

**INSTITUTE OF CHEMICAL SCIENCES  
BAHAUDDIN ZAKARYIA UNIVERSITY MULTAN**

**THE FOLLOWING SCHEME OF STUDIES IS DULY APPROVED FROM  
INSTITUTE OF CHEMICAL SCIENCES AND VARIOUS BODIES OF BZU, MULTAN  
Scheme of Studies (Course Outline) for ADS 2 YEAR PROGRAMM IN Chemistry Fall 2023**

<b>1<sup>st</sup> Semester</b>			
<b>S No</b>	<b>Course Title</b>	<b>Course Codes</b>	<b>Credit Hours</b>
1	<b>Quantitative Reasoning-I</b>	<b>QANR-100</b>	<b>3</b>
2	<b>Functional English</b> <i>(Science Faculty Dean's Office Course Contents)</i>	<b>ENGL-100</b>	<b>3</b>
3	<b>Applications of Information and Communication Technologies (ICT)</b> <i>(Science Faculty Dean's Office Course Contents)</i>	<b>AICT-100</b>	<b>2+1</b>
4	<b>Islamic Studies ** (OR) Religious Education/Ethics in lieu of Islamic Studies (only for non-Muslim students)</b> <i>(Science Faculty Dean's Office Course Contents)</i>	<b>ISLS-100/ETHC-100</b>	<b>2</b>
5	<b>Inorganic Chemistry</b>	<b>CHEM-151</b>	<b>3+1</b>
6	<b>Translation of Holy Quran-1/ Ethics-I</b>	<b>ARAB-151/ETHC-151</b>	<b>0</b>
	<b>Sub. Total</b>		<b>15</b>
<b>2<sup>nd</sup> Semester</b>			
<b>S No</b>	<b>Course Title</b>	<b>Course Codes</b>	<b>Credit Hours</b>
1	<b>Quantitative Reasoning-II</b>	<b>QANR-101</b>	<b>3</b>
2	<b>Expository Writing</b> <i>(Science Faculty Dean's Office Course Contents)</i>	<b>ENGL-101</b>	<b>3</b>
3	<b>Ideology and Constitution of Pakistan</b> <i>(Science Faculty Dean's Office Course Contents)</i>	<b>IDCP-100</b>	<b>2</b>
4	<b>Art &amp; Humanities</b>	<b>XXXX*-101</b>	<b>2</b>
5	<b>Biochemistry</b>	<b>BCHM-131</b>	<b>2</b>
6	<b>Bioanalytical Techniques</b>	<b>BATS-111</b>	<b>2+1</b>
7	<b>Translation of Holy Quran-II/Ethics-II</b>	<b>ARAB-152/ETHC-152</b>	<b>0</b>
	<b>Sub. Total</b>		<b>15</b>
<b>3<sup>rd</sup> Semester</b>			
<b>S No</b>	<b>Course Title</b>	<b>Course Codes</b>	<b>Credit Hours</b>
1	<b>Physical Chemistry</b>	<b>CHEM-271</b>	<b>3+1</b>
2	<b>Organic Chemistry</b>	<b>CHEM-261</b>	<b>3+1</b>
3	<b>Natural Science</b>	<b>NASC-221</b>	<b>2+1</b>
4	<b>Civics and Community Engagement</b>	<b>CCES-201</b>	<b>2</b>
5	<b>Material Science/Everyday Science/Forensic Science</b>	<b>MTSC-251/EVSC-251/FRSC-251</b>	<b>2</b>
6	<b>Translation of Holy Quran-III/ Ethics-III</b>	<b>ARAB-251/ETHC-251</b>	<b>0</b>
	<b>Sub. Total</b>		<b>15</b>
<b>4<sup>th</sup> Semester</b>			
<b>S No</b>	<b>Course Title</b>	<b>Course Codes</b>	<b>Credit Hours</b>

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1	Physical Chemistry	CHEM-272	2
2	Analytical Chemistry	CHEM-212	2
3	Organic Chemistry	CHEM-262	2
4	Environmental Science	ENSC-241	2
5	Fundamental of Physics/Fundamental of Biology/Biotechnology/Microbiology	PHYS-200/BIOL-200 /BTCH-200/MICB-200	3
6	Social Science	XXXX*-200	2
7	Entrepreneurship	MNGT-200	2
8	Translation of Holy Quran-IV/ Ethics-IV	ARAB-252/ETHC-252	0
	Sub. Total		15
	TOTAL		60

\* XXXX-100, for Arts & Humanities any course from list may be offered, XXXX-100 will be taken as

\* XXXX-200 for Social Sciences any course from list may be offered, XXXX-200 will be taken as

Note: For ADS (2-Year) Program course outline up to first four Semesters will be followed.

In Semesters VII & VIII, the field of specialization will be Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Analytical Chemistry and Applied Chemistry depending upon the availability of teaching faculty.

Any future changes/ amendments in the scheme and courses of reading will be incorporated by the approval of respective bodies.

List of Arts & Humanities Courses: *Fine Arts (FA-100), Economics (ECON-100), Philosophy (Phil-100), Sociology (Soci-100)*

List of Social Sciences Courses: Public Administration (PADM-200), Journalism (JOUR-200), Introduction to Mass Communication (MCOM-200), Law and Legislature (LALA-200), Education (EDU-200), History (HIS-200), International Relations (IR-200)

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**Scheme of Studies (Course Outline) for  
ADS 2 YEAR Program in Chemistry Fall- 2023**

**ADS 1<sup>st</sup>Year**

**Semester-I**

**Course Title: INORGANIC CHEMISTRY-I**

**Code: CHEM-151**

**Credit Hours: 3+1**

**Marks**

**100**

**Course Objectives:**

Students will acquire knowledge about basic as well as in orbital approach chemical bonding, ionic solids, acid-base chemistry and functioning of indicator.

**Course Content:**

**Chemical Bonding: Covalent Bonding: Orbitals**

The localized electron model and hybrid orbital, the molecular orbital model, Linear combination of atomic orbitals and application approach on heteroatomic molecules/ions like CO, NO, NO<sup>+</sup>, NO<sup>-</sup>, CN<sup>-</sup>, Hybridization approach to find out electron pair and molecular geometry of molecules like XeF<sub>2</sub>, XeF<sub>4</sub>, XeF<sub>6</sub>, SF<sub>4</sub>, SF<sub>6</sub>, IF<sub>3</sub>, IF<sub>5</sub>, IF<sub>7</sub>

**Acid Base Concepts:**

Acid-Base concepts i.e Arrhenius, Lowry-Bronsted, Lewis, Soft and hard acids and bases (SHAB), Lux-Flood, Usanovich Concept, Common ion effect, Application of common ion effect in salt analysis, Buffer Solution and solubility.

**Theories of Indicators:**

Ostwald's and Quinonoid theories of indicators to explain functioning of phenolphthalein, methyl orange etc.

**p-Block Elements:**

Physical and chemical properties of p-block elements with emphasis on some representative compounds such as Boric Acid, Alums, Carbides, Silicates, Nitric Acid, orthophosphoric acid, Sulfuric Acid, inter-halogens, pseudo-halogens and Polyhalides.

**CHEM-151 Lab.**

Lab safety and good laboratory practices, knowledge about material safety data sheets (MSD), disposal of chemical waste and first-aid practices.

1. Qualitative analysis of inorganic salt (one acidic & one basic radical).
2. Quantitative analysis.

Acid-base titrations

Redox titrations

**Note: Experiment can be designed/ modified by Instructors/Teacher keeping in view of semester courses contents according to lab facility**

**Recommended Books:**

**Note: Updated version of following reference books may be consulted from library or available online.**

- Cotton, F. A. and Wilkinson, G., *Advanced Inorganic Chemistry*, 6th ed., John-Wiley & Sons, New York, (2007).
- Huheey, J. E., *Inorganic Chemistry: Principles of Structure and Reactivity*, 3rd ed., Harper International SI Edition, (2006).
- House, J. E., *Inorganic Chemistry*, Academic Press. USA, (2008).
- Lee, J. D., *Concise Inorganic Chemistry*, 5th ed., Chapman and Hall, (1996).
- Miessler, G. L., Tarr, D. A., *Inorganic Chemistry*, 3rd ed., Pearson Education, India, (2008).

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- Huheey, J. E., Keiter E. A., Keiter L. R., *Inorganic Chemistry: Principles of Structure and Reactivity*, 4th ed., Benjamin-Cummings Pub Co., (1993).
- Sharpe, A. G., *Inorganic chemistry*, 3rd ed., Pearson Education India,(1981).
- G.S. Sodhi, "Principle of Inorganic Chemistry" 1<sup>st</sup> edition 2013. R.L.Madan, *Inorganic Chemistry*, 2010
- Chaudhary S. U., *Ilmi Textbook of Inorganic Chemistry*, IlmiKitabKhana, Lahore, (2013).
- Catherine E. House crdft, Alan G. Sharpe, *Inorganic Chemistry*, 3rd ed.,Prentice Hall,(2008).
- Kathleen A. H., James E. H., *Descriptive Inorganic Chemistry*, 2nd ed.,Brooks Cole, (2010).
- Wulfsberg G., *Principles of Descriptive Inorganic Chemistry*, 1st ed.,University Science Books, (1991).
- G.D. Tuli, *Advanced Inorganic Chemistry, Volume I*, 2014,
- Mala Nath, *Inorganic Chemistry-A laboratory Manual*, 2016.
- Mendham, J., Denny, R. C., Barnes, J. D., Thomas, M. and Sivasankar,B., *Vogel's Textbook of Quantitative Chemical Analysis*, 6th ed., PearsonEducation, Ltd., (2000).
- Svehla, G., *Vogel's Qualitative Inorganic Analysis*, 7th ed., (7th imp.),Pearson Education, Ltd., (2009).

**ADS 2<sup>nd</sup> Year**

**Semester-III**

**Course Title:        PHYSICAL CHEMISTRY-I**

**Code:                 CHEM-271**

**Credit                3 +1**

**Marks**

**100**

**Hours:**

**Course Objectives:**

Students will learn about thermodynamics, state of matters and different phenomena of solution chemistry.

