# B Sc Polymer Chemistry SYLLABUS FORCOMMON COURSES

#### Semester III A11 BASIC NUMERICAL SKILLS

Total Hours: 80; Credits: 4;Hours/Week:5; Total Marks 100(Internal 20& External 80)

**Objectives-**To acquire knowledge on numerical equations, matrices, progression, statistical tools and its applications

**Course outcome (s)** 

- To understand set operations
- To acquire knowledge on matrix and operation rules
- To acquire knowledge on solving equations.
- To understand progression, Statistical tools and their applications.

#### Module I: Set Theory and Matrices (16Hours)

Sets and Set Operation - Venn Diagrams - Elements of Co-ordinate system -Matrices -Fundamental ideas about matrices and their operational rules - Matrix multiplication - Inversion of square matrices of not more than 3rd order -Solving system of simultaneous linear equations.

#### **Module II: Equations (10 Hours)**

Theory of Equations : Meaning - types of equations - Simple linear and Simultaneous equations (only two variables) eliminations and substitution method only - Quadratic equation factorization and formula method (ax2 + bx + c = 0 form only) - Problems on business applications.

#### **Module III: Progressions (16Hours)**

Progressions : Arithmetic Progressions - Finding the 'n'th term of an AP and also sum to 'n' terms of an AP - Insertion of Arithmetic means in given terms of AP and representation of AP - Geometric Progression : Finding 'n'th term of GP - Insertion of GMs in given GP and also representation of GP - Mathematics of Finance - Simple and compound interest (Simple problems only).

#### Module IV: Statistics (16 Hours)

Meaning and Definition of Statistics - Scope and limitations - Statistical enquiries -Scope of the problem - Methods to be employed - Types of enquiries - Presentation of data by Diagrammatic and Graphical Method - Formation of Frequency Distribution.

#### Module V: Statistical Measures and Analysis (22 Hours )

Measures of Central Tendency - Arithmetic Mean - Median - Mode - Geometric and Harmonic Mean - Measures of variation and standard, mean and quartile deviations -Skewness and Kurtosis Lorenz curve. Analysis of Time Series: Methods of measuring - Trend and Seasonal variations Index number -Unweighted indices -Consumer price and cost of living indices. (Theory and problems may be in the ratio of 20% and 80% respectively. An over view of the topics is expected and only simple problems shall be given)

References

1. Sundaresan and Jayaseelan - An Introduction to Business Mathematics and Statistical Methods.

- 2. Dr. A K Arte & R V Prabhakar A Text Book of Business Mathematics.
- 3. Sanchethi and Kapoor- Business Mathematics.
- 4. Gupta S.P- Statistical Methods

- 5. Navaneethan P- Business Mathematics
- 6. R.S.N. Pillai, Mrs. Bhagavathi Statistics
- 7. P.R. Vittal Business Mathematics and Statistics.

Mark distribution	
Module 1	26
Module II	11
Module III	22
Module IV	23
Module V	28

# Semester III A12 INFORMATICS AND EMERGING TECHNOLOGIES Total Hours: 80; Credits: 4; Hours/Week: 5; Total Marks 100 (Internal

#### 20& External 80)

**Objectives** To gain a basic knowledge of the Basic parts of a computer, operating systems, Scientific data bases, wireless communication, mobile phones and emerging technologies such as optical fibres, lasers, holography and biometrics with special emphasis on cyber security

#### **Course outcome (s)**

To understand about the basic parts of computer and its memmory devices

To recognise scientific databases

To distinguish wireless technologies

To understand the basic priciples and applications of optical fibers, lasers, holography and biometrics

To recognise the significance of cyber security

#### Module I: Computers and operating system (10 Hours)

Computer-Evolution of computers-Basic ideas about the parts of a computer, Input devices, Output devices, Memory, Storage devices and Operating systems. Evolution of internet- Scientific data bases and useful educational websites.

#### Module II: Wireless Communication (12 Hours)

Wireless Communication: Analog & Digital access – WAP, WLANs, Microwave LANs, radio LANs, infrared LANs, WLL technologies. International wireless communication systems. Mobile Phones: Evolution of mobile telephone technology – DAMPS vs GSM vs CDMA – PCS Networks. Smart Phones: Feature phones, mobile OSs, Elementary ideas on smart phone

applications.

#### Module III: Optical fibres and lasers (20 Hours)

Optical fibres-manufacturing-Industrial applications of optical fibers in communication, sensor devices, power transmission-Other specific applications. Laser-History-Classification based on hazardousness-Applications in Scientific, medical, military, industrial and entertainment.

Holography-Introduction -Applications in art, data storage and security.(Basic Ideas Only)

#### Module IV: Social informatics (20 Hours)

Introduction to Cyber security- CIA triad-security attacks-issues related to social networking – Guidelines. Applications of Digital Signature - Good password practices E-commerce – Online banking security- Online shopping fraud-Guidelines and Recommendations Connecting your devices to Internet-Managing your browser-Social media Security-E-mail security. Indian IT Act, 2008 - Cyber Forensics – Functions of cyber crime cell

Module V: Introduction to biometrics (18 Hours)

Introduction to biometrics - Fingerprint verification- Face recognition. (Basic Ideas Only) Hand geometry based verification - Recognizing persons by their Iris pattern. Retina identification. Automatic online signature verification-Speaker recognition – identification of faces and body parts. Large scale systems-Multimodal biometrics-Smartcard based authentication.

