HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
Main Library Summerhill Shimla-5

No. HPUL/Internship/2015- Dated: 02.11.2023

To

The Chairman,
Department of Library and Information Science,
HPU, Shimla-5.

Subject: Internship Report of Bachelor of Library and Information Science students.

Sir,

With reference to your letter No. HPU/B.Lib & Info. Sc./2022/Admission dated 3.7.2023 & 5.7.2023, it is submitted the following students of your department have completed one month internship in Himachal Pradesh University, Central Library, Summerhill, Shimla-5. During the period of internship the students were deployed in different sections of our Library to get the exposure of various Library functions.

Sr No.	Name	Examination Roll No.	Duration of Internship
1	Aim Chand	27220010001	06.07.2023 to 05.08.2023
2	Anju Devi	27220010002	05.07.2023 to 04.08.2023
3	Gaurav	27220010004	12.07.2023 to 11.08.2023
4	Gopal	27220010005	05.07.2023 to 04.08.2023
5	Ishika	27220010006	05.07.2023 to 05.08.2023
6	Kajal	27220010007	05.07.2023 to 04.08.2023
7	Kirna Devi	27220010008	06.07.2023 to 05.08.2023
8	Kritika Chopra	27220010009	05.07.2023 to 04.08.2023
9	Pratibha	27220010010	05.07.2023 to 04.08.2023
10	Priya Verma	27220010011	06.07.2023 to 05.08.2023
11	Rajni Kumari	27220010012	06.07.2023 to 05.08.2023
12	Sheetal Pathania	27220010014	06.07.2023 to 05.08.2023
13	Simran Dhiman	27220010015	06.07.2023 to 05.08.2023
14	Sonam Dolma	27220010016	05.07.2023 to 04.08.2023

Yours faithfully,

Deputy Librarian

DEPUTY LIBRARIAN
H.P. University, Shimla-5

8/11/2023

D.A.

HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
DEPARTMENT OF LIBRARY & INFORMATION SCIENCE
Summer Hill, Shimla-171005

No. HPU/2023/B.Lib.&M.Lib./Dissertation.- 362-63 Dated: 10.7.2023

Notice

The students of Master of Library and Information Science, 2nd Semester, Session 2022-23 are hereby alloted supervisors for the Course- Dissertation (Paper Code - 404) as noted against their names:

Sr No.	Name of Students	Name of Supervisor
1	Shadiya	Dr Mohd. Shikoh
2	Simran	
3	Nivesh	
4	Sheetal	Ms. Tanya Bodh
5	Anupriya	
6	Bhawna	
7	Ritu Negi	Ms. Phuntsok Dolma
8	Ved Parkash	
9	Monika Sharma	

Chairman

Copy for information to:

1. All guest faculty, Department of Library & Information Science, HPU Shimla-5.
2. Notice Board.

Chairman


Klenz Flo
UV USAGE




Scigenics Biotech
ORBITEK
Scigenics Biotech
ORBITEK
Scigenics Biotech
ORBITEK


acziel
HPU-MICRO-
acziel


HAT IS SATIRE

2.3.1 Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences

Location	Name of Faculty	Name of the Department/Institute /Centre	Name of the Programme	Programme Code	Academic Year	Semester/ year	Methodology used (Write description in max of 500 words)	Link to the relevant document (not to be filled now)	Any additional information
HP University, Summer Hill-171005	Faculty of Physical Sciences	Chemistry	MSc Chemistry	NA	2022-23	NA	NA	NA	NA
HP University, Summer Hill-171005	Faculty of Physical Sciences	Chemistry	MPhil Chemistry	NA	2022-23	NA	NA	NA	NA
HP University, Summer Hill-171005	Faculty of Physical Sciences	Chemistry	PhD Chemistry	NA	2022-23	NA	NA	NA	NA

DEPARTMENT OF HISTORY

NAAC Accredited 'A' Grade University
Himachal Pradesh University, Summerhill
Shimla – 171005

1-37/2017-HPU (Hist.)-

Dated: 13 July 2022

NOTICE

As a part of ***Azadi ka Amrut Mahotsav***, the Department of History is organising a Quiz Competition based on NCERT Indian History syllabus on 19th July 2022 from 11am onwards in Room No. 402. There will be three teams from MA 2nd Semester, 4th Semester & research Scholars (M.Phil & PhD) consisting of three participants each team. All the interested students may give their names in the Department till the evening of 16th July 2022.