**Course Content:**

**Chemical Thermodynamics:** Introduction to thermodynamics, Three laws of thermodynamics (Zeroth, first and second law) and their applications, Entropy, thermochemistry, calorimetry, heat capacities and their dependence on temperature, pressure and volume, reversible and non-reversible processes, spontaneous and non-spontaneous processes, relationship of entropy and Gibbs free energy with equilibrium constant, Gibbs Helmholtz equation and its applications, Clausius Clapeyron equation

**States of Matters:** Introduction to physical states of matter, Physical properties of liquids, intermolecular forces, surface tension, viscosity, refractive index, dipole moment etc. and their applications, Properties of gases, Kinetic theory of gases, Equation of state, Ideal and Non-ideal gases, Vander Waal's equation and its relationship with critical phenomenon, derivation of kinetic equation, Properties of Solids, Crystal structure, Bragg's Law, X-ray diffraction and its application

**Solution Chemistry:** Introduction to solutions, Types of solution, concentration units (percentage solution, mole fraction, molarity, normality, molality, ppm and their interconversion), Solute-solvent interaction, Ideal and non-ideal solutions, Raoult's law and its applications, Colligative Properties (lowering of vapor pressure, elevation of boiling point, depression of freezing point, osmotic pressure) and their applications, abnormal colligative properties.

**CHEM-271 Lab.**

1. Laboratory security, safety and preparation

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2. Determination of surface tension, viscosity and refractive index of liquids.
3. Determination of molecular weight of a compound by elevation of boiling point (ebullioscopic method).
4. Determination of molecular weight of a compound by lowering of freezing point (cryoscopic method).
5. Determination of molecular weight of polymer by viscosity method.
6. Determination of heat of solution by solubility and calorimetric methods.
7. Determination of heat of neutralization of an acid with a based

**Recommended Books:**

- *McQuarrie, D. A. and Simon, J. D., Physical Chemistry – A Molecular Approach, 1st ed., University Science Books, (1997).*
- *Atkins, P. and Paula, J. D., Atkin's Physical Chemistry, 9th ed., Oxford University Press, (2010).*
- *Shoemaker, D., Experiments in Physical Chemistry, 8th ed., McGraw Hill Publishing Company Limited, (2003).*
- *Silbey, R., Alberty, R. and Bawendi, M., Physical Chemistry, 4th ed., (2005).*
- *Glasstone, S., Textbook of Physical Chemistry, Macmillan London (1960).*
- *James, A. M., Prichard, F. E., Practical Physical Chemistry, 3rd ed., Longman Group Limited, New York, (1974).*
- *Chaudhary, S. U., Ilmi Textbook of Physical Chemistry, 2nd ed., Ilmi Kitab Khana, Lahore, (2013).*
- *Atkins, P., Jones, L., Chemical Principles: The Quest for Insight, 5th ed., W. H. Freeman, New York, (2010).*
- *Linder, B., Elementary Physical Chemistry, World Scientific Publishing Co. Pvt. Ltd., (2011).* 10.  
*Davis, W. M., Dykstra, C. E., Physical Chemistry: A Modern Introduction, 2 nd ed., CRC Press, (2011).*

**ADS 2<sup>nd</sup> Year**

**Semester-III**

**Course Title:       ORGANIC CHEMISTRY -I**

**Code:               CHEM-261**

**Credit Hours:     3+1**

**Marks**

**100**

**Course Objectives:**

Students will acquire knowledge about basic concepts of organic chemistry, chemistry of hydrocarbons and functional groups and the mechanism of organic reactions. Such information will be useful for qualitative analysis and synthesis of organic compounds.

**Course Content:**

Basic Concepts of Organic Chemistry:

Chemical bonding and hybridization, localized and delocalized bonding, structure- aromaticity, inductive effect, dipole moment, resonance and its rules, hyperconjugation, classification and nomenclature of organic compounds including IUPAC system, types of organic reactions (an overview).

Chemistry of Functional Groups:

Introduction and general reactions and properties of Saturated hydrocarbons, unsaturated hydrocarbons, aromatic hydrocarbons, alcohols, phenols, ethers, amines, aldehydes, ketones and carboxylic acids and their derivatives including esters, amides, acid halides and acid anhydride.

**CHEM-261 Lab.**



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solid, liquid and gas phases, extent of reactions and equilibrium constants, Gibbs energies of formation and calculations of equilibrium constants, effect of temperature and pressure on the equilibrium constants/compositions, van't Hoff equation, Le-Chatelier's principle, Gibbs phase rule, Phase diagrams of one component and two component systems, Gibbs energy and the phase diagram of a substance, location of phase boundaries, vapor-liquid equilibrium of binary liquid mixtures, binary phase diagrams and lever rule

**Recommended Books:**

- *Atkins, P. and Paula, J.D., Atkin's Physical Chemistry, 9th ed., Oxford University Press, (2010).*
- *Silbey, R., Alberty, R. and Bawendi, M., Physical Chemistry, 4th ed., (2005).*
- *Glasstone, S., Textbook of Physical Chemistry, Macmillan London (1960).*
- *Linder, B., Elementary Physical Chemistry, World Scientific Publishing Co. Pvt. Ltd., (2011)*
- *Noor, A., Chemical Kinetics, University Grant Commission (1983)*
- *Laidler K.J. "The World of Physical Chemistry" 1st ed., Oxford University Press (1993).*
- *Laidler K.J., John H.M. and Bryan C.S. "Physical Chemistry" 4th ed., Houghton Mifflin Publishing Company Inc.(2003).*
- *Barrow G.M. "Physical Chemistry" 5th ed., McGraw Hill (1992).*

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

**Course Title:**

**ANALYTICAL CHEMISTRY -I**

**Code:**

**CHEM-212**

**Credit Hours:**

**2**

**Marks**

**100**

**Course Objectives:**

Students will acquire knowledge about sampling and their handling, standards, good laboratory practices, quality control and quality assurance. In addition they will learn and develop understanding about the chemical equilibria and gravimetry.

**Course Content:**

**Introduction to Analytical Chemistry**

Analytical chemistry, Quantitative and qualitative analysis, Non-destructive analysis, Analytical process, Calibration (Calibration standards, reference standards, S/N ratio, ), Trace and Ultra trace analysis

**Sampling and Sample Preparations Techniques**

Different types of samples (solids, liquids/solutions, gaseous/volatile), Representative sample (gross and analytical sample), Minimization of contamination and interferences, Physical techniques (grinding and milling, sieving and particle size reduction), Chemical techniques (wet digestion methods, microwave digestion and acid extraction), Dry ashing and combustion, Solvent extraction techniques, Automation in sample preparation, Sample storage

**Approach to Equilibrium**

General concepts (Types, Activity and activity coefficient, Systematic treatment of equilibria), Acid-base equilibria (Acid-base theories, pH scale), Complexation equilibria (Complex mixtures, complex ion formation), Precipitation equilibria (Solubility product,  $K_{sp}$  and activity coefficients, Factors affecting precipitation), Gravimetric analysis (Selective precipitation techniques, Filtration techniques)

**Good Laboratory Practice: Quality Assurance and Validation**

Definitions, Seven tools for quality control, The concept of quality assurance, Quality control, Quality Assurance, Validations, Six sigma and ISO standards, Introduction to









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**ADS 1<sup>st</sup> Year**

**Semester-I**

**Course Title:** **Islamic Studies**  
(Science Faculty Dean's Office Course Contents)

**Code:** **ISLS-100**

**Credit Hours:** **2** **Marks** **100**

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**Course Name:** *Islamic Studies*

**Credit Hours:** 2 (2-0)

**Contact Hours:** 2-0

**Pre-requisites:** None

**Course Introduction:**

To provide Basic information about Islamic Studies. To enhance understanding of the students regarding Islamic Civilization. History of Islam, understanding of the worship and its usefulness. The basic concept of Quran Pak: wisdom, patience, loyalty. The comparative analysis of Islam with other religions. The Concept and Value of *Haqooq ul Ibad* (Bandon Kay Haqooq) in Islam. What is The rights of people in Islamic Point of View. Islamic point of view about other religions.

<b>CLO No.</b>	<b>Course Learning Outcomes</b>	<b>Bloom Taxonomy</b>
1	• To further enhance the knowledge of Islam.	
2	• To understand the basic concept of Islam and Quran Pak.	
3	• To understand the concept of Haqooq ul ibad in the light of Quran.	
4	• To know the importance of Islamic concept about other religions.	

**Course Outline:**

Basic Themes of Quran, Introduction to Sciences of Hadith, Introduction to Islamic Jurisprudence, Primary & Secondary Sources of Islamic Law, Makken & Madnian life of the Prophet, Islamic Economic System, Political theories, Social System of Islam. Definition of Akhlaq. The Most Important Characters mentioned in the Holy Qur'an and Sunnah, SIDQ (Truthfulness) Generosity Tawakkaul (trust on Allah) Patience Taqua (piety). Haqooq ul ibad in the light of Quran & Hadith - the important characteristic of Islamic Society.

**Reference Materials: (or use any other standard and latest books)**

1. Introduction to Islam by Dr Hamidullah, Papular Library Publishers Lahore
2. Principles of Islamic Jurisprudence by Ahmad Hassan, Islamic Research Institute, IIUI
3. Muslim Jurisprudence and the Quranic Law of Crimes, By Mir Waliullah, Islamic Books Services

**ADS 1<sup>st</sup> Year**

**Semester-II**

**Course Title:** **Quantitative Reasoning II**

**Code:** **QANR-101**

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**Credit Hours:**                      **3**    **Marks**    **100**

**Course Objectives:**

This course builds upon the mathematical foundation established in Quantitative Reasoning-II and delves into advanced topics in mathematics and statistics relevant to chemistry research. It covers matrices, sequences, multivariable calculus, differential equations, advanced statistics, and data analysis, with an emphasis on their applications in various chemistry subfields. By the end of this course, students will be able to:

Apply matrix operations and determinants to solve systems of linear equations in chemical equilibrium calculations.

