To,

The Principal Secretary
Raj Bhawan, Bihar, Patna

Sub: Regarding submission of proposed course structure and uniform syllabus of History for 3rd to 8th Semester of 4-Year undergraduate.

Ref: Letter No.- BSU(UGC)-02/2023-1457/GS (1) Dated 14.09.2023

Sir,

In Compliance with your Letter No.-BSU(UGC)-02/2023-1457/GS (1) Dated 14.09.2023 followed by above mentioned letter no., we are submitting the proposed course structure and syllabus of History for 3rd to 8th Semester of 4-Year undergraduate course system as per UGC regulations.

Yours faithfully

Dr. Radha Govind singh
Head, P.G. Dept. of History
VKSU, Ara

Prof. Rajeev Ranjan
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Professor & Head, Deptt. of History
Magadh University

Prof.(Dr.) Syed Raza
Professor & Head
Jai Prakash University, Chapra

Professor Amar Kant Singh
Prof. in Charge
Murarka College, Sultanganj
(Bhagalpur)

Dr. Ashutosh Kumar
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B. N. M. College, Barahia
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Dr. Abhimanyu Prasad
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Proposed Course Structure for 4 Year

Bachelor of Arts

History

Under CBCS System

Syllabus for MJC & MIC of Semester III to VIII

Programme framed according to the National Education Policy

(NEP-2020)

effective from

Academic Session 2023-27

for

Universities of Bihar & Patna University

Course Structure (Semester-III)

Sl.No.	Name of the Course	Type of Course	L-T-P	Credit	Marks
1.	History of India: Earliest time to 550CE	MJC-3	5-1-0	5	100
2.	History of Europe:13th Century to1789	MJC-4	4-1-0	4	100
3.	History of India: Earliest time to 550CE	MIC-3	3-1-0	3	100
4.	To be selected from other faculties' MIC	MDC-3	3-1-0	3	100
5.	Disaster Risk Management	AEC - 3	2-1-0	2	100
6.	Skill Enhancement Course (To be Selected from Basket (given*)	SEC-3	3-1-0	3	100
				Total Credit-20	

Basket for Skill Enhancement Courses for Semester III (SEC – 3)
*Skill Enhancement Course (To be Selected from the Basket given below)

- Personal Financial Planning
- Visual Communication & Photography
- Statical Software Package
- Communication in Professional Life
- **रचनात्मक लेखन**
- **लेखन**

The **question paper pattern** for all courses shall consist of three parts –
Part A – Compulsory – consisting of objective/multiple choice type-
Each carrying two marks 10x2 = 20 marks
Part B – Short Answer Type – Four questions to be answered out of six questions-
Each carrying five marks 04x5 = 20 marks
Part C – Long Answer Type – Three questions to be answered out of five questions-
Each carrying five marks 03x10 – 30 marks
Total: 100 Marks **End Semester Examination: 70 Marks** **CIA: 30 Marks**

MJC-3
History of India; From Earliest Times to 550 C.E

Course Outcome:

- **CO1:** As a history student will learn about the historiographical trends, and interpretation of the historical sources of ancient India as well.
- **CO2:** They can acquire knowledge about the Vedic Period and the rise of Jainism and Buddhism culture in ancient times of India

MJC-3:	History of India; From Earliest Times to 550 C.E (5 Credits)	
Unit	**Topics to be covered**	**No. of Lectures**
I	**Sources, Historiography and Prehistoric India** a) Sources: Scientific Literature, Regional Languages and Religious Literature of Ancient Indian History up to 550 C.E. b) A survey of Prehistoric India: Palaeolithic, Mesolithic, Neolithic and Chalcolithic Cultures. c) The Indus – Saraswati Civilization, Debate on the relationship of Indus, Saraswati Civilization and Vedic Civilization. d) Significant features of Indus- Saraswati Civilization, its continuity, fall and survival of Saraswati Civilization	10
II	**Aryan Civilization** a) Origin of Aryans and Homeland in India, Myths of Aryan Invasion: Various theories, b) Vedic Cultures: Early Vedic and Post-Vedic Literature and Vedic Polity, Society and Economy c) Vedic Religion and Philosophy. d) Epic Literature and Culture: Problem of Dating and Historicity of the Epics.	10
III	**India from Sixth Century BCE to Mauryan Age** a) Sources b) India in the Sixth Century BCE Mahajanpada, Republic and Growth of Urban Centers, Rise of Magadhan Imperialism. c) Religious Systems in the 6th century BCE, Buddhism and Jainism. d) The Maurya Empire, Chandragupta Maurya, Mauryan administration, Ashok and Ashoka's Dhamma. Mauryan Society, Fall of Mauryan Empire. Greek Invasion and its Impact	10
IV	Post Mauryan Age a) Sources b) Reorganization of Republic in Post Mauryan Age. c) Indo-Greek, Saka, Kushan, Shunga, Kharvela, Satvahanas: Society and Culture, Art, Architecture and Coinage. d) Sangam Age: Sangam Literature, Society, Culture and Foreign Trade in Post Mauryan Age.	10
V	**Imperial Guptas** a) Sources b) Imperial Guptas and their Contemporaries. c) Gupta Administration d) Gupta Art, Architecture, Religion. Literature and Development of Science and Technology.	10
VI	**Sangam Age in South Indian History** a) Sources b) Cheras c) Pandyas d) Early Cholas	10
	Total	60

Suggested Readings:

1. *Agarwal, D.P: The Archaeology of India, 1985*
2. *Jayaswal, Vidula: Bhartiya Itihas Ke Adi Charna ki Rooprekha, Delhi, 1987*
3. *Majumdar, R.C. and Pusalkar, A.D (edited): The History and Culture of Indian People Vol. I, Vedic Age.*
4. *Majumdar, R.C. and Pusalkar, A.D (edited): The History and Culture of Indian People Vol. II: The Age of Imperial UNITy*
5. *Pandey, Rajbali: Prachin Bharat, Vishwavidyalya Prakashan, revised edition, Varanasi, 2010.*
6. *Raychaudhary, H.C: Political History of Ancient India, rev Edition, 1996 by B.N Mukherjee*
7. *Raychaudhary, H.C.: The History and Culture of Ancient India, Vol III: The Classical age*
8. *Sankalia, HD: Prehistory and Prohistory of India and Pakistan, Poona 1974*
9. *Sastri, K.A Nilakanta: A History of South India, from Prehistoric Times to the fall of Vijyanagar, Oxford University Press, 1955; Also, in Hindi Translation by Bihar Hindi Granth Academy.*
10. *Singh, Kripa Shankar: Rigveda, Harrappa Sabhyata and Sanskritic Nirantarta, Kitab Ghar publication, New Delhi, 2007*
11. *Singh, Upinder: A history of Ancient and Early Medieval India, from Stone Age to early Medieval India. 2008, Pearson, New Delhi.*
12. *Thapar, Romila: Early India from the Beginnings to 1300, London, 2002*
13. *Kumar, Ashutosh: Magadh ki Prachin Sanskriti Evam Parampara, Prachya Prakashan, Patna, 2017*

MJC-4

History of Europe from 13th Century to 1789

Course Outcome:

- To develop the understanding of Europe from a theocratic society to a modern nation-state system.
- To understand Renaissance and its influence on European Society, Economy, Polity, and Culture leading to the subsequent development of Nation-State and the emergence of new Ideologies culminating in the form of the French Revolution.

MJC-4	History of Europe from 13th Century to 1789	(4 Credits)
Unit	Topics to be covered	No. of Lectures
I	**Beginning of Modern Europe** a) Decline of Feudalism and its Consequences b) Renaissance: Causes, Phases, Development of Art, Architecture and Literature, New discourse on Renaissance. c) Reformation movement in Europe and Counter Reformation, Religious Warfare: The Thirty Years War, d) Geographical Discoveries: Its impact on economy,.	12
II	**Absolutism in Europe** a) Growth of Absolute Monarchy in Spain and France. b) Absolute Monarchy in Britain and Struggle with Parliament c) Absolutism in Austria and Russia, Conflict in Germany d) Emergence of Nation-State in Europe.	12
III	**Economic Development in Europe** a) Feudal Economy and its impact b) Growth of Mercantilism in European Nations c) Development of Capitalism in Europe: Theory of Karl Marx d) Industrial Revolution: Causes, Growth and Impact	12
IV	**The age of Enlightenment and Scientific Revolution** a) Enlightenment in France in 18Th century b) Enlightenment in England and Growth of Democratic System c) Revolution in Science and Technology in Europe d) Scientific Development and its impact on society	12
V	**Revolutions in Europe** a) The Glorious Revolution in England: Causes and Nature b) Impact of Glorious Revolution on other European Countries c) French Revolution (1789): Causes, Phases and Impact d) French Revolution New Discourses	12
	Total	**60**

Suggested Readings:

1. Acton (1906): Lectures on Modern History, London, Macmillan and co. Ltd
2. Anderson, M.S.: Europe in the 18th Century
3. Andrews Stuart: Eighteenth century Europe
4. Butterfield: H. The Origins of Modern Europe
5. Cipola Carlo: M. before the Industrial Revolution, European Society and Economy 1000-1700
6. Elton G.R: Reformation in Europe
7. Fisher H.A.L: (1938), History of Europe (relevant portion only), London, Eyre and Spottiswoode
8. Hale J.R.: Renaissance Europe
9. Hayes C.J.H: (1936), A Cultural and Political History of Europe (Vol. I) (1500- 1830), London, Macmillan
10. Hazen C.D (1937): A History of Europe in Modern times, Henry holt and company
11. Hilton Rodney: Transition from Feudalism to Capitalism
12. Rai ,Koleshwar Adhunik Paschim ka Uday (Uttar Madhyakalin Europe 1453- 1783)
13. Kriedte Peter: Peasants, Landlords and merchant capitalist
14. Verma ,Lal Bahadur : Europe ka Itihas (Punarjagaran se Kranti Tak)
15. Miskimm Harry: The Economy of Later renaissance
16. Gupt ,Parthsarthi: Adhunik Paschim Ka Uday, Hindi Madhyam Karyanwayan Nideshalaya
17. Phukan Meenaxi: (2012) Rise of Modern West, Trinity Press Pvt. Ltd.
18. Rice F.: The Foundations of Early Modern Europe
19. Scamell, V.: The First Imperial age: European overseas Expansion, 1475-1715
20. Schevil: (1898) History of Modern Europe (Hindi or English), Charles Scribner's sons
21. Singh Heeralal And Ram Vriksh Singh: 2011Adhunik Europe ka Itihas
22. The Cambridge: Economic History of Europe Vol I to Iv
23. Inderpal Vimal: Adhunik Europe (1453-1789), Agra, Laxmi Narayan Agrawal

MIC-3
History of India; From Earliest Times to 550 C.E

Course Outcome:

- As a history student he/she will learn about the historiographical trends, and interpretation of the historical sources of Ancient India as well.
- They can acquire knowledge about the Vedic Period and the rise of Jainism and Buddhism, Cultural development in Ancient India

MIC-3: History of India; From Earliest Times to 550 C.E		**(3 Credits)**
Unit	**Topics to be covered**	**No. of Lectures**
I	**Sources, Historiography and Prehistoric India** a) Sources of Ancient Indian History up to 550 C.E. b) A survey of Prehistoric India: Palaeolithic, Mesolithic, Neolithic and Chalcolithic Cultures. c) The Indus – Saraswati Civilization, A debate for resurgence. d) Significant features of Indus- Saraswati Civilization, its continuity and decline	6
II	**Aryan Civilization** **a)** Origin of Aryans and their Homeland in India. b) Vedic Age: Society and Economy c) Vedic Religion and Philosophy. d) Epic literature (Ramayan and Mahabharata).	6
III	**India from Sixth Century BCE to Mauryan Age** a) Mahajanapada b) Republic in Ancient India. c) Magadhan Imperialism d) Buddhism and Jainism.	6
IV	Post Mauryan Age a) The Maurya Empire, Chandragupta Maurya, Ashoka and Ashoka's Dhamma. Fall of Mauryan Empire. b) Indo-Greek, Saka, Kushan, Shunga, Kharvela, Satvahanas: Society and Culture, Art, Architecture and Coinage. c) Sangam Age: Sangam Literature, Society and Culture	6
V	**Imperial Guptas** a) Imperial Guptas and their Contemporaries. b) Gupta Administration c) Gupta Art, Architecture, Religion. Literature and Development of Science and Technology.	3
VI	**Sangam Age in South Indian History** a) Cheras b) Pandyas c) Early Cholas	3
	Total	**30**

Suggested Readings:

1. Agarwal, D.P: The Archaeology of India, 1985
2. Jayaswal, Vidula: Bhartiya Itihas Ke Adi Charna ki Rooprekha, Delhi, 1987
3. Majumdar, R.C. and Pusalkar, A.D (edited): The History and Culture of Indian People Vol. I, Vedic Age.
4. Majumdar, R.C. and Pusalkar, A.D (edited): The History and Culture of Indian People Vol. II: The Age of Imperial UNITy
5. Pandey, Rajbali: Prachin Bharat, Vishwavidyalya Prakashan, revised edition, Varanasi, 2010.
6. Raychaudhary, H.C: Political History of Ancient India, rev Edition, 1996 by B.N Mukherjee
7. Raychaudhary, H.C.: The History and Culture of Ancient India, Vol III: The Classical age
8. Sankalia, HD: Prehistory and Prohistory of India and Pakistan, Poona 1974
9. Sastri, K.A Nilakanta: A History of South India, from Prehistoric Times to the fall of Vijyanagar, Oxford University Press, 1955; Also, in Hindi Translation by Bihar Hindi Granth Academy.
10. Singh, Kripa Shankar: Rigveda, Harrappa Sabhyata and Sanskritic Nirantarta, Kitab Ghar publication, New Delhi, 2007
11. Singh, Upinder: A history of Ancient and Early Medieval India, from Stone Age to early Medieval India. 2008, Pearson, New Delhi.
12. Thapar, Romila: Early India from the Beginnings to 1300, London, 2002

Course Structure (Semester IV)

SI.No.	Name of the Course	Type of Course	L-T-P	Credit	Marks
1.	History of India: 550 CE- 1200 C.E.	MJC-5	5-1-0	5	100
2.	History of Europe: 1789 C.E.- 1919 C.E.	MJC-6	5-1-0	5	100
3.	History of India: 1200 C.E.-1700 C.E.	MJC-7	5-1-0	5	100
4.	History of Europe:13th Century to1789	MIC-4	3-1-0	3	100
5.	NCC/NSS/NGOs/Social Service/Scout and Guide/Sports	AEC-4	2-1-0	2	100
				Total Credit-20	
Exit Option to students with U.G. Diploma. After completing I, II, III & IV Semester earning full credits students will be awarded UG Diploma only if he or she takes one Vocational Course of 4 credit (During Summer Vacation). This Course will not be included in SGPA & CGPA Calculation.					

The **question paper pattern** for all courses shall consist of three parts –
Part A – Compulsory – consisting of objective/multiple choice type-
Each carrying two marks 10x2 = 20 marks
Part B – Short Answer Type – Four questions to be answered out of six questions-
Each carrying five marks 04x5 = 20 marks
Part C – Long Answer Type – Three questions to be answered out of five questions-
Each carrying five marks 03x10 = 30 marks
Total: 100 Marks **End Semester Examination: 70 Marks** **CIA: 30 Marks**

MJC-5

History of India; From 550 C.E. to 1200 C.E

Course Outcome:

- Students will learn and analyze the transition from early historic era to the early medieval era.
- They'll be able to delineate changes in the realm of Polity and Culture; Puranic Religion; the growth of Vernacular Languages and newer forms of Art and Architecture.

MJC-5 History of India; From 550 C.E. to 1200 C.E. (5 Credits)		
Unit	**Topics to be covered**	**No. of Lectures**
I	Emergence of New Powers and Age of Decentralization a) Decline of Gupta Power b) Huna Invasion and its impact c) Dynasty of Pushyabhuti and Kanyakubja with reference to Harsha and contemporary State, Society and Culture. d) Origin of Rajput: Various theories.	12
II	Decentralization and Emergence of Regional Power a) Rajputs: Origin, Emergence and Decline b) Tripartite Struggle c) Establishment of Muslim Rule in North India d) Muslim Rule in Delhi and the Impact of Muslim Rule on India	12
III	Regional Powers of South and Deccan a) Chalukyas of Vatapi; Origin history, Art and Architecture. b) Rashtrakutas of Manyakhet: History, Expansionist Policy, Religion, Art and Architecture. c) Cholas of Kanchi: History, Administration, Art and Architecture. d) Other Regional Powers: Pallava, Pandya, Chera, Kakatiya, Ganga, Kadamba and Sinhal (Sri Lanka)	12
IV	Decline of Rajputs a) North Western India: Dynasties of Kashmir; Sindh; Arab Invasion; Hindu Shahi and Nepal and their political and cultural achievements. b) Central India: Maukharies, Pratihars, Gahadwals, Chahman, Chandela, Kalachuri, Parmara and their Political and Cultural Achievements. c) South Western India: Chalukya and Solanki and their Political and Cultural Achievements. d) North Eastern India: Palas, Senas of Bengal; Dynasties of Kalinga and Other Region; Dynasty of Kamroop and their Political and Cultural Achievements.	12
V	Culture of Early-Medieval India a) Disintegration of Political Power b) Society and Religion in Early-Medieval India c) Fine Arts in Early-Medieval India: Architecture, Sculpture, Paintings. d) Emergence and Spread of the Bhakti movement in India.	12
	Total	**60**

Suggested Readings:

1. Majumdar R.C and Pusalkar A.D (edited): The History of Indian People, vol. V, The Struggle for Empire
2. Majumdar R.C. and Pusalkar A.D (edited): The History of Indian People, Vol. IV, The Age Imperial Kanauj
3. Majumdar, A.K.: Bhakti Renaissance, Bhartiya Vidyabhawan, Calcutta.
4. Majumdar, R.C. and Altekar, A.S Vakataka: Gupta Age, Motilal Banarasi Das, 2007.
5. Pande, Rekha: Religion movement in Medieval India, Gyanbook, New Delhi.
6. Pathak Vishudhanand: Uttar Bharat ka Rajnaitik Itihas (600-1200 A.D.), Hindi Sansthan Uttar Pradesh,1973
7. Ray Chaudhary, H.C.: Political History of Ancient India.
8. Sastri, K.A. Nilkanta: a History of South India, from Prehistoric times to the fall of Vijaynagar, Oxford University Press, 1955, also, in Hindi translation by Bihar Hindi Granth Academy.
9. Sastri, K.A. Nilkanta: Studies in Chola History and Administration, University of Madras, 1932.
10. Shastri, K.A Nilkanta: History of South India: from Prehistoric times to the Fall of Vijaynagar, IV Edition, 1975
11. Singh, Upinder: A History of Ancient and Early Medieval India, from Stone Age to Early Medieval India, a Pearson pub., New Delhi, 2008.
12. Srivastva, B: Dakshin Bharat ka Itihas, Chaukhambha Prakashan, Varanasi, 2010.
13. Tripathi, R.S: History of Kannauj to the Moselm conquest, 1986.
14. Vaidya, C.V.: Early History of Rajputs (750 to 1000 A.D), Reprint, Gyanbooks, New Delhi, 2019.
15. Vaidya, C.V: History of Medieval Hindu India, Reprint, Gyanbooks, New Delhi, 2018.

MJC-6

History of Europe- 1789-1919

Course Outcome:

- The students will be able to analyze the historical developments in Europe between 1789-1919. As it focuses on the Democratic & Socialist foundations of Modern Europe.
- They will be able to situate historical developments of Socialist upsurge & the economic forces of the wars, other Ideological Shifts.

