy, 2003, Human Values, New Age International Publishers.

Mode of Evaluation:

Assignment/ Seminar/Continuous Assessment Test/Semester End Exam.

Co curricular Activities:

1. Visit to an Old Age Home and spending with the inmates for a day.
2. Conduct of Group Discussions on the topics related to the syllabus.
3. Participation in community service activities.
4. Working with a NGO like Rotary Club or Lions International, etc.