Utilize sequences and series to approximate complex functions in quantum chemistry and spectroscopy.

Analyze functions of several variables, including thermodynamic surfaces, using multivariable calculus.

Model chemical kinetics, rate laws, and chemical reactions using differential equations.

Perform advanced statistical analyses of experimental data and hypothesis testing relevant to chemistry research.

Process and analyze complex experimental data using advanced data analysis techniques and visualization tools.

**Course Content:**

**Descriptive statistics** (mean, median, mode, variance, standard deviation).

Graphs and their significance in chemistry (histograms, scatter plots, box plots). Concept of maxima and minima

Statistical Inference: Concepts of population and sample. Estimation and confidence intervals.

Hypothesis testing (null and alternative hypotheses, p-values). Mean, Comparing means (t-tests, F-Test, ANOVA).

**Regression Analysis:** Simple linear regression (interpretation of slope and intercept). Curve fitting. Solutions of linear equations, Correlation,

Multiple linear regressions (model building, diagnostics, and multicollinearity).

Applications of regression in chemistry research (calibration curves, sensitivity, Limit of detection, Limit of quantification).

**Experimental Design:** Principles of experimental design (randomization, replication, blocking). Factorial designs and interaction effects. Applications of experimental design in chemistry (e.g., optimization studies).

Numerical Methods and Modeling: Numerical methods for solving equations (e.g., root finding, numerical integration).

Modeling chemical processes (e.g., reaction kinetics, thermodynamics, Logarithmic functions, Exponential functions, Differentiation, Partial differentiation, Differential equations and their use in chemical problems Integration, Determinants, real number lines, functions and their graphs, solutions of equations, limits and continuity)

Functions of Several Variables ,Multiple Integrals (Volume and Surface area Calculations)

**Recommended Books:**

- Paul, M. (2006). *Mathematics for chemistry. (1st ed.)*. Oxford, United Kingdom: Oxford University Press
- Ghram, D. (1996). *Mathematics in chemistry. (1st ed.)*. New York, USA: Prentice Hall Publishing.
- Akar, G. K., Zembat, İ. Ö., Arslan, S., & Thompson, P. W. (2023). *Quantitative Reasoning in Mathematics and Science Education. 1st Ed.*, Springer, USA.
- Sharma, A. K. (2005). *Text book of elementary statistics. Discovery Publishing House. 3*.
- Blitzer, R. (2014). *Precalculus, 5th Ed.*. Pearson Education, Limited. New York

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**ADS 1<sup>st</sup> Year**

**Semester-II**

**Course Title:**

**Expository Writing**

*(Science Faculty Dean's Office Course Contents)*

**Code:**

**ENGL-101**

**Credit Hours:**

**3**

**Marks**

**100**

**Course Introduction:**

The course introduces students to the communications so they can effectively communicate their message. The course also covers how to make an effective presentation both written and verbal. Various modern techniques of communication and presentation skills are covered in this course. Further the course aims to enhance students' linguistic command, so they could communicate effectively in diversified socio-cultural situations; create larger stretches of interactive text in speech and writing; and identify and repair any instances of potential communication break-up.

**CLO No. Course Learning Outcomes**

**Bloom Taxonomy**

**Course Outline:**

Principles of writing good English, understanding the composition process: writing clearly; words, sentence and paragraphs; Comprehension and expression; Use of grammar and punctuation. Process of writing, observing, audience collecting, composing, drafting and revising, persuasive writing, reading skills, listening skills and comprehension, skills for taking notes in class, skills for exams; Business communications; planning messages, writing concise but with impact. Letter formats, mechanics of business, letter writing, letters, memo and applications, summaries, proposals, writing resumes, styles and formats, oral communications, verbal and non-verbal communication, conducting meetings, small group communication, taking minutes. Presentation skills; presentation strategies, defining the objective, scope and audience of the presentation, material gathering material organization strategies, time management, opening and concluding, use of audio-visual aids, delivery and presentation.

**Reference Materials: (or use any other standard and latest books)**

1. Practical Business English, Collen Vawdrey, 1993, ISBN = 0256192740
  2. Effective Communication Skills: The Foundations for Change, John Nielsen, 2008, ISBN = 1453506748
  3. College Writing Skills with Readings, by John Langan, McGraw-Hill, 5th Edition.
  4. A Textbook of English Prose and Structure by Arif Khattak, et al, GIKI Institute, 2000
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**ADS 1<sup>st</sup> Year**

**Semester-II**

**Course Title:** Ideology and Constitution of Pakistan  
(Science Faculty Dean's Office Course Contents)

**Code:** IDCP-100

**Credit Hours:** 2 **Marks** 100

**Course Introduction:**

Pakistan studies is an important course at this university in which students study about their motherland. The following are the specific objective of the course

- to develop vision of Historical Perspective, Government, Politics, Contemporary Pakistan, ideological background of Pakistan.
- To study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

**CLO No. Course Learning Outcomes**

**Bloom Taxonomy**

- |   |  |
|---|--|
| 1 | • To educate students about the history of Pakistan        |
| 2 | • To educate student about the various pillar of the state |
| 3 | • To educate student Government and politics               |

**Course Outline:**

Historical background of Pakistan: Muslim society in Indo-Pakistan, the movement led by the societies, the downfall of Islamic society, the establishment of British Raj- Causes and consequences. Political evolution of Muslims in the twentieth century: Sir Syed Ahmed Khan; Muslim League; Nehru; Allama Iqbal: Independence Movement; Lahore Resolution; Pakistan culture and society, Constitutional and Administrative issues, Pakistan and its geo-political dimension, Pakistan and International Affairs, Pakistan and the challenges ahead.

**Reference Materials: (or use any other standard and latest books)**

1. The Emergence of Pakistan, Chaudary M., 1967
  2. The making of Pakistan, Aziz. 1976
  3. A Short History of Pakistan, I. H. Qureshi, ed., Karachi, 1988
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**ADS 1<sup>st</sup> Year**

**Semester-II**

**Course Title:** FINE ARTS

**Code:** 100

**Credit Hours:** 2 **Marks** 100

**Course Objectives:**

Students will learn how to explore the diverse branches and forms of art, to appreciate the interdisciplinary nature of artistic practices and their cultural significance throughout history and in modern society. This course will also help to evaluate the importance and impact of art on human expression, cultural identity, and societal discourse, encouraging critical thinking about art's role in shaping historical narratives and contemporary perspectives across global contexts.

**Course Content:**

Introduction to Art: Define art, Elements and Principles of Art: Explore the fundamental elements of art such as line, shape, form, color, texture, and space, as well as principles of design such as balance, contrast, emphasis, movement, pattern, and unity.

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Various branches, forms, and types, including painting, sculpture, drawing, printmaking, Architecture, photography, Craft and graphic design, Film making, Camera and computer art, multimedia and other digital art forms.

Discuss the importance of visual art in human history and contemporary society.

**Recommended Books:**

- *Art Fundamentals: Theory and Practice" by Otto G. Ocvirk, Robert E. Stinson, Philip R. Wigg, and Robert O. Bone* N7430.A697 2012. 701'.8—dc23. 2011045559 (2012)
- *Understanding Art" by Lois Fichner-Rathus, 11th Edition; 978-1285859293 (2016)*
- *The Visual Experience* Hobbs, Jack A.; Salome, Richard; Vieth, Ken; Publisher Davis Pubns, 2004 ISBN 10: 087192627X / ISBN 13: 9780871926272 (2004)

**ADS 1<sup>st</sup> Year**

**Semester-II**

**Course Title: PRINCIPLES OF ECONOMICS**

**Code: ECON-100**

**Credit Hours: 2**

**Marks**

**100**

**Course Objectives:**

Economics is the study of how a society decides how to use its limited resources. This course will introduce you the ways economists study the decisions people and firms make and the implications of those decisions. Students will learn how to think analytically about the economic forces at work in a modern society by developing a set of analytical tools and practicing applying them to selected policy issues.

**Course Content:**

**SECTION A: MICROECONOMIS:** Definitions of Economics, Adam Smith, Alfred Marshall, Lionel Ribbons, ,Types of Economics , Theoretical & Practical Importance of Economics , Economic Way of Thinking Concept of Demand ,Law of Demand ,Statement, Assumptions, Exceptions, Determinants of Demand Elasticity ,Factors of Price Elasticity of Demand , Importance of Price Elasticity of Demand, Elasticity vs Slope ,Elasticity of Demand , Price Elasticity, Income Elasticity, Cross Price Concept of Supply and Stock ,Law of Supply ,Statement, Assumptions, Exceptions ,Determinants of Supply ,Price Elasticity of Supply ,Factors of Price Elasticity of Supply Market ,Definition, Kinds ,Market Equilibrium ,Effects on Market Equilibrium Utility: Concept and Kinds Law of Diminishing Marginal Utility Statement, Assumptions, Exceptions Law of Equi-Marginal Utility Statement, Assumptions, Exceptions

Production Concept and Kinds Factors of Production Factor Pricing Rent, Wage, Interest, Profit Laws of Returns Law of Variable Proportions Cost Concept, Kinds Revenue Concept, Kinds Concept & Characteristics of Market Structures Perfect Competition, Monopoly, Monopolistic Competition, Oligopoly

**SECTION B: MACROECONOMICS:** National Income: Concept Aggregates of National Income Consumption Concept, Kinds Savings Concept, Kinds Investment Concept, Kinds Determinants of Consumption and Investment

Unemployment Concept, Kinds, Causes and Solution Inflation Concept, Kinds, Causes and Solution Trade Cycle Concept, Causes and Solution Budget Deficit Concept, Causes and Solution Taxes Concept, Kinds, Canons Pitfalls of Barter System Money Concept and Functions, Evolution, Kinds Banks Concept and Kinds of Bank Functions of Commercial Bank Functions of Central Bank Balance of Payments Concept of BOP and BOT Causes of Deficit and Solution Exchange Rate Concept, Kinds