The winner team shall get suitable prize.

Ankush
Chairman
Department of History

अध्यक्ष
इतिहास विभाग
हि.प्र. विश्वविद्यालय शिमला

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DEPARTMENT OF HISTORY

NAAC Accredited 'A' Grade University
Himachal Pradesh University, Summerhill
Shimla – 171005

1-37/2017-HPU (Hist.)- Dated: 18 July 2022

NOTICE

As a part of ***Azadi ka Amrut Mahotsav***, the Department of History is organising a Quiz Competition based on NCERT Indian History syllabus on 19th July 2022 from 11am onwards in Room No. 402. There are three teams consisting of three participants each team. The names of the participants have been provided below:

Team A	**Team B**	**Team C**
Thakru Ram	Ved Prakash	Rajesh Pojta
Dinesh Kumar	Vineet	Monika
Amit Kapil	Babu Ram	Manisha

Teams are directed to be present in the Department by 10.45am positively.

All the faculty members and students are cordially invited.

Ankush

Chairman
Department of History

अध्यक्ष
इतिहास विभाग
हिमाचल विश्वविद्यालय शिमला

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DEPARTMENT OF HISTORY

NAAC Accredited 'A' Grade University
Himachal Pradesh University, Summerhill
Shimla – 171005

123

/2017-HPU (Hist.)- Dated: 19th July 2022

Closure Report

As a part of ***Azadi ka Amrut Mahotsav***, the Department of History organized a Quiz Competition based on NCERT Indian History syllabus on 19th July 2022 from 11am to 12.30pm in Room No. 402. There were three teams consisting of three participants each team.

Chairperson Dr. Ankush Bhardwaj, Prof. BK Shivram , Dr. Vinay Kumar Sharma, Mr. Sunny Kumar and Mr. Kartar Chand were present as faculty members. Dr. Anjali Verma conducted the session.

Team A	**Team B**	**Team C**
Thakru Ram	Ved Prakash	Rajesh Pojta
Dinesh Kumar	Vineet	Monika
Amit Kapil	Babu Ram	Manisha
Score 60	**10**	**70**

The students of MA 2nd Semester & 4th Semester were present and enthusiastically participated in the Quiz Competition for pass questions. The session was closed after declaration of result and distribution of awards to the teams by the Chairperson and other faculty members.

Anjali Verma
19/07/2022

Co-ordinator

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Quiz Competition

19th July 2022

29

S. No.	Name	Class / Course	Signature
1.	Deep kumar	MA 4th sem	Deep kumar
2.	Sangeeta	M. A 2nd Sem.	Sangeeta
3.	Reeta	M. A 2nd sem	Reeta
4	Monika	M. A. 2nd sem	Monika
5.	Neha	M.A. 2nd sem.	Thakur
6.	Deepak Thakur	M.A 2nd Sem.	Deepak
7.	Preeti Sharma	M.A 2ND Sem	Preeti
8.	Namita Kumari	M.A 2nd Sem	Namita
9.	Krishan	M.A 2nd sem	Krishan
10	Surekha Thakur	M.A 2nd sem	Surekha
11	Anoop Kumar	M.A 2nd Sem	Anoop
12	Kalan Singh	M.A 2nd Sem	Kalan
13	Suresh Kumar	M.A. 2nd Sem.	Suresh
14.	Ravrena	MA 2nd Sem	Ravrena
15.	Ravina	M.A. 2nd Sem	Ravina
16.	Kavita	M.A. 2nd sem	Kavita
17	Sapna	M.A. 4th Sem	Sapna
18	Kajal	MA 4th sem	Kajal
19	Lisheem Chand	M.A 2and Sem	Lisheem
20	Ranjana	M.A 4th sem	Ranjana
21	Deepika	M.A. 4th Sem	Deepika
22	Priyanka	M.A. 4th Sem	Priyanka
23	Mahima	M.A. 2nd sem	Mahima
24.	Kumari Neha	M.A 4th Sem	Neha
25	Ankita Kumari	M.A 4th sem.	Ankita
26	Sonia Begum	MA 2nd sem.	Sonia
27	Yashika	M.A. 2nd Sem	Yashika
28.	Priyanka	M.A. 2nd sem.	Priyanka
29	Surekha	M.A 2nd sem	Surekha
30	Champa	M.A 2nd Sem	Champa
31	Sakshi	M.A IInd sem	Sakshi
32	Anoop Kumar	M.A 2nd Sem	Anoop