MJC-6 History of Europe- 1789-1919		(5 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Rise of Nationalism in Europe a) Rise of Napoleon and spread of French Imperialism b) Reforms of Napoleon as First Consul c) Downfall of Napoleon d) Age of Reactionism, Congress of Vienna and its Significance e) Revolutions of 1830 and 1848: Causes and Consequences	12
II	Rise of New Nations a) Unification of Germany under Bismarck. b) Unification of Italy: Role of Cavour, Mazzini and Garibaldi c) Russia & Problems of Eastern Nationalities.	12
III	Capitalist Industrialization & Socio-Economic Transformation a) Process of Capitalist development in Industry & Agriculture in Britain, France, Germany and Russia. b) New Social Classes: Bourgeoisie, Proletariat, and Peasantry c) Rise of Socialism and Growth of New Capitalism d) Imperialism and its impact	12
IV	International Relations: New Era & the Concept of Balance of Power. a) Congress of Berlin, Creation of Alliance under Bismarck b) The decline of Ottoman Empire and emergence of Modern Turkey under Mustafa Kamal Pasha c) Third French Republic: its Problems and Foreign policy d) Communism in Russia: The Bolshevik Revolution	12
V	Road to First World War and New World Order a) Circumstances leading to the First World War b) Paris Peace Conference and its Significance c) Intervention of USA: 14 points of Woodrow Wilson	12
	Total	**60**

Suggested Readings:

1. Aldrich, Robert Greater France: A history of French Overseas Expansion
2. Anderson, M.S The Ascendancy of Europe: 1815-1914 (3rd Ed. 2003)
3. Bartlett. C.J.: Peace, War and the European Powers, 1814-1914 (1996) brief overview 216pp
4. Blanning, T.C .W Ed.: The Nineteenth Century: Europe 1789-1914 (Short Oxford History of Europe) (2000)
5. Bridge, F.R & Roger Bullen.: The Great Powers and the European States System 1814-1914, 2nd Ed. (2005)
6. Brunn, Geoffery, :Europe and the French Imperium, 1799-1814 (1938)
7. Bury. J.P.T Ed.:. The new Cambridge Modern History: Vol. 10: The Zenith of European Power 1830-70 (1964)
8. Cameron, Rondo: France and the Economics Development of Europe, 1800-1914: Conquest of Peace and Seeds of War (1961), a wide –ranging economic and business History.
9. Crawley, C.W Ed.: The New Cambridge Modern History, Vol. 14: Altas (1972)
10. Evans, Richard :j The Pursuit of power Europe 1815-1914 (2015)
11. Gildea, Robert : Barricades and Boders: Europe 1800-1914 (3rd Ed. 2003)
12. Gooch, G.P: History of modern Europe 1878-1919 (1923)
13. Grab, Alexander: Napolean and the Transformation of Europe (2003)
14. Grant & Temperley: Europe in the Ninteenth and twentieth century's.
15. Hayes C.J.H.: A political and Cultural History of Europe, 1830-1839.
16. Herring, George C.: Years of Peril and Ambition U.S foreign Relations. 1776-1921 (2017)
17. Hinsley F.H Ed: the New Cambridge modern History Vol. 11 Material Progress and World Wide Problems 1870-1898 (1979)
18. Kennedy, Paul: The Rise and Fall of the Great powers Economic Change and Military Conflict from 1500-2000 (1987), stress on Economic and Military factors
19. Ketelbey, C.D.M : A history of Modern Times (English or Hindi)
20. Langer, William :European Alliances and Alignments 1870-1890 (1950) Advanced history.
21. Langer, William : The Diplomacy of Imperialism 1890-1902 (1950) Advanced History
22. Lipson: Europe in the Nineteenth and Twentieth centuries
23. Mason, David S: A Concise History of Modern Europe, Liberty, Equality, Solidarity (2011). Since 1700
24. Merriman, John and J.M Winter Eds.: Europe 1789-1914. Encyclopaedia of the Age of Industry and Empire (5 vol. 2005)
25. Mowat, RB: A History of European Diplomacy 1815-1914 (1922)
26. New Cambridge modern History (13 vol 1957-79), old but thorough coverage, mostly of Europe, strong on Diplomacy
27. Osterhammel, Jurgen: The transformation of the world: A Global History of the nineteenth Century (2015)
28. Porter, Andrew Ed.: The Oxford History of the British Empire Volume III: The

Nineteenth century (2001)
29. Saimi Hannu: 19th Century Europe A Cultural History (2008)
30. Sontag, Raymond European Diplomatic history: 1871-1932 (1933) Basic Summary 425pp
31. Steinberg, Jonathan: Bismarck A Life (2011)
32. Taylor AJP: The Struggle for Mastery in Europe 1848-1918 (1954) 638 pp- advanced history and analysis of major diplomacy
33. Wesseling, H.L The European colonial Empire 1815-1919 (2015)
34. Bhatnagar and Gupt: Adhunik Europe ka Itihas (Bhag-2)
35. Lal ,K.S Lal: Adhunik Europe ka Itihas (Bhag-2)
36. Verma ,Lal Bahadur: Europe ka Itihas (Bhag-2), New Delhi Prakash Sansthan
37. Gupta ,Parthsarthi: Adhunik Paschim ka Uday, Hindi Madhyam Karyanvayan Nideshalaya (1983)
38. Gupta ,Parthsarthi: Europe ka Itihas, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi
39. Joll,James: Europe 1870 se, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi
40. Gupta ,Parthsarthi: Britain ka Itihas, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi
41. Saxena ,Banarasi Prasad: America ka Itihas, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi

MJC-7

History of India (1200- 1707)

Course Outcome:

- Students will be able to identify the major Political developments in the History of India during the period between the twelfth and the seventeenth century.
- Outline the Changes and Continuities in the field of Culture, especially with regard to Art, Architecture, the Bhakti Movement, and the Sufi movement.
- Delineate the development of trade and urban complexes during this period.

MJC-7 History of India (1200-1707)		5 Credits
Unit	**Topics to be covered**	**No. of Lectures**
I	**Medieval India** a) Important sources of Medieval Indian History b) Early Turks, Khalji revolution, and Tughlaqs, Invasion of Timur c) Ruling Dynasties of Assam, Rajput States (Mewar and Marwar), Orissa, Kashmir d) Vijayanagara Empire	12
II	**Afghans and Mughals** a) Afghan Rule: Lodis and Surs b) India on the Eve of Babur's Invasion c) Establishment and Re-establishment of Mughal Rule, Hemu Vikramaditya, Rana Pratap, Rani Durgavati, Chand Bibi d) Expansion of the Mughal Empire, Administration: Theory of State, Land Revenue System, Jagirdari and Mansabdari system	12
III	**Aurangzeb, Shivaji and Other Powers** a) Aurangzeb, Extent and Disintegration of Mughal Empire b) Resistance of Mewar and Marwar c) Rise of Marathas under Shivaji, Maratha Administration, Concept of Hindu Pad Padshahi d) Resistance of Sikhs, Jats,Satnamis and Bundelas	12
IV	**Society and Economy** a) Hindu Society: Caste and Occupational groups, Education, Customs and Traditions b) Muslim Society: Divisions and Occupational groups; Lifestyle, Education, Customs and Tradition. c) Condition of Peasants, Artisans and Women d) Condition of Agriculture and Industry. e) Development of Trade and Commerce.	12
V	**Religion and Culture** a) Bhakti movement b) Sufism, Sikhism and Other Sects in South India, Bengal and Kashmir c) Development of Language and Literature d) Development of Science and Technology, Architecture, Painting and Classical Music.	12
	Total	**60**

Suggested Readings

1. Srivastava A.L: Delhi Sultanate (English or Hindi Version), Shiv Lal Agarwal & Co., Agra, Reprint, 2017
2. Srivastava A.L: The Mughal Empire (English or Hindi Version), Shiv Lal Agarwal & Co., Agra, Reprint, 2017
3. Yadav B.N.S : Society and Culture in North India in the 12th century. Raka Prakashan, Prayagraj, 2012
4. Majumdar B.P.: Socio-Economic History of Northern India, Firma K. L. Mukhopadhyay (1960)
5. Purandare Babasaheb: Raja Shivchattrapati, Vol. I & II, Purandare Prakashan, 2020
6. . Ojha: G.H. Rajputane Ka Itihas,(Hindi) Vaidik Yantralaya, Ajmer, 1927
7. Sharma G.N: Mewar and the Mughal Emperors, Shiv Lal Agarwal, Agra, 1962
8. Kulke Herman (ed.) The State in India (1000-1700), OUP, 1995
9. Prasad Ishwari : Medieval India (English or Hindi version) 4th ed., Digitized 2006
10. Sarkar J.N: Life and Times of Shivaji, Orient Blackswan Pvt. Ltd., New Delhi, 2010
11. Shastri K.A. Nilkantha: A History of South India, Oxfortd, 1997
12. Chitnis K.N: Socio- Economic History of Medieval India, Atlantic Publishers, 2018
13. Majumdar, Raychaudhary & Dutta : An Advanced History of India, Laxmi Publications, 2016
14. Habib Mohammad and K.A. Nizami, ed. : Comprehensive History of India, Vol. V, The Delhi Sultanate, PPH, 1992
15. Acharya N.N: The History of Medieval Assam from 13th to 17th centuries, Omsons Publications, 2003
16. .Majumdar R.C & others (ed.): The History and Culture of the Indian People Vol. 6, the Delhi Sultanate, Bhartiya Vidya Bhawan, 2006
17. Majumdar R.C & others (ed.): The history and Culture of the Indian People Vol. 7, the Mughal Empire, Bhartiya Vidya Bhawan, 2006
18. Bhardwaj R.K Hemu: Life and times of Hemchandra Vikramaditya, Hope India Publications, Gurgaon, 2004
19. Tripathi R.P : Rise and fall of the Mughal Empire (English or Hindi), Surjeet Publications, 2012
20. . Sharma S.R. : The Crescent in India: A Study in Medieval History, Bhartiya Kala Prakashan, 2005
21. Prasad Ishwari: A Short History of Muslim Rule in India, Surjeet Publications, 2018
22. Digby,Simon, War Horses and Elephants in the Delhi Sultanate. OUP, 1971
23. Bhargava V.S: Marwar and the Mughal Emperors, Munshiram Manoharlal, 1966
24. Pande:Rekha: Religious Movements in Medieval India, Gyan Publishing House, 2005
25. Chandra Satish :Uttar Mughal Kalin Bharat Ka Itihas, Minakshi Prakaskan, 1974
26. Shrivastava, Nripendra Kumar Process of Urbanizization of Bihar during the Medieval Period, Janaki Publication, Patna, 2014.
27. Mittal Dr. Satish Chandra :Muslim sasaka tatha Bhartiya samaj, Suruchi Prakashan, 2014
28. Mittal Dr. SatishChandr:Bharat ka Sankhipt Itihasa, Suruchi Prakashan, 2014
29. Ahmad Imtiaz Madhyakalin Bharat : Ek Sarvekshan
30. Jha,A.C.Jha, Dilli Sultanate: Ek Sarvekshan

MIC-4

History of Europe from 13th Century to 1789

Course Outcome:

- To develop the understanding of transition of Europe from a theocratic society to a modern nation-state system.
- Renaissance and its influence on European Society, Economy, Polity, and Culture leading to the subsequent development of Nation-State and the emergence of new Ideologies culminating in the form of the French Revolution.

MIC-4 History of Europe from 13th Century to 1789 (3 Credits)		
Unit	**Topics to be covered**	**No. of Lectures**
I	**Beginning of Modern Europe** a) Decline of Feudalism and its consequences b) Renaissance: Causes, Phases, Development of Art, Architecture and Literature, New discourse on Renaissance.	6
II	**Absolutism in Europe** a) Growth of Absolute Monarchy in Spain and France. b) Absolute Monarchy in Britain and Struggle with Parliament	6
III	**Economic Development in Europe** a) Feudal Economy and its impact b) Growth of Mercantilism in European Nations	6
IV	**The age of Enlightenment and Scientific Revolution** a) Enlightenment in France in 18Th century b) Enlightenment in England and Growth of democratic System	6
V	**Revolutions in Europe** a) The Glorious Revolution in England: Causes and Nature b) Impact of Glorious Revolution on other European Countries	6
	Total	**30**

Suggested Readings:

1. Acton (1906): Lectures on Modern History, London, Macmillan and co. Ltd
2. Anderson, M.S.: Europe in the 18th Century
3. Andrews Stuart: Eighteenth century Europe
4. Butterfield: H. The Origins of Modern Europe
5. Cipola Carlo: M. before the Industrial Revolution, European Society and Economy 1000-1700
6. Elton G.R: Reformation in Europe
7. Fisher H.A.L: (1938), History of Europe (relevant portion only), London, Eyre and Spottiswoode
8. Hale J.R.: Renaissance Europe
9. Hayes C.J.H: (1936), A Cultural and Political History of Europe (Vol. I) (1500-1830), London, Macmillan
10. Hazen C.D (1937): A History of Europe in Modern times, Henry holt and company
11. Hilton Rodney: Transition from Feudalism to Capitalism
12. Rai, Koleshwari: Pashchim ka Uday (Uttar Madhyakalin Europe) (1453- 1783)
13. Kriedte Peter: Peasants, Landlords and merchant capitalist
14. Verma Lal Bahadur: Europe ka Itihas (Punarjarran se kranti tak), New Delhi
15. Miskimm Harry: The Economy of Later renaissance
16. Gupt ,Parthsarthi: Adhunik Paschim ka uday, Hindi Madhyam , Karyanvan Nideshalaya, New Delhi
17. Phukan Meenaxi: (2012) Rise of Modern West, Trinity Press Pvt. Ltd.
18. Rice F.: The Foundations of Early Modern Europe
19. Scamell, V.: The First Imperial age: European overseas Expansion, 1475-1715
20. Schevil: (1898) History of Modern Europe (Hindi or English), Charles Scribner's sons
21. Singh Heeralal And Ram Vriksh Singh: 2011, Adhunik Europe ka Itihas
22. The Cambridge: Economic History of Europe Vol I to Iv
23. Inderpal Vimal: Adhunik Europe (1453-1789)

Course Structure (Semester-V)

Sl.No.	Name of the Course	Type of Course	L-T-P	Credit	Marks
1.	History of Modern World:1919-1945	MJC-8	5-1-0	5	100
2.	History of India:1707-1857	MJC-9	5-1-0	5	100
3.	History of India: 550CE-1200 CE	MIC-5	3-1-0	3	100
4.	History of Europe:1789-1919	MIC-6	3-1-0	3	100
5.	Internship	INT	-	4	100
			Total Credit-20		

The **question paper pattern** for all courses shall consist of three parts –
Part A – Compulsory – consisting of objective/multiple choice type-
Each carrying two marks 10x2 = 20 marks
Part B – Short Answer Type – Four questions to be answered out of six questions-
Each carrying five marks 04x5 = 20 marks
Part C – Long Answer Type – Three questions to be answered out of five questions-
Each carrying five marks 03x10 = 30 marks
Total: 100 Marks **End Semester Examination: 70 Marks** **CIA: 30 Marks**

MJC-8
History of Modern World (1919- 1945)

Course Outcome:

- The students will have an understanding of an era of shifting history from Euro centric to World.
- They will able to comprehend the turbulent times when totalitarianism rose as an alternative to Democratic and Liberal ideal and also the growing desire for peace through formation of organizations such as United Nations.

MJC-8	History of Modern World (1919-1945)	(5 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	1919 A New World Order a) Formation of the League of Nations: Organizations, Achievements & Failures b) Formation of ICJ & ILO c) New Imperialism: Mandate System d) Democracies between the wars	12
II	Rise of Totalitarianism a) Failure of Weimar Republic & Rise of Nazism in Germany b) Factors leading to the Growth of Fascism in Italy and the Concept of Corporate state c) Rise of Totalitarianism in Russia & Stalin d) Rise of Militarism in Japan	14
III	Anti-Imperialist Movements between the Great Wars a) Arab Nationalism b) Nationalist Movement in China with reference to The role of Dr.Sun Yat-Sen c) Anti-Imperialist Movement in Indo-China d) Anti-Imperialist Movement in Egypt	12
IV	Challenges to Capitalism a) Rise and Role of trusts in USA b) The progressive Movement and Foreign Policy of USA c) The Great Economic Depression: 1929 d) Reconstruction and New Deal Policy of F.D Roosevelt	12
V	Quest for security and road to Second World War a) French quest for security: Locarno Pact-1925 b) Causes and Consequences of Second World War c) U.N.O its Organization and Achievements d) Cold War and Emergence of New Bi-Polar world.	10
	Total	**60**

Suggested Readings

1. Barzun Jacques from Dawn to Decandence 500 years of western Cultural life : 1500- present New York, Harper Collins 2001
2. Benns F. Lee : Europe Since 1914
3. Car, E.H (1948) International Relations between two World Wars (1919-1939), Delhi, Macmillian & Co.
4. Carsten. F.L (1982) : The Rise of Fascism University of California Press
5. Cayley, E.S (1856) The European revolutions of 1848, London Smith Elder & Co. Vol I and II
6. Contemporary History of the World by Edwin Augustus Grosvenor
7. Crawley C.W (1965) The new Cambridge modern History Volume 9. War & Peace in an age of upheaval. 1793-1830. Cambridge University Press.
8. Dhar, S.N (1967) : International Relations and World Politics since 1919, Bombay, Asia Publish House
9. Doenecke Justus D. Stoler Mark A (2005). Debating Franklin D Roosevelt's Foreign
10. Rowman & Little field, Policies. 1933-1945
11. Dunan Marcel Larousse: Encyclopaedia of Modern History from 1500 to the Present day, New York Harper & Row, 1964.
12. Duruy V & Grosvenor E.A (1894) History of modern times: From the fall of Constantipole to the French Revolution, New York H Holt and Company
13. FP Walters: A History of the League of Nations (oxford 1965)
14. Gaddis John Lewis (1972) The United States and the Origins of the Cold War, 1941- 1947 Columbia University Press
15. Grosvenor, Edwin A Contemporary History of the World New York and Boston T.Y Crowell & Co. 1899
16. Henry Kitchell Webster : Early European History
17. Jules Michelet, Mary Charlotte, Mair Simpson : A summary of Modern history
18. Joll James: Europe Since 1870

MJC-9
History of India (1707-1857)

Course Outcome:

- The students will be able to trace the British colonial expansion in the political contexts of eighteenth-century India.
- They will learn about the changes in society, politics, religion and economy during this period.
- They'll also acquire knowledge about the freedom struggle.

MJC-9	History of India (1707-1857)	(5 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Downfall of Mughals and Maratha Power a) Disintegration of Mughal Power: Main Political Trends b) Expansion of Maratha Kingdom under Peshwas and Maratha confederacy c) Administration and Socio- Economic condition under Marathas d) Causes of the Downfall of Maratha power- Third Battle of Panipat	12
II	Rise of Indian States a) Rise of Punjab under Ranjit Singh: Conquests and Administration b) Rise of Bengal and Awadh in the 18th Century c) Rise of Hyderabad and Mysore in the 18th Century d) Political conditions in South India: Cochin & Travancore	12
III	Expansion of East India Company's Rule a) Arrival of European companies: Rivalry for Control b) Ascendancy of English East India Company: Battle of Buxar and Plassey; Their effects c) Territorial Expansion of East India Company1765- 1813 (From ring fence to Subordinate isolation) d) Territorial Expansion of East India Company1813-1856	12
IV	Administration of East India Company a) Economic Policies- Agriculture, Trade, Banking, Land revenue b) Administrative Apparatus under East India Company with special reference to Education, Communication and judicial policy c) Theories of Cultural Ascendency: Utilitarianism, Evangelicals and White Men Burden Theory d) Response of Indian Society and Socio-Religious Reform Movements	12
V	Resistance to Colonial Power a) Peasant Revolts in the 19th Century: Deccan, Indigo and Pabna b) Tribal Revolts: Bhil, Kol, Santhal, Gond and others c) First War of Independence: Causes, Nature d) Main Leaders and People's Resistance in 1857 and Geographical Areas	12
	Total	**60**

Suggested Readings:

1. Banerjee A.C : The New History of modern India (1707-1947)
2. Basu B.D. : Rise and Fall of Christian Power in India, Vol. II
3. Grover B.R : A new look on Modern Indian History
4. Bayly C.A : An illustrated History of Modern India 1600-1947
5. Chabra, G.S. : Advance History of Modern India
6. Kumar D. : The Cambridge Economic History of India
7. Desai A.R: India's Path of Development
8. Desai, A.R. : Social Background of Indian Nationalism
9. Dodwell : A Sketch of the History of India
10. Dutta,K.K : Social History of Modern India
11. Freedenberg, R.E : Land Control and Social Structure in India
12. Prasad I.& Subedar: History of Modern India (English or Hindi)
13. Farquhar J.N : Modern Relegious Movements in India
14. Sarkar J.N. : Mughal Economy
15. Veluthat Kesvan : Political Structure of Early Medieval South India
16. Lal, Sunder : Bharat me Angreji Raj
17. Ali M. Athar : Mughal Nobility under Aurangzeb
18. Mishra, B.B : Administrative History of modern India
19. Karashima Nobora : South Indian History and Society
20. Marshall P.J.: The Eighteenth century in Indian History
21. Majumdar R.C : British Paramountacy and Indian Renaissance (Part I)
22. Dutt R.P : India Today
23. Tripathi R.P. : The Rise and Fall of Mughal Empire
24. Muir Ramsay: The making of British India
25. Sarkar Sumit : Modern India
26. Sarkar Sumit: Adhunik Bharat
27. Sen Sunil K. : Agrarian Relations in India, 1793-1947
28. Singh, G.N : Constitutional Development of India
29. Stein Burton : The Making of Agrarian Policy in british India, 1770-1900
30. Gordon Stewart: The Marathas 1600-1818
31. Sarkar Sumit: Modern India 1885-1947
32. Metealf Thomas: Ideologies of the Raj
33. Thompson & Garret : Rise and Fulfillment of British Rule in India

MIC-5

History of India; From 550 C.E. to 1200 C.E

Course Outcome:

- Students will learn and analyze the transition from historic centuries to the early medieval.
- They'll be able to delineate changes in the realm of Polity and Culture; Puranic Religion; the growth of Vernacular Languages and newer forms of Art and Architecture.