**Recommended Books:**

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- *John Sloman, Alison Wride (Latest Issue). Economics, Pearson Education Limited.*
- *Michael Parkins (Latest Issue) Economics, New York Addison Wesley.*
- *Deviga Vengedadasalam, Karunagaran Madhavan. Principles of Economics,(Third Edition). Oxford University Press.*

**Further Suggested Readings**

- *Colander C. David (2006). Economics. 6th edition Mc Graw. Hill international edition*
- *Hailstone J. Thomas and Matrianna V. Frank (2004). Basic Economics. 13th edition, Thomson*
- *Colin Bamford (2002) Economics, Cambridge.*
- *Robert H. Frank, Ben S. Bernanke, Kate Antonovics, and Ori Heffetz (2016). Principles of Economics 6th Edition.*
- *Hall, R. E. and M. Lieberman (2005), Introduction to Economics, 2nd edition (USA: Thompson South-Western).*
- *Dr. Muhammad Ramzan & Dr Muhammad Zahir Faridi Principles of Economics Latest Issue by Target Publications*
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**ADS 1<sup>st</sup> Year**

**Semester-II**

**Course Title: PHILOSPHY**

**Code: PHIL-100**

**Credit Hours: 2**

**Marks**

**Course Objectives:**

This course is designed to acquaint students with the subject matter of philosophy, its terms, methods, and theories of several different areas within philosophy. There are many different ways in which philosophy can be and has been defined by many different thinkers. In a scholarly sense, philosophy is the study of the history of human thought. And this course also aims at the familiarity with great ideas understood through the various major thinkers in world history of ideas or great conversation. This course introduces these general areas of philosophy: Logic, epistemology (theory of knowledge), metaphysics, ethics, Aesthetics and political values and Philosophy of Science. It will explore such concepts as the nature of the world and how we have access to knowledge of the world; moral behavior and the nature of good and evil; the relationship between minds and bodies; the relationship between our thoughts and the external world; arguments for and against the existence of God; and how we should employ logical analysis and empirical observations to evaluate arguments, history of science, logical positivism and social and feminist critique of science. The objective of this course is to provide a clear, systematic, and comprehensive introduction to the core areas of Philosophy and philosophy of science which is sub branch of Philosophy.

**Course Content:**

Introduction; Four Knowledge Forms, Time-line of Knowledge revolutions, Definition and Branches of Philosophy, Core branches, Sub- branches, Approaches to Philosophy, Philosophy Religion and Science, Introduction to Metaphysics and Epistemology, Plato's Allegory of the Caves, Definition and sources of knowledge, Concept of God, Problem of evil, Personal Identity, Axiology (Ethical, Political and Aesthetic Values), Introduction to Ethics, Basic concepts and historical development of ethical theories, Natural Law Ethics, Deontology, Utilitarianism The meaning of life, The influence of Philosophy on Life, Introduction to Logic, Basic concepts, Types of arguments and fallacies, Categorical propositions and Syllogism, Inductive Logic (Analogical Reasoning, Casual Reasoning, Science and Hypothesis, Probability), History of





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prokaryotes; cellular architecture and diversity of eukaryotes.

**Acid-Base and Electrolyte Chemistry:** Intracellular and extracellular electrolytes, body fluids as electrolyte solutions, pH, Henderson-Hasselbalch equation and buffers, amino acids, peptides and proteins, buffer capacity, buffers of body fluids, haemoglobin as an acid-base system, renal control of acid-base balance, acid-base disorders: acidosis, alkalosis. haemoglobin and homeostasis, variation of Na<sup>+</sup>, K<sup>+</sup>, Cl<sup>-</sup> in acid-base disturbances.

**Carbohydrates:** Definition and classification, chemistry, physical and chemical properties of various classes of carbohydrates, biological functions of starch, glycogen, cellulose, and cell wall polysaccharides, acid mucopolysaccharides and proteoglycans.

**Lipids:** Definition and classification of lipids, chemistry and biological importance of fatty acids, waxes, glycerides, phospholipids, sphingolipids, glycolipids, sterols prostaglandins. Significance of lipids in biological membranes and transport mechanism.

**Amino acids and proteins:** Chemistry and classification of amino acids, physical and chemical properties of amino acids, biological significance of amino acids, peptides, proteins, their classification, properties and biological significance, primary, secondary tertiary and quaternary structure of proteins, denaturation of proteins.

**Nucleic acids:** Chemical composition of nucleic acids, structure and biological significance of nucleic acids, chemical synthesis of oligonucleotides, nucleic acids hydrolysis, isolation and separation of nucleic acids, introduction to recombinant DNA technology.

**Recommended Books:**

- *Fundamentals of Biochemistry. (2008) 3rd Ed. by D. J. Voet, G.J. Voet and C. W. Pratt. J. Wiley & Sons Inc.*
- *Text Book of Biochemistry (1970) by E. West & W. Todd Macmillan*
- *Biochemistry. (1999) 3rd Ed. by C. K. Mathews, K. E. Van Holde, & K.G. Ahern. Prentice Hall.*
- *Harper's Illustrated Biochemistry, 27th Ed. by R.K. Murray, D.K. Grannar, V. W. Rodwell. McGraw-Hill.*
- *Lehninger Principles of Biochemistry (2008) 5th Ed. by D. L. Nelson, M. M. Cox. W. H. Freeman Publishers*

**ADS 1<sup>st</sup> Year**

**Semester-II**

**Course Title:           BIOANALYTICAL TECHNIQUES**

**Code:                    BATS-111**

**Credit Hours:        2+1**

**Marks**

**100**

**Course Objectives:**

At the end of the course, students will know the basics of conventional bioanalytical techniques, as well as general bioanalytical methods. They will learn and develop understanding about the bio-samples and their bio-based studies. Students will be able to select appropriate (bio) analytical methods to solve given analytical questions, to apply an analytical protocol and to analyze biological samples.

**Course Content:**

**Introduction:** Introduction to bioanalytical nomenclature, Biomacromolecules, Biopolymers, Bioanalytical samples (blood, cerebrospinal fluids, lymph, saliva etc.), Assays, Immobilization, etc.

**Bio-based Materials and Biosensing:** Sensors (chemical, physical, optical, electrical); Enzyme-based biosensors, Immune-sensors, DNA biosensors

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Environmental monitoring techniques, Biomarker analysis, Toxicological analysis

**Bioanalytical Methods:** Introduction to fundamental concepts of identification and quantification of analytes in biological samples

**Immunological techniques:** Enzyme Linked Immunosorbent Assay (ELISA), Radioimmunoassay (RIA), Fluorescence immunoassay (FIA)

**Centrifugation techniques:** Principles of sedimentation, Preparative (differential, density gradient) and analytical centrifugation

**Electrophysiological methods:** Electrocardiogram (ECG), Positron emission tomography (PET), Magnetic Resonance Imaging (MRI), Computed tomography (CT), Flow cytometry, Introduction to polymerase chain reaction

**BATS-111 Lab.**

1. Cleaning, washing, and calibration of volumetric glassware, electronic and analytical equipment available in laboratory
2. Statistical evaluation of analytical data including Linear Regression Analysis
3. Chemicals and solvents toxicity, safety and handling
4. Solution preparation: Molarity, Normality, Molality, Formality with the concept of conversion of units and stoichiometric calculations.
5. Preparation of buffer solutions
6. Acid Base Titration (Strong acid vs. weak base, strong acid vs. strong base, strong base vs. strong acid, strong base vs. weak base) with concept of indicators
7. Kjeldahl analysis: protein determination
8. Titration of amino acids
9. Spreadsheet Calculation: Amino Acid pH Distribution
10. Estimation of reducing sugars (Benedict's method)

**Note: Experiment can be designed/ modified by Instructors/Teacher keeping in view of semester courses contents according to lab facility**

**Recommended Books:**

- Mikkelsen, S. R., Corton, E. *Bioanalytical Chemistry, 2nd Edition, John Wiley & Sons Inc. 2016, ISBN: 978-1-118-30254-5.*
- Ugo, P., Marafini, P., Meneghello, M. *Bioanalytical Chemistry, From Biomolecular Recognition to Nanobiosensing, De Gruyter, 2021, ISBN: 9783110589160. <https://doi.org/10.1515/9783110589160>*
- Labuda, Jan et al., "Terminology of bioanalytical methods (IUPAC Recommendations 2018)" *Pure and Applied Chemistry, 2018, <https://doi.org/10.1515/pac-2016-1120>*
- Kubota, L. T., *Tools and Trends in Bioanalytical Chemistry, Springer Cham, 2021, 978-3-030-82381-8. <https://doi.org/10.1007/978-3-030-82381-8>*
- Victor, G., *Understanding Bioanalytical Chemistry, Principles and Applications, John Wiley & Sons, 2009, ISBN: 978-0-470-02906-0.*
- Andreas Manz, A., *Bioanalytical Chemistry, Imperial College, Press, 2015, ISBN: 9781860943706.*

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<b>DETAIL OF COURSES BS 2<sup>nd</sup> Year 3<sup>rd</sup> Semester</b>			
<b>S No</b>	<b>Course Title</b>	<b>Course Codes</b>	<b>Credit Hours</b>
1.	Physical Chemistry	CHEM-271	3+1
2.	Organic Chemistry	CHEM-261	3+1
3.	Natural Science	NASC-221	2+1
4.	Civics and Community Engagement	CCES-201	2
5.	Material Science/Everyday Science/Forensic Science	MTSC-251/EVSC-251/FRSC-251	2
6.	Translation of Holy Quran-III/ Ethics-III	ARAB-251/ETHC-251	0
	<b>Sub. Total</b>		<b>15</b>

**ADS 2<sup>nd</sup> Year**

**Semester-III**

**Course Title:** NATURAL SCIENCE

**Code:** NASC-221

**Credit Hours:** 2 +1 **Marks** **100**

**Course Objectives:**

The objectives of the course are to educate the students about the fundamentals of chemical industry, raw materials, manufacturing and industrial processes. They will also become able to understand alternate energy sources.

