COURSE WISE BREAKUP

Second Year Third Semester

THEORY

COURSE CODE	TITLE	CREDIT HOURS	MARKS
ENG-201	ENGLISH-III (FUNCTIONAL)	03	100
PS-201	PAKISTAN STUDIES	02	50
GEN-201	GENERAL-IV	03	100
GEN-201	GENERAL-V	03	100
CHEM-241	ENVIRONMENTAL CHEMISTRY	02	75
CHEM-271	PHYSICAL CHEMISTRY	03	100

PRACTICALS

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-271	PHYSICAL CHEMISTRY	01	25

- **Total Credits of the Semester = 17 (theory 16 & practicles 01 credits)**
- **Maximum Marks = 550 (theory 525 & practicles 25 marks)**

2nd Year; 3rd Semester

Title of the Course: **ENGLISH-III (REPORT WRITTING)** **Code: ENG-201**

Credit Hours: **03** **Marks: 100**

Objectives: Enhance language skills and develop critical thinking

Course Contents

Presentation skills

Essay Writing: Descriptive; narrative; discursive; argumentative

Academic Writing: How to write a proposal for research paper/term paper.

How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency).

Technical Report Writing

Progress Report Writing

RECOMMENDED BOOKS:

a) Essay Writing and Academic Writing

1. Writing. Advanced by Ron White. Oxford Supplementary Skills. Third Impression, 1992. ISBN 0 19 435407 3 (particularly suitable for discursive, descriptive, argumentative and report writing).
2. College Writing Skills by John Langan. Mc-Graw-Hill Higher Education. 2004.
3. Patterns of College Writing (4th edition) by Laurie G. Kirszner and Stephen R. Mandell. St. Martin's Press.

b) Presentation Skills

c) Reading

The Mercury Reader. A Custom Publication. Compiled by norther Illinois University. General Editiors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharton. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).

2nd Year; 3rd Semester

Title of the Course: **PAKISTAN STUDIES** **Code: PS-201**

Credit Hours: **02** **Marks: 50**

Objectives:

1. Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.
2. Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Contest:

Historical Perspective

a. Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-i-Azam Muhammad Ali Jinnah.

b. Factors leading to Muslim separatism

c. People and Land: i. Indus Civilization; ii. Muslim advent; iii. Location and geo-physical features.

Government and Politics in Pakistan

Political and constitutional phases: a. 1947-58; b. 1958-71; c. 1971-77; d. 1977-88; e. 1988-99; f. 1999 onward

Contemporary Pakistan

a. Economic institutions and issues; b. Society and social structure; c. Ethnicity; d. Foreign policy of Pakistan and challenges; e. Futuristic outlook of Pakistan

RECOMMENDED BOOKS:

1. Burki, Shahid Javed. State & Society in Pakistan, The Macmillan Press Ltd, 1980.
2. Akbar, S. Zaidi. Issue in Pakistan's Economy. Karachi: Oxford University Press, 2000.
3. S. M. Burke and Lawrence Ziring. Pakistan's Foreign policy: An Historical Analysis. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. Pakistan Political Roots & Development. Lahore, 1994.
5. Wilcox, Wayne.The Emergence of Banglades., Washington: American Enterprise, Institute of Public Policy Research, 1972.

6. Mehmood, Safdar. Pakistan Kayyun Toota, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
7. Amin, Tahir. Ethno - National Movement in Pakistan, Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. Enigma of Political Development. Kent England: WmDawson & Sons Ltd, 1980.
9. Zahid, Ansar. History & Culture of Sindh. Karachi: Royal Book Company, 1980.
10. Afzal, M. Rafique. Political Parties in Pakistan, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
11. Sayeed, Khalid Bin. The Political System of Pakistan. Boston: Houghton Mifflin, 1967.
12. Aziz, K.K. Party, Politics in Pakistan, Islamabad: National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem, Pakistan Under Martial Law, Lahore: Vanguard, 1987.
14. Haq, Noor ul. Making of Pakistan: The Military Perspective. Islamabad: National Commission on Historical and Cultural Research, 1993.

