St. JOHN'S COLLEGE OF ARTS & SCIENCE
(Accredited with B++ by NAAC & Approved by UGC under section 2(f) & 12(B) status)
(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)
(A Christian Minority Institution)
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ELECTIVE COURSE – BSC PHYSICS

St. John's College of Arts and Science, Ammandivilai

Department of Physics (2023-2024)

Major-Elective paper

Sl.No	Semester	Subject	Subject code
1.	V	Communication Electronics	CEPH52
2.	VI	Energy physics	CEPH61

HOD

	Subject Part	Subject Title	Contact Hr / Week	Credit	Exam Hrs	Marks		
						Int	Ext	Total
Semester V	Part III	Core subject 5.Basic Electronics	6	4	3	25	75	100
		6. Spectroscopy	5	4	3	25	75	100
		7.Atomic and Nuclear Physics	6	4	3	25	75	100
		Major Elective (any one) a.Programming in C++ b.Communication Electronics	5	4	3	25	75	100
		Practical – V - General Practical	3	3	3	50	50	100
		Practical-VI Electronics	3	3	3	50	50	100
	Part IV	Skill based subject (Common) Personality development / Effective Communication / Youth Leadership	2	2	3	25	75	100
		Total	30	24				
Semester VI	Subject Part	Core Subject 9. Quantum Mechanics	5	4	3	25	75	100
		10. Digital Electronics	5	4	3	25	75	100
		11. Solid State Physics	5	4	3	25	75	100
		Major Elective (any one) a.Energy Physics b.Medical Physics	5	4	3	25	75	100
		Project	4	4	3	50	50	100
		Practical-VII General Practical	3	3	3	50	50	100
		Practical-VIII Electronics	3	3	3	50	50	100
		Total	30	26				

MSU/2021-22/UG-Colleges/Part-III(B.Sc.Physics)/Semester–V

MAJOR ELECTIVE – b. COMMUNICATION ELECTRONICS

Preamble: This course enables the students to understand various modulation and demodulation techniques used for communication. The paper needs a basic knowledge in electronics and mathematics and the learners are expected to come out with the ability to choose proper modulation techniques.

UNIT-I: AMPLITUDE MODULATION AND TRANSMISSION

Introduction–amplitude Modulation–AM envelop–AM frequency spectrum and bandwidth–Phas or representation of AM with carrier – coefficient to f modulation or percentage modulation or modulation index – degrees of modulation – AM power distribution – AM Current relation and efficiency-modulation by complex information signal –double side band suppressed carrier AM - single side band suppressed carrier AM – Vestigal side band amplitude modulation – AM modulator circuits – emitter modulations or low power AM –collector modulator or medium and high power AM modulator - AM transmitters –Broadcast AM transmitters–Low level of AM transmitter–High level AM transmitter.

UNIT-II: AMPLITUDE MODULATION - RECEPTION

Comparison of AM system – Quadrature amplitude modulation – principles of AM detection – AM receivers – receiver parameters – Tuned radio frequency (TRF) receiver or straight receiver – principles of super hetrodyne – double frequency conversion AM receiver.

UNIT-III: ANGLE MODULATION – TRANSMISSION

Introduction – Frequency modulation – Phase modulation – Phase deviation and modulation index – Multi tone modulation – Transmission band width of FM –conversion of PM to FM or frequency modulator– conversion of FM to PM / phase modulators – commercial broadcast FM – phase or representation of an FM and PM – average power of an AM/FM wave – generation of FM – direct method of FM generation – reactance tube modulator– indirect method of FM wave generation – FM transmitters – indirect method – Comparison of AM and FM.

UNIT-IV: FM RECEPTION

FM detectors – Balanced slope detector – Foster seemly discriminator – ratio detector –FM super heterodyne receiver–FM noise suppression–threshold extension by FMFB technique.

UNIT–V: DIGITAL MODULATION TECHNIQUES

Introduction–BFSK–Binary phase shift keying – Quadrature PSK –Differential PSK – Performance comparison of digital modulation schemes - M ary FSK– correlative coding– Duo binary encoding.

