

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)**

**Chemical Science**

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
	<b>Total (I, II and III Year)</b>	<b>78</b>	<b>122</b>	<b>122</b>
Minor	Minor	20	20	20
Other Courses	Open Elective (OE)/ Multidisciplinary Courses	12	12	12
	Indian Knowledge System	02	02	02
	Co-Curricular Courses	08	08	08
	Ability Enhancement Courses	08	08	08
	Value Education Courses	04	04	04
	<b>Total</b>	<b>132</b>	<b>176</b>	<b>176</b>

### 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, Zoology, 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 Chemical Sciences**

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	OE-01	OE-01	Chemistry in day-to-day life	03
2.	I	II	4.5	OE-02	OE-02	Chemistry of Food, Nutrition and Preservation	03
3.	II	III	5.0	OE-03	OE-03	Fuel Chemistry	03
4.	II	IV	5.0	OE-04	OE-04	Introduction to Common Medicines	03
							12

**Ahmednagar Jilha Maratha Vidya Prasarak Samaj's**  
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**Syllabus**  
**Open Elective (OE)**

Title of the Course: Chemistry in Day to Day Life								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CI E	ESE	Total
OE-01	OE-01	03	00	03	45	30	70	100

**Learning Objectives:**

1. Understand the role of vitamins and minerals in the diet.
2. Know the difference between fat soluble and water-soluble vitamins.
3. List reasons why vitamins and minerals are critical to a healthy diet.

**Course Outcomes (Cos)**

1. Learn the concept of energy production in the body.
2. Understand some common health hazards.
3. Acquire the knowledge of the role of vitamins and minerals in the body.
4. Understand the biofuels and its uses.
5. Learn the different types of polymers and their uses in day-to-day life.

**Detailed Syllabus:**

**Unit I: Respiration and Energy Production in Human Body (09)**

Respiration, respiratory enzymes, brief outline of hemoglobin and myoglobin, oxygen transport mechanism in body, cooperativity, respiration in lower animals, hemocyanin, hemerythrin.

Energy production in the body, ATP, enzyme responsible for food digestion, mechanism of food digestion, active site of cytochrome C oxidase.

**Unit II: Chemical Aspects of Some Common Health Hazards (12)**

Anemia, sickle cell anemia, leukemia, blood pressure irregularity, blood sugar, arthritis, carbon monoxide poisoning in mines, cyanide poisoning, fluorosis, etc.

**Unit III: Vitamins and Minerals (12)**

Need for vitamin in body, types of vitamins, water soluble and fat soluble vitamins, vitamin B-12, Vitamin C (Cyanocobalamin), D, Vitamin K. Role of minerals in the body, iodine deficiency and remedy.

**Unit IV: Chemistry of Materials (12)**

Soaps and Detergents - their action, Biofuels - production of biofuels and its utility as alternative fuel source Fibers - natural fibers, cotton, wool, silk, rayon, artificial fibers, polyamides, acrylic acid, PVC, PVA, Examples of natural biodegradable polymers cellulose, cellulose acetate, cellophane, soy protein, corn, zein protein, wheat gluten protein, synthetic biodegradable polymers. Use of polymeric materials in daily life.

**Suggested Readings/Material:**

1. Kaim W., Bioinorganic Chemistry, Vol. 4, Brigitte 1994.
2. Crichton R. H., Biological Inorganic Chemistry - An Introduction, Elsevier, 2008.
3. Berg J. M., Tymoczko J. L., Stryer I., Freeman W. H., Biochemistry, 2008.
4. Bertini I., Gray H. B. Lippard S. J. and Valentine J. S., Bioinorganic Chemistry, University Science Books 1994.
5. Lippard S. J., Berg J. M., Principles of Bioinorganic Chemistry, University Science Books, 1994.
6. Polymer Science, V. R. Gowariker, N. V. Viswanathan, J. Sridhar New Age International.

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**Syllabus**  
**Open Elective (OE)**

Title of the Course: Chemistry of Food, Nutrition and Preservation								
Year: II				Semester: III				
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. Students will acquire the knowledge of the basic concept of nutrition for maintaining normal health
2. Role of nutrients for the body, dietary requirements of Carbohydrates proteins, fats, vitamins, minerals etc.
3. Students will understand the importance of essential amino acids, fatty acids and vitamins for the body.
4. Students will learn the concept of community nutrition.

**Course Outcomes (Cos)**

1. Learn the concept of nutrition and health.
2. Understand the physiological role of different nutrients.
3. Understand the causes of obesity.
4. learn the concept and consequences of malnutrition
5. Students will learn different methods of food packaging

### **Detailed Syllabus:**

#### **Unit I: Basics of Human physiological System and Food Science (12)**

Digestive System: Structure and functions of G. I. tract, Process of digestion and absorption of food, structure and functions of liver gallbladder and pancreas Basic concept on food nutrition and nutrients (nutrition malnutrition and health: scope of Nutrition), basic idea about community nutrition (objective, importance of programs), classification of food classification of nutrients

#### **Unit II: Nutrition (15)**

Dietary Requirements of carbohydrates proteins lipids balanced diet, Concept of protein quality essential amino acids, essential fatty acids and their physiological role.

Dietary fibres (composition, properties minerals and trace elements (biochemical and (Allotted Lectures) physiological role bioavailability and requirements, sources, deficiency & excess (Calcium, Sodium, Potassium, Phosphorus, Iron, Fluoride, Zinc, Selenium, Iodine, Chromium)

Vitamins (examples biochemical and physiological requirements, deficiency and excess), water (requirement, water balance),

#### **Unit III: Malnutrition and Obesity (06)**

Recommended dietary allowances, nutritive value of common foods, protein-calorie malnutrition.

Obesity - Definition, genetic and environmental factors leading to obesity

#### **Unit IV: Food Preservation (12)**

Food preservation: definition objectives and principle of food preservation. different methods of food preservation preserved products: jam jelly marmalade sources pickles squashes syrups- types composition and manufacture, selection cost storage uses and nutritional aspects food standards ISI Agmark, FPO, MPO, PFA, FSSAI

### **Suggested Readings/Material:**

1. Srilakshmi B (2017): Nutrition Science, 6th multicoloured Edition. new age International Private Limited
2. Roday S (2012): Food Science and nutrition Second Edition Oxford University Press
3. Mann J and Tuswell (2017): Essentials of human nutrition, 5th Edition, Oxford University Press
4. Oser B. L. (1965) Hawk's physiological chemistry, 14th Edition McGraw- Hill Book
5. Gopalan C, Rama Sastri BV and Balsubramanian SC (2016): Nutritive Value of Indian foods, Indian Council of Medical Research.
6. Subalakshmi, G and Udipi SA (2006): Food processing and preservation, 1st Ed., New Age International Private Limited.

7. Srilakshmi B (2018): Food Science, 7th Colour Edition, New Age International Private Limited.
8. Potter N N and Hotchikiss J H (1999): Food Science, 5th Edition, Springer