2nd Year; 3rd Semester

Title of the Course: GENERAL-IV **Code: GEN-201**

Credit Hours: 03 **Marks: 100**

Principles of Management:

Concept of management and organization, Managers and their functions. Management environment both external and internal and adaptation to environments. Decision making, organization planning, human resource management, managing team work. Motivating and rewarding employees. Leadership and management. Communication and interpersonal skills. Organization control techniques. Productivity and quality.

2nd Year; 3rd Semester

Title of the Course: GENERAL-V **Code: GEN-201**

Credit Hours: 03 **Marks: 100**

Community Development:

Concept of community and community development, Dynamics of change and analysis of community situation, producing a project plan and consulting with relevant stakeholders, sponsors or agencies and conducting community project meeting for solution of the problems. Developing a fund raising strategy. Identifying potential donors and creating a data base. Managing the projects and establishing controls. Monitoring and evaluation of the project. Some examples of projects, Deforestation, over fishing, Disposal of waste, sewerage system. Vaccination against deadly diseases. Rehabilitation of the community affected by natural disasters.

2nd Year; 3rd Semester

Title of the Course: **ENVIRONMENTAL CHEMISTRY** **Code: CHEM-241**

Credit Hours: **02** **Marks: 75**

Objectives of the Course:

From this course, the students should be able to:

• Understand the fundamental principles of environmental chemistry.

• Apply these principles in pollution related subjects.

• Demonstrate the understanding of environmental chemistry principles via experimental exercises in the laboratory.

Course Contents:

Atmospheric Chemistry

The air around us, atmospheric temperature and pressure profile, Temperature inversion and photochemical smog, particulate matter in the atmosphere, Industrial pollutants, radioactivity, atmospheric aerosols, Acid rain – major sources, mechanism, control measures and effects on buildings and vegetation, Global warming – major green house gases, mechanism, control measures and global impact, The stratospheric ozone – the ozone hole, CFCs, ozone protection, biological consequences of ozone depletion.

Water Pollution and Water Treatment

Sources of water pollution, industrial sources and agricultural sources, heavy metals contamination of water, Eutrophification, detergents and phosphates in water, water quality criteria, Water purification – primary, secondary and advanced treatment, Removal of nitrogen and phosphorous compounds from polluted water, organic matter in water and its decomposition.

Soil Pollution

Soil and mineral resources, general principles of metal extraction, Heavy metals contamination of soil, toxicity of heavy metals, bio-accumulation of heavy metals, Organic matter in soil, Macro and micro-nutrients in soil, ion-exchange in soil, soil pH and nutrients availability.

Green Revolution

Pest control, pesticides, toxicity of pesticides, integrated pests management.

Energy Production and Environment – Liquid and gaseous fuel, hydrogen economy.

Renewable Energy – Nuclear energy, solar energy, geothermal and tidal energy.

RECOMMENDED BOOKS:

1. Collin Baird, Environmental Chemistry, W. H. Freeman and company, New York, 1995.
2. John W. Moore and Elizabeth A. Moore, Environmental Chemistry, Academic Press Inc., New York, 1976.
3. Anil Kumar De, Environmental Chemistry, Wiley Eastern Ltd. New Delhi, 1989.
4. R. W. Raiswell, P. Brimblecombe, D. L. Dent and P. S. Liss, Edward Arnold Ltd., London, 1980.
5. Staneley E. Manahan, Environmental Chemistry, Brooks, California.
6. Peter O. Neill, Environmental Chemistry, Chapman and Hall, London, 1993.
7. Derek M. Elsom, Atmospheric Pollution, Blackwell Publishers, Oxford, 1992.
8. Geoffrey Lean and Don Hinrichsen, Atlas of the Environment, Helicon Publishing Ltd., Oxford, 1992.