**Course Content:**

**Fundamentals of Chemical Industry**

Applied chemistry and its role in the commercial sector; Factors for installation of the chemical industry and registration process; Unit Operations and Unit Processes; Raw materials and chemicals; Flow sheet diagrams. Future trends of chemical industry

**Alternate Energy Resources**

Biomass Resources: Biomass conversion processes, bio gas technology. Alcohols and its uses as alternative fuel. Hydrogen: Hydrogen production, storage, handling and its uses as alternative fuel. Solar Energy: Photovoltaic power conversion & solar energy collectors. Hydel Energy: introduction to Hydel energy. Prospecting of hydel powers in Pakistan.

**CHEM-221 Lab.**

1. Safety and Record Keeping
2. Application of various units of concentration Molarity, Molality, Normality, PPM, PPB, PPT, and % age composition of a solution
3. Solution preparation
4. Standardization of prepared solution
5. Preparation of standard oxalic acid solution
6. Find strength in g/L of given sodium hydroxide solution with the help of standard oxalic acid solution
7. Find strength in g/L of given sodium hydroxide solution with the help of standard sodium carbonate solution and intermediate solution of an acid.

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8. Production of biogas
9. Application of solar energy to produce Hydrogen from water,
10. Preparation of green house

**Recommended Books:**

- Kent, J. A., *Riegel's Handbook of Industrial Chemistry, 10th ed., Kluwer Academic/ Plenum Publishers, (2003).*
- George T. Auston., *Shreve's Chemical Process Industries, 5th Edition., McGraw Hill Book Company Inc. New York (1984).*
- P.C. Jain., *A Textbook of Applied Chemistry (1987).*
- Furnas, C. C., *Industrial Chemistry, Vol-II 6th Ed., D. VanNostrand Company, Inc. Princeton New Jersey, New York (1957).*
- Hede, P. D., Bier. S.P., *Inorganic and Applied Chemistry, Ventus publishing app., (2007).*
- Sharma, J., Ndi., *Applied Industrial Chemistry, Arise publishers & Distributors, (2012).*
- Erwin D. L., *Industrial Chemical Process Design, McGraw-Hill, (2002).*
- Prakash, N. B., *Applied Chemistry Lab Manual, LAP Lambert Academic Publishing, (2013).*
- Vermani, O. P., *Applied Chemistry : Theory And Practice, 2nd ed., New Age International, (2006).*
- Goostray. S and Schwenck. R. J., *Experiments in Applied Chemistry, Collier-Macmillan, (1966).*
- Harker, J.b .and Backurst, J.R. *Fuel and Energy. Academic Press, London and New York (1988).*
- Goodger E. M. *Alternative fuels (chemical energy resources). The Macmillan press Ltd, London, (1980).*

**ADS 2<sup>nd</sup> Year**

**Semester-III**

**Course Title: CIVICS AND COMMUNITY ENGAGEMENT**

**Code: CCES-201**

**Credit Hours: 2**

**Marks**

**100**

**Course Objectives:**

The Civics and Community Engagement course is designed to provide students with an understanding of the importance of civic participation, culture and cultural diversity, basic foundations of citizenship, group identities and the role of individuals in creating positive change within their communities. The course aims at developing students' knowledge, skills and attitudes necessary for active and responsible citizenship. Learning outcomes After completing this course, students will be able to

- Understand the concepts of civic engagement, community development, and social responsibility.
- Understand rights and responsibilities of citizenship
- Understand cultural diversity in local and global context
- Analyze the significance of civic participation in promoting social justice, equity, and democracy.
- Examine the historical and contemporary examples of successful civic and community engagement initiatives.
- Identify and assess community needs, assets, and challenges to develop effective strategies for community improvement.
- Explore the ethical implications and dilemmas associated with civic and community engagement.
- Develop practical skills for effective community organizing, advocacy, and leadership.
- Foster intercultural competence and respect for diversity in community engagement efforts.
- Collaborate with community organizations, stakeholders, and fellow students to design and implement community-based projects.
- Reflect on personal growth and learning through self-assessment and critical analysis of community engagement

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experiences.

**Course Content:**

Introduction to Civics & Community Engagement Overview of the course: Civics & Community Engagement Definition and importance of civics Key concepts in civics: citizenship, democracy, governance, and the rule of law Rights and responsibilities of citizens Citizenship and Community Engagement Introduction to Active Citizenship: Overview of the Ideas, Concepts, Philosophy and Skills Approaches and Methodology for Active Citizenship Identity, Culture, and Social Harmony Concept and Development of Identity, Group identities Components of Culture, Cultural pluralism, Multiculturalism, Cultural Ethnocentrism, Cultural relativism, Understanding cultural diversity, Globalization and Culture, Social Harmony, Religious Diversity (Understanding and affirmation of similarities & differences) Understanding Socio-Political Polarization Minorities, Social Inclusion, Affirmative actions Multi-cultural society and inter-cultural dialogue Inter-cultural dialogue (bridging the differences, promoting harmony) Promoting intergroup contact/ Dialogue Significance of diversity and its impact Importance and domains of Inter-cultural dialogue Active Citizen: Locally Active, Globally Connected Importance of active citizenship at national and global level Understanding community Identification of resources (human, natural and others) Utilization of resources for development (community participation) Strategic planning, for development (community linkages and mobilization) Human rights, constitutionalism and citizens' responsibilities Introduction to Human Rights Human rights in constitution of Pakistan Public duties and responsibilities Constitutionalism and democratic process Social Institutions, Social Groups, Formal Organizations and Bureaucracy Types of Groups, Group identities, Organizations Bureaucracy, Weber's model of Bureaucracy Role of political parties, interest groups, and non-governmental organizations Civic Engagement Strategies • Grassroots organizing and community mobilization • Advocacy and lobbying for policy change • Volunteerism and service-learning opportunities Social issues/Problems of Pakistan Overview of major social issues of Pakistani society Social Action Project

**Recommended Books:**

- Kennedy, J. K., & Brunold, A. (2016). *Regional context and Citizenship education in Asia and Europe*. New York: Routledge, Falmer.
- Henslin, James M. (2018). *Essentials of Sociology: A Down to Earth Approach* (13th ed.). New York: Pearson Education
- Macionis, J. J., & Gerber, M.L. (2020). *Sociology*. New York: Pearson Education

**Reference Books:**

- Glencoe McGraw-Hill. (n.d.). *Civics Today: Citizenship, Economics, and Youth*.
- Magleby, D. B., Light, P. C., & Nemacheck, C. L. (2020). *Government by the People* (16th ed.). Pearson.
- Sirianni, C., & Friedland, L. (2005). *The Civic Renewal Movement: Community-Building and Democracy in the United States*. Kettering Foundation Press.
- Bloemraad, I. (2006). *Becoming a Citizen: Incorporating Immigrants and Refugees in the United States and Canada*. University of California Press.
- Kuyek, J. (2007). *Community Organizing: Theory and Practice*. Fernwood Publishing.
- DeKieffer, D. E. (2010). *The Citizen's Guide to Lobbying Congress*. TheCapitol.Net.
- Rybacki, K. C., & Rybacki, D. J. (2021). *Advocacy and Opposition: An Introduction to Argumentation* (8th ed.). Routledge.
- Kretzmann, J. P., & McKnight, J. L. (1993). *Building Communities from the Inside Out: A Path Towards Finding and Mobilizing a Community's Assets*. ACTA Publications.
- Patterson, T. E. (2005). *Engaging the Public: How Government and the Media Can Reinvigorate American Democracy*. Oxford University Press.
- Love, N. S., & Mattern, M. (2005). *Doing Democracy: Activist Art and Cultural Politics*.

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SUNY Press.

**ADS 2<sup>nd</sup> Year**

**Semester-III**

**Course Title: MATERIAL SCIENCE**

**Code: MTSC-251**

**Credit Hours: 2**

**Marks**

**100**

**Course Objectives:**

Students will acquire knowledge about the key introductory concepts of materials, fundamental properties of materials, basic knowledge of metals, polymers and ceramics

**Course Content:**

Introduction to materials science, Classification of materials, structure of crystalline solids, Unit cell, types of unit cell like simple/primitive, face centered, body centered, end centered unit cells, Structure of some simple ionic compounds like CsCl, ZnS, CaF<sub>2</sub>, Radius ratio and co-ordination number, Number of atoms per unit cell in primitive, FCC, BCC unit cells, Calculation of density of a crystal, Imperfections in solids

**Metals and alloys:** steel, iron, Aluminium, Titanium, Zinc, Copper, Nickel, Cobalt of their alloys, properties, application, everyday life examples and future trends. **Ceramics:** Introduction, natural ceramics, refractories, ceramics composites, cement and concrete, high performance ceramics, glasses.

**Polymers:** introduction and classifications advance polymer, liquid crystal polymer, films, foams, coatings, fiber, Adhesives, elastic polymers, thermoplastic polymers, thermosetting polymer.

**Composites:** History of composites, natural composite, polymer matrix composites, metal matrix composites, ceramic matrix composite, carbon carbon composites.

**Recommended Books:**

**Note: Updated version of following reference books may be consulted from library or available online.**

- Huheey, J. E., *Inorganic Chemistry: Principles of Structure and Reactivity*, 3rd ed., Harper International SI Edition, (2006).
- House, J. E., *Inorganic Chemistry*, Academic Press. USA, (2008).
- Lee, J. D., *Concise Inorganic Chemistry*, 5th ed., Chapman and Hall, (1996).
- Miessler, G. L., Tarr, D. A., *Inorganic Chemistry*, 3rd ed., Pearson Education, India, (2008).
- Huheey, J. E., Keiter E. A., Keiter L. R., *Inorganic Chemistry: Principles of Structure and Reactivity*, 4th ed., Benjamin-Cummings Pub Co., (1993).
- Sharpe, A. G., *Inorganic chemistry*, 3rd ed., Pearson Education India, (1981).
- G.S. Sodhi, "Principle of Inorganic Chemistry" 1st edition 2013. R.L.Madan, *Inorganic Chemistry*, 2010
- Chaudhary S. U., *Ilmi Textbook of Inorganic Chemistry*, Ilmi Kitab Khana, Lahore, (2013).
- Catherine E. House crdft, Alan G. Sharpe, *Inorganic Chemistry*, 3rd ed., Prentice Hall, (2008).

