

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce, and Science College, Ahmednagar
(Autonomous)
(Affiliated to Savitribai Phule Pune University, Pune)



National Education Policy (NEP)
Choice Based Credit System (CBCS)

Programme Skeleton and Syllabus of
Open Elective (OE)

Physical Science
(Physics and Electronics)

Implemented from
Academic Year 2023-24

Credit Distribution: UG Programme

	Type of Courses	III Yr	IV Yrs (Honours)	IV Yrs Research
Major Marathi	Discipline-Specific Courses (DSC)	46	74	66
	Discipline Specific Elective (DSE)	08	16	16
	Skill Enhancement Courses (SEC)	06	06	06
	Vocational Skill Courses (VSC)	08	08	08
	On-Job Training (OJT)	04	08	04
	Field Project (FP)	04	04	04
	Community Engagement and Service (CEP)	02	02	02
	Research project	00	00	12
	Research Methodology	00	04	04
	Indian Knowledge System	02	02	02
	Total (I, II and III Year)	80	124	124
Minor	Minor	20	20	20
Other Courses	Open Elective (OE)/ Multidisciplinary Courses	12	12	12
	Co-Curricular Courses	08	08	08
	Ability Enhancement Courses	08	08	08
	Value Education Courses	04	04	04
	Total	132	176	176

Bucket list of Open Elective Courses (OE) offered by the college

Sr. No.	School/Department	Department	Credits/Course	Courses	Total Credits
1.	Marathi	Marathi	03	04	12
2.	Hindi	Hindi	03	04	12
3.	English	English	03	04	12
4.	Economics	Economics	03	04	12
5.	Social Sciences	History, Political Science Sociology, Defense Studies	03	04	12
6.	Mental and Moral Sciences	Philosophy Psychology	03	04	12
7.	Music	Music	03	04	12
8.	Commerce	Commerce	03	04	12
9.	Management	BBA and BBA (CA)	03	04	12
10.	Chemical Science	Chemistry	03	04	12
11.	Life Sciences	Botany, Physics, Microbiology, and Biotechnology	03	04	12
12.	Physical Sciences	Physics and Electronics	03	04	12
13.	Mathematical Science	Mathematics and Statistics	03	04	12
14.	Computational Science	CASAS	03	04	12
15.	Media Studies	Communication Studies and Animation	03	04	12
16.	Earth and Environmental Science	Geography and Environmental Science	03	04	12

List of OE under the Faculty of Science

Open for Commerce and Humanities (Arts)

Sr. No.	Offering Departments	OE-01	OE-02	OE-03	OE-04
	Credits	03	03	03	03
1.	Chemical Science	ABC	ABC	ABC	ABC
2.	Life Sciences	ABC	ABC	ABC	ABC
3.	Physical Sciences	ABC	ABC	ABC	ABC
4.	Mathematical Science	ABC	ABC	ABC	ABC
5.	Computational Science	ABC	ABC	ABC	ABC
6.	Media Studies	ABC	ABC	ABC	ABC
7.	Earth and Environmental Science	ABC	ABC	ABC	ABC

List of OE under the Faculty of Commerce

Open for Humanities (Arts) and Science

Sr. No.	Offering Departments	OE-01	OE-02	OE-03	OE-04
	Credits	03	03	03	03
1.	Commerce	ABC	ABC	ABC	ABC
2.	Management	ABC	ABC	ABC	ABC

List of OE under the Faculty of Humanities (Arts)

Open for Commerce and Science

Sr. No.	Offering Departments	OE-01	OE-02	OE-03	OE-04
	Credits	03	03	03	03
1.	Marathi	ABC	ABC	ABC	ABC
2.	Hindi	ABC	ABC	ABC	ABC
3.	English	ABC	ABC	ABC	ABC
4.	Economics	ABC	ABC	ABC	ABC
5.	Social Sciences	ABC	ABC	ABC	ABC
6.	Mental and Moral Sciences	ABC	ABC	ABC	ABC
7.	Music	ABC	ABC	ABC	ABC

Programme Framework (Courses and Credits): Open Elective (OE) in Physical Sciences

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	OE-01	OE-01	Renewable Energy Sources	03
2.	I	II	4.5	OE-02	OE-02	Basics of Computer Hardware and Software	03
3.	II	III	5.0	OE-03	OE-03	Space Explorations	03
4.	II	IV	5.0	OE-04	OE-04	Consumer Electronics	03
							12

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Syllabus
Open Elective (OE)

Title of the Course: Renewable Energy Sources								
Year: I					Semester: I			
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
OE-01	OE-01	03	00	03	45	30	70	100

Learning Objectives:

1. Explain various forms of the energy and comparative aspects, advantages and disadvantages of various sources of energy with facts and myths regarding the energy sources.
2. Explain basic principles involved and technologies developed in the energy sector.
3. Explain challenges and opportunities in conversion of energy from one form to another, generation of electricity and mechanical work using different energy sources.
4. Explain challenges and recent trends in energy storage devices.
5. Introduces concepts like super-capacitors and batteries, electrical vehicles, etc.
6. Motivate to imagine about future road maps in the fields of energy conversion and storage technologies.

Course Outcomes:

After successful completion of this course, students can learn and understand following things:

1. Understand various forms of the energy and comparative aspects, advantages and disadvantages of various sources of energy with facts and myths regarding the energy sources.
2. Learn basic principles involved and technologies developed in the energy sector.
3. Understand challenges and opportunities in conversion of energy from one form to another, generation of electricity and mechanical work using different energy sources.
4. Acquainted with challenges and recent trends in energy storage devices.
5. Learn concepts like super-capacitors and batteries, electrical vehicles, etc.
6. Understand future road maps in the fields of energy conversion and storage technologies.
7. Understand need of the Energy Conservation for our future generations.