MIC-5	History of India; From 550 C.E. to 1200 C. E	(3 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Emergence of New Powers and Age of Decentralization a) Huna Invasion and its impact b) Harsha the Last Hindu Ruler of Ancient India. c) Origin of Rajput: Various theories.	8
II	Decentralization and Emergence of Regional Power a) Emergence of Rajput States b) Tripartite Struggle c) Establishment of Muslim Rule in Delhi and the Impact of Muslim Rule on India	6
III	Regional Powers of South and Deccan a) Chalukyas of Vatapi : A brief History. b) Rashtrakutas of Manyakhete : A brief History. c) Cholas of Kanchi: A brief History. d) Other Religional Powers: Pallava, Pandya, Chera: A brief History.	6
IV	Decline of Rajputs a) North Western India: Dynasties of Kashmir; Sindh; Arab Invasion; b) Central India: Pratihars, Gahadwals, Chahman, Chandelari, Parmara and their Political and cultural achievements. c) South Western India: Chalukya and their political and cultural achievements. d) North Eastern India: Palas, Senas of Bengal;	6
V	Culture of Early-Medieval India a) Society and Religion in Early-Medieval India b) Fine Arts in Early-Medieval India: Architecture, Sculpture, Paintings. c) Emergence and Spread of the Bhakti movement in India.	4
	Total	**30**

Suggested Readings:

1. Majumdar R.C and Pusalkar A.D (edited): The History of Indian People, vol. V, The Struggle for Empire
2. Majumdar R.C. and Pusalkar A.D (edited): The History of Indian People, Vol. IV, The Age Imperial Kanauj
3. Majumdar, A.K.: Bhakti Renaissance, Bhartiya Vidyabhawan, Calcutta.
4. Majumdar, R.C. and Altekar, A.S Vakataka: Gupta Age, Motilal Banarasi Das, 2007.
5. Pande, Rekha: Religion movement in Medieval India, Gyanbook, New Delhi.
6. Pathak Vishudhanand: Uttar Bharat ka Rajnitik itihas (600-1200 A.D) Hindi Sansthan, Uttar Pradesh, 1973
7. Raychaudhary, H.C.: Political History of Ancient India.
8. Sastri, K.A. Nilkanta: A History of South India, from Prehistoric times to the fall of Vijaynagar, Oxford University Press, 1955, also, in Hindi translation by Bihar Hindi Granth Academy.
9. Sastri, K.A. Nilkanta: Studies in Chola History and Administration, University of Madras, 1932.
10. Shastri, K.A Nilkanta: History of South India: from Prehistoric times to the Fall of Vijaynagar, IV Edition, 1975
11. Singh, Upinder: A History of Ancient and Early Medieval India, from Stone Age to Early Medieval India, a Pearson pub., New Delhi, 2008.
12. Srivastva, B: Dakshin Bharat Ka Itihas , Caukhambha Prakashan, Varanasi, 2010.
13. Tripathi, R.S: History of Kannauj to the Moselm conquest, 1986.
14. Vaidya, C.V.: Early History of Rajputs (750 to 1000 A.D), Reprint, Gyanbooks, New Delhi, 2019.
15. Vaidya, C.V: History of Medieval Hindu India, Reprint, Gyanbooks, New Delhi, 2018.

MIC-6
History of Europe- 1789-1919

Course Outcome:

- The students will be able to analyze the historical developments in Europe between 1789-1919. As it focuses on the democratic & socialist foundations of modern Europe.
- They will be able to situate historical developments of socialist upsurge & the economic forces of the wars, other ideological shifts.

MIC-6 History of Europe- 1789-1919 (3Credits)		
Unit	**Topics to be covered**	**No. of Lectures**
I	Rise of Nationalism in Europe a) Rise of Napoleon and Downfall of Napoleon b) Congress of Vienna and its significance c) Revolutions of 1830 and 1848: Causes and Consequences	6
II	Rise of New Nations a) Unification of Germany under Bismarck. b) Unification of Italy: Role of Cavour, Mazzini and Garibaldi	6
III	Capitalist Industrialization & Socio-Economic Transformation a) Industrial Revolution in Britain and Europe b) Rise of Socialism c) Imperialism and its impact	6
IV	International Relations: New Era & the Concept of Balance of Power. a) Congress of Berlin, b) Communism in Russia: The Bolshevik Revolution	6
V	Road to First World War and New World Order a) Circumstances leading to the First World War b) Paris Peace Conference and its Significance	6
	Total	**30**

Suggested Readings:

1. Aldrich, Robert Greater France: A History of French Overseas Expansion
2. Anderson, M.S The Ascendancy of Europe: 1815-1914 (3rd Ed. 2003)
3. Bartlett. C.J. Peace, War and the European Powers, 1814-1914 (1996) brief overview 216pp
4. Blanning, T.C .W Ed. The Nineteenth Century: Europe 1789-1914 (Short Oxford History of Europe) (2000)
5. Bridge, F.R & Roger Bullen. The Great Powers and the European States System 1814-1914, 2nd Ed. (2005)
6. Brunn, Geoffery, Europe and the French Imperium, 1799-1814 (1938)
7. Bury. J.P.T Ed. The new Cambridge Modern History: Vol. 10: The Zenith of European Power 1830-70 (1964)
8. Cameron, Rondo France and the Economics Development of Europe, 1800-1914: Conquest of Peace and Seeds of War (1961), a wide –ranging economic and business History.
9. Crawley, C.W Ed. The New Cambridge Modern History, Vol. 14: Altas (1972)
10. Evans, Richard j The Pursuit of power Europe 1815-1914 (2015)
11. Gildea, Robert Barricades and Borders: Europe 1800-1914 (3rd Ed. 2003)
12. Gooch, G.P History of modern Europe 1878-1919 (1923)
13. Grab, Alexander Napolean and the Transformation of Europe (2003)
14. Grant & Timperley: Europe in the Nineteenth and twentieth centuries.
15. Hayes C.J.H. A political and Cultural History of Europe, 1830-1839.
16. Herring, George C Years of Peril and Ambition U.S foreign Relations. 1776-1921 (2017)
17. Hinsley F.H Ed the New Cambridge modern History Vol. 11 Material Progress and World-Wide Problems 1870-1898 (1979)
18. Kennedy, Paul The Rise and Fall of the Great powers Economic Change and Military Conflict from 1500-2000 (1987), stress on economic and military factors
19. Kotelbey, C.D.M A history of Modern Times (English or Hindi)
20. Langer, William European Alliances and Alignments 1870-1890 (1950) Advanced history.
21. Langer, William The Diplomacy of Imperialism 1890-1902 (1950) advanced History
22. Lipson Europe in the Nineteenth and Twentieth centuries
23. Mason, David S A Concise History of Modern Europe, Liberty, Equality, Solidarity (2011). Since 1700
24. Merriman, John and J.M Winter eds. Europe 1789-1914. Encyclopaedia of the Age

of Industry and Empire (5 vol. 2005)
25. Mowat, RB: A History of European Diplomacy 1815-1914 (1922)
26. New Cambridge modern History (13 vol 1957-79), old but thorough coverage, mostly of Europe, strong on Diplomacy
27. Osterhammel, Jurgen: The transformation of the world: A Global History of the nineteenth Century (2015)
28. Porter, Andrew Ed.: The Oxford History of the British Empire Volume III: The Nineteenth century (2001)
29. Saimi Hannu: 19th Century Europe A cultural History (2008)
30. Sontag, Raymond European Diplomatic history: 1871-1932 (1933) Basic Summary 425pp
31. Steinberg, Jonathan: Bismarck A Life (2011)
32. Taylor AJP: The Struggle for Mastery in Europe 1848-1918 (1954) 638 pp- advanced history and analysis of major diplomacy
33. Wesseling, H.L The European Colonial Empire 1815-1919 (2015)
34. Bhatnagar and Gupt: Adhunik Europe ka Itihas (Bhag-2)
35. Lal ,K.S Lal: Adhunik Europe ka Itihas (Bhag-2)
36. Verma ,Lal Bahadur: Europe ka Itihas (Bhag-2), New Delhi Prakash Sansthan
37. Gupta ,Parthsarthi: Adhunik Paschim ka Uday, Hindi Madhyam Karyanvayan Nideshalaya (1983)
38. Gupta ,Parthsarthi: Europe ka Itihas, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi
39. Joll,James: Europe 1870 se, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi
40. Gupta ,Parthsarthi: Britain ka Itihas, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi
41. Saxena ,Banarasi Prasad: America ka Itihas, Hindi Madhyam Karyanvayan Nideshalaya, New Delhi

Course Structure (Semester VI)

SI.No.	Name of the Course	Type of Course	L-T-P	Credit	Marks
1.	Indian National Movement 1857-1947	MJC-10	4-1-0	4	100
2.	History of Modern India:1947-2000	MJC-11	5-1-0	5	100
3.	Cultural Heritage of India	MJC-12	5-1-0	5	100
4.	History of India:1200-1707	MIC-7	3-1-0	3	100
5.	History of ModernWorld:1919-1945	MIC-8	3-1-0	3	100
				Total Credit-20	
Exit Option: A student may be awarded 3-year UG Degree in the Major & Minor discipline, provided he/she earns all credits of I, II, III, IV, V & VI Semester.					

The **question paper pattern** for all courses shall consist of three parts –
Part A – Compulsory – consisting of objective/multiple choice type-
Each carrying two marks 10x2 = 20 marks
Part B – Short Answer Type – Four questions to be answered out of six questions-
Each carrying five marks 04x5 = 20 marks
Part C – Long Answer Type – Three questions to be answered out of five questions-
Each carrying five marks 03x10 = 30 marks
Total: 100 Marks **End Semester Examination: 70 Marks** **CIA: 30 Marks**

MJC-10
Indian National Movement (1857-1947)

Course Outcome:

- The contents of the syllabus are designed to cover core issues pertaining to the vast canvass of Nationalist history so that the student at the undergraduate level is equipped to focus upon the core ideas of the National Movement in its contextuality.
- The students will understand India's quest for Independence and Nation-building are interwoven scripts of history, debated most widely at the global level with various angles.
- They will comprehend India's National Movement has a vast and divergent ideological base with inner contradictions.

MJC-10	Indian National Movement (1857-1947)	(4 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Rise of Mass Nationalism a) Debates on 1857 and Its Impact on British Policies. b) Factors leading to growth of Nationalism in India & Social Background of Indian Nationalism. c) Formation of early political organizations d) Congress- Moderates & Extremists	12
II	From Swadeshi to Home Rule a) Economic Nationalism, Idea of Swadeshi, Swadeshi Movement & Congress Split at Surat b) Idea & formation of Muslim league: Demands and Early Programs c) First World War: Lucknow Pact, Home Rule Movement d) Entry of Gandhi: Regional Movements, Rowlatt Satyagraha, Khilafat Issue e) Indian Council Act of 1909 & Government of India Act 1919	12
III	Mass Movements of Congress & Alternative Ideologies a) Non-Cooperation Movement and Swarajists b) Revolutionary Movement, Trial of Bhagat Singh, Rise of Leftist Ideology c) Simon Commission, Nehru Report and Civil Disobedience Movement d) Tripuri crisis. Issues and Ideas of Subhash Chand Bose, Quit India Movement.	12
IV	Rise of Peasant, Workers, Tribals' Movement a) Peasant Issues since 1919, formation of Regional Peasant Associations and all India Kisan Sabha, Role of Madan Mohan Malviya & Sahjanand Saraswati. b) Rise of Industrial Worker Class, its issues and Formation of Trade Unions. c) Colonial Policies & Tribal Issues (1857- 1947)- Birsa Munda Ulgulan and Tana Bhagat Movement d) Government of India Act 1935	12

V	Road to Partition Independence a) Challenges of Communalism (1942- 1947) b) Role of INA, INA Trials & RIN Mutiny c) Constitutional Formulas: Wavell Plan, Cripps and Cabinet Mission d) Mountbatten plan, Circumstances leading to Partition & Independence e) Nationalist Movement in Princely states	12
	Total	**60**

Suggested Reading

1. Sarkar Sumit: Modern India 1885 n 1947. Macmillian, 1983
2. Jeffery R., Masseloss J: From Rebellion to the Republic
3. Brass Paul: The Politics of India since Independence
4. Subramanian K.G: The Living Tradition: perspectives on Modern Indian Art.
5. Dutta. K.K: Social History of Modern India
6. Desai A.R.: Social background of Indian Nationalism
7. Desai A.R.: India's Path of Development
8. Prasad, Bisheswar: Bondage and Freedom, Vol. 2
9. Singh Ayodhya: Bharat Ka Mukti Sangram
10. Patel Vallabh Bhai: Correspondence, Writings and Speeches
11. Agrow D.: Moderates and Extremist in the Indian National Movement
12. Gupta M.N.: History of the revolutionary Movement in India
13. Moon Penderal: Divide and Quit
14. Sarkar Sumit: Adhunik Bharat
15. Chand Tara: History of Freedom Movement in India, Vol. 3
16. Mehrotra S.R: The Emergence of Indian National congress
17. Chandra Bipan and Others: Freedom Struggle
18. Delanty Gerard & Kumar Krishna, Nations & Nationalism

MJC-11
History of Modern India (1947-2000)

Course Outcome:

- Students will learn about the post-war Developments of Social, Political and Economic scenarios of India.

MJC-11	History of Modern India (1947-2000)	(5 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	The Impact of Colonialism and National Movement: a) Impact of Colonialism on Political, Social, Economic System and Cultural Values. b) National Movements after Independence: Its significance, Value and Legacy c) Partition and Independence of India: Role of Congress & Communists, Hindu Mahasabha and others d) Integration of Princely States; special discussion on Hyderabad, Junagarh and Jammu & Kashmir	12
II	Indian Constitution and Consolidation as a Nation: a) Definition of Bharat (India) as 'Shaswat Rashtra' and Framing of Indian Constitution - Constituent Assembly - Draft Committee Report - declaration of Indian Constitution, Role of Dr. B.R. Ambedkar, Indian constitution - Basic Features and Institutions. b) The Linguistic Reorganization of the States, Regionalism and Regional inequality c) India's Relations with Neighbouring countries; Pakistan, China, Nepal, Sri Lanka, Afghanistan and Myanmar. d) Evolution and Development of Parliamentary Democracy	12
III	Developments in India since independence: a) Politics in the States: Tamil Nadu, Andhra Pradesh, Assam, West Bengal and Jammu & Kashmir, the Punjab crisis. b) Development of Science, Technology and Modern Education System & Policies. c) Industrial Policy; Emergence of Public Sector Enterprises d) Social Justice; Law & Politics for the upliftment of the weaker sections and tribal issues.	12
IV	Socio-Economic development since independence: a) Indian Economic development - industrialization, liberalization and globalization. b) Land Reforms: Zamindari Abolition and Tenancy Reforms, Ceiling and the Bhoodan Movement, Cooperatives and an Overview, Agriculture Growth and the Green Revolution and Agrarian Struggles Since Independence	12

	c) Significance of political & social movements, Women Empowerment and the question of Peasant rights d) Issue of Identity Politics: Communalism; Regional and Caste Consciousness; Dalit Politics, Untouchability, Anti-caste Politics and Strategies	
V	India and the World: a) India's Foreign Policy in the Nehru (1947-1964) & post Nehru (1964-2000) period, challenges and responses. b) Issue of Non-Alignment movement after the end of the Cold War. c) Emergence of Terrorism, Issues and Challenges d) India's Role in the Contemporary World.	12
	Total	**60**

Suggested Readings:

1. Balbushevik, A. & Dyakov, A.M.:A Contemporary History of India
2. Basu, D.D.: Shorter Constitution of India
3. Bettleheim: Charles, India Independent
4. Pal Bipin Chandra: Essay on Contemporary India,
5. Pal Bipin Chandra: India's Struggle for Independence
6. Chahal, S.K.: Dalits Patronized
7. Gadgil D.R.: Policy Making in India
8. Davies, H.A.: Outline History of the World
9. Fisher, H.A.L: A History of Europe
10. Gaur, Madan, India: 40 Years after Independence
11. Guha, Ranjit (ed.), Subaltern Studies, Vol. I-XI
12. Hasan, Mushirul, India's Partition: Process, Strategy and Mobilization
13. Henderson, O.P., The Industrial Revolution on the Continent
14. Hill, Christopher, From Reformation to Industrial Revolution
15. Hinsely, F.H. (ed.), Modern History: Material Progress and World Wide Problems
16. Jaisingh, Hari, India and Non-Aligned World: Search for A New Order
17. Joll, James, Europe Since 1870: An International History
18. Kothari, Rajni: Democratic Policy and Socialist Change in India
19. Langer, W.L.: Diplomacy of Imperialism
20. Langer, W.L.: European Alliances and Alignments
21. Majumdar, Datta and Ray Chowdhary: Advanced History of India
22. Nanda, B.R., Gandhi: A Biography
23. Nanda, B.R., Jawaharlal Nehru: A Biography
24. Omvedt, Gail, Dalits and Democratic Revolution: Dr. Ambedkar and Dalit

Movement in Colonial India
25. Palmer, R.A. and Cotton Joel, A History of Modern World
26. Patel, Vallabhbhai, Correspondence, Writings and Speeches
27. Rao, U. Bhaskar, The Story of Rehabilitation
28. Rolls, Eric, History of Economic Thought
29. Rude, George, Revolutionary Europe
30. Sarkar, Sumit, Modern India
31. Satyamurti, T.V., India Since Independence
32. Srinivas, M.N.:Social Change in Modern India
33. Starvrianes, L.S.: The World Science 1500
34. Tara Chand: History of the Freedom Movement in India, Vol. IV
35. Taylor, A.J.P: The Origins of the Second World War
36. Thompson, David: Europe Since Napoleon
37. V.P. Menon: The Story of Integration of the Indian States

MJC-12
Cultural Heritage of India

Course Outcome:

- This course enables students to explore various aspects of cultural heritage and cultural diversity in historical perspective that discusses numerous cultural practices that have evolved over centuries.
- They will acquire knowledge of changing socio-cultural scenarios of India. As well as they can gather knowledge about the cultural heritage, cultural forms and cultural expressions performing arts, fairs and festivals.

MJC-12	Cultural Heritage of India	(5 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Indian Cultural Heritage: An Introduction a) Meaning, Concept and Historical Background of Cultural Heritage b) Types of Indian Cultural Heritage: Tangible, intangible Oral and Living traditions. c) Significance of Cultural Heritage in Human life. d) Impact and significance of geography on Indian culture.	12
II	Fairs Festivals, Rituals: Ethnic Indian Cultural Construct a) Concepts, Significance and types (Religious, folk, Animals, Monsoon): Historical background and some major fairs of India b) Concepts, Significance, types and some major Festivals of India: Buddha Poornima, Diwali, Dusshera, Holi, Onam, Pongal Guru Parb, Eid- Ul-Fitr, Navroz, Swatantra Diwas c) Meanings, concepts, significance and importance of Ritual in human life, Types of Ritual: An Introduction (Nature Worship, Domestic Worship, Samskara); d) Concepts of Tirthas: Some important Tirthas of India (Amarnath, Haridwar,Vrindavan, Pushkar, Prayag, Dwarka, Puri, Rameshwaram, Guruvayur, Kashi, Ayodhya)	12
III	legends, Narratives and Cultural Ethos a) Meaning, significance, forms and tradition of legends and their historical background in India. b) Ramayana and Mahabharata: Tradition of Cultural Heritage; c) Ancient Indian fables of ethical and moral values: Panchtantra, Jataka. d) Nature, Culture and Environment in India; Inter relationship; Environment and Environmental consciousness in Indian ethos and philosophy.	12
IV	UNIT IV Traditional Performing Art a) The source of performing Indian classical Art: Bharat Natya Shashtra, Works of Kalidas & Bhasa b) Indian Classical Dances as Cultural Dances: Bharatnatyam, Katthak,	12

	Kuchipudi, Kathakali etc. c) Folk dances and theatre: Regional variation, some important folk dances, Garba, Ghoomar, Lavani, Changlo, Giddha,Kalbelia etc. d) Oral Tradition and performing Arts- Bhajan, Katha, Sankirtan, Harikatha, Vedic Chants, Gurbani (Gurugranth) as Intangible Cultural Heritage.	
V	UNIT V Architecture and Built Heritage a) Meaning, Definition and Ideas of Built Heritage: Brief survey of Shelter, pit dwellings, Rock Alignments, Memorials, Shrines, Water tanks, Garden b) Significance and Contribution of Architecture and Built Heritage in Cultural Life of India. c) Some important Monuments of India Shore Temple (Mahabalipuram), Ajanta-Ellora, Bhimbetka, Sarnath, Nalanda, Sanchi, Konark, Khajuraho, d) Some important historical monument: Hampi, Vijayanagar, Chittorgargh Fort & Kirti Stambh, Taj mahal, Golden Temple, Red fort, Amber fort, Hazratbal, .	12
	Total	**60**

Suggested Readings:

1. Achaya, K.T , Indian food: A Historical Companion, oxford University Press, 1998.
2. Banga, I. (ed).: The City in Indian History : Urban Demography, Society and Politics, Delhi, Manohar, 1991
3. Basham A.L: The wonder that was India. Picador Publisher, Indian ed. 2014
4. Biswas Shekhar: Protecting the Cultural Heritage (National Legislation and International Convention, Aryan Books International, 1999.
5. Bose N.K : "Culture Zones of India" in culture and Society in India, Asia publishing House
6. Dinkar Ramdhari Singh: Sanskriti ke chaar Adhyaya, Udyanchal Publishers
7. Gokulsing, K. Moti : Popular Culture in a Globalized India, New Delhi, Routiledge, 2009
8. Hansen Kathryn: Grounds for play, The Nautanki Theatre of north India, University of California
9. Mehta Bhanu Shankar: Ramlila Varied Respective , B.R Publishing Corporation, 2011
10. Narayan S.: Indian Classical Dances, Shubhi Publications, 2005.s
11. Prakash, H.S :Shiva Traditional Theatres, Incredible India Series, New Delhi, 2007
12. Radhakrishnan S.: "Culture of India" in the Annals of the American Academy of Political and Social Science, Vol 233, India Speaking (may 1944).pp 18-21

13. Rangacharya A.: The Natya shastra, English translation with critical Notes, New Delhi, Munshiram Manoharlal Publishers Pvt ltd.
14. Thapiyal K. , Shukla S.: Sindhu Sabhyataien, Luckhnow,2003
15. The Director General Survey of India (ed.) Guide Books: World Heritage Series, New Delhi
16. Tiwari Shashi, Origin of Environmental Science from Vedas. A Research paper presented at the National Seminar on" Science and Technology" in Ancient Indian Text, Special Centre for Sanskrit Studies. JNU, 9-10th, January, 2010
17. Varadara Raman: Glimpses of Indian Heritage, Popular Prakashan Private Ltd., Bombay, 1989
18. Varapande, M.L : History of Indian Folk Theatre (Lok Ranga Panorama of Indian Folk Theatre) Abhinav Publications,1992
19. Vasudev V.: Fairs and Festivals, Incredible India series, 2007

MIC-7

History of India (1200-1707)

Course Outcome:

- To develop understanding regarding the major political developments in the History of India during the period.
- To have knowledge about the changes and continuities in the field of culture, especially with regard to Art, Architecture, Bhakti and Sufi movement.
- To delineate the development of trade and urban complexes during this period.