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S.No.	Name	Course / Class	Signature
33.	NISHA KUMARI	M.A. 2ND Sem.	@Kumari
34.	Jai Prakash	M.A. 2nd Sem.	
35	Krishan	M.A 2nd Sem	Krishna
36	Ankit	M.A 2nd Sem	
37.	Vinay Sharma	~~Assistant. prof.~~	
38.	Anjali Verma	Assist. Prof.	
39.	Skanda Verma	Assist. Prof.	
40.	Kartar Chand	~~Assist. Prof.~~	

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Quiz Competition



Quiz Competition



Quiz Competition



Quiz Competition



Basic Sanskrit words through Chart technique



Basic Sanskrit words through Chart technique



Basic Sanskrit words through Chart technique



To

The Chairperson,

Department of History,

Himachal Pradesh University,

Summer Hill,

Shimla-5.

Subject: Classroom activity

Sir

With all due respect, I wish to state that I am going to conduct a special class-room activity with students of IV semester with ancient Indian history specialization under the paper State and Economy in Ancient India (HIST-446A). It is about spices and seeds used since ancient past to present with special emphasis on north and south Indian spices which is a part of curriculum.

This is for your kind information.

Thanking you

Yours' sincerely

Anjali Verma 24/04/2023

(Anjali Verma)

Allowed

Ankush

24/04/23.




Happy
smiles

To

The Chairperson,

Department of History,

Himachal Pradesh University,

Summer Hill,

Shimla-5.

Subject: Classroom activity (small group activity)- closure report

Sir

With your due acknowledgement, today i.e., 24.04.2023 at 1:15-2:15 PM class activity to acquaint students with basic exchange, import and export of spices was performed. The participants of activity were students of the paper State and Economy in Ancient India (HIST-446A).

Total eighteen students were present during the activity. Few pictures of the activity are being mailed to you (office ID).

This is for your kind information.

Thanking you

Yours' sincerely

Anjali Verma

(Anjali Verma)

Sloka Recitation Activity

To

The Chairperson,

Department of History,

Himachal Pradesh University,

Summer Hill,

Shimla-5.

Subject: Sanskrit Śloka recitation activity

Sir

With all due respect, I wish to state that I am going to conduct a special class-room activity with students of IIIrd semester with ancient Indian history specialization under the paper State and Society in Ancient India (HIST-335A). It is about Śaloka recitation with special emphasis on *Manusmriti* and *Arthashastra* which is a part of curriculum.

This is for your kind information.

Thanking you

Yours' sincerely

Anjali Verma 22/11/22

(Anjali Verma)

Seen

22-11-2022

अध्यक्ष
इतिहास विभाग
हि.प्र. विश्वविद्यालय शिमला-5

DEPARTMENT OF ECONOMICS
Himachal Pradesh University,
Department of Evening Studies
Shimla, H.P

Prof. K.C. Sharma

Certificate

This is to certify that the dissertation entitled, ***"Socio-Economic and Environmental Impacts of Hydro Power Generation: A Case Study of District Mandi"***, submitted by Kushal Singh has been carried out under my supervision and guidance.