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<b>ADS 2<sup>nd</sup> Year 4<sup>th</sup> Semester</b>			
<b>S No</b>	<b>Course Title</b>	<b>Course Codes</b>	<b>Credit Hours</b>
1.	<b>Physical Chemistry</b>	<b>CHEM-272</b>	2
2.	<b>Analytical Chemistry</b>	<b>CHEM-212</b>	2
3.	<b>Organic Chemistry</b>	<b>CHEM-262</b>	2
4.	<b>Environmental Science</b>	<b>ENSC-241</b>	2
5.	<b>*Fundamental of Physics/Fundamental of Biology/ Biotechnology/ Microbiology</b>	<b>PHYS-200/BIOL-200 /BTCH-200/MICB-200</b>	3
6.	<b>Social Science</b>	<b>XXXX*-200</b>	2
7.	<b>Entrepreneurship</b>	<b>MNGT-200</b>	2
8.	<b>Translation of Holy Quran-IV/ Ethics-IV</b>	<b>ARAB-252/ETHC-252</b>	0
	<b>Sub. Total</b>		<b>15</b>

**Note: Social Sciences\*:** The course can be chose from the list provided with course contents depending upon the expertise available. **Economics, Public Administration, Journalism, Introduction to Mass Communication, Law and Legislature, History, International Relations**

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

**Course Title:** Environmental Science

**Code:** ENSC-241

**Credit Hours:** 2

**Marks**

**100**

**Course Objectives:**

Students will be able to acquire knowledge and develop understanding about the fundamental principles of environmental chemistry and different types of pollutions. Such information will be useful in studying and solving pollution related issues and experiments in the laboratory.

**Course Content:**

**Atmospheric Pollution:**

The atmosphere, composition, temperature and pressure profile, role of free radicals in the atmosphere, temperature inversion and photochemical smog, particulate matter in the atmosphere, Industrial pollutants, atmospheric aerosols, acid-rain major sources, mechanism, control measures and effects on buildings and vegetation, global warming, major greenhouse gases, mechanism, control measures and global impact, the stratospheric ozone–the ozone hole, CFCs, ozone protection, biological consequences of ozone depletion.

**Water Pollution:**

Water pollution and waste water treatment, municipal, industrial and agricultural sources of pollution, heavy metals contamination of water, eutrophication, 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.

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**Recommended Books:**

- Baird, C. and Cann, M., *Environmental Chemistry*, 5th ed., W. H. Freeman & Company, (2012).
- Dara, S. S. and Mihsra, D. D., *A Text Book of Environmental Chemistry and Pollution Control*, 9th ed., S. Chand & Co. Ltd., (2004).
- Singhi, R. and Singh, V., *Green Chemistry for Environmental Remediation*, John-Willey & Sons, Inc., (2011).
- Holloway, A. M. and Wayne, R. P., *Atmospheric Chemistry*, 1st ed., Royal Society of Chemistry, (2010).
- Vaclavikova, M., Vitale, K., Gallios, G. P. and Ivanicova, L. *Water Treatment Technologies for Removal of High Toxicity Pollutants*, Springerlink, UK, ( 2010).
- Manahan, S. E., *Environmental Chemistry*, 9th ed., CRC press, Taylor & Francis group, USA, (2009).
- Girard, J. E., *Principles of Environmental Chemistry*, 2nd ed., Jones and Bartlett publishers, (2010).
- Harrison, R. M., Monks, P., Farmer, J. G., Graham, M. C., Mora, S. J., Pulford, I. and Hulsal, C., *Principles of Environmental Chemistry*, 1st ed., Royal Society of Chemistry, (2007).
- Matalack, A., *Introduction to Green Chemistry*, 2nd ed., CRC press, Taylor & Francis group, USA, (2010).
- Wright, J., *Environmental Chemistry*, Routledge, (2003).
- O'Neill, P., *Environmental Chemistry*, 3rd ed., Blackie Academic & Professional, (1998)

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

**Course Title: FUNDAMENTAL OF PHYSICS**

**Code: PHYS-200/BIOL-200**

**Credit 3**

**Marks 100**

**Hours:**

**Course Objectives:**

The main objective of this course is to understand the Physics of Electromagnetism and to develop simple mathematical formalisms to analyze the electromagnetic fields and interactions. This is a calculus-based introductory course with maximum emphasis on applying the acquired knowledge to solving problems.

**Course Content:**

**Electrostatics:**

Electric Charge, Conductors and Insulators, Coulomb's Law, Electric Fields due to a Point Charge and an Electric Dipole, Electric Field due to a Charge Distribution, Electric Dipole in an Electric Field, Electric Flux, Gauss' Law and its Applications in Planar, Spherical and Cylindrical Symmetry.

**Electric Potential:**

Equipotential Surfaces, Potential due to a Point Charge and a Group of Point Charges, Potential due to an Electric Dipole, Potential due to a Charge Distribution, Relation between Electric Field and Electric Potential Energy.

**Capacitors and Capacitance:**

Parallel Plate, Cylindrical and Spherical capacitors, Capacitors in Series and Parallel, Energy

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Stored in an Electric Field, Dielectrics and Gauss' Law (1 week).

**DC Circuits:**

Electric Current and Current Density, Resistance and Resistivity, Ohm's Law, Power in Electric Circuits, Semiconductors and Superconductors, Work, Energy, and EMF, Resistances in Series and Parallel, Single and Multi-loop Circuits, Kirchhoff's Rules, RC Circuits, Charging and Discharging of a Capacitor.

**Magnetic Field and Magnetic Force:**

Crossed Electric and Magnetic Fields and their Applications, Hall Effect, Magnetic Force on a Current Carrying Wire, Torque on a Current Loop, Magnetic Dipole Moment, Magnetic Field Due to a Current, Force between two Parallel Currents, Ampere's Law, Biot- Savart Law: Magnetic Field due to a Current, Long Straight Wire carrying Current, Solenoids and Toroids, A current-carrying Coil as a Magnetic Dipole, Inductance, Faraday's Law of Induction, Lenz's Law, Induction and Energy Transfers, Induced Electric Fields, Inductors and Inductances, Self-Inductance, RL Circuits, Energy Stored in a Magnetic Field, Energy Density, Mutual Induction.

**Alternating Fields and Currents:**

LC Oscillations, Damped Oscillations in an RLC circuit, Alternating Currents, Forced Oscillations, Resistive, Capacitive, and Inductive Loads, RLC series Circuit, Power in AC Circuits, Transformers, Gauss' Law for Magnetism, Induced Magnetic Fields, Displacement Current, Spin & Orbital Magnetic Dipole Moment, Diamagnetism, Paramagnetism, Ferromagnetism, Hysteresis.

**Recommended Books:**

1. D. Halliday, R. Resnick and J. Walker, "Fundamentals of Physics", John Wiley & Sons, 9th ed. 2010.
2. R. A. Serway and J. W. Jewett, "Physics for Scientists and Engineers", Golden Sunburst Series, 8th ed. 2010.
3. R. A. Freedman, H. D. Young, and A. L. Ford (Sears and Zeemansky), "University Physics with Modern Physics", Addison-Wesley-Longman, 13th International ed. 2010.
4. F. J Keller, W. E. Gettys and M. J. Skove, "Physics: Classical and Modern, McGraw Hill. 2nd ed. 1992.
5. D. C. Giancoli, "Physics for Scientists and Engineers, with Modern Physics", Addison-Wesley, 4th ed. 2008.

**BS 2<sup>nd</sup> Year**

**Semester-IV**

**Course Title: FUNDAMENTAL OF BIOLOGY**

**Code: BIOL-200**

**Credit Hours: 3**

**Marks 100**

**Course Objectives:**

Students will gain basic knowledge about the biology including various subdivisions and applications. They will learn how biology is necessary for human beings and how it is linked with the development and evaluation of human beings.

**Course Content:**

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Myths and Realities of Evolution , Microevolution ,Speciation ,Macroevolution ,Level of, Organization , Plants , Tissues Nutrition and Transport  
Reproduction Growth and Development Animals: Tissue, Organ System and Homeostasis  
Information Flow and Neuron Nervous System Circulation and Immunity Nutrition and  
Respiration Reproduction and Development Ecology and Behavior Ecosystems Biosphere  
Social Interactions Community Interactions Human Impact on Biosphere  
Environment Conservation

**Recommended Books:**

**Note: Updated version of following reference books may be consulted from library or available online.**

1. Roberts, M.M., Reiss and G.Monger. 2000. Advanced Biology, Nelson.
2. Starr, C, and R, Taggart, 2001. Biology: The Unity and Diversity of Life Brooks and Cole.
3. Campbell, N.A., J.B, Reece, L.G. Mitchell, M.R, Taylor. 2001. Biology: Concepts and Connections. Prentice-Hall.

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

<b>Course Title:</b>	<b>LAW AND LEGISLATURE</b>		
<b>Code:</b>	<b>LALA-200</b>		
<b>Credit Hours:</b>	<b>2</b>	<b>Marks</b>	<b>100</b>

**Course Objectives:**

This course introduces fundamental principles of law and legislature with a focus on topics relevant to chemistry students. It explores the legal framework surrounding scientific research, intellectual property rights, environmental regulations, and ethical considerations in scientific practice. Through case studies and discussions, students will gain an understanding of how law and legislation intersect with chemistry and scientific innovation.

**Course Content:**

**Introduction to Law and Legal Systems:** Overview of legal systems and branches of law, Basic legal concepts: statutes, regulations, precedent, Sources of law relevant to chemistry

**Legal Framework for Scientific Research:** Ethical principles in scientific research, Institutional review boards and research ethics, Legal requirements for conducting experiments and trials

**Intellectual Property Rights in Chemistry:** Patents, trademarks, and copyrights, Protection of inventions and innovations, Case studies on landmark patent disputes in chemistry

**Environmental Regulations and Chemistry** Overview of environmental laws and regulations, Chemical substances and their regulation, Case studies on environmental litigation involving chemical pollution

**Ethical Considerations in Chemistry:** Ethical responsibilities of chemists, Professional codes of conduct, Ethical dilemmas in research and industry

**Legal Issues in Chemical Industry:** Product liability and safety regulations, Compliance with health and safety standards, Legal challenges in chemical manufacturing and distribution.