MIC-7	History of India (1200-1707)	(3 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	**Medieval India** a) Important sources of Medieval Indian History b) Early Turks, Khaljis, and Tughlaqs, Invasion of Timur c) Vijayanagara Empire: Administration, Society and Economy	6
II	**Afghans and Mughals** a) Afghan Rule: Lodis and Surs b) Establishment and Expantion of Mughal Empire c) Administration and Revenue System	6
III	**Aurangzeb, Shivaji and Other Powers** a) Rise of Marathas under Shivaji b) Maratha Administration, Concept of Hindu Pad Padshahi c) Aurangzeb and Decline of the Mughal empire	6
IV	**Society and Economy** a) Hindu Society and Muslim Society, Divisions and Occupational groups, Education, Position of Women b) Development of Agriculture, Trade and Commerce, Process of Urbanisation	6
V	**Religion and Culture** a) Bhakti and Sufi movement b) Development of Literature, Art and Architecture	6
	Total	**30**

Suggested Readings

1. Srivastava , A.L, *Delhi Sultanate (English or Hindi Version)*, Shiv Lal Agarwal & Co., Agra, Reprint, 2017
2. Srivastva A.L,*The Mughal Empire* (English or Hindi Version), ShivLal Agarwal & Co., Agra, Reprint, 2017
3. Yadav B.N.S, *Society and Culture in North India in the12th century*, Raka Prakashan, Prayagraj, 2012
4. Majumdar B.P., *Socio-Economic History of Northern India*, Firma K.L. Mukhopadhyay (1960)
5. Purandare Babasaheb, *Raja Shivachattrapati,Vol.I & II*, Purandare Prakashan, 2020
6. Ojha, G.H., *Rajputane Ka Itihas,(Hindi)*, VaidikYantralaya, Ajmer,1927
7. Prasad, Ishwari, *Medieval India (English or Hindi version)* 4th ed.,Digitized 2006
8. Sarkar J.N., *Life and Times of Shivaji*, Orient Blackswan Pvt.Ltd., NewDelhi,2010
9. Majumdar, Raychaudhary & Dutta, *An Advanced History of India*, Laxmi Publications,2016
10. Habib Mohammad and Nizami K.A., ed., *Comprehensive History of India, Vol.V, The Delhi Sultanate*, PPH, 1992
11. Majumdar R.C. & others(ed.), *The History and Culture of the Indian People Vol.6, the Delhi Sultanate*, Bhartiya Vidya Bhawan, 2006
12. Pande, Rekha, *Religious Movements in Medieval India*, Gyan Publishing House,2005
13. Chandra Satish, *Uttar Mughal Kalin Bharat Ka Itihas*, Minakshi Prakaskan,1974
14. Shrivastava Nripendra Kumar, *Process of Urbanisation of Bihar during the Medieval Period*, Janki Publication, Patna,2014
15. Shrivasta Ashivadi Lal, *Delli Sultanat*, (Hindi)
16. Chandra Satish, *Madhyakalin Bharat*, Bhag-1

MIC-8
History of Modern World (1919- 1945)

Course Outcome:

- The students will have an understanding of an era of shifting history from Euro centric to World.
- They will be able to comprehend the turbulent times when totalitarianism rose as an alternative to democratic and liberal ideal and also the growing desire for peace through formation of organizations such as United nations.

MIC-8	History of Modern World (1919- 1945)	(3 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	**A New World Order** a) Formation of the League of Nations: Organizations, Achievements & Failures b) Formation of ICJ & ILO	6
II	**Rise of Totalitarianism** a) Failure of Weimar Republic & Rise of Nazism in Germany b) Factors leading to the Growth of Fascism in Italy c) Rise of Militarism in Japan	6
III	**Anti-Imperialist Movements between the Great Wars** a) Arab Nationalism b) Nationalist Movement in China with reference to The role of Dr.Sun Yat-Sen	6
IV	**Crisis of Capitalism** a) The Great Economic Depression: 1929 b) Reconstruction and New Deal Policy of F.D Roosevelt	6
V	**Quest for security and road to Second World War** a) Causes and Consequences of Second World War b) U.N.O its Organization and Achievements	6
	Total	**30**

Suggested Readings

1. Barzun Jacques from Dawn to Decandence 500 years of western Cultural life : 1500- present New York, Harper Collins 2001
2. Benns F. Lee : Europe Since 1914
3. Car, E.H (1948) International Relations between two World Wars (1919-1939), Delhi, Macmillian & Co.
4. Carsten. F.L (1982) : The Rise of Fascism University of California Press
5. Cayley, E.S (1856) The European revolutions of 1848, London Smith Elder & Co. Vol I and II
6. Contemporary History of the World by Edwin Augustus Grosvenor
7. Crawley C.W (1965) The new Cambridge modern History Volume 9. War & Peace in an age of upheaval. 1793-1830. Cambridge University Press.
8. Dhar, S.N (1967) : International Relations and World Politics since 1919, Bombay, Asia Publish House
9. Doenecke Justus D. Stoler Mark A (2005). Debating Franklin D roosevelt's Foreign
10. Policies. 1933-1945 Rowman & Little field
11. Dunan Marcel Larousse: Encyclopedia of Modern History from 1500 to the Present day, New York Harper & Row, 1964.
12. Duruy V & Grosvenor E.A (1894) History of modern times: From the fall of Constantipole to the French Revolution, New York H Holt and Company
13. Walters FP: A History of the League of Nations (oxford 1965)
14. Gaddis John Lewis (1972) The UNITed States and the Origins of the Cold War, 1941- 1947 Columbia University Press
15. Grosvenor, Edwin A Contemporary History of the World New York and Boston T.Y Crowell & Co. 1899
16. Webster Henry Kitchell : Early European History
17. Michelet Jules, Mary Charlotte, Mair Simpson : A summary of Modern history

Course Structure (Semester VII)

Sl.No.	Name of the Course	Type of Course	L-T-P	Credit	Marks
1.	Asian Resurgence	MJC-13	5-1-0	5	100
2.	Research Methodology	MJC-14	5-1-0	5	100
3.	History of Communication	MJC-15	6-1-0	6	100
4.	History of India:1707-1857	MIC -9	4-1-0	4	100
		Total Credit-20			

The **question paper pattern** for all courses shall consist of three parts –
Part A – Compulsory – consisting of objective/multiple choice type-
Each carrying two marks 10x2 = 20 marks
Part B – Short Answer Type – Four questions to be answered out of six questions-
Each carrying five marks 04x5 = 20 marks
Part C – Long Answer Type – Three questions to be answered out of five questions-
Each carrying five marks 03x10 = 30 marks
Total: 100 Marks **End Semester Examination: 70 Marks** **CIA: 30 Marks**

MJC-13
Asian Resurgence

Course Outcome:

- Students will be able to analyze how global forces of Economic, Political and Cultural Change affecting Contemporary Asian Societies.
- They will be able to explain basic historical linkages between Asia and the world, including economic and cultural linkages.

MJC-13	Asian Resurgence	(6 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Rise of Nationalities & Cultures a) Geographical Outline of Asia & Concept of Resurgence. b) Historical Development of China & Japan. c) Rise of Nationalities in West & Central Asia. d) History & Culture of South East Asia.	12
II	Resistance & Resurgence of Japan a) Crisis & Challenges: Opium Wars and opening of Japan. b) National Identity and Japan's Meiji Restoration, 1868-1894. c) Rise of Imperial Japan in the beginning of 20th Century. d) Rise of Japan as World Power 1919-1939.	12
III	East Asia in the Age of Imperialism and Nationalism, 1868-1945 a) China's reaction to imperialism; the nationalist movement 1911-1927. b) Chinese search for identity 1930-1947. c) Age of Chinese domination 1947-1990. d) Prosperity and Growth of China.	12
IV	Asia and its resistance to Cold War a) Communism and East Asia b) Cold War and Korea. c) Occupation, Reconstruction, and Prosperity in Japan 1945-1970 d) The Resistance in Vietnam.	12
V	Emerging trends and emergence of ideologies in West Asia a) Nationalism: Arab, Iranian and Turkish. b) Emergence of Mohammad Ali Pasha and his reforms. c) Disputes: Arab-Israel, Iran-Iraq, Ethnic-Sectarian Conflict. d) The Changing political and strategic environment: Regional and Global Implications.	12
	Total	**60**

Suggested Readings:

1. Azad, Abul Kalam (1988). India Wins Freedom: The Complete Version. Madras and Hyderabad: Orient Longman.
2. Bagchi, A.K. (1982). The Political Economy of Underdevelopment. Cambridge: Cambridge University Press.
3. Bhagavan, Manu (2010). A new hope: India, the UNITed Nations and the making of the universal declaration of human rights. Modern Asian Studies, vol. 44, No. 2, pp. 311-347.
4. Chowdhury, Anis (2009). Microfinance as a poverty reduction tool–a critical assessment. Working Paper, No. 89 (ST/ESA/2009/DWP/89). New York: UNITed Nations Department of Economic and Social Affairs.
5. Cumings, Bruce (1984). The legacy of Japanese imperialism in Korea. In The Japanese Colonial Empire, 1895-1945, Ramon H. Myers and Mark R. Peattie, eds. Princeton, New Jersey: Princeton University Press.
6. Feeny, David (1982). The Political Economy of Productivity: Thai Agricultural Development, 1880-1975. Vancouver: University of British Colombia.
7. Hasan, Pervez (2008). Pakistan. In Handbook on the South Asian Economies, Anis Chowdhury and Wahiduddin Mahmud, eds. London: Edward Elgar.
8. Ingram, James C. (1971). Economic Change in Thailand 1850-1970. Stanford: Stanford University Press.
9. Jolly, Richard, and others (2004). UN Contributions to Development Thinking and Practice. Bloomington, Indiana: Indiana University Press.
10. Manarungsan, S. (1989). Economic Development of Thailand 1850-1950, Response to the Challenge of the World Economy. Bangkok: Institute of Asian Studies.
11. Myers, Ramon H., and Mark R. Peattie, eds. (1984). The Japanese Colonial Empire, 1895-1945. Princeton, New Jersey: Princeton University Press.
12. Robinson, E.A.G., and Keith Griffin, eds. (1974).The Economic Development of Bangladesh within a Socialist Framework: Proceedings of a Conference by International Economic Association. London: Macmillan.
13. Sapir, Jacques (1996). Inflation and transition: from Soviet experience to Russian reality. InFinancial Fragility, Debt and Economic Reforms, Sunanda Sen, ed. London: Macmillan.
14. Simmons, Colin (1985). "De-industrialization", industrialization and the Indian economy, c. 1850-1947. Modern Asian Studies, vol. 19, No. 3, pp. 593-622.
15. Wightman, David (1963). Toward Economic Co-operation in Asia: The UNITed Nations Economic Commission for Asia and the Far East. New Haven, Connecticut: Yale University Press for the Carnegie Endowment for International Peace.
16. Yong, Tan Tai (2005). The Garrison State: Military, Government and Society in Colonial Punjab, 1849-1947. New Delhi: Sage.
17. Pruthi R.K., Deepa Bhandari: Adhunik Asia ka Itihas, 2017Arjun Publishing House, New Delhi.
18. Pandey Dhanpati, Motilal Banarasidas : Adhunik Asia ka Itihas (1997). Publication, Varanasi.
19. Vinake Herald M., Translated by Kumari Mishla Mishra· Purva Asia Ka Adhunik Itihas (1994), , Uttar Pradesh Hindi Sansthan, Lucknow.
20. Upadhyay Vidyanand : Dakshin Purva Asia Ka Rajneetik Itihas (1987), Bihar Hindi Granth Akademi, Patna

MJC-14
Research Methodology

MJC-15
History of Communication in India

Course Outcome:

- This course will enable students to understand past of Communication in India.
- They will also understand in depth various dimensions of communication in Indian Past.

MJC-15	History of Communication in India	(6 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Communication: Concept and History a) Communication: Definition, Concept, Elements & Scope. b) Types of communication: Formal and Informal, Verbal and Non-Verbal, Oral and Graphic. c) Different Process, Functions, Theories and Philosophy of Communication. d) History of Communication: A Brief Survey, Primitives, Petroglyphs, Pictogram, Ideograms, Writing, Printing.	12
II	Means of Communication a) Art as means of Communication: Painting, Sculpture, Symbols, Signals b) Folk and Community Communication- Folk songs, Folklore, Folk craft, Legends. c) Performing Art as effective Communication: Dance, Drama, Theatre, Puppetry, and Storytelling. d) Changing dimensions of Communication in Modern times. Basic Knowledge of new means of Communication: Telephone/ Phonograph/ Radio/ Television/Fax/ Mobile /Computer/Internet/ Digital.	12
III	Writing and Language as Communication a) Inscription as a source of Communication b) Evolution of Printing in India. c) History of Newspaper in India. d) An Introduction of the History of Advertisement	12
IV	History of the Ideas of Communication in India a) History of the Communication in India: Narad, Krishana, Buddha, Shankar, Vivekananda and Gandhi. b) Literature as communicators in India: Myth and legends, Natyashastra, Meghdoot, Panchtantra, Gurugranth Sahib, Ramcharita Manas. c) Live examples of Visual arts in India: Bhitti chitra, Rock Art and Potteries.	14

V	Museum & Archive Communication a) Museum and archives as a source of historical and cultural communication. b) Museum: Artifacts, Galleries, Exhibition and outreach programme. c) Monument as a living Museum. d) Case study of any Art Museum.	10
	Total	**60**

Suggested Readings:

1. Vatsyayan, Kapila : Traditional Indian Theatre
2. ----------: Tradition of Indian Folk Dance
3. ----------: Bharat the Natyashashtra
4. Bim Mason: Painted Rock shelters of India
5. Mukharji Ajit: Folk Art of India
6. Singhal & Rogers: Indian Communication Revolution: From Bullock Cart to Cybers Marts
7. Ahuja B.N: History of India Press
8. Das Sukumar: The Book Industry in India: Context, Challenges and Strategy
9. Diringer David: The Book before printing, Ancient, Medieval and Oriental
10. Mukhopadhyay DD: Folk Arts and Social Communication
11. Zimmer H.: Myth and Symbolism in Indian Art and civilization
12. Werner & Tankard: Communication- Theories Origin& Method
13. Pandey Rajbali : Indian Rocks painting: Their Chronology, Technique and Preservation
14. Pandey S.K. : Indian Rock Art, Aryan Book ltd, New Delhi, 1993
15. Chakravartey Somnath: Interpreting Rock Art in India, A holistic and Cognitive Approach
16. Wakankar V.S: Painted Rock shelters of India
17. Raymond William : Communication, Culture & Media

MIC-9
History of India (1707-1857)

Course Outcome:

- The students will be able to trace the British colonial expansion in the political contexts of eighteenth-century India.
- They will learn about the changes in society, politics, religion and economy during this period.
- They'll also acquire knowledge about the Freedom Struggle.

MIC-9	History of India (1707-1857)	(4 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	**Downfall of Mughals and Maratha Power** a) Disintegration of Mughal Power: Main Political Trends b) Expansion of Maratha Kingdom under Peshwas and Maratha confederacy c) Causes of the Downfall of Maratha power- Third Battle of Panipat	8
II	**Rise of Indian States** a) Rise of Punjab and Bengal in the 18th Century b) Rise of Hyderabad and Awadh in the 18th Century	8
III	**Expansion of East India Company's Rule** a) Ascendancy of English East India Company: Battle of Buxar and Plassey; Their effects b) Territorial Expansion of East India Company1765- 1856	8
IV	**Administration of East India Company** a) Economic Policies- Agriculture, Trade, Banking, Land revenue b) Response of Indian Society and socio-religious reform movements	8
V	**Resistance to Colonial Power** a) Tribal Revolts: Bhil, Kol, Santhal, Gond and others b) First War of Independence: Causes, Nature	8
	Total	**40**

Suggested Readings:

1. Banerjee A.C : The New History of modern India (1707-1947)
2. Basu B.D. : Rise and Fall of Christian Power in India, Vol. II
3. Grover B.R : A new look on Modern Indian History
4. Bayly C.A : An illustrated History of Modern India 1600-1947
5. Chabra, G.S. : Advance History of Modern India
6. Kumar D. : The Cambridge Economic History of India
7. Desai A.R: India's Path of Development
8. Desai, A.R. : Social Background of Indian Nationalism
9. Dodwell : A Sketch of the History of India
10. Dutta,K.K : Social History of Modern India
11. Freedenberg, R.E : Land Control and Social Structure in India
12. Prasad I.& Subedar: History of Modern India (English or Hindi)
13. Farquhar J.N : Modern Relegious Movements in India
14. Sarkar J.N. : Mughal Economy
15. Veluthat Kesvan : Political Structure of Early Medieval South India
16. Lal, Sunder : Bharat me Angreji Raj
17. Ali M. Athar : Mughal Nobility under Aurangzeb
18. Mishra, B.B : Administrative History of modern India
19. Karashima Nobora : South Indian History and Society
20. Marshall P.J.: The Eighteenth century in Indian History
21. Majumdar R.C : British Paramountacy and Indian Renaissance (Part I)
22. Dutt R.P : India Today
23. Tripathi R.P. : The Rise and Fall of Mughal Empire
24. Muir Ramsay: The making of British India
25. Sarkar Sumit : Modern India
26. Sarkar Sumit: Adhunik Bharat
27. Sen Sunil K. : Agrarian Relations in India, 1793-1947
28. Singh, G.N : Constitutional Development of India
29. Stein Burton : The Making of Agrarian Policy in british India, 1770-1900
30. Gordon Stewart: The Marathas 1600-1818
31. Sarkar Sumit: Modern India 1885-1947
32. Metealf Thomas: Ideologies of the Raj
33. Thompson & Garret : Rise and Fulfillment of British Rule in India

Course Structure (Semester VIII)

SI.No.	Name of the Course	Type of Course	L-T-P	Credit	Marks
1.	Bihar Through the Ages	MJC-16	4-1-0	4	100
2.	Indian National Movement 1857-1947	MIC - 10	4-1-0	4	100
3.	Research Project/ Dissertation	RP- 1	-	12	100
				Total Credit-20	

Exit Option A student will be awarded Degree in UG Honours Major and Minor if he/she earns all credits of I, II, III, IV, V, VI, VII & VII Semester. Students who want UG Degree Honours with Research in Major he/she must obtain 7.5 CGPA and above in the I to VI Semester. Such students can choose a research stream in the fourth year if they can (80 Credits, including 12 credits from a research project/dissertation). They will be awarded UG Degree (Honours with Research)

The **question paper pattern** for all courses shall consist of three parts –
Part A – Compulsory – consisting of objective/multiple choice type-
Each carrying two marks 10x2 = 20 marks
Part B – Short Answer Type – Four questions to be answered out of six questions-
Each carrying five marks 04x5 = 20 marks
Part C – Long Answer Type – Three questions to be answered out of five questions-
Each carrying five marks 03x10 = 30 marks
Total: 100 Marks **End Semester Examination: 70 Marks** **CIA: 30 Marks**

MJC-16
Bihar Through the Ages

Course Outcome

- The student will understand the connection between Regional history, National history and World history.
- They will know how their ancestors lived in this territory, where they are living today.
- They will understand the problems, their ancestors faced and how they countered those problems.
- They will know about the fragrance of the culture of Bihar.