2nd Year; 3rd Semester

Title of the Course: **PHYSICAL CHEMISTRY** **Code: CHEM-271**

Credit Hours: **03** **Marks: 100**

Course Contents:

Physical States of Matter

Ideal and real gases; equations of state, critical phenomenon and critical constants. Molecules in motion: collision diameter and mean free path. Physical properties of liquids: surface tension, viscosity, refractive index etc. and their applications. Brief account of interactions among the molecules in liquids. Packing of atoms in solids. Unit cells and crystal systems. Method of crystal structure analysis. Brief account of polymers

and composite materials with special emphasis on superconductors, semi-conductors etc. Introduction to plasma.

Chemical Thermodynamics

Laws of thermodynamics and their applications. Thermodynamic functions: internal energy, enthalpy, entropy and free energy. Relation between thermodynamic functions. van't Hoff's equation. Heat capacities, concept of entropy and probability.

Chemical Kinetics

Rate of reaction. Rate law, order and molecularity of the reactions. Zero, first and second order reactions. Determination of reaction order and its rate constant. Effect of temperature on the reaction rate. Concepts of chemical equilibrium. Le-Chatelier's principle and its applications. Elementary concepts underlying complex and fast reactions.

Solution Chemistry

Ideal and non-ideal solutions. Raoult's and Henery's laws and their applications. Molecular interactions in solutions. Colligative properties. Distillation and concept of azeotropic mixture.

Surface Chemistry

Concept of interfaces. Adsorption and adsorption isotherms: Freundlich and Langmuir adsorption isotherms. Catalysis, colloids emulsion and their industrial applications.

Electrochemistry

Basic concepts of electrochemistry. Ions in solution. Measurement of conductance and Kohlrausch's law. Debye-Hueckel theory and activity coefficient. Application of conductance measurement. Electrode potential. Electrochemical cell. Application of electrode potential

2nd Year; 3rd Semester

Title of the Practical: PHYSICAL CHEMISTRY

Code: CHEM-271 Credit Hours: 01 Marks: 25

Course Contents:

1. Determination of viscosity and parachor values of liquids.
2. Determination of percent composition of liquid solutions viscometrically.
3. Determination of refractive index and molar refractivity.
4. Determination of percent composition of liquid solutions by refractive index measurements.
5. Determination of molecular weight of a compound by elevation of boiling point (ebullioscopic method).
6. Determination of molecular weight of a compound by lowering of freezing point (cryoscopic method).
7. Determination of heat of solution by solubility method.
8. Determination of heat of neutralization of an acid with a base.
9. Kinetic study of acid catalyzed hydrolysis of ethyl acetate.
10. Determination of partition coefficient of a substance between two immiscible liquids.

RECOMMENDED BOOKS:

1. Alberty R. "Physical Chemistry" 17th ed., John Wiley and Sons (1987).
2. Atkins, P.W. "Physical Chemistry" 6th ed., W.H. Freeman and Co. New York (1998).
3. Laidler K.J. "The World of Physical Chemistry" 1st ed., Oxford University Press (1993).
4. Laidler K.J., John H.M. and Bryan C.S. "Physical Chemistry" 4th ed., Houghton Mifflin Publishing Company Inc. (2003).
5. Peter P.A. "Chemical Thermodynamics" Oxford University Press (1983).
6. Brain S.E. "Basic Chemical Thermodynamics" 4th ed., E.L.B.S. Publishers (1990).
7. Barrow G.M. "Physical Chemistry" 5th ed., McGraw Hill (1992).
8. Jaffar M. "Experimental Physical Chemistry" University Grants Commission (1989).
9. Levitt B.P. "Findlay's Practical Physical Chemistry" 9th ed., Longman Group Limited (1978).
10. Shoemaker D. "Experiments in Physical Chemistry" 5th ed., McGraw Hill Publishing Company Limited (1989).