The data reported in it is genuine. The references and the help taken from various sources have been duly acknowledged. It is further certified that no part of the thesis has been submitted elsewhere in full or in part of any degree or diploma of any University. The thesis is worthy consideration for the award of Master of Philosophy in Economics.

I recommend the dissertation for evaluation.

Date: 30/05/2022
Place: Shimla

(K.C. Sharma)

HIMACHAL PRADESH UNIVERSITY
DEPARTMENT OF EVENING STUDIES
THE MALL, SHIMLA-171001

Prof. Pratibha Tiwari

CERTIFICATE

This is to certify that the dissertation entitled, **"ROLE OF NABARD IN RURAL DEVELOPMENT: A STUDY OF DISTRICT HAMIRPUR IN HIMACHAL PRADESH"** submitted by **Ankita Sharma** to the Department of Economics, Himachal Pradesh University, Summer Hill, Shimla for the degree of **Master of Philosophy** is an original piece of work done under my supervision.

The assistance and help received during the course of this investigation have been fully acknowledged.

Pratibha Tiwari

Prof. Pratibha Tiwari

Place: Shimla

Date: 10/5/2022

Dr. RAKESH SINGH

DEPARTMENT OF ECONOMICS
HIMACHAL PRADESH UNIVERSITY
(NAAC ACCREDITED 'A' GRADE UNIVERSITY)
SUMMER HILL, SHIMLA-171005

Certificate

It is certify that the M. Phil dissertation titled **"A STUDY OF COVID-19 PANDEMIC IMPACT ON EDUCATION SECTOR OF HIMACHAL PRADESH"** embodies as original work done **by Mr. Yogesh Kumar, S/o Late Sh. Dharm Chand, Bearing Exam Roll No. 121311221220010** under my supervision and guidance. No part of the dissertation has been submitted elsewhere, for any other degree or diploma. The dissertation is worthy of consideration for the award of **Degree of Master of Philosophy** from the Department of Economics, Himachal Pradesh University, Summer-Hill, Shimla (HP).

To the best of my knowledge all assistance received and sources of literature tapped during the course of the investigation have been duly acknowledged and the conduct of the research scholar remained satisfactory during the period of research.

(Dr. Rakesh Singh)

Place: Shimla

Date: .....

DEPARTMENT OF ECONOMICS
Himachal Pradesh University
(NAAC Accredited 'A' Grade University)
Summer Hill, Shimla – 171005

Mr. Tanuj Sharma
Assistant Professor

CERTIFICATE

I hereby certify that the dissertation entitled, **"An Economic Analysis of Fruit Production in Himachal Pradesh"** is an original work of **Mr. Punit** and has been completed under my supervision and guidance. Further, this work has not been submitted either in part or in full for any other purpose in any university. I consider it worthy of submission and fit to be considered for the award of **Master of Philosophy in Economics**

Place: Shimla
Date: 06-09-2022

(Tanuj Sharma)

DEPARTMENT OF ECONOMICS
HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
SUMMER HILL, SHIMLA- 171005

Dr. Tek Singh
(Assistant Professor)

Certificate

I hereby certify that the dissertation entitled, "**Income and Employment Generation Through MGNREGA in Shillai Block of District Sirmaur in Himachal Pradesh**" is an original work of **Miss. Ranjana** and has been completed under my supervision and guidance. Further, this work has not been submitted either in part or in full for any other purpose in any university. I consider it worthy of submission and fit to be considered for the award of **Master of Philosophy in Economics.**

Place: Shimla

Dated: 31/10/2022

(Dr. Tek Singh)

Dr. SANJEEV KUMAR

DEPARTMENT OF ECONOMICS
HIMACHAL PRADESH UNIVERSITY
(NAAC ACCREDITED 'A' GRADE UNIVERSITY)
SUMMER HILL, SHIMLA-171005

CERTIFICATE

It is certify that the M. Phil dissertation **titled "Understanding Patterns of Households Income and Employment: A Block Level Study of Bharmour in District Chamba of Himachal Pradesh"** embodies as original work done **by Mr. Rajesh Kumar, S/o Sh. Jagdish Chand, Bearing Exam Roll No. 201311221220007** under my supervision and guidance. No part of this dissertation has been submitted elsewhere, for any other degree or diploma. This dissertation is worthy of consideration for the award of **Degree of Master of Philosophy** from the Department of Economics, Himachal Pradesh University, Summer Hill, Shimla (India).