MJC-16	Bihar Through the Ages	(4 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	**Historical and Political History of Bihar** a) Historical Geography of Bihar: From Pre-Historic times to 1200 b) Bihar during Sultanate and Mughal period c) Bihar's role in Indian Freedom Struggle: Revolt of 1857, Champaran Satyagraha, Non-Cooperation Movement, Civil Disobedience Movement, Quit India Movement d) Creation and Reorganization of Modern Bihar: 1912, 1935, 2000	12
II	**Art and Architecture** a) Art and Architecture in Bihar: Mauryan, Gupta, Post Gupta, Delhi Sultanate and Mughals b) Buddhist Sculptures, Ashoka Pillars and Pala Art c) Patna Kalam, Manjusha Painting, Madhubani Painting d) Historical monuments of Bihar: Barabar Caves,Vaishali Stupa,Nalanda Mahavihara, Mahabodhi Temple, , Tomb of Sher Shah Suri, Golghar,	12
III	**Cultural History** a) Folk Dances and Folk Tales: Jhijhiya, Jat-Jutin, Sama Chakwa, Jhumar, Vidyapati Nach, Puja Aarti, Domkach, Kathghorwa, Nach, Kajree, Launda Nach, Bidesiya, b) Festivals and Fairs: Chatta Puja, Shravani Mela, Sonepur Cattle Mela, Mukar Sankranti, Pritrapaksha Mela, Rajgir Mahotsava c) Religious Sects: Buddhism, Jainism, Sufism d) Educational Institutions: Nalanda, Vikramshila, Mithila School of Education, Udantpuri	12
IV	**Socio-Economic History** a) Panji Prabandha of Mithila b) Agriculture, Craft and Industry c) Trade and Commerce d) Urbanization	12

V	**Great Personalities of Bihar** a) Janak, Jeevak, Yajnavalkya, Maitreyi, Gargi b) Mandan Mishra, Jyotireshwar, Chandeshwar, Vidyapati, , Sant Dariya Saheb, c) Babu Kunwar Singh, Yogendra Shukla, Baikuntha Shukla, Rajendra Prasad, Mazharul Haque, Jaiprakash Narayan, Jagjivan Ram, Siyaram Singh, Veer Chand Patel, Dashrath Manjhi and Yamuna Karjee	12
	Total	**60**

Suggested Readings

1. Diwakar R.R.: Bihar Through the Ages
2. Choudhary R.K.: History of Bihar
3. Sinha B.P.: Comprehensive History of Bihar vol. I Part I&II
4. Ahmad Q.: Patna through the Ages
5. Askasi S.H. & Qeyamaddin Ahmad (ed.) Comprehensive History of Bihar Vol. III Part I&II
6. Dutta K.K. : History of Freedom Movement in Bihar 3 Vols
7. Sinha Ranjan: Aspect of Society and Economy of Bihar (1765-1856)
8. Singh Sudhir Kr. :Press, Politcs and Public Opinion in Bihar (1912-1947)
9. Raza Syed: Mazharul Haque; An Epitome of Indian Liberation and Communal Harmony
10. Patel Hitendra: Commutation and Intelligentsia in Bihar
11. Nayak Rajesh Kr.: Micro and Macro Prospection of Commutations in Bihar, Gyan Bharati, Varanasi 2014
12. Das Pramodanand & Kumar Amrendra: Bihar Itihas Evam Sanskriti
13. Dutta K.K. & Narain V.A. Ed): Comprehensive History of Bihar Vol. III Part I & II.
14. Shrivastava Nripendra Kr., History of Bihar
15. Shrivastava Nripendra Kr., Process of Urbanization of Bihar During the Medieval Period,Janaki Publication ,Patna
16. Jha Aditya Chandra (ed), Researches in the History and Culture of Bihar

MIC-10
Indian National Movement (1857-1947)

Course Outcome:

- The contents of the syllabus are designed to cover core issues pertaining to the vast canvass of Nationalist history so that the student at the undergraduate level is equipped to focus upon the core ideas of the National Movement in its contextuality.
- The student will able to understand India's quest for Independence and Nation-building are interwoven scripts of history, debated most widely at the global level with various angles.
- They will comprehend India's National Movement has a vast and divergent ideological base with inner contradictions.

MIC-10	Indian National Movement (1857-1947)	(4 Credits)
Unit	**Topics to be covered**	**No. of Lectures**
I	Rise of Mass Nationalism a) Factors leading to growth of Nationalism in India & Social Background of Indian Nationalism. b) Congress- Moderates & Extremists	6
II	From Swadeshi to Home Rule a) Economic Nationalism, Idea of Swadeshi, Swadeshi Movement & Congress Split at Surat b) Idea & formation of Muslim league c) Entry of Gandhi: Regional Movements, Rowlatt Satyagrah, Khilafat Issue	6
III	Mass Movements of Congress & Alternative Ideologies a) Non Cooperation Movement b) Simon Commission, Nehru Report and Civil Disobedience Movement c) Tripuri crisis: Issues and Ideas of Subhash Chand Bose, Quit India movement.	6
IV	Rise of Peasant, Workers, Tribals' Movement a) Peasant Issues since 1919, formation of Regional Peasant Associations and all India Kisan Sabha, Role of Madan mohan Malviya & Sahjanand Saraswati. b) Rise of Industrial Worker Class, its issues and Formation of Trade Unions.	6
V	Road to Partition Independence a) Constitutional Formulas: Wavell Plan, Cripps and Cabinet Mission b) Mountbatten plan, Circumstances leading to Partition & Independence	6
	Total	**30**

Suggested Reading

1. Sarkar Sumit: Modern India 1885 n 1947. Macmillian, 1983
2. Jeffery R., Masseloss J: From Rebellion to the Republic
3. Brass Paul: The Politics of India since Independence
4. Subramanian K.G: The Living Tradition: perspectives on Modern Indian Art.
5. Dutta. K.K: Social History of Modern India
6. Desai A.R.: Social background of Indian Nationalism
7. Desai A.R.: India's Path of Development
8. Prasad, Bisheswar: Bondage and Freedom, Vol. 2
9. Singh Ayodhya: Bharat Ka Mukti Sangram
10. Patel Vallabh Bhai: Correspondence, Writings and Speeches
11. Agrow D.: Moderates and Extremist in the Indian National Movement
12. Gupta M.N.: History of the revolutionary Movement in India
13. Moon Penderal: Divide and Quit
14. Sarkar Sumit: Adhunik Bharat
15. Chand Tara: History of Freedom Movement in India, Vol. 3
16. Mehrotra S.R: The Emergence of Indian National congress
17. Chandra Bipan and Others: Freedom Struggle
18. Delanty Gerard & Kumar Krishna, Nations & Nationalism

To,

The Principal Secretary,
Raj Bhavan, Bihar,
Patna

Sub:- **Regarding submission of proposed course uniform syllabus of Chemistry for 3rd to 8th Semester of 4 - Year undergraduate Course, (CBCS)**

Ref.:- Letter No.-BSU (UGC) -02/2023-1457/ GS(I) dated 14.09.2023

Sir,

In compliance with your letter no. BSU(UGC)-02/2023-1457/GS(I), dated-14.09.2023, we are submitting the proposed course syllabus of **Chemistry** for 3rd to 8th semester of the 4 - year under graduate course (CBCS) as per UGC regulations.

Yours sincerely

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Chemistry

(A)Major Core Courses

Sem	Type of Course	Name of Course	Credits	Marks
I	MJC-1 (T)	Inorganic Chemistry I: Atomic Structure & Chemical Bonding (T)	6	100
II	MJC-2 (T)	Physical Chemistry I: States of Matter & Ionic Equilibrium (T)	4	100
	MJC-2 (P)	Physical Chemistry I: States of Matter & Ionic Equilibrium (P)	2	100
III	MJC-3 (T)	Organic Chemistry: Cyclic Hydrocarbons and their Halogen Derivatives (T)	5	100
	MJC-4 (T)	Physical Chemistry: Chemical Thermodynamics and its Applications (T)	3	100
	MJC-4 (P)	Physical Chemistry: Chemical Thermodynamics and its Applications (P)	1	100
IV	MJC-5 (T)	Inorganic Chemistry: *s*-, *p*-, *d*- and *f*-block elements (T)	3	100
	MJC-5 (P)	Inorganic Chemistry: Qualitative Analysis of Inorganic Salt Mixture. (P)	2	100
	MJC-6 (T)	Organic Chemistry: Compound with OxygenContainingFunctionalGroups. (T)	3	100
	MJC-6 (P)	Organic Chemistry: identification of oxygen Containing Functional Groups (P)	2	100
	MJC-7 (T)	Physical Chemistry: Phase Equilibria, Conductance and Electrochemical Cells	5	100
V	MJC-8 (T)	Inorganic Chemistry: Coordination Chemistry (T)	3	100
	MJC-8 (P)	Inorganic Chemistry: Coordination Chemistry, preparation of complexes (P)	2	100
	MJC-9(T)	Organic Chemistry: Polynuclear hydrocarbons, nitrogen containing compounds, heterocyclic compounds, alkaloids and terpenoids (T)	5	100
VI	MJC-10 (T)	Physical Chemistry: Colligative Properties of Dilute Solutions, Chemical Kinetics and Photochemistry (T)	3	100
	MJC-10 (P)	Physical Chemistry: Colligative Properties of Dilute Solutions and Chemical Kinetics (P)	1	100
	MJC-11 (T)	Organic Chemistry: Biomolecules (T)	3	100
	MJC-11 (P)	Organic Chemistry: Biomolecules (P)	2	100
	MJC-12 (T)	Physical Chemistry: Quantum Chemistry & Spectroscopy (T)	5	100
VII	MJC-13 (T)	Inorganic Chemistry: Organometallic Chemistry symmetry and Group theory (T)	5	100
	MJC-14 (T)	Research Methodology (T)	5	100
	MJC-15 (T)	Organic Chemistry: Spectroscopy (T)	6	100
VIII	MJC-16 (T)	Analytical Methods in Chemistry (T)	4	100

Sub Total = 80

SEMESTER- III

MJC-3 (T): Organic Chemistry: Cyclic Hydrocarbons and their Halogen Derivatives (T)

Course Outcomes

After completion of the course, students will be able to understand:

CO1: the aromatic character of the molecules.

CO2: the idea to design some organic synthesis.

MJC-3: Organic Chemistry: Cyclic Hydrocarbons and their Halogen Derivatives. (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Reaction intermediates:** Carbenes, nitrenes and benzynes: Generation, structure, stability and reactions.	12
2	**Chemistry of Cyclic Hydrocarbons:** Nomenclature of monocyclic and bicyclic compounds, Baeyer's strain theory, conformation of cyclohexane, relative stability of chair, boat and twist boat forms of cyclohexane with their energy level diagram, relative stability of mono- and disubstituted cyclohexanes, Aromaticity and Huckel rules with reference to benzenoids, cyclocarbocations and cyclocarbanions, mechanism of electrophilic aromatic substitution in benzene-halogenation, nitration, sulphonation, Friedel -Crafts alkylation/acylation, energy profile diagrams of these reactions, reactivity of mono-subsituted benzene, directive influence of functional groups.	12
3	**Chemistry of Halogen Derivatives of alkanes:** General methods of preparation, properties and uses of mono- and dihalo derivatives of alkanes. Mechanism of substitution and elimination reactions *viz.* S_N1, S_N2, S_N^i, E1, E2 and E1CB mechanism.	12
4	**Halogen derivatives of arenes:** General methods of preparation, properties and uses of halogen derivatives of arenes. Mechanism: ArS_N2, ArS_N1, elimination-addition mechanism (benzyne mechanism).	12
	TOTAL	48

Suggested Readings:

1. Reaction Mechanism in Organic Chemistry - S. M. Mukherjee and S.P. Singh
2. Organic Chemistry, vol.-1, I. L. Finar
3. Organic Chemistry – Morrison & Boyd
4. Organic Chemistry: Graham Solomons
5. Oranic Chemistry: Paula Yurkanis Bruice
6. Stereochemistry in Organic Chemistry: D. Nassipuri

7. Stereochemistry- Conformation and Mechanism: P.S.Kalsi.
8. Advanced Organic Chemistry, Fourth Edition, J. March, Wiley, India (2006)
9. Greeves, N., Clayden, J.; Warren, S., Organic Chemistry, 2nd Ed., Oxford University, Press India (2014).
10. Sykes, P., A Guidebook to Mechanism in Organic Chemistry, 6th Ed., Pearson Education India (2003)

Semester-III
MJC-4: Physical Chemistry: Chemical Thermodynamics and its Applications (T)

Course Outcomes

After completion of the course, students will be able to understand:

CO1: various thermodynamic terms.

CO2: various enthalpies of transformations and Kirchoff's law.

CO3: entropy changes, Gibbs free energy change, partial molar quantities, spontaneous and non- spontaneous processes.

CO4: second and third law of thermodynamics.

MJC-4: Physical Chemistry: Chemical Thermodynamics and its Applications (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Thermodynamics-I:** Definition of thermodynamic terms: system, surroundings, types of systems, intensive and extensive properties, state and path functions, thermodynamic processes, concept of heat and work, First law of Thermodynamics-Statements, definition of internal energy and enthalpy, Heat capacities at constant volume and constant pressure with their relationship, Joule's law, Joule-Thomson coefficient and inversion temperature, calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible and irreversible processes.	12
2	**Thermochemistry:** Standard state, enthalpy of reaction, standard enthalpy of formation, Hess's law of constant heat summation and its applications, enthalpy of combustion, enthalpy of neutralization, bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy, Kirchoff's equation.	12
3	**Thermodynamics-II:** Second law of thermodynamics, need of the law, different statements of the law, Carnot theorem, Carnot cycle and its efficiency, concept of entropy, entropy as a function of V&T, P&T, entropy change in ideal gases and mixing of ideal gases, free energy and spontaneity, variation of Gibbs free energy (G) and Helmholtz free energy(A) with P,V and T, Maxwell's relations, Thermodynamic equation of state, Nernst heat theorem, third law of thermodynamics, statement, evaluation of absolute entropy from third law of thermodynamics, concept of residual entropy .	12
4	**Systems of Variable Composition:** Partial molar quantities, chemical potential, dependance of chemical potential with temperature and pressure, chemical potential of a gas in ideal gas mixture, Gibb's Duhem equation.	12
	TOTAL	48

Suggested Readings:

1. Peter, A. & Paula, J. de., Physical Chemistry 9th Ed., Oxford University Press (2011).
2. Castellan, G. W. Physical Chemistry 4th Ed., Narosa (2004).
3. Engel, T. & Reid, P. Physical Chemistry 3rd Ed., Prentice-Hall (2012).
4. McQuarrie, D. A. & Simon, J. D. Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi (2004).
5. Assael, M. J.; Goodwin, A. R. H.; Stamatoudis, M.; Wakeham, W. A. &Will, S. Commonly Asked Questions in Thermodynamics. CRC Press: NY (2011).
6. Levine, I.N. Physical Chemistry 6th Ed., Tata Mc Graw Hill (2010).
7. Metz, C.R. 2000 solved problems in chemistry, Schaum Series (2006).

Semester-III
MJC-4 (P): Chemical Thermodynamics and its Applications (P)

Course Outcomes

After completion of this practical course, students will be skilled in determining:

CO1: different types of enthalpy changes.

CO2: the heat capacity of calorimeter.

CC-4: Chemical Thermodynamics and its Applications (Practical: 2 credits)
Practical: **Chemical Thermodynamics and its Applications** 1. Determination of water equivalent of calorimeter. 2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide. 3. Determination of enthalpy of ionization of ethanoic acid. 4. Determination of the basicity of a polybasic acid against standard sodium hydroxide solution. 5. Determination of heat of displacement of Cu by Zn from Cu^{2+} salt solution. 6. Determination of enthalpy of hydration of copper sulphate. 7. Determination of solubility of benzoic acid in water and ΔH for the process. 8. Determination of heat capacity of the calorimeter and integral enthalpy of solution of salts.

Suggested Readings:

1. Khosla, B. D.; Garg, V. C. & Gulati, A., Senior Practical Physical Chemistry, R. Chand & Co., New Delhi (2011).
2. Athawale, V. D. & Mathur, P. Experimental Physical Chemistry, New Age International, New Delhi (2001).

SEMESTER – IV

MJC-5 (T): Inorganic Chemistry: *s*-, *p*-, *d*- and *f*-block elements (T)

Course Outcomes

After completion of the course, the students will be able to understand: -

CO1: different oxidation states of elements with their relative stability and complex forming properties.

CO2: the ring, cage and polymers of B, Si & P.

CO3: to carry out the preparation of inorganic compounds.

CO4: the important properties of transition metals such as their oxidation states, colour, magnetic and spectral, use of Latimer diagrams in identifying oxidizing, reducing and disproportionating species.

CO5: the concepts related with noble gases, their compounds, shapes, properties and applications.

***s*-, *p*-, *d*-and *f*-block elements (Theory: 4 credits)**		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Periodic Table and Periodicity of Elements:** *s*-, *p*-, *d*- and *f*-block elements, the long form of periodic table, detailed discussion of the following periodic properties of the elements with reference to *s*- and *p*-block: (a) shielding or screening effect, Slater's rules, effective nuclear charge (b) atomic radii (covalent, metallic and van der Waals) (c) ionization enthalpy, successive ionization enthalpies, factors affecting ionization enthalpy and applications of ionization enthalpy. (d) electron gain enthalpy. (e) electronegativity: Pauling's, Mullikan, Allred Rochow's scales, group electronegativity, variations of electronegativity with bond order and partial charge. General electronic configuration of *s*- and *p*- block elements, inert pair effect, relative stability of different oxidation states, diagonal relationship and anomalous behaviour of first member of each group, allotropy and catenation properties, complex forming tendency of *s*- and *p*- block elements,	10
2	**Compounds of *p* block elements:** Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses:- Boric acid, borates, borazines, borohydrides, calcium carbide, silicon carbide, aluminium carbide, silicates, silanes, siloxanes, silcon halides, silicones, NH_3-manufacture (Haber's process), oxides, oxy-, peroxy acids of nitrogen, phosphorus and sulphur, inter-halogen compounds, polyhalides and pseudohalides.	10
3	**Chemistry of noble gases:** Occurrence and isolation, rationalization of inertness of noble gases, nature of bonding in noble gas compounds, shape and structure of noble gas compounds using VSEPR theory, preparation and properties of XeF_2, XeF_4 and XeF_6. Clathrates.	5

4	**Chemistry of d-block elements:** General electronic configuration of d-block metals and their group trends, variable oxidation states and their relative stabilities, magnetic and catalytic properties of metals, colour, complex forming ability of metals, difference between 1st, 2nd and 3rd transition series, Chemistry of Cr, Mn, Fe and Co in various oxidation states with special reference to their following compounds: peroxo compounds of Cr, potassium dichromate, potassium permanganate, potassium ferrocyanide and ferricyanide, sodium nitropruside and sodium cobaltinitrite.	10
5	**Chemistry of f-block Elements:** General electronic configuration of f- block elements (inner transition elements - 4f and 5f series), position of lanthanides and actinides in periodic table, group trends with special reference to electronic configuration, ionic radii and lanthanide contraction, consequences of lanthanide contraction, complex forming ability of lanthanides, occurrence and isolation of lanthanides, compounds of lanthanides, sources of actinides, chemistry of actinides, separation of Np and Pu from spent fuel .	10
	TOTAL	45

Readings:

1. Lee, J. D., Concise Inorganic Chemistry, 5th Ed., Wiley India (2008).
2. Housecroft, C. E.; Constable, E. C. Chemistry-An Introduction to Organic, Inorganic and Physical Chemistry, 4th Ed., Pearson Education (2010).
3. Atkins, P.; Overton, T.; Rouke, J.; Weller, M.; Armstrong, F.; Hagerman, M., Shriver Atkins's Inorganic Chemistry, 6th Ed., Oxford University Press India (2015).
4. Miessler, G.; Tarr, D. A., Inorganic Chemistry, 3rd Ed., Pearson Education India (2008).
5. Huheey, J. E.; Keiter, E. A.; Keiter, R. L.; Medhi, O. K., Inorganic Chemistry: Principles of Structures and Reactivity, 4th Ed., Pearson Education India (2006).
6. Cotton, F. A.; Wilkinson, G.; Gaus, P. L., Basic Inorganic Chemistry, 3rd Ed., Wiley India (2007).
7. Puri, B. R.; Sharma, L. R.; Kalia, K. C., Principles of Inorganic Chemistry, 33rd Ed., Vishal Publishing (2017).

Semester-IV

MJC-5 (P): Qualitative Analysis of Inorganic Salt Mixture Containing Four Radicals (P)

Course Outcomes

After the end of this practical course students will be skilled in: -

CO1: identification of basic radicals from known and unknown salts.

CO2: identification of acid radicals from known and unknown salts.