Detailed Syllabus:

Unit I: An Introduction to Energy Sources (08 Hrs.)

Classification and comparison of energy sources (hydro, thermal, nuclear, solar, wind, biomass, and fossil fuels) considering environmental, safety, economy, production and distribution aspects. Facts and Myths about various sources of energy, thermal, nuclear sources of energy, Hybrid sources. Energy audit.

Unit II: Solar thermal Applications (10 Hrs.)

Sun as a source of energy, Solar Constant, Liquid flat plate collector, construction and working, various types of solar concentrators, advantages and disadvantages of concentrating collectors, Solar drying, Box type Solar Cooker, Solar water heating systems, Solar still.

Unit III: Solar Photovoltaic systems Applications (12 Hrs.)

Introduction, Semiconductor, Types of semiconductors, Photovoltaic principle, Power output and conversion efficiency, Limitation to photovoltaic efficiency, Basic photovoltaic system for power Generation, Application of solar photovoltaic systems, Advantages and disadvantages of Solar PV Systems. Configurations of Solar Photovoltaic Systems: Off-grid, Grid-Tied and Grid-Storage, Net metering and steps in installation of a rooftop solar PV System design.

Unit IV: Biomass and wind energy (08 Hrs.)

Bio-mass conversion technologies, Bio-gas generation, Working of biogas plant, Bio-gas from plant wastes, Methods for obtaining energy from biomass, Thermal gasification of biomass, Introduction to wind energy, Classification and description of wind machines, Wind energy, Wind data.

Unit V: Energy storage devices and electrical Vehicles (07 Hrs)

Recent trends in batteries, super-capacitors, fuel cells. Applications of storage devices: Electrical Vehicles (EV), Converter, Inverter, Controls & Controllers in EV, Future Trends in Electric Cars.

Suggested Readings/Material:

1. Non-conventional Energy sources- G. D. RAI (4th edition), Khanna Publishers, Delhi
2. Solar Energy - S. P. Sukhatme (Second Edition), Tata Mc Graw Hill Ltd., New Delhi.
3. Solar Energy Utilisation - G. D. RAI (5th edition), Khanna Publishers, Delhi.
4. Renewable Energy Technology: A practical guides of beginners, Chetan Singh Solanki, PHI Learning Private-Ltd., New Delhi.

5. Solar Photovoltaics: Fundamentals, Technologies and Applications, Chetan Singh Solanki, PHI Learning Private-Ltd., New Delhi
6. NPTEL Video: <https://nptel.ac.in/courses/109/101/109101171/> Energy Resources, Economics and Environment, Prof. Rangan Banerjee, Department of Energy Science and Engineering, IIT Bombay, 2021
7. NPTEL Video: <https://nptel.ac.in/courses/121/106/121106014/> Non-Conventional Energy Resources, Prof. Prathap Haridoss, Department of Metallurgical and Materials Engineering, IIT Madras 2021
8. NPTEL Video: <https://nptel.ac.in/courses/109/106/109106161/> Energy Economics and Policy, Prof. Shyamasree Dasgupta, Department of Humanities and Social Sciences, IIT Mandi, 2021.

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Syllabus
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Title of the Course: Basics of Computer Hardware and Software								
Year: I					Semester: II			
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
OE-2	OE-2	03	00	03	45	30	70	100

Learning Objectives:

1. To understand basics of computers and its logic behind operation in it.
2. To learn computer system's characteristics and capabilities.
3. To comprehend basic functional components and peripheral devices in computer system.
4. To understand different types of software's used in computer system.

Course Outcomes:

After successful completion of this course, students can learn and understand following things:

1. Understand computer system and its operations.
2. Enhance the knowledge of different devices used in the computer with respect to their applications.
3. Understand the use of system software and applications software.
4. Able to troubleshoot the computer hardware or software problems.

Detailed Syllabus:

UNIT I: Fundamental of Computers (10)

Computer: definition, block diagram of computer system, need, features, characteristics; Generation of computers; Classifications of computer systems: main-frames, microcomputer, minicomputers, supercomputer; Types of computer: desktop, laptop, server, tablet; Application areas of computers.

UNIT II: Components of Computer (14)

Microprocessor: block diagram, working, features, classification of microprocessor, generation of microprocessor, packaging of microprocessor, types of processor.

Motherboard: block diagram, working, features, chipset, components, connectors, slots, ports, classification of motherboard, concept of PCB, types of motherboard.

Memory: definition, features, types of memory, memory hierarchy; Primary memory: RAM, ROM; Concept of cache memory; Secondary memory: floppy disk, hard disk, CD, DVD, pen drive, memory card, external memory.

UNIT III: Computer Peripherals (14)

Input devices: definition, characteristics, classification; Keyboard: features, types; Mouse: features, types; Scanning devices: scanner, O.M.R., touch screen; Microphone; Webcam.

Output devices: definition, characteristics, classification; Monitor: features, types; Printer: features, classification, types; Projector; Speaker; Concept of computer assembling and disassembling.

UNIT IV: Computer Software (07)

Software: definition, features, types, applications; System software: operating system, types, DOS, boot loader, BIOS, utility programs; Application software: features, types; Concept software installation, concept of driver; Troubleshooting of computer in terms of hardware and software.

Suggested Readings/Material:

1. Computer Fundamentals, P. K. Sinha, BPB Publications, Sixth Edition.
2. Introduction to Information Technology, V. Rajaraman, PHI, Second Edition.
3. Fundamental of Information Technology, Chetan Shrivastava, Kalyani Publishers.
4. Computers Today, Suresh K Basandra, Galgotia Publications.