**Recommended Books:**

- *"Chemistry and the Law" by Margaret E. McLaughlin*
- *"Intellectual Property Law for Chemists" by John R. Thomas*
- *"Environmental Law and Policy for Chemists" by William H. Rodgers Jr.*

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

<b>Course Title:</b>	<b>JOURNALISM</b>
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**Code:** JOUR-200  
**Credit Hours:** 2 **Marks** 100

**Course Objectives:**

This introductory course in journalism is specifically designed for chemistry students to develop essential communication and media literacy skills within the context of scientific reporting and communication. The course will cover basic journalism principles, news writing techniques, ethical considerations in science journalism, and the role of media in shaping public perception of scientific advancements and challenges. Students will learn to critically analyze and report scientific information accurately, engaging with various media platforms relevant to the field of chemistry.

**Course Content:**

**Fundamentals of Journalism:**

Definition of journalism and its role in society, History of journalism, Key principles of ethical journalism

**News Writing and Reporting:**

Basics of news writing: inverted pyramid structure, headline writing, Conducting interviews and gathering information, Writing news articles related to chemistry topics

**Media Literacy in Science Communication**

Understanding different media formats: print, digital, broadcast, Analyzing and critiquing science news coverage in mainstream media, Identifying bias and evaluating sources in science reporting

**Science Communication Techniques**

Communicating complex scientific concepts to non-expert audiences, Using visuals, graphics, and multimedia tools for effective science storytelling, Writing press releases, blogs, and social media posts related to chemistry news

**Ethical Issues in Science Journalism Specifically in Chemistry**

Accuracy, objectivity, and fairness in science reporting, Avoiding sensationalism and misinformation in science news, Ethical considerations in reporting on controversial scientific topics

**Role of Media in Science Education and Public Engagement**

Importance of science journalism in fostering public understanding of chemistry and scientific research, Impact of media coverage on public perception of scientific issues, Engaging with the public through science outreach initiatives and media campaigns

Writing and editing news articles on current chemistry developments, Creating multimedia presentations or podcasts on chemistry topics and Industry Insights

Compiling a portfolio of Chemistry news articles, multimedia projects, and reflections on chemical science journalism experiences throughout the course, Presenting and discussing the portfolio in a culminating showcase.

**Recommended Books:**

- Christians, C.G., Fackler, M., Kreshel, P.J., & Richardson, K.B. (2020). *Media Ethics: Cases and Moral Reasoning* (11th ed.). Routledge. <https://doi.org/10.4324/9780429282249>
- Mark Poepsel, (2018). *Media, Society, Culture and You* Publisher Rebus Community
- American Chemical Society (ACS): *Specifically geared towards chemists. Provides a source of information for every step in the publishing process. It is printed by Oxford University Press.*
- *Scientific Style and Format, The CSE Manual for Authors, Editors, and Publishers, Eighth Edition*
- Andrew Abbott (2014) *Digital Paper-A Manual for Research and Writing with Library and*

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*Internet Materials, Library Science and Publishing.*

**ADS 2<sup>nd</sup> Year**

<b>Semester-IV</b>				
<b>Course Title:</b>	<b>INTRODUCTION TO MASS COMMUNICATION</b>			
<b>Code:</b>	<b>IMCO-200</b>			
<b>Credit Hours:</b>	<b>2</b>	<b>Marks</b>	<b>100</b>	

**Course Objectives:**

The students will understand the fundamental concepts of Communication, Mass Communication, and Journalism, including their definitions and distinguishing characteristics. Teaching Chemistry students about Mass Communication will help them understand how to effectively communicate scientific information to diverse audiences. Moreover they will be able to analyze the significance of Mass Communication in society, recognizing its role in shaping public opinion, agenda setting, and dissemination of information across diverse media platforms.

**Course Content:**

Types Of Communication, The Significance of Mass Communication, The Process And Models of Communication, Essentials for Effective Communication, Barriers in Communication, Four Theories of Press, The Role of Mass Media in Agenda Setting, Various Types Of Media Including Print Media and Electronic Media, The Importance of Social Media in Society, Functions of Mass Communication, and Aspects Related to News Such as its Importance, Types, and Elements.

Public Relations and Marketing in Science: Strategies for promoting scientific work and research findings. Crisis communication and handling controversies in science. Building and maintaining relationships with the media.

**Recommended Books:**

- *Dominick, J. R. (2006) Dynamics of Mass Communication (8<sup>th</sup> ed.), New York: McGraw-Hill*
- *Staubhaar, LaRose. (2002) Media Now: Communication Media in the Information Age (3<sup>rd</sup> ed.). USA: Wadsworth.*
- *Understanding Mass Communication, Defleur Dennis, Houghton, 2000*
- *Introduction to Mass Communication, Edward J. Whetmore Publishing, (1995)*
- *Media of Mass Communication, John Vivian and Bacon, 2000*
- *Introducing Mass Communication, Michael W. Gambol, 1996.*

**ADS 2<sup>nd</sup> Year**

<b>Semester-IV</b>				
<b>Course Title:</b>	<b>Public Administration</b>			
<b>Code:</b>	<b>PADM-200</b>			
<b>Credit Hours:</b>	<b>2</b>	<b>Marks</b>	<b>100</b>	

**Course Objectives:**

The course gives an overview of public administration concepts, offer a definition of public administration, identify ways that public and private organizations are similar and different, explain the consequences of those differences for what government does and does not do. The students will be able to learn about the tools that modern public administrators use to pursue public goals, along with the pros and cons of those tools, explain the major values that public

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administration has and illustrate how those affect the work of government.

**Course Content:**

Introduction, definition, Nature and Scope of Public Administration, Approaches of public administration Public vs private sector and public vs private administration- similarities and differences, Evolution of public administration as a specialized academic discipline  
Public Administration and Development: Administrative Structure of Pakistan: Nature, Organization and Management Processes in the Central and the Provinces. Role of Public administration in Modern Welfare States, Constitutional framework of Public Administration in Pakistan  
Personal and Financial Administration, its Techniques and Functions.  
Corruption, its Types, causes and Effects.  
Decision Making, Role of Bureaucracy, Good Governance

**Recommended Books:**

- *Khan, Haroon A, An Introduction to Public administration (Maryland; University Press of America 2008).*
- *Sharma, Urmila, Public administration (New Delhi: Atlantic Publishers,2002).*
- *Khan, Sultan, Dr, Public Administration (Famous Books 40- Urdu Bazar, Lahore).*

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

**Course Title:**

**EDUCATION**

**Code:**

**EDU-200**

**Credit Hours:**

**2                      Marks                      100**

**Course Objectives:**

The purpose of this course is to give an introduction to BS students to understand the basic concepts of education. Education is in fact a key subject to get insight of teaching and learning process. It is not only helpful for students but it will also useful for prospective teachers. This course will provide learners with grounding in view of philosophy, teaching, learning, curriculum and assessment and evaluation. The major goal is to give an overview about the whole process of education which evolves around the above mentioned key areas. The numerous topics under these key areas will develop a thorough insight of learners to enhance their teaching and learning skills.

**Course Content:**

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**Chapter 1:** Basics of Education Introduction (Why this course?), Concept and meaning of education, Islamic concept of education, Modes of Education, formal, informal, and non-formal education, Philosophical foundations of education

**Chapter 2:** Teaching : Role of teacher in classroom: teaching philosophy and classroom management, Principles of effective teaching, Qualities of a good teacher, Teaching strategies and methods

**Chapter 3:** Curriculum ; Introduction of curriculum and curriculum development, Curriculum Models Curriculum development in Pakistan

**Chapter 4:** Education and Psychology ; Relationship between psychology and education, Laws of learning, Factors affecting students' learning, Theories of Motivation (Intrinsic Motivation and Extrinsic Motivation)

**Chapter 5:** Assessment and Evaluation; Concept of assessment and evaluation, Types of assessment and evaluation, Internal and external assessment, Essay type test and Objective type test, Course Wrap up

**Assessment and Evaluation:** Course Grading Policy, Grading policy will be based on Mid-term and Final-term exams. Additionally, class participation, class assignments, surprise tests, quizzes and attendance will be marked for sessional marks as per university rules. The assessment policy will be shared with the students at the beginning of the course.

**Recommended Books:**

- Downey, M., & Kelly, A. V. (1986). *Theory and practice of education*. Sage.
- Lowery, C. L., & Jenlink, P. M. (Eds.). (2019). *The Handbook of Dewey's Educational Theory and Practice*. BRILL.
- Hattie, J., & Yates, G. C. (2013). *Visible learning and the science of how we learn*. Routledge.
- Moore, A. (2012). *Teaching and learning: Pedagogy, curriculum and culture*. Routledge.
- Jarvis, P. (Ed.). (2006). *The theory and practice of teaching*. Routledge.
- Daniels, H., Lauder, H., & Porter, J. (Eds.). (2012). *Educational theories, cultures and learning: A critical perspective*. Routledge.
- Boyle, B., & Charles, M. (2016). *Curriculum development: A guide for educators*. Sage.
- Secolsky, C., & Denison, D. B. (Eds.). (2012). *Handbook on measurement, assessment, and evaluation in higher education*. Routledge.
- ul Amin, S. N., & Jan, M. H. *Educational Measurement and Evaluation*. Evincepublishing.
- Mangal, S. K., & Mangal, S. (2019). *ASSESSMENT FOR LEARNING*. PHI Learning Pvt. Ltd..

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

**Course Title:**

**History**

**Code:**

**HIST-200**

**Credit Hours:**

**3**

**Marks**

**100**

**Course Objectives:**

The objective of the undergraduate history course is to develop students' understanding of historical events, processes, and contexts across different periods and regions. It aims to cultivate critical thinking, research skills, and the ability to analyze historical sources and

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evidence. Students will also explore the impact of historical developments on contemporary society and global perspectives.