Qualitative Analysis of inorganic salt mixture containing Four Radicals. **(Practical:2 credits)**
1. Identification of known cations (basic radicals) and anions (acid radicals) from the supplied salt.
2. Identification of cation (basic radicals) and anions (acid radicals) from unknown salt.
3. Identification of cation (basic radicals) and anions (acid radicals) from binary mixture of inorganic salts.

SuggestedReadings:

1. Raj, G., Advanced Practical Inorganic Chemistry, Krishna Prakashan, Meerut (2013).
2. Mendham, J.; Denney, R. C., Barnes, J. D.; Thomas, M.; Sivasankar, B., Vogel's Quantitative Chemical Analysis, 6th Ed., Pearson Education India (2009).

Semester-IV

MJC-6 (T): Organic Chemistry: Compounds with Oxygen Containing Functional Groups (T)

CourseOutcomes

After the completion of the course, students will be able to understand:

CO1: preparation, properties and reactions of compounds with oxygen containing functional groups.

CO2: to draw plausible mechanisms for reactions involving these functional groups.

CO3: the knowledge of various named organic reactions associated with these functional groups.

CO4: chemistry of epoxides.

CO5: the detection of *O*-containing functional groups like alcohols, phenols, carbonyl and carboxylic acid groups.

CO6: the preparation of various organic compounds by functional group transformations and other common organic reactions.

CO7: the green practices in Organic syntheses.

Compounds with Oxygen Containing Functional Groups (Theory:4credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Alcohols, Phenols, Ethers and Epoxides** **Alcohols:** Classification and nomenclature. Preparation of 1^{o}, $2^{o}$and 3^{o}alcohols using substitution reaction, addition reactions, Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acids and esters. **Reactions:** With sodium, HX (Lucas test), esterification, oxidation (with PCC, alk. $KMnO_4$, acidic dichromate, conc. HNO_3). Oppeneauer oxidation. **Diols:** Oxidation of diols. Pinacol-Pinacolone rearrangement. **Glycerol:** Preparation, properties and uses. **Phenols:** Classification, nomenclature and properties **Preparation:** Cumene hydroperoxide method, from diazonium salts. **Reactions:** Electrophilic substitution: Nitration, halogenation and sulphonation. Fries and Claisen Rearrangements, Kolbe's–Schmidt Reaction, Lederer-Manasse reaction, Reimer-Tiemann Reaction, Gattermann-Koch Reaction, Houben–Hoesch Condensation, Schotten–Baumann Reaction. **Ethers and epoxides (aliphatic and aromatic):** Classification, nomenclature, preparation and properties. **Reactions:** Cleavage of ethers with HI. Syntheses of epoxides, Acid and base–catalyzed ring opening of epoxides, orientation of ring opening, reactions of Grignard and organolithium reagents with epoxides. Concept of crown ethers.	20

2	**Aldehydes and ketones (aliphatic and aromatic):** Structure, reactivity and preparation; nucleophilic additions, Nucleophilic addition-elimination reactions with ammonia derivatives and their mechanisms; mechanisms of Aldol and Benzoin condensation, Knoevenagel condensations, Claisen-Schmidt, Perkin, Cannizzaro and Wittig reactions, Beckmann and Benzil-Benzilic acid rearrangements, haloform reaction and Baeyer Villiger oxidation, α-substitution reactions,oxidations and reductions (Clemmensen, Wolff-Kishner, $LiAlH_4$, $NaBH_4$, MPV and PDC). Addition reactions of unsaturated carbonyl compounds: Michael addition. Active Methylene Compounds: Keto-enol tautomerism. Preparation and synthetic applications of diethyl malonate and ethyl acetoacetate.	10
3	**Carboxylic Acids and their Derivatives:** Preparation, physical properties and reactions of monocarboxylic acids. Typical reactions of dicarboxylic acids, hydroxy acids and unsaturated acids: succinic/phthalic, lactic, malic, tartaric, citric, maleic and fumaric acid. Preparation and reactions of acid chlorides, anhydrides, esters and amides; Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Dieckmann and Reformatsky reactions, Hofmann bromamide degradation and Curtius rearrangement.	09
4	**Carbohydrates** Classification and general properties of carbohydrates, Glucose and Fructose (open chain and cyclic structure), Determination of configuration of monosaccharides, absolute configuration of Glucose and Fructose, Mutarotation, ascending and descending in monosaccharides. Structure of disacharrides (sucrose, cellobiose, maltose, lactose) and polysacharrides (starch and cellulose).	09
	TOTAL	48

Suggested Readings:

1. Greeves, N.; Clayden, J.; Warren, S., Organic Chemistry, 2nd Ed., Oxford University, Press India (2014).
2. Sykes, P., A Guide book to Mechanism in Organic Chemistry, 6th Ed., Pearson Education India (2003)
3. Ghosh, S. K., Advanced General Organic Chemistry, Part-I & Part-II, 3rd Ed., New Central Book Agency (2010).
4. Bhal, B. S.; Bhal, A., A Textbook of Organic Chemistry, 22nd Ed., S. Chand and Company (2016).
5. Sengupta, S., Basic Stereochemistry of Organic Molecules, 2ndEd., Oxford University Press India (2018).
6. Finar, I. L. Organic Chemistry (Volume1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Semester-IV

MJC-6 (P): Organic Chemistry: Compounds with Oxygen Containing Functional Groups (P)

Course Outcomes:

When the students will finish this practical course, they will be skilled in: -

CO1: acetylation and benzoylation of various functional groups present in organic compounds.

CO2: oxime formation, hydrazone formation, semi-carbazone formation, iodoform test and in the bromination of phenols.

CO3: oxidation of alcohols and reduction of nitro compounds.

CO4: Aldol Condensation by conventional and green methods.

Compounds with Oxygen Containing Functional Groups (Practical:2 credits)
(a) Acetylation of one of the following compounds: phenols (β - naphthol, vanillin, salicylic acid) by any one method: Using conventional method/Using green approach. (b) Benzoylation of one of the following amines (aniline, *o*-, *m*-, *p*-toluidines and *o*-, *m*-, *p*-anisidine) and one of the following phenols (*β*-naphthol, resorcinol, *p*-cresol) by Schotten-Baumann reaction. (c) Preparation of Oxime and 2,4-dinitrophenylhydrazone of aldehydes and ketones (d) Oxidation of ethanol and isopropanol (Iodoform reaction). (e) Preparation of semicarbazone of the following compounds: acetone, ethyl methyl ketone, cyclohexanone, benzaldehyde. (f) Aldol condensation using either conventional or green method. (g) *S*-Benzylisothiouronium chloride from thiourea and benzyl chloride. (h) Reduction of *p*-, *m*-nitrobenzaldehyde by sodium borohydride. (i) Bromination of Phenol. (j) Hydrolysis of amides and esters.

Suggested Readings:

1. Agarwal, O. P., Advanced Practical Organic Chemistry, Krishna Prakashan, Meerut (2014).
2. Ahluwalia, V. K.; Aggarwal, R., Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, Universities Press (2000).
3. Furniss, B. S.; Hannafold, A. J.; Smith, P. W. G.; Tatchell, A. R., Vogel's Textbook of Practical Organic Chemistry, 5th Ed., Pearson Education India (2003).
4. Clarke, H. T., A Handbook of Organic Analysis: Qualitative and Quantitative, 4th Ed., CBS Publishers India (2007).
5. Vogel, A. I., Tatchell, A. R., Furnis, B. S., Hannaford, A. J. & Smith, P. W. G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996.
6. Mann, F.G. & Saunders, B. C. Practical Organic Chemistry Orient-Longman, 1960.
7. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry. R. Chand & Co.: New Delhi(2011).

Semester-IV

MJC-7: Physical Chemistry: Phase Equilibria, Conductance and Electrochemical Cells (T)

Course Outcomes

After completion of the course, students will be able to understand: -

CO1: the degree of ionization, pH and salt hydrolysis.
CO2: the different types of Buffer solutions.
CO3: the concepts of solubility product.
CO4: the conductivity, specific conductivity, equivalent conductivity and molar conductivity, application of conductance measurement in determining various physical parameters.
CO5: the standard electrode potential of half cells and calculate the EMF of a cell using Nernst equation.
CO6: EMF measurements in determining various parameters like free energy, enthalpy, entropy, equilibrium constants, etc.
CO7: the concentration cells with and without transference.
CO8: the principle of potentiometric titrations.

MJC-7:Physical Chemistry: Ionic Equilibria, Conductance and Electrochemical Cells (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Phase Equilibria:** Phases, components and degrees of freedom of systems, criteria of phase equilibria, Gibbs Phase Rule and its thermodynamic derivation, derivation of Clausius - Clapeyron equation and its importance in phase equilibria, phase diagram of one component system (water/sulphur) and two component system involving eutectics, congruent and incongruent melting points (lead-silver, $FeCl_3$-water and Na-K only), Nernst distribution law and its thermodynamic derivation, limitations of Nernst distribution law, modification of the distribution law in cases of association and dissociation of solutes, application of the law in the process of solvent extraction.	12
2	**Conductance:** Conductance, specific conductance (conductivity), equivalent and molar conductance, their variation with dilution for weak and strong electrolytes, Kohlrausch law of independent migration of ions, transference number and its experimental determination using Hittorf and Moving Boundary Methods, ionic mobility, applications of conductance measurements, determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt, conductometric titrations (only acid-base).	12
3	**Electrochemical cells :** Electrode and electrode potential, reference electrodes (Standard hydrogen electrode and Calomel	12

	electrode), standard electrode potential, type of electrodes, galvanic cells, electrochemical series and its significance, Nernst equation and its importance, types of electrochemical cells – chemical cells and concentration cells, concept of EMF of a galvanic cell, measurement of EMF of a cell, construction and working of a Galvanic cell, liquid junction potential and salt bridge, EMF of a concentration cell with and without transference.	
4	**Applications of EMF measurements** Determination of equilibrium constant, ΔG, ΔS and ΔH of cell reactions, calculation of solubility product of a sparingly soluble salt, the valency of ions, determination of pH using hydrogen electrode and quinhydrone electrode. Potentiometric titrations: qualitative treatment (acid-base and oxidation-reduction only).	12
	TOTAL	48

Suggested Readings:

1. Atkins, P. W.; de Paula, J.; Keeler, J., Physical Chemistry, 11th Ed., Oxford University Press India (2018).
2. Bahl, A.; Bahl, B. S.; Tuli, G. D., Essentials of Physical Chemistry, S. Chand and Company (2014).
3. Negi, A. S.; Anand, S. C., Physical Chemistry, New Age International Publishers (2007).
4. Puri, B. R.; Sharma, L. R.; Pathania, M. S., Principles of Physical Chemistry, 47th Ed., Vishal Publishing (2017).
5. Silbey, R. J.; Alberty, R. A.; Bawendi, M. G., Physical Chemistry, 4th Ed., Wiley India (2006).
6. Rakshit, P. C., Physical Chemistry, Revised Ed. Sarat Book House (2014).
7. Kapoor, K. L., A Textbook of Physical Chemistry: States of Matter and Ions in Solution, Vol. I, 6th Ed., McGraw Hill Education India (2019).

SEMESTER – V
MJC-8 (T): Co-ordination Chemistry (T)

Course Outcomes:

After completion of the course, students will be able to understand: -

CO1: ligand, denticity of ligands, chelates, coordination number and nomenclature coordination of compounds.

CO2: isomerism in coordination compounds.

CO3: Valence Bond Theory to predict the structure and magnetic behavior of metal complexes.

CO4: pairing energy, CFSE and its effects, high spin and low spin complexes.

CO5: magnetic properties and colour of complexes on the basis of Crystal Field Theory.

CO6: properties of transition metal complexes, variable oxidation states, colours, magnetic and catalytic properties.

Co-ordination Chemistry (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Introduction:** Molecular or addition compounds, double salts and coordination compounds, coordination sphere, coordination number (C.N), oxidation state (O.S.) of the central metal atom/ion, ligands and their classification, chelating ligands, chelates and their stability. Werner's theory of coordination compounds, limitations of Werner's theory, effective atomic number (EAN) rule, nomenclature of coordination compounds, isomerism in coordination compounds.	12
2	**Valence bond theory:** Valence bond theory of complex compounds, different octahedral, square planar and tetrahedral complexes of Cr, Fe, Co, Ni, Cu and Zn, strength of ligands and stability of complexes, outer and inner orbital complexes. Limitations of valence bond theory (VBT).	12
3	**Crystal field theory:** Crystal field theory, crystal field splitting of d-orbitals in octahedral, tetrahedral, tetragonal and square-planar complexes, HS and LS complexes, factors affecting the crystal field splitting energy, spectrochemical series, magnetic properties of complexes, colour of the complexes, crystal field stabilization energy (CFSE) and its calculation. variation of octahedral ionic radii. Crystal structure of spinels. Jahn-Teller effect and distortion in octahedral and tetrahedral complexes, charge transfer spectra (LMCT) and (MLCT), heat of hydration, lattice energy of bivalent metal ions of transition metals.	12
4	**Magnetic properties of transition metal complexes:** Types of magnetic behaviour, methods of determination of magnetic susceptibility, L-S coupling, correlation of the magnetic moment (spin only formula) and effective magnetic moment values, quenching of orbital contribution to magnetic moment, applications of magnetic moment data for 3d series.	12
	TOTAL	48

Suggested Readings:

1. Selected Topics in Inorganic Chemistry- Malik, Madan and Tuli
2. Chemistry for degree students- R. L. Madan.
3. Inorganic Chemistry – Gary L. Miessler and Donald A.Tarr.
4. Advanced Inorganic chemistry- F.A. Coton andWilkinson.
5. Concise Inorganic Chemistry – J.D.Lee.
6. Inorganic Chemistry - P.W.Atkins.
7. Advanced Inorganic Chemistry – Kalia, Puri andSharma

Semester-V
MJC-8 (P): Co-ordination Chemistry (P)

Course outcomes

After completion of this practical course, students will be skilled in:-

CO1: preparation of complex compounds.

CO2: complexometric titrations and colorimetric analysis.

Co-ordination Chemistry (Practical: 2 credits)
Practical **1.Preparation of inorganic compounds/ complexes.** a) Preparation of potash alum [$K_2SO_4.Al_2(SO_4)_3\ 24H_2O$] b) Preparation of potassium tris(oxalato) ferrate (III), $K_3[Fe(C_2O_4)_3]$ c) Preparation of potassium tris(oxalato) chromate (III), $K_3[Cr(C_2O_4)_3]$ d) Preparation of hexammine nickel (II) chloride, $[Ni(NH_3)_6]Cl_2$. e) Preparation of tetramminecopper(II) sulphate,$[Cu(NH_3)_4]SO_4$. f) Preparation of sodium nitropruside, $Na_2[Fe(CN)_5(NO)]$. **2.Complexometric titrations and colorimetry** a) Estimation of copper sulphate/copper ion from a given solution colorimetrically. b) Estimation of phosphate ion, $(PO_4)^{3-}$ in a given sample of water/soil colorimetrically. c) Complexometric titrations by EDTA (i) Estimation of Ca^{2+}/ Mg^{2+} in the supplied sample of water. (ii) Estimation of total hardness from the supplied sample of water.

Suggested Readings:

1. Qualitative inorganic chemistry – A. I .Vogel
2. Advance practical inorganic chemistry – Gurdeep Raj

Semester-V

MJC-9 (T): Polynuclear hydrocarbons, nitrogen containing compounds, heterocyclic compounds, alkaloids and terpenoids (T)

Course Outcomes

After completion of the course, students will be able to understand:

CO1: the chemistry of polynuclear hydrocarbons.

CO2: the named reactions related to amines nitriles, isonitriles and diazo compounds.

CO3: the chemistry of some common heterocyclic compounds.

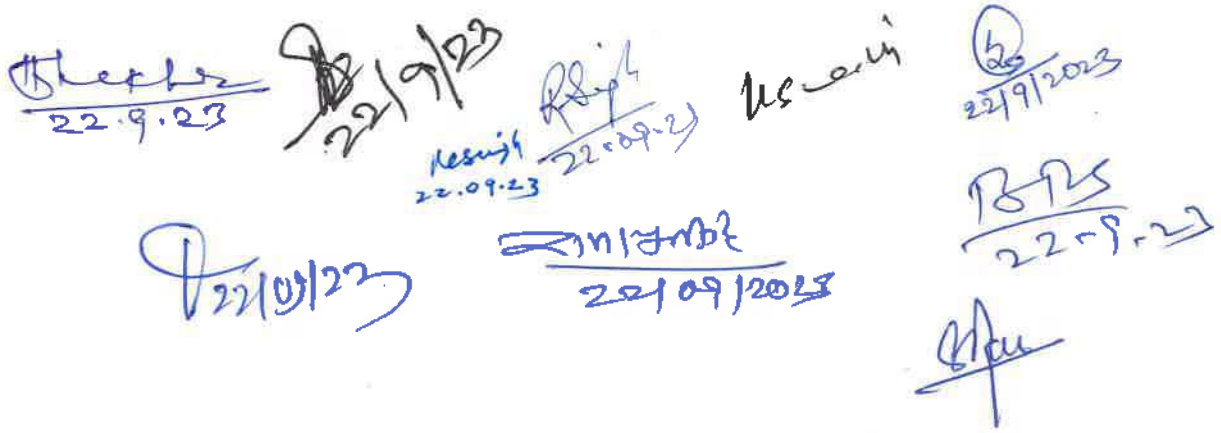
CO4: the general methods involved in structural elucidation of alkaloids and terpenoids.

Polynuclear hydrocarbons, nitrogen containing compounds, heterocyclic compounds, alkaloids and terpenoids (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Polynuclear Hydrocarbons:** Nomenclature of polynuclear hydrocarbons, preparation and properties and constitution of naphthalene, anthracene and phenanthrene.	12
2	**Nitrogen containing Compounds: Amines, Nitriles, Isocyanides and diazonium compound:** Reduction of nitro compounds under different conditions, von Richter reaction, preparation and separation of primary, secondary and tertiary amines, relative basic strength of amines, distinctions among primary, secondary and tertiary amines, preparation of diazonium salts and their synthetic applications, diazo- coupling reactions, Gomberg reaction, preparation and properties of nitriles and isonitriles.	15
3	**Heterocyclic Compounds:** Classification and nomenclature of heterocyclic compounds, aromaticity in 5- & 6-membered rings with one heteroatom, syntheses of pyrrole(Knorr-Pyrrole synthesis, Paal-Knorr synthesis, Hantzsch synthesis), Reaction synthesis and constitutions of furan, thiophene, pyridine (Hantzsch synthesis), reactions of pyrrole, furan, thiophene and pyridine. **Quinoline and isoquinoline:** Reactions, syntheses and constitution of quinoline and isoquinoline. (Skraup synthesis, Friedlander's Synthesis, Knorr Quinoline Synthesis, Bischler Napieralski Synthesis)	12
4	**Alkaloids and Terpenoids:** Natural occurrence, classification and isolation of alkaloids and terpenoids, isoprene. Isoprene and Special Isoprene rule, reactions used in general methods involved in structural elucidation of alkaloids and terpenoids.	09
	TOTAL	48

Suggested Readings:

1. Morrison R.T., Boyd R.N., (2007) Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar I.L., (2014) Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

3. Finar I.L., (2014) Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Acheson R.M., (1976), Introduction to the Chemistry of Heterocyclic compounds, John Wiley & Sons.
5. Graham Salomons T.W., Organic Chemistry, John Wiley & Sons, Inc.
6. Kalsi P.S., (2010), Textbook of Organic Chemistry 1st Ed., New Age International (P) Ltd. Pub.



Semester-VI

MJC-10 (T): Colligative Properties of Dilute Solutions, Chemical Kinetics and Photochemistry (T)

Course Outcomes

After completion of the course, studentswill be able to understand:-

CO1: Colligative properties of dilute solutions and determination of these properties.

CO2: Abnormal colligative properties and molar mass.

CO3: Azeotropes, maximum and minimum boiling azeotropic mixture.

CO4: Kinetics of simple and complex reactions.

CO5: Jablonski diagram and laws of photochemistry.