#### References

1. Fundamentals of Computers: Pearson Education India, 2011

2. Introduction To Information Technology. Rajaraman, V. Phi Learning Pvt. Ltd., 2018

3. Fundamentals of Wireless Communication. David Tse, Pramod Viswanath. Cambridge University Press, 2005

4. Cell Phone Culture: Mobile Technology in Everyday Life. Gerard Goggin.Routledge, 2006

5. Fundamentals of Plastic Optical Fibers. Yasuhiro Koike. John Wiley & Sons, 2015

6. Lasers: Fundamentals and Applications. K. Thyagarajan, Ajoy Ghatak. Springer Science & Business Media. 2010

7. Basics of Holography. P. Hariharan. Cambridge University Press. 2002

8. Introduction to Computer Networks and Cybersecurity. Chwan-Hwa (John) Wu, J. David Irwin

CRC Press, 2016

9. Information Technology Law and Practice. Vakul Sharma. Universal Law Publishing, 2011

10. Introduction to Biometrics. Anil K. Jain, Arun A. Ross, Karthik Nandakumar. Springer Science

& Business Media, 2011

11. Biometrics: Identity Verification in a Networked World. Samir Nanavati, Michael Thieme, Raj

Nanavati. John Wiley & Sons, 2002

#### **Further Reading**

1. Information Technology: An Introduction for Today's Digital World. Richard Fox

CRC Press, 2013

2. Data Processing and Information Technology. Carl French . Cengage Learning EMEA, 1996

3. *The New Communications Technologies: Applications, Policy, and Impact*, 5th. Edition. Mirabito,

Michael M.A; and Morgenstern, Barbara L., Focal Press, 2004.

4. Lasers: Basics, Advances and Applications. Hans Joachim Eichler, Jürgen Eichler, Oliver Lux

Springer. 2018.

5. Cyber Forensics. S. Murugan. Oxford University Press, 2018

6. Encyclopedia of Biometrics:Stan Z. Li. Springer Science & Business Media, 2009

Mark distribution		
Module 1	16	
Module II	21	
Module III	21	
Module IV	28	
Module V	24	

# Semester IV A13 ENTREPRENEURSHIPAND ENVIRONMENTALSCIENCE

Total Hours: 80; Credits: 4; Hours/Week: 5; Total Marks 100 (Internal 20& External 80)

**Objective(s)** To acquire a detailed knowledge about the relationship between Entrepreneurship and sustainability with special emphasis on industrial pollution and its control measures

#### **Course outcome (s)**

To appreciate the role of Entrepreneur in Economic Growth To recognise the contradicting nature of industrialization and sustainable development

To distinguish the types of pollution of water, air and land To understand the basic principles and applications of pollution control methods

To recognise the significance of Environment policies and Regulations

#### Module I -Fundamentals of Entrepreneurship (20 Hours)

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth. MSMEs – Definition and Significance in Indian Economy; MSME Steps for starting, promotion measures by government-Incentive & subsidy. Role of Promotional Institutions with Special Reference to KINFRA, KITCO. Identification of Business Opportunities in Kerala-Industrial policy, 2007. Measures to speedup industrial growth. ED Club-Mission, objectives & functions. Business Incubation-benefits & setting up incubation centre.

#### Module II-Process of starting business (16 Hours)

Search for business idea, sources of ideas, idea processing, input requirements : sources and criteria of financing, fixed and working capital assessment; technical assistance; marketing assistance; sickness of units and remedial assistance; preparation of feasibility reports and legal formalities and documentation.

#### Module III-Environmental Concerns (12Hours)

Industrial activity and environment, industrialization and sustainable development- indicators of sustainability-sustainability strategies. Barriers to sustainability, Pollution prevention in achieving sustainability Prevention vs control of industrial pollution, Environment policies and Regulations to encourage pollution prevention, Regulations for clean environment and implications for industries **Module IV-Pollution (16 Hours)** 

Definition of pollutant, types of pollution; Air, Water, Land, noise- adverse effects of pollutants on eco system and human health - Need for effluent treatment and toxicity control.

#### **Module V -Pollution Control Methods (16Hours)**

Air standards for cities and industrial areas. Particulate emission controlgravitational settling chambers- cyclone separators, fabric filters, electrostatic precipitators, wet scrubbers, absorbers. Noise pollution measurements and its control. Water standards for portable, agricultural and left-off streams Principles of water treatment -primary, secondary and tertiary treatments

#### References

1. Fundamentals Of Entrepreneurship, Sangram Keshari Mohanty, Phi Learning Pvt. Ltd.

2. Entrepreneurship development small business enterprises. Poornima M

Charantimath, Pearson, 2013.