**Course Content:**

**Introduction:** What is History? Literal, terminological and conceptual meaning of history  
History as Fact History as Process History as Narrative

**Memory, Record and History**

**Nature of History:** Being and Becoming; Continuity and Change; Evolution, Progress and Development  
Macrocosm & Microcosm: Time, Space, Causation, Facts and opinion/objectivity & Subjectivity

**Utility, Benefits & importance of History:** History as a corrective/cohesive force; History as a repetitive force  
Continuity of History from Past to Future Lessons from Past Historical determinism, etc. History as Mother of All Sciences/Knowledge

**Epistemological nature of History:** Relationship of History with other forms of knowledge:  
Natural Sciences Social Sciences Literature and Arts

**Forms and Classification of History**

**Recommended Books:**

- *Burke, Varieties of Cultural History, Cornell University Press, 1977* Carlo, Ginzburg. *Clues.*
- *Myths, and the Historical Method, John Hopkins: University Press, 1992*
- *Carr, E. H., What is History? Harmondsworth: Penguin, 1961*
- *Cohn, Bernard. An Anthropologist among Historians and Other Essay, Oxford University Press, 1988*
- *Collingwood, R. G. The Idea of History. Oxford: Oxford University Press, 1978.*
- *Daniels, Studying History: How and Why, New Jersey, 1981.*
- *Gertrude Himmelfarb. The New History and the Old, Cambridge: Harvard University Press, 1987*
- *Govranski. History Meaning and Methods, USA, 1969*
- *Hegel. Elements of the Philosophy of Right. Cambridge University Press, 1991*
- *Qadir, Khurram, Tarikh Nigari Nazriyat-o-Irtiqa, Lahore: Palgrave, 1994.*
- *Qureshi, Muhammad Aslam. A Study of Historiography. Lahore: Pakistan Book Centre, Latest Edition.*
- *Steedman. Caroline, Dust: The Archive and Cultural History, Manchester University Press, 2002*
- *Stern Fritz, .Varieties of History: from Voltaire to the Present, Vintage, 2nd Edition 1975*
- *Tahir Kamran, The Idea of History Through Ages, Lahore: Progressive Publisher, 1993*
- *Lemon, M. C., Philosophy of History, London: Routledge, 2003*
- *Marwick, Arthur, The New Nature of History, London, 1989, pp.31-35.*
- *Roberts, Geoffrey, ed., History and Narrative Reader, London: Routledge, 2001.*
- *Shafique, Muhammad, British Historiography of South Asia: Aspects of Early Imperial Patterns and Perceptions, Islamabad, NIHCR, Quaid-iAzam University, 2016*

**ADS 2<sup>nd</sup> Year**

**Semester-IV  
Course Title:**

**International Relations**

**Code:**

**INTR-200**

**Credit Hours:**

**2**

**Marks 100**

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**Course Objectives:**

The purpose of this course is to understand the key concepts of academic International Relations. Moreover, students will be able to get understanding about pattern and dynamics of International Politics. And, they will be taught key concepts such as International Politics, State-System, National Interest, Nationalism, Cold War, Détente, Foreign Policy, International Political Economy, Deterrence, Globalization etcetera. Moreover, focus of this course also will be on Pakistan's participation in international arena especially on Pakistan's engagement with major powers such as USA, China, Russia, China and Pakistan's relations with its neighbors particularly India. Pakistan's response to contemporary regional and international issues will also be discussed during this course.

**Course Content:**

The class will be conducted in lecture cum discussion format. However, two-third portion of class session will be reserved for lecture while remaining one-third time of the class session will be allocated for discussion. All students are requested to read from the prescribed texts before coming to class. Class participation, presentation, assignments, mid-term and final examinations are the elements in the determination of final grade. All assignments must be submitted by the due date. Eighty percent attendance, as per the University rules, is mandatory.

**Definition and Scope of International Relations:** Definition of International Relations, World Politics and International ,Politics, IR in everyday life, State and State System, Evolution of global state system, Historical Context of International Relations 1900-1939, First World War (1914-1919), Causes and Consequences of WWI, Inter war Period 1919-1939, The Treaty of Versailles, The Great Depression, World War Second (1939-1945), Causes and Consequences of World War II, International Relations 1945-1990, The Post World War II Developments, Cold War, Nuclearization of world politics, Cold War: Definition, Origin and Causes, Policy of Containment, The Marshall Plan, Politics of Alliances (NATO & WARSAW PACT), SEATO & CENTO, Détente: Rise and Fall, SALT I & SALT II, End of Cold War, The Concept of Power, Balance of Power, Theoretical Approaches in IR Liberalism, Realism, Marxism, International Political Economy, Definition of IPE, Approaches of Political Economy, Mercantilis, Economic Liberalism, Marxism, The concept of Foreign Policy in IR, The concept of Nationalism, Globalization, Pakistan and International Community

**Recommended Books:**

- *Robert Jackson and George Sorensen, Introduction to International Relations, (New York: Oxford University Press, 1999)*
- *John Baylis & Steve Smith, The Globalization of World Politics: An Introduction to International Relations, 2nd ed., (New York: Oxford University Press Inc., 2001)*
- *Charles W. Kegley, Jr. & Eugene R. Wittkopf, World Politics: Trend and Transformation, 6th ed., (New York: St. Martin's Press, 1997)*
- *Theodore A. Columbus, Introduction to International Relations: Power and Justice, 4th ed. (New Jersey: Prentice-Hall, Inc. 1978)*
- *Joshua S. Goldstein, International Relations, 5th ed. (New Delhi: Pearson Education Inc., 2004)*
- *Abdul Sattar, Pakistan Foreign Policy: 1947-2001 A Concise History, (Karachi: Oxford University Press, 3rd ed., 2013)*

**ADS 2<sup>nd</sup> Year**

**Semester-IV**

**Course Title:**

**ENTREPRENEURSHIP**

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**Code: MNGT-200**

**Credit Hours: 2**

**Marks**

**Course Objectives:**

- To provide students with an understanding of the nature of business formation, growth & execution with particular reference to:
- To develop in students an understanding of the theoretical and practical aspects of Entrepreneurships literature.
- To develop in students the skills of analysis, synthesis and evaluation in context of Pakistani business environment.

**Course Content:**

**Introduction To Entrepreneurship:** The Nature and Importance of Entrepreneurship: Nature and Development of Entrepreneurship; Entrepreneurial Decision Process; Role of Entrepreneurs in Economic development; Ethics and Social Responsibility of Entrepreneurship; The Future of Entrepreneurship, The Entrepreneur and Entrepreneurial Mind: The Entrepreneurship process; Myths of Entrepreneurs, Managerial VS Entrepreneurial Decision Making; Entrepreneurial Leadership Characteristics

**Idea Generation:** The Individual Entrepreneur, and Techniques for Idea Generation Process; Entrepreneur VS Intrapreneur. Inside the Entrepreneurial Mind: From Ideas to reality: Creativity, Innovation and Entrepreneurship; Creativity A necessity for survival; Creative Thinking; Barriers to creativity; How to enhance creativity; The creative Process; Techniques for improving the creative process; Protecting your ideas.

**Planning:** The Customer and Product Plan/Feasibility: Understanding of Customer through Demand and Desire, and of Product (Good and/or Service) The Industry and Marketing Plan/Feasibility: Understanding of Marketing Plan, Characteristics of Marketing Plan; and Environment Analysis and Steps in preparing the Marketing Plan The Financial Plan/Feasibility: Operating and Capital Budgets, Break Even Analysis; Cash Flows and Balance Sheets, The Organizational Plan/Feasibility: Developing the management team; Building the successful Organization, The Role of BODs

**Business Plans And Business Model Business Plan:** Components, and Classification of Business Plans Financing Options: e.g. Leveraged Buyouts;

**Product Life Cycle:** Preparing for the new Launch; Execution & Growth; Managing early growth of the New Venture

**Environmental Issues / Trends And Their Impact Pestel :**Analysis, and Competitive Environment Analysis

**Strategic Options For Growth:** Growth Options: Joint Venture; Franchising; Acquisitions; Synergy; Mergers; Hostile Takeovers; Licencing etc.  
Sustainability Analysis and Maintenance

**International Entrepreneurship Opportunities:** The Nature of International Entrepreneurship; Importance of International Entrepreneurship; Entrepreneurial Entry into International Business

**Contemporary Issues:** Management of SMEs in today's world , Promotion and Development of SMEs in Pakistan, SMEs' contribution towards Income, Employment and other Macroeconomic Variables , Management succession and continuity: A family Business Perspective, Woman and Minority Entrepreneurship , Social Entrepreneurship (Social Responsibility) , Latest Theories/Research Work on SMEs and Entrepreneurship ,Any other ancillary topic/issue/research/article

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**Recommended Books:**

**Note:** Updated version of following reference books may be consulted from library or available online.

- *Entrepreneurship: Successfully Launching New Ventures* by Bruce R. Barringer, Duane Ireland, Latest Edition .
- *Entrepreneurship new venture creation* by David H. Holt - Latest Edition
- *Pitts R.A. and Snow C.C., Strategies for Competitive Success*, Johan Willy - Latest Edition
- *Barlett, Christopher A., and Sumantra Goshal. Strategy & Leadership* - Latest Edition
- *Hisrich and Peters, Entrepreneurship*, McGraw-Hill – Latest Edition
- *Carrier, Camille., Entrepreneurship in Large Firms and SMEs. A Comparative Study – Latest Edition*

**Reference Books:**

- *Kagan, Daniel. (Latest Edition), Why Entrepreneurs ignore good advice: A study in non-linearity and Ego. Human System Management Vol14, no 4, pp327-33.*
- *Thomas W. Zimmer, Norman M, Essentials of entrepreneurship and small business management*, Prentice Hall - Latest Edition
- *Donald F. Kuratko, Richard M. Hodegetts, Entrepreneurship, Theory, Process and Practise* - Latest Edition
- *Essentials of Entrepreneurship and Small Business Management*, Norman M. Scarborough, Latest Edition