Colligative Properties of Dilute Solutions, Chemical Kinetics and Photochemistry (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1.	**Colligative Properties of Dilute Solutions:** Colligative properties of solutions, Henry's law, Raoult's law (thermodynamic derivation), ideal and non-ideal solutions, azeotropes, thermodynamic derivation and experimental determination of relative lowering in vapour pressure, elevation in boiling point, depression in freezing point and osmotic pressure, abnormal colligative properties due to association and dissociation of solutes in solutions, van't Hoff's factor, abnormal molar mass, applications of colligative properties in determining molar mass of solutes, degree of dissociation and association.	15
2.	**Kinetics of Elementary Reactions:** Rate laws of first, second, third and zero order reactions, methods of determination of order of reactions, temperature dependance of reaction rate, Arrhenius equation, Activation energy, Collision theory and transition state theory of reaction rates. **Catalysis:** Theory and applications.	12
3.	**Kinetics of Complex Reactions:** Steady state approximation, integrated rate expression (first order only) for the 1. Opposing reactions 2. Parallel reactions and 3. Consecutive reactions.	12
4.	**Photochemistry:** Introduction, consequences of light absorption, Lambert-Beer's law, laws of photochemistry, Grotthus-Draper law, Stark-Einstein law of photochemical equivalence, quantum yield, photochemical reactions ($H_2 + Cl_2$, $H_2 + Br_2$, decomposition of HI), photochemical rate laws, energy transfer in photochemical reactions, Jablonski diagram, photosensitization, fluorescence, phosphorescence and chemiluminescence.	09
	TOTAL	48

Suggested Readings:

1. Physical Chemistry: P.W. Atkins (ELBS)
2. Comprehensive Physical Chemistry: Hemant Snehi
3. Theoretical Physical Chemistry: Gladstone

4. Physical Chemistry: G.M. Barrow.
5. Modern Electrochemistry: JOM Bakris and A.K.N. Reddy
6. Text Books of Polymer Science: F.W. Billmayer Jr.
7. Advanced Physical Chemistry: Gurdeep Raj

Semester-VI
MJC-10 (P): Physical Chemistry: Colligative Properties of Dilute Solutions and Chemical Kinetics (P)

Course Outcomes

After completion of this practical course, students will be skilled in:

CO1: determination of molecular mass by elevation in boiling point and depression in freezing point methods.

CO2: determination of the velocity constants of hydrolysis of esters and inversion of cane sugar.

Properties of Dilute Solutions and Chemical Kinetics (Practical: 2 credits)
Practical: **Solutions:** 1. Determination the molecular weight of non-volatile solute by Landsberger's method. 2. Determination of molecular mass of non-volatile solutes by Beckmann method. **Chemical Kinetics:** 1. Determination of the rate constant of hydrolysis of ethyl/methyl acetate catalyzed by HCl. 2. Determination of the rate constant of inversion of cane sugar. 3. Determination of the rate constant of hydrolysis of ethyl/methyl acetate with NaOH (saponification).

Suggested Readings:

1. Khosla, B. D.; Garg, V. C. & Gulati, A., *Senior Practical Physical Chemistry*, R. Chand & Co.: New Delhi (2011).
2. Athawale, V. D. & Mathur, P. *Experimental Physical Chemistry* New Age International: New Delhi (2001).

SEMESTER – VI

MJC-11: Organic Chemistry: Biomolecules (T)

Course Outcomes

After completion of the course, students will be able to understand the:

CO1: genetic materials involved in living biosystems.

CO2: physicochemical properties of amino acids, peptides and proteins.

CO3: enzymes and their activity as well as some basic idea about lipids.

CO4: basics of energetics in biosystems and introduction to some synthetic and naturally occurring pharmaceuticals.

Biomolecules (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Amino Acids, Peptides and Proteins:** Classification of α-Amino Acids, General methods of synthesis, ionic properties and reactions, Zwitterions, pK_a values, isoelectric point and electrophoresis, study of peptides: Oligo and polypeptides, features of peptide bonds, syntheses of peptides using *N*-protecting, *C*-protecting and *C*-activating groups, solid-phase synthesis,elementary idea of primary, secondary, tertiary and quaternary structures of proteins.	10
3	**Nucleic Acids:** Components of nucleic acids, nucleosides and nucleotides, Structure and syntheses of Adenine, Guanine, Cytosine, Uracil and Thymine, structure of polynucleotides and DNA double helix.	10
2	**Enzymes and Lipids:** Introduction, classification and characteristics of enzymes, mechanism of enzyme action (taking trypsin as example), factors affecting enzyme action specificity of enzyme action, enzyme inhibitors and their importance, phenomenon of inhibition (competitive, uncompetitive and non-competitive inhibition), Introduction to oils and fats, classification of lipids, phospholipids, hydrogenation and iodine number, saponification value.	10
4	**Concept of energy in Biosystems and Pharmaceutical compounds:** Role of ATP in glycolysis during phosphorylation of glucose, conversion of glucose-6-phosphate to fructose-6-phosphate, phosphorylation of fructose-6-phosphate, cleavage of fructose-1,6-biphosphate, oxidation of glyceraldehyde-3-phosphate to 1,3-biphosphoglycerate, phosphoryl transfer from biphosphate to ADP, Conversion of 3-phosphoglycerate to 2-phosphoglycerate, dehydration of 2-phosphoglycerate, transfer of the phosphoryl group from phosphonyl pyruvate to ADP and overall energy balance sheet for ATP. Structure, syntheses and therapeutic uses of aspirin, paracetamol, and ibuprofen, medicinal values of curcumin (haldi), azadirachtin (neem) and vitamin C.	18
	TOTAL	48

Suggested Readings:

1. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2006) Biochemistry. VIth Edition. W.H. Freeman and Co.
2. Nelson, D.L., Cox, M.M. and Lehninger, A.L. (2009) Principles of Biochemistry. IV Edition. W.H. Freeman and Co.
3. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009) Harper's Illustrated Biochemistry. XXVIII edition. Lange Medical Books/ McGraw-Hill.

Semester-VI
MJC-11: Organic Chemistry: Biomolecules (P)

After completion of this practical course, students will be skilled in: -
CO1: tests of amino acids and proteins.
CO2: experiments related to enzymes, oils and fats.

Biomolecules (Practical: 2 credits)
Practical: **Tests of amino acids and proteins:** 1. Estimation of glycine by Sorenson's formalin method. 2. Study of the titration curve of glycine. 3. Test of proteins. **Experiments related to enzymes, oils and fats:** 1. Study of the action of salivary amylase on starch at optimum conditions. 2. Effect of temperature on the action of salivary amylase. 3. Saponification value of an oil or a fat. 4. Determination of Iodine number of an oil/ fat. **Experiment related to pharmaceutical compounds** 1. Synthesis of salicylic acid and aspirin.

Suggested Readings:

1. Manual of Biochemistry Workshop, 2012, Department of Chemistry, Universityof Delhi.
2. Arthur, I. V. *Quantitative Organic Analysis*, Pearson.
3. Any other laboratory manual available in departmental library as advised by the instructor.

Semester-VI
MJC-12 (T): Physical Chemistry: Quantum Chemistry &Spectroscopy (T)

Course Outcomes

After completion of the course, students will be able to understand:

CO1: the postulates of quantum mechanics, Schrödinger's wave equation and its applications

CO2: the concepts related to electronic and rotational spectra.

CO3: the concepts related to vibrational and Raman spectra.

Quantum Chemistry & Spectroscopy (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Elementary Quantum Mechanics:** Postulates of Quantum Mechanics, quantum mechanical operators, properties of operator, Hermitian operator, Schrödinger wave equation and its importance, physical interpretation of wave function, probability distribution function, nodal properties, particle in one dimensional box, particle in three dimensionalbox, concept of degeneracy and zero point energy, Schrödinger wave equation for hydrogen atom, separation of variables, hydrogen like wave functions.	12
2	**Valence Bond Theory and Molecular Orbital Theory:** Basic ideas of VBT and MOT, valence bond model of H_2, construction of MO's by LCAO for H_2^+ ion, physical picture of bonding and antibonding wave functions, concept of σ, σ^*, π, π^* non-bonding orbitals, comparison between VBT and MOT. Hybrid orbitals *sp*, sp^2 and sp^3 and calculation of coefficients of atomic orbitals used in these hybrid orbitals.	12
3	**Rotational and Electronic Spectra:** Electromagnetic radiation, Energy levels of a rigid rotor, selection rules, intensity of spectral lines using population distribution and degeneracy, effect of isotopic substitution, determination of bond length and atomic mass from rotational spectra,description of non-rigid rotor, Franck-Condon principle and intensity of spectral lines, pre-dissociation and dissociation, calculation of bond dissociation energy, electronic transitions, singlet and triplet states, concept of potential energy curves for bonding and anti-bonding molecular orbitals.	12
4	**Vibrational and Raman Spectroscopy** Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, determination of force constant and bond length, relation of force constants with bond energy, effect of anharmonic motion, idea of vibrational frequencies of different functional groups, overtones, combination bands and Fermi resonance, modes of vibration, vibrational-rotational spectrum, P, Q and R branches, Raman spectrum : concept of polarizability, vibrational Raman spectra, Stokes and anti-Stokes lines, their relative intensity, principle of mutual exclusion.	12
	TOTAL	48

Suggested Readings:

1. Banwell C. N., Mc Cash E. M., (2006). Fundamentals of Molecular Spectroscopy 4th Ed. Tata McGraw-Hill: New Delhi.
2. Chandra A. K., (2001). Introductory Quantum Chemistry Tata McGraw-Hill.
3. House J. E., (2004). Fundamentals of Quantum Chemistry 2nd Ed. Elsevier: USA.
4. Lowe J. P., Peterson K., (2005). Quantum Chemistry, Academic Press.
5. Kakkar R., (2015). Atomic & Molecular Spectroscopy, Cambridge University Press.

SEMESTER – VII

MJC-13: Inorganic Chemistry: Organometallic Chemistry, Symmetry and Group theory (T)

Course Outcomes

After completion of the course, students will be able to understand the:

CO1: nomenclature and classification of Organometallic compounds.
CO2: properties of metal carbonyls including their structures.
CO3: methods of preparation of Organometallics.
CO4: concept of symmetry and group theory.

Organometallic Chemistry (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Introduction** Definition, nomenclature and classification of organometallic compounds,concept of hapticity, classification, preparation, properties and bonding of metal carbonyls, EAN rule and 18-electron rule applied to metal carbonyls, π-acceptor behaviour of CO, synergic effect, use of IR spectra in determining structure of metal carbonyls, structure of mono-, bi- and poly-nuclear metal carbonyls.	12
2	**σ- complexes** Preparation, properties, bonding and applications of Alkyls and aryls of Li, Al, Hg, Sn and Ti. Concept of multicentred bonding.	12
3	**π-Complexes** A brief account of metal-ethylene and Metal-acetylene complexes. **Zeise's salt:** Preparation, properties, bonding and synergic effect. **Ferrocene:** Preparation, reactions, structure and aromaticity, comparison of aromaticity and reactivity with that of benzene.	12
4	**Symmetry and Group Theory** Concept of symmetry, symmetry elements and symmetry operations, point groups, determination of point groups of simple molecules. Multiplication table of C_{2v} and C_{3v} point groups, group, characteristics of a group and subgroups.	12
	TOTAL	48

Suggested Readings:

1. Organometallic Chemistry: Gurdeep Chatwal and M. S. Yadav – Himalaya Publishing House.
2. Selected Topics in Inorganic Chemistry, by Dr. Wahid U. Malik, Dr. G. D. Tuli and Dr. R. D. Madan, S. Chand Publication.
3. Organometallic Chemistry – R. C. Mehrotra and A. Singh – New Age International Publication.
4. Chemistry for Degree Students – B. Sc. Third Year – by Dr. R. D. Madan- S Chand Publication.

5. General Inorganic Chemistry (Vol-II) – by Bidhan Chandra Roy and Satyanarayan Das – NCBA
6. Miessler, G.; Tarr, D. A., Inorganic Chemistry, 3rd Ed., Pearson Education India
7. Cotton F. A. Chemical applications of group theory, 3rd Ed. Interscience (Wiley), New York,
8. Gurdeep Raj, Group Theory & Symmetry in Chemistry, Krishna Prakashan Media.

Semester-VII
MJC-15: Organic Chemistry: Spectroscopy (T)

Course Outcomes

After completion of the course, students will be able to understand: -

CO1: different types of electronic transitions in organic molecules.

CO2: the principles related to ultraviolet spectroscopy.

CO3: different types of vibrations in organic molecules and the principles related to infrared spectroscopy.

CO4: the nuclear spin, shielding and deshielding effects and the principles of NMR

CO5: the principles of ESR spectroscopy.

Organic Spectroscopy (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Ultraviolet (UV)Absorption Spectroscopy:** Origin and spectrum of electromagnetic radiations, absorption and emission spectra, Lambert- Beer's law, types of electronic transitions, molar absorption coefficient, selection rules, recording and analysis of UV spectra, chromophore, auxochrome, bathochromic-, hypsochromic-, hyperchromic- and hypochromic-shifts, Woodward-Fieser rules for calculating $\lambda_{max.}$, UV spectra of conjugated enes and enones.	12
2	**Infrared (IR)Absorption Spectroscopy:** Degree of freedom, Hooke's law, different types of bond vibrations in organic molecules, IR, near IR and far IR regions, selection rules for IR spectroscopy, functional group characteristic vibrations in IR, fingerprint region, factors affecting the position and intensity of IR bands, recording of IR spectra, interpretation of IR spectra of simple organic molecules.	12
3	**Nuclear Magnetic Resonance (NMR) Spectroscopy:** Principle of Nuclear magnetic resonance (^{1}H-NMR) spectroscopy, shielding and deshielding effects, chemical shift, splitting of signals, spin-spin coupling and coupling constant, number, position, area and intensity of NMR signals, interpretation of NMR spectra of simple organic molecules.	12
4.	**Electron Spin Resonance (ESR) Spectroscopy:** Introduction, principle of ESR spectroscopy, types of species taken for investigation through ESR, relaxation processes, spin-lattice relaxation, spin-spin relaxation, effect of relaxation time on line width, presentation of ESR spectra, the g–factor, hyperfine structure (electron spin and nuclear spin coupling), number and intensity of lines, ESR spectra of some simple species ($H^{\cdot}$, $CH_3^{\cdot}$, $C_2H_5^{\cdot}$, $C_6H_6^{\cdot-}$), Applications of ESR spectroscopy.	12
	TOTAL	48

Suggested Readings:

1. Organic Chemistry –Morrison and Boyd
2. Organic spectroscopy: Y.R. Sharma.
3. Organic spectroscopy -William Kemp (MacMillan)
4. Spectroscopy of Organic Compounds – P.S. Kalsi.
5. Physical methods in inorganic chemistry – Russell S. Drago.

Semester-VIII
MJC-16(T): Analytical Methods in Chemistry (T)

Course Outcomes

After completion of the course, students will be able to: -

CO1: understand accuracy and precision.
CO2: develop methods of analysis for different samples independently.
CO3: test contaminated water samples.
CO4: understand basic principle of instrument like Flame Photometer, UV-vis spectrophotometer.
CO5: learn separation of analytes by chromatography.
CO6: apply knowledge of geometrical isomers and keto-enol tautomers to analysis.
CO7: determine composition of soil.
CO8: estimate macronutrients using Flame photometry.

MJC-16 (T): Analytical Methods in Chemistry (Theory:4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Qualitative and Quantitative Aspects of Analysis:** Sampling, evaluation of analytical data, errors, accuracy and precision, methods of their expression. Normal law of distribution of indeterminate errors, statistical test of data, F, Q and t test, rejection of data, and confidence intervals.	12
2	**Optical Methods of Analysis:** **UV-Visible Spectrophotometry:** Basic principle of instrumentation (choice of source, monochromator and detector) for single and double beam instrument, Transmittance. Absorbance. Basic principles of quantitative analysis: Estimation of metal ions from aqueous solution, geometrical isomers, keto-enol tautomers. **Flame Atomic Absorption and Emission Spectrometry:** Basic principles of instrumentation (choice of source, monochromator, detector, choice of flame and Burner designs). Techniques of atomization and sample introduction; Method of background correction, sources of chemical interferences and their method of removal, Techniques for the quantitative estimation of trace level of metal ions from water samples.	12
3	**Thermal Methods of Analysis:** Theory of thermogravimetry (TG) and basic principle of instrumentation of thermal analyser. Techniques for quantitative estimation of Ca and Mg from their mixture.	12
4	**Chromatography:** Classification, principle and efficiency of the technique, Mechanism of separation: adsorption, partition & ion-exchange, Development of chromatograms: frontal, elution and displacement methods.	12
	TOTAL	48

Suggested Readings:

1. Willard, H.H. (1988), Instrumental Methods of Analysis, 7th Edition, Wardsworth Publishing Company.
2. Christian, G.D. (2004), Analytical Chemistry, 6th Edition, John Wiley & Sons, New York.
3. Harris, D. C. (2007), Quantitative Chemical Analysis, 6th Edition, Freeman.
4. Khopkar, S.M. (2008), Basic Concepts of Analytical Chemistry, New Age International Publisher.
5. Skoog, D.A.; Holler F. J.; Nieman, T.A. (2005), Principles of Instrumental Analysis, Thomson Asia Pvt. Ltd.

Course Structure

Chemistry

(B) Minor Courses to be offered by the department for students of other departments of science

Sem	Type of Course	Name of Course	Credits	Marks
I	MIC-1 (T)	Inorganic Chemistry I: Atomic Structure & Chemical Bonding	2	100
	MIC-1 (P)	Inorganic Chemistry Lab: volumetric analysis Organic Lab: detection, purification and separation of organic compounds	1	
II	MIC-2 (T)	Physical Chemistry: States of Matter & Ionic Equilibrium (T)	2	100
	MIC-2 (P)	Physical Chemistry: Determination of surfaces surface tension, viscosity and molecular weight (P)	1	100
III	MIC-3 (T)	Organic Chemistry: Hydrocarbons & Chemistry in everyday life.	3	100
IV	MIC-4 (T)	Chemical Thermodynamics and its Applications (T)	3	100
V	MIC-5 (P)	Chemical Thermodynamics and its Applications (P)	3	100
	MIC-6 (T)	*s*-, *p*- and d-block elements (T)	3	100
VI	MIC-7 (P)	Qualitative Analysis of Inorganic Salt Mixture Containing Four Radicals (P)	3	100
	MIC-8 (T)	Compounds with Oxygen Containing Functional Groups (T)	3	100
VII	MIC-9 (P)	Identification of Oxygen Containing Functional Groups (P)	2	100
	MIC-9 (T)	Colligative Properties of Dilute Solutions, Chemical Kinetics and Photochemistry	2	100
VIII	MIC-10 (T)	Physical chemistry: Phase Equilibria and Electrochemical cells	4	100
		Sub Total	**32**	

SEMESTER-III

MIC-3(T) : Hydrocarbons & Chemistry in everyday life

Course outcomes:

After completion of this course, student will be able to understand:

CO1: Chemistry of hydrocarbons.

CO2: applications of Chemistry in everyday life.

MIC-3(T) : Hydrocarbons & Chemistry in everyday life (Theory: 3 credits)		
Unit	**Name of Course**	**No. of Lectures**
	Aliphatic Hydrocarbons Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.	
1	**Alkanes:** (Upto 5 Carbons): Preparation: Catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis, from Grignard reagent. Reactions: Free radical Substitution: Halogenation.	11
2	**Alkenes:** (Upto 5 Carbons): Preparation: Elimination reaction, dehydration of alkenes and dehydrohalogenation of alkyl halides (Saytzeff's rule); cis Reactions: cis-addition (alk. $KMnO_4$) and trans-addition (bromine), Addition of HX (Markownikoff's and anti-Markownikoff's addition), Hydration, Ozonolysis, oxymecuration-demercuration, Hydroboration-oxidation,.	11
3	**Alkynes:** (Up to 5 Carbons): Preparation: Acetylene from CaC_2 and conversion into higher alkynes; by dehalogenation of tetra halides and dehydrohalogenation of vicinal-dihalides. Reactions: formation of metal acetylides, addition of bromine and alkaline $KMnO_4$, ozonolysis and oxidation with hot alk, $KMnO_4$.	11
4	**Chemistry in everyday life:** Air Pollution, Water Pollution, Toxic Chemicals, Inorganic and Organic Chemicals in soil, Important Fertilizers Green Chemistry, essential constituents in foods, Important drugs food preservatives	12
	TOTAL	45

Suggested Readings:

1. Organic Chemistry-Graham Solomons
2. Organic Chemistry- Morrison & Boyd.

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Semester-IV
MIC-4: Physical Chemistry: Chemical Thermodynamics and its Applications (T)

Course Outcomes

After completion of the course, students will be able to understand:

CO1: various thermodynamic terms.

CO2: various enthalpies of transformations and Kirchoff's law.

CO3: entropy changes, Gibbs free energy change, spontaneous and non- spontaneous processes.

CO4: second law of thermodynamics.

MJC-4: Physical Chemistry: Chemical Thermodynamics and its Applications (Theory: 3 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Basic concepts and first law of thermodynamics:** Definition of thermodynamic terms: system, surroundings, types of systems, intensive and extensive properties, state and path functions, thermodynamic processes, concept of heat and work, First law of Thermodynamics-Statements, definition of internal energy and enthalpy, Heat capacities at constant volume and constant pressure with their relationship, Joule's law, Joule-Thomson coefficient and inversion temperature, calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible and irreversible processes.	12
2	**Thermochemistry:** Standard state, enthalpy of reaction, standard enthalpy of formation, Hess's law of constant heat summation and its applications, enthalpy of combustion, enthalpy of neutralization, bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy, Kirchoff's equation.	11
3	**Second law of thermodynamics:** Second law of thermodynamics, need of the law, different statements of the law, Carnot theorem, Carnot cycle and its efficiency.	11
4	**Entropy and free energy:** Concept of entropy, entropy as a function of V&T, P&T, entropy change in ideal gases and mixing of ideal gases, free energy and spontaneity, variation of Gibbs free energy (G) and Helmholtz free energy(A) with P, V and T.	11
	TOTAL	45

Suggested Readings:

1. Peter, A. & Paula, J. de., Physical Chemistry 9th Ed., Oxford University Press (2011).
2. Castellan, G. W. Physical Chemistry 4th Ed., Narosa (2004).
3. Engel, T. & Reid, P. Physical Chemistry 3rd Ed., Prentice-Hall (2012).