Book For Study

1. Principles Of Communication Engineering - Dr. K.S.Srinivasan, Second Edition:2010.

2. Electronic communication systems – George Kennedy & Bernard Davis, Tata Mcgraw Hills, 4th edition, 2008

Books for reference:

1. Electronic communication systems – Blake, Joseph J Adams ki, Sun Yifeng, Delamer publication, 2nd edition, 2012 (Rupa Publication, India)
2. Fundamentals of Electrical engineering – Wayone tomasi

MSU/2021-22/UG-Colleges/Part-III(B.Sc.Physics)/Semester–VI

MAJOR ELECTIVE

(any one)

a. ENERGY PHYSICS

Preamble: Objective of the course is to provide an understanding of the present energy crisis and various available energy sources. The paper does not need require any special prerequisite and the learners are expected to know the use of alternate energy sources

UNIT I: INTRODUCTION TO ENERGY SOURCES

World's reserve of Commercial energy sources and their availability-Various forms of energy- renewable & non-renewable energy sources – Conventional & non-conventional energy sources– commercial & non-commercial energy sources, comparison –merits, demerits and applications of coal, oil and natural gas

UNIT II: SOLAR ENERGY

Solar energy – nature of solar radiation and its components -Basic Principles of Liquid flat plate collector –Materials for flat plate collector -Construction and working- Solar water heater - Solar crop dryer – Solar space cooling – solar ponds - solar cookers (box type) - merits and demerits of solar energy

UNIT III: PHOTOVOLTAIC SYSTEMS

Introduction – Photovoltaic principle - Basic Silicon Solar cell- Power output and conversion efficiency-Limitation to photovoltaic efficiency-Basic photovoltaic system for power generation-Advantages and disadvantages-Types of solar cells-Application of solar photovoltaic systems - PV Powered fan – PV powered area lighting system– A Hybrid System.

UNIT IV: BIOMASS ENERGY

Introduction-Biomass classification- Biomass conversion technologies-Bio-gas generation-Factors affecting bio-digestion -Working of biogas plant- floating and fixed dome type plant -advantages and disadvantage of -Bio-gas from plant wastes-Methods for obtaining energy from biomass-Thermal gasification of biomass-Working of down draft gasifier- Advantages and disadvantages of biological

conversion of solar energy.

UNIT V: WIND ENERGY AND OTHER ENERGY SOURCES

Wind Energy Conversion-Classification and description of wind machines, wind energy collectors- Energy storage-- Energy from Oceans and Chemical energy resources - Ocean thermal energy conversion- tidal power, advantages and limitations of tidal power generation-Energy and power from waves- wave energy conversion devices- Fuel cells- and application of fuel cells- batteries- advantages of battery for bulk energy storage- Hydrogen as alternative fuel for motor vehicles.

Books for study

1. Rai G. D, Non conventional Energy sources, 4th Edition, Khanna Publishers,2010

2.Solar Energy- Principles of thermal collection and storage - S.P.SUKHAME-Tata-McGraw-Hill Publishing Company Ltd.

Books for References

1. Chetan Singh Solanki, Solar Photvoltaics Fundamentals, Technologies and Applications, 2nd Edition, PHIL earning Private Limited, 2011.

2. Kothari D.P., K.C.Singal and Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India, 2008.

3. Jeffrey M. Gordon, Solar Energy: The State of the Art, Earthscan, 2013.

4. Kalogirou S.A., Solar Energy Engineering: Processes and Systems, 2nd Edition, Academic Press, 2013.

5. Zobaa A.F. and Ramesh Bansal, Hand book of Renewable Energy Technology, World Scientific, 2011

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Declaration

I hereby declare that the details and information given above are complete and true to the best of my knowledge and belief.

Dr. V.Y. DASAPPAN M.A., M.Phil.,Ph.D.
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ST. JOHN'S COLLEGE OF ARTS & SCIENCE
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KANYAKUMARI DISTRICT

Principal