3. Environment and Sustainable Development , M.H. Fulekar, Bhawana Pathak, R K Kale, Springer

Science & Business Media

4. Greening Industry: New Roles for Communities, Markets, and Governments, Volume 1

World Bank Publications, 2000

5. A Text Book Of Environmental Science, Arvind Kumar, APH Publishing, 2004

6. Pollution: Causes, Effects and Control. Roy M. Harrison, Royal Society of Chemistry, 2001

7. Industrial Chemistry, BK Sharma Krishna Prakashan Media, 1991

8. Water Pollution. Agarwal S. K. APH Publishing

#### **Further reading**

1. Entrepreneurship: Theory And Practice, Raj Shankar, Vijay Nicole

imprintsltd in collaboration with Tata Mc-graw Hill Publishing Co.ltd.-new

Delhi, 2012

2. Entrepreneurship. 8 th Edition Robert D. Hisrich, Mathew J. Manimala, Michael P Peters and

Dean A. Shepherd, Tata Mc-graw Hill Publishing Co.ltd.-new Delhi, 2012

3. The Design of Business. Martin Roger, , Harvard Business Publishing, 2009

4. Innovation and Entrepreneurship, Drucker.F, Peter, Harper business, 2006.

5. Environment Protection and Sustainable Development. Saligram Bhatt, APH Publishing, 2004

6. Pollution: Causes, Effects and Control. Roy M. Harrison, Royal Society of Chemistry, 2001

Mark distribution		
Module 1	21	
Module II	16	
Module III	24	
Module IV	23	
Module V	26	

# Semester IV

# A14 NUTRITION AND HEALTH

# Total Hours: 80; Credits: 4;Hours/Week: 5; Total Marks 100 (Internal 20& External 80)

## **Objectives:**

- 1. To understand the importance of nutrition with relation to health
- 2. To get the knowledge about energy and their concepts
- 3. To study the various nutrients available in the food

## **Course outcomes:**

- 1. Familiarise the importance of food & health
- 2. Acquire knowledge of energy requirements for various activities
- 3. Exposure to nutrients in foods

# Module I: Concept of Health (4 Hours)

Definition of physical health, mental health, social health, spiritual healthdeterminants of health, indication of health

# Module II: Concept of Nutrition (6Hours)

Definition of terms: Nutrition, under nutrition, Malnutrition, Health & Nutritional status – adequate, optimum & good nutrition. Relation of good nutrition to normal physical development & sound health

# Module III: Energy (6 Hours)

Definition of Caloric & Joule.Measurement of calorific values of food, basal metabolism, specific dynamic action of foods, energy needs of body, measurement of energy balance of body.

# Module IV: Food Guide (4 Hours)

Nutrients supplied by foods. Basic food groups.

#### Module V : Carbohydrates (12 Hours)

Sources, Classification, digestion, absorption, transportation & utilization, functions, sources, requirements and effect of deficiency. Dietry Fibre-Definition, classification, sources, role of fibre in human nutrition.

#### Module VI : Proteins (12 Hours)

Classification, digestion absorption, transportation & utilization, functions, sources & requirements. Essential amino acids, evaluation of protein quality, supplementation and deficiency.

#### Module VII: Lipids (12 Hours)

Classification, saturated and unsaturated fatty acids, digestion, absorption, transportation & utilization, functions, sources & requirements and effect of deficiency.

#### Module VIII: Minerals (8 Hours)

Functions, sources, absorption and factors affecting the utilization of Calcium, Phosphorus, Iron, Iodine, Copper and Fluoride, effects of deficiency.

#### Module IX : Vitamins (8 Hours)

Classification, functions, sources, factors affecting destruction, factors enhancing vitamins in foods, absorption, requirements & deficiency conditions – Vit. A, D, E, K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Pantothenic acid.

#### Module X : Water (8 Hours)

Importance, distribution in body, function sources, requirements, water balance.

#### **References:**

1. Essential of food & Nutrition –Vol. 1 M. Swaminathan,Bappco,Bangalore.

2. Human Nutrition and Dietetics –Davidson S. Passmore

3. Normal and Therapeutic Nutrition- Corinne .H.Robinson & Marilyn Lawler

4. Contemporary Nutrition - Gordon M. Wardlaw, Paul Insel et, al., (2000) Mosby, Chicago.

5. Nutrition- concepts and controversies- Eleanor Whitney –Eighth Edition (2000)

6. Basic principles of Nutrition- Seema Yadav, First edition (1997)

7. Essentials of Nutrition and Diet therapy -Sue Rodwell Williams, fifth edition, Times Mirror Mosby College Publishing, 1990.

8. Understanding Nutrition -Whitney P.N. and Roes S.R., West Publication Co, 1996.

9. Swaminathan, M.Essential of Food & Nutrition, 1974. Bappco, Bangalore.

10. Jussawalla, JM. Natural Dietics, A hand book on Food, Nutrion and Health. Wikas publishing house.

11. Sumati R Mudambi,Rajogopal,M.V.Fundamentals Food,nutrition & Diet Therapy,1982.NewAge PLtd.

12. Education planning group.Food & Nutrition,1980.Arya publishing group, New Delhi

13. National Institute of Nutrition, Food & Health, I.C.M.R, Hydrabad