4. McQuarrie, D. A. & Simon, J. D. Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi (2004).
5. Assael, M. J.; Goodwin, A. R. H.; Stamatoudis, M.; Wakeham, W. A. &Will, S. Commonly Asked Questions in Thermodynamics. CRC Press: NY (2011).
6. Levine, I.N. Physical Chemistry 6th Ed., Tata Mc Graw Hill (2010).
7. Metz, C.R. 2000 solved problems in chemistry, Schaum Series (2006).

Semester-V

MIC-5 (P): Chemical Thermodynamics and its Applications (P)

Course Outcomes

After completion of this practical course, students will be skilled in determining:

CO1: different types of enthalpy changes.

CO2: the heat capacity of calorimeter.

MIC-5: Chemical Thermodynamics and its Applications (Practical: 3 credits)
Practical: **Chemical Thermodynamics and its Applications** 1. Determination of water equivalent of calorimeter. 2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide. 3. Determination of enthalpy of ionization of ethanoic acid. 4. Determination of heat of displacement of Cu by Zn from Cu^{2+} salt solution. 5. Determination of enthalpy of hydration of copper sulphate.

Suggested Readings:

1. Khosla, B. D.; Garg, V. C. & Gulati, A., Senior Practical Physical Chemistry, R. Chand & Co., New Delhi (2011).
2. Athawale, V. D. & Mathur, P. Experimental Physical Chemistry, New Age International, New Delhi (2001).

SEMESTER – V

MIC-6 (T): Inorganic Chemistry: *s*-, *p*- and d-block elements (T)

Course Outcomes

After completion of the course, the students will be able to understand: -

CO1: different oxidation states of elements with their relative stability and complex forming properties.

CO2: the ring, cage and polymers of B, Si & P.

CO3: to carry out the preparation of inorganic compounds.

CO4: the important properties of transition metals such as their oxidation states, colour, magnetic and spectral, use of Latimer diagrams in identifying oxidizing, reducing and disproportionating species.

CO5: the concepts related with noble gases, their compounds, shapes, properties and applications.

***s*-, *p*- and *d*-block elements (Theory: 3 credits)**		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Periodic Table and Periodicity of Elements:** The long form of periodic table, detailed discussion of the following periodic properties of the elements a) Atomic radii (covalent, metallic and van der Waals) b) Ionization enthalpy, successive ionization enthalpies, factors affecting ionization enthalpy and applications of ionization enthalpy. c) Electron gain enthalpy. d) Electronegativity: Pauling's and Mullikan, variations of electronegativity with bond order and partial charge. General electronic configuration of *s*- and *p*- block elements, inert pair effect, relative stability of different oxidation states, diagonal relationship and anomalous behaviour of first member of each group, allotropy and catenation properties.	14
2	**Compounds of *p* block elements:** Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses:- Boric acid, borates, borazines, silicates, silicones, NH_3-manufacture (Haber's process), oxides, oxy- and peroxy acids of nitrogen, phosphorus and sulphur.	11
3	**Chemistry of noble gases:** Occurrence and isolation, rationalization of inertness of noble gases, shape and structure of noble gas compounds using VSEPR theory, preparation and properties of XeF_2, XeF_4 and XeF_6.	8
4	**Chemistry of d-block elements:** General electronic configuration of d-block metals and their group trends, variable oxidation states and their relative stabilities, magnetic and catalytic properties of metals, colour, complex forming ability of metals, Chemistry of Cr, Mn and Fe in various oxidation states with special reference to their following compounds: peroxo compounds of Cr, potassium dichromate, potassium permanganate..	12
	TOTAL	45

Readings:

1. Lee, J. D., Concise Inorganic Chemistry, 5th Ed., Wiley India (2008).
2. Housecroft, C. E.; Constable, E. C. Chemistry-An Introduction to Organic, Inorganic and Physical Chemistry, 4th Ed., Pearson Education (2010).
3. Atkins, P.; Overton, T.; Rouke, J.; Weller, M.; Armstrong, F.; Hagerman, M., Shriver Atkins's Inorganic Chemistry, 6th Ed., Oxford University Press India (2015).
4. Miessler, G.; Tarr, D. A., Inorganic Chemistry, 3rd Ed., Pearson Education India (2008).
5. Huheey, J. E.; Keiter, E. A.; Keiter, R. L.; Medhi, O. K., Inorganic Chemistry: Principles of Structures and Reactivity, 4th Ed., Pearson Education India (2006).
6. Cotton, F. A.; Wilkinson, G.; Gaus, P. L., Basic Inorganic Chemistry, 3rd Ed., Wiley India (2007).
7. Puri, B. R.; Sharma, L. R.; Kalia, K. C., Principles of Inorganic Chemistry, 33rd Ed., Vishal Publishing (2017).

Semester-VI

MIC-7 (P): Qualitative Analysis of Inorganic Salt Mixture Containing Four Radicals (P)

Course Outcomes

After the end of this practical course students will be skilled in: -

CO1: identification of basic radicals from known and unknown salts.

CO2: identification of acid radicals from known and unknown salts.

Qualitative Analysis of inorganic salt mixture containing Four Radicals. **(Practical 3 credits)**
1. Identification of known cations (basic radicals) and anions (acid radicals) from the supplied salt. 2. Identification of cation (basic radicals) and anions (acid radicals) from unknown salt. 3. Identification of cation (basic radicals) and anions (acid radicals) from binary mixture of inorganic salts.

SuggestedReadings:

1. Raj, G., Advanced Practical Inorganic Chemistry, Krishna Prakashan, Meerut (2013).
2. Mendham, J.; Denney, R. C., Barnes, J. D.; Thomas, M.; Sivasankar, B., Vogel's Quantitative Chemical Analysis, 6th Ed., Pearson Education India (2009).

Semester-VI

MIC-8 (T): Organic Chemistry: Compounds with Oxygen Containing Functional Groups (T)

CourseOutcomes

After the completion of the course, students will be able to understand:

CO1: preparation, properties and reactions of compounds with oxygen containing functional groups.

CO2: to draw plausible mechanisms for reactions involving these functional groups.

CO3: the knowledge of various named organic reactions associated with these functional groups.

CO4: chemistry of epoxides.

CO5: the detection of *O*-containing functional groups like alcohols, phenols, carbonyl and carboxylic acid groups.

CO6: the preparation of various organic compounds by functional group transformations and other common organic reactions.

CO7: the green practices in Organic syntheses.

Compounds with Oxygen Containing Functional Groups (Theory: 3 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Alcohols, Phenols, Ethers and Epoxides** **Alcohols:** Classification and nomenclature. Preparation of 1^{o}, $2^{o}$and 3^{o}alcohols using substitution reaction, addition reactions, Grignard reagent. **Reactions:** With sodium, HX (Lucas test), esterification, oxidation (with PCC, alk. $KMnO_4$, acidic dichromate, conc. HNO_3). Oppeneauer oxidation. **Phenols:** Classification, nomenclature and properties **Preparation:** Cumene hydroperoxide method, from diazonium salts. **Reactions:** Electrophilic substitution: Nitration, halogenation and sulphonation. Kolbe's–Schmidt Reaction, Reimer-Tiemann Reaction, Gattermann-Koch Reaction, Schotten–Baumann Reaction. **Ethers and epoxides (aliphatic and aromatic):** Classification, nomenclature, preparation and properties. **Reactions:** Cleavage of ethers with HI. Syntheses of epoxides, Acid and base–catalyzed ring opening of epoxides.	17
2	**Aldehydes and ketones (aliphatic and aromatic):** Structure, reactivity and preparation; nucleophilic additions, Nucleophilic addition-elimination reactions with ammonia derivatives and their mechanisms; mechanisms of Aldol and Benzoin condensation, Knoevenagel condensations, Claisen-Schmidt, Perkin, Cannizzaro and Wittig reactions, haloform reaction and Baeyer Villiger oxidation, oxidations and reductions (Clemmensen, Wolff-Kishner, $LiAlH_4$, $NaBH_4$, MPV and PDC).	10

	Addition reactions of unsaturated carbonyl compounds: Michael addition.	
3	**Carboxylic Acids and their Derivatives:** Preparation, physical properties and reactions of monocarboxylic acids. Preparation and reactions of acid chlorides, anhydrides, esters and amides; Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Dieckmann and Reformatsky reactions, Hofmann bromamide degradation and Curtius rearrangement.	09
4	**Carbohydrates** Classification and general properties of carbohydrates, Glucose and Fructose (open chain and cyclic structure), Mutarotation, ascending and descending in monosaccharides.	09
	TOTAL	45

Suggested Readings:

1. Greeves, N.; Clayden, J.; Warren, S., Organic Chemistry, 2nd Ed., Oxford University, Press India (2014).
2. Sykes, P., A Guide book to Mechanism in Organic Chemistry, 6th Ed., Pearson Education India (2003)
3. Ghosh, S. K., Advanced General Organic Chemistry, Part-I & Part-II, 3rd Ed., New Central Book Agency (2010).
4. Bhal, B. S.; Bhal, A., A Textbook of Organic Chemistry, 22nd Ed., S. Chand and Company (2016).
5. Sengupta, S., Basic Stereochemistry of Organic Molecules, 2ndEd., Oxford University Press India (2018).
6. Finar, I. L. Organic Chemistry (Volume1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Semester-VII

MIC-9 (P): Organic Chemistry: Identification of Oxygen Containing Functional Groups (P)

Course Outcomes:

When the students will finish this practical course, they will be skilled in: -

CO1: acetylation and benzoylation of various functional groups present in organic compounds.

CO2: oxime formation, hydrazone formation, semi-carbazone formation, iodoform test and in the bromination of phenols.

CO3: oxidation of alcohols and reduction of nitro compounds.

CO4: Aldol Condensation by conventional and green methods.

Compounds with Oxygen Containing Functional Groups (Practical: 2 credits)
(a) Acetylation of salicylic acid. (b) Benzolyation of aniline. (c) Preparation of Oximes and 2,4-dinitrophenylhydrazones of aldehydes and ketones (d) Bromination of Phenol.

Suggested Readings:

1. Agarwal, O. P., Advanced Practical Organic Chemistry, Krishna Prakashan, Meerut (2014).
2. Ahluwalia, V. K.; Aggarwal, R., Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, Universities Press (2000).
3. Furniss, B. S.; Hannafold, A. J.; Smith, P. W. G.; Tatchell, A. R., Vogel's Textbook of Practical Organic Chemistry, 5th Ed., Pearson Education India (2003).
4. Clarke, H. T., A Handbook of Organic Analysis: Qualitative and Quantitative, 4th Ed., CBS Publishers India (2007).
5. Vogel, A. I., Tatchell, A. R., Furnis, B. S., Hannaford, A. J. & Smith, P. W. G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996.
6. Mann, F.G. & Saunders, B. C. Practical Organic Chemistry Orient-Longman, 1960.
7. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi(2011).

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Semester-VII

MIC-9 (T): Colligative Properties of Dilute Solutions, Chemical Kinetics and Photochemistry (T)

Course Outcomes

After completion of the course, students will be able to understand:-

CO1: Colligative properties of dilute solutions and determination of these properties.

CO2: Abnormal colligative properties and molar mass.

CO3: Azeotropes, maximum and minimum boiling azeotropic mixture.

CO4: Kinetics of simple and complex reactions.

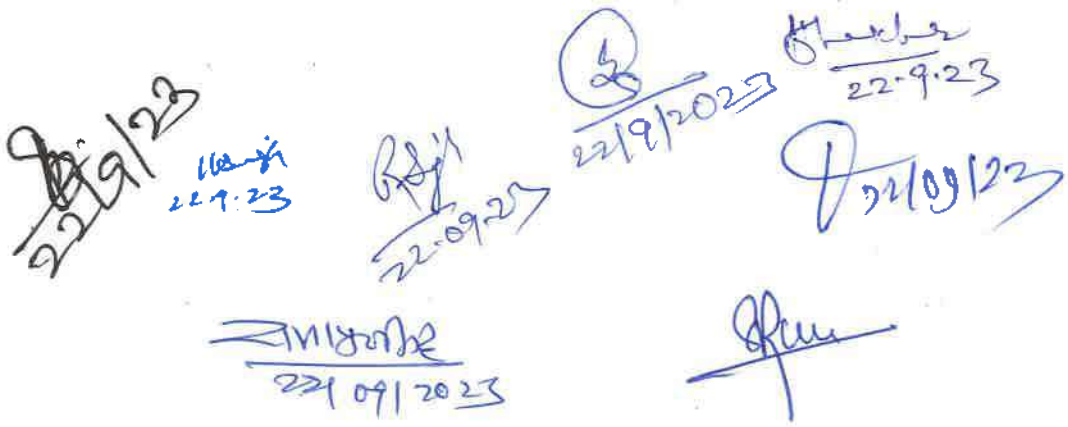
CO5: Jablonski diagram and laws of photochemistry.

Colligative Properties of Dilute Solutions, Chemical Kinetics and Photochemistry (Theory: 2 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1.	**Colligative Properties of Dilute Solutions:** Colligative properties of solutions, Henry's law, Raoult's law (thermodynamic derivation), ideal and non-ideal solutions, azeotropes, thermodynamic derivation and experimental determination of relative lowering in vapour pressure, elevation in boiling point, depression in freezing point and osmotic pressure, abnormal colligative properties due to association and dissociation of solutes in solutions, van't Hoff's factor, abnormal molar mass, applications of colligative properties in determining molar mass of solutes, degree of dissociation and association.	8
2.	**Kinetics of Elementary Reactions:** Rate laws of first, second, third and zero order reactions, methods of determination of order of reactions, temperature dependance of reaction rate, Arrhenius equation, Activation energy, **Catalysis:** Theory and applications.	8
3.	**Kinetics of Complex Reactions:** Steady state approximation, integrated rate expression (first order only) for the 1. Opposing reactions 2. Parallel reactions and 3. Consecutive reactions.	7
4.	**Photochemistry:** Introduction, consequences of light absorption, Lambert-Beer's law, laws of photochemistry, Grotthus-Draper law, Stark-Einstein law of photochemical equivalence, quantum yield, photochemical reactions ($H_2 + Cl_2$, $H_2 + Br_2$, decomposition of HI), photochemical rate laws.	7
	TOTAL	30

Suggested Readings:

1. Physical Chemistry: P.W. Atkins (ELBS)
2. Comprehensive Physical Chemistry: Hemant Snehi
3. Theoretical Physical Chemistry: Gladstone
4. Physical Chemistry: G.M. Barrow.
5. Modern Electrochemistry: JOM Bakris and A.K.N. Reddy

6. Text Books of Polymer Science: F.W. Billmayer Jr.
7. Advanced Physical Chemistry: Gurdeep Raj



Semester-VIII

MIC-10: Physical Chemistry: Phase Equilibria, Conductance and Electrochemical Cells (T)

Course Outcomes

After completion of the course, students will be able to understand: -

CO1: the degree of ionization, pH and salt hydrolysis.
CO2: the different types of Buffer solutions.
CO3: the concepts of solubility product.
CO4: the conductivity, specific conductivity, equivalent conductivity and molar conductivity, application of conductance measurement in determining various physical parameters.
CO5: the standard electrode potential of half cells and calculate the EMF of a cell using Nernst equation.
CO6: EMF measurements in determining various parameters like free energy, enthalpy, entropy, equilibrium constants, etc.
CO7: the concentration cells with and without transference.
CO8: the principle of potentiometric titrations.

MIC-10: Physical Chemistry: Ionic Equilibria, Conductance and Electrochemical Cells (Theory: 4 credits)		
Unit	**Topics to be covered**	**No. of Lectures**
1	**Phase Equilibria:** Phases, components and degrees of freedom of systems, criteria of phase equilibria, Gibbs Phase Rule and its thermodynamic derivation, phase diagram of one component system (water/sulphur).	15
2	**Conductance:** Conductance, specific conductance (conductivity), equivalent and molar conductance, their variation with dilution for weak and strong electrolytes, Kohlrausch law of independent migration of ions, transference number.	15
3	**Electrochemical cells:** Electrode and electrode potential, reference electrodes (Standard hydrogen electrode and Calomel electrode), standard electrode potential, type of electrodes, galvanic cells, electrochemical series and its significance, Nernst equation and its importance, types of electrochemical cells – chemical cells and concentration cells, concept of EMF of a galvanic cell, measurement of EMF of a cell, construction and working of a Galvanic cell.	15
4	**Applications of EMF measurements** Determination of equilibrium constant, ΔG, ΔS and ΔH of cell reactions, calculation of solubility product of a sparingly soluble salt, the valency of ions.	15
	TOTAL	60

Suggested Readings:

1. Atkins, P. W.; de Paula, J.; Keeler, J., Physical Chemistry, 11th Ed., Oxford University Press India (2018).
2. Bahl, A.; Bahl, B. S.; Tuli, G. D., Essentials of Physical Chemistry, S.

Chand and Company (2014).
3. Negi, A. S.; Anand, S. C., Physical Chemistry, New Age International Publishers (2007).
4. Puri, B. R.; Sharma, L. R.; Pathania, M. S., Principles of Physical Chemistry, 47th Ed., Vishal Publishing (2017).
5. Silbey, R. J.; Alberty, R. A.; Bawendi, M. G., Physical Chemistry, 4th Ed., Wiley India (2006).
6. Rakshit, P. C., Physical Chemistry, Revised Ed. Sarat Book House (2014).
7. Kapoor, K. L., A Textbook of Physical Chemistry: States of Matter and Ions in Solution, Vol. I, 6th Ed., McGraw Hill Education India (2019).

Course Structure

Chemistry

(B) Multidisciplinary Courses to be offered by the department for students of different disciplines.

Sem	Type of Course	Name of Course	Credits	Marks
I	MDC-1 (T)	Inorganic Chemistry: Atomic Structure, Chemical Bonding and fundamentals of Organic Chemistry.	2	100
	MDC-1 (P)	Inorganic and Organic Chemistry Lab	1	100
II	MDC-2-(T)	Inorganic Chemistry: Atomic Structure, Chemical Bonding and fundamentals of Organic Chemistry.	2	100
	MDC-2 (P)	Inorganic and Organic Chemistry Lab (P)	1	100
III	MDC-3 (T)	Chemistry in Everyday Life	2	100
III	MDC-3 (P)	Inorganic and Organic Chemistry Lab (P)	1	100

Sub Total: 09

SEMESTER-III

MDC-3 (T): Chemistry in everyday life

Course outcomes:

After completion of this course, student will be able to understand:

CO1: Chemistry of hydrocarbons.

CO2: applications of Chemistry in everyday life.

MDC-3 (T): Chemistry in everyday life (Theory: 3 credits)		
Unit	**Name of Course**	**No. of Lectures**
1	**Polymers:** Monomers and polymers, classification of polymers, addition and condensation of polymers, homopolymers and copolymers, preparation, properties and applications of polymers, styrene, PVC, Teflon, acrolein, nylon-6, nylon-66, natural rubber, Buna-S, Buna-N, bakelite, neoprene, biodegradable polymers.	8
2	**Sources of energy:** Nuclear energy, solar energy, bioenergy, hydral energy, bio additives to fuels, blue and green hydrogen as fuel.	8
3	**Colloids:** True solution, suspension, colloidal solution, types of solution, preparation of colloids, Tindal effect, Brownian motion, electrophoresis, cataphoresis, dialysis.	8
4	**Chemistry in everyday life:** Air Pollution, Water Pollution, Toxic Chemicals (Inorganic and Organic), Chemicals in soil, Important Fertilizers, Green Chemistry and foods preservatives.	6
	TOTAL	30

Suggested Readings:

1. Organic Chemistry- Morrison & Boyd.
2. Environmental Chemistry, B. K. Sharma

Semester-III

MDC-3 (P): Qualitative Analysis of Inorganic Salt Mixture Containing Four Radicals (P)

Course Outcomes

After the end of this practical course students will be skilled in: -

CO1: identification of basic radicals from known and unknown salts.

CO2: identification of acid radicals from known and unknown salts.

Qualitative Analysis of inorganic salt mixture containing Four Radicals. **(Practical 1 credits)**
1. Identification of known cations (basic radicals) and anions (acid radicals) from the supplied salt. 2. Identification of cation (basic radicals) and anions (acid radicals) from unknown salt. 3. Identification of cation (basic radicals) and anions (acid radicals) from binary mixture of inorganic salts.

SuggestedReadings:

1. Raj, G., Advanced Practical Inorganic Chemistry, Krishna Prakashan, Meerut (2013).
2. Mendham, J.; Denney, R. C., Barnes, J. D.; Thomas, M.; Sivasankar, B., Vogel's Quantitative Chemical Analysis, 6th Ed., Pearson Education India (2009).