To the best of my knowledge all assistance received and sources of literature tapped during the course of this investigation have been duly acknowledged and the conduct of the research scholar remained excellent during the period of research.

Place: Shimla

Date.....

(Dr. Sanjeev Kumar)

DEPARTMENT OF ECONOMICS
HIMACHAL PRADESH UNIVERSITY
SHIMLA, SUMMER HILL- 171005

Dr. Rakesh Singh
(Associate Professor)

Certificate

Certified that the M.Phil Dissertation titled: "Evidences of Women Entrepreneurship in Himachal Pradesh: A Review Study", submitted in partial fulfillment of the requirements for the degree of Master of Philosophy in Economics is a record of research work carried out under my supervision by Miss Shruti Chauhan, D/o Mr. Bhagat Ram Chauhan, bearing exam Roll No. 201311221220009 for the Session 2020-21. No part of this dissertation has been submitted elsewhere, for any other degree or diploma. All assistance received and sources of literature tapped during the course of present investigation have been duly acknowledged.

21/11/2022

Place: Shimla

(Dr. Rakesh Singh)

Dated: 21.11.2022

DEPARTMENT OF ECONOMICS
HIMACHAL PRADESH UNIVERSITY
(NAAC ACCREDITED 'A' GRADE UNIVERSITY)
SUMMER HILL, SHIMLA-171005

Dr. SANJEEV KUMAR

Certificate

It is certify that the M. Phil dissertation **titled "An Analysis of Socio-Economic Status of MGNREGA Workers: A Study of Rait Development Block of District Kangra, H.P."** embodies as original work done **by Mr. Akshay, S/o Sh. Chain Singh, Bearing Exam Roll No. 201311221220002** under my supervision and guidance. No part of this dissertation has been submitted elsewhere, for any other degree or diploma. This dissertation is worthy of consideration for the award of **Degree of Master of Philosophy** from the Department of Economics, Himachal Pradesh University, Summer Hill, Shimla (India).

To the best of my knowledge all assistance received and sources of literature tapped during the course of this investigation have been duly acknowledged and the conduct of the research scholar remained excellent during the period of research.

Place: Shimla
Date. 21/09/2022

(Dr. Sanjeev Kumar)

DEPARTMENT OF ECONOMICS
HIMACHAL PRADESH UNIVERSITY
SUMMER HILL, SHIMLA- 171005

Dr. Tek Singh
Assistant Professor

Certificate

I hereby certify that the dissertation entitled **"ECONOMIC ANALYSIS OF KISAN CREDIT CARD SCHEME: A STUDY OF KARSOG BLOCK OF MANDI DISTRICT IN HIMACHAL PRADESH"** is an original work of Mr. Mahender Kumar and has been completed under my supervision and guidance. Further this work has not been submitted either in part or in full for any other purpose in any university. I consider it worthy of submission and fit to be considered for the award of **Master of Philosophy in Economics.**

Dated: 21/10/2022
Place: Shimla

Dr. Tek Singh

Himachal Pradesh University

(NAAC Accredited 'A' Grade University)

Department of Evening Studies

Celebrates

Azadi Ka Amrit Mahotsav

National One-Week Workshop

On

"Research Methodology: Skills and Outcome"

Date: 17-22 September 2022

Hybrid Mode (Online & Offline)



Chief Guest
Prof. Jyoti Prakash
Hon'ble Pro Vice-Chancellor
Himachal Pradesh University



Chief Guest Valedictory
Prof Arvind K.Bhatt
Dean Planning & Teachers' Matters
Himachal Pradesh University



Principal
Prof. Meenakshi F. Paul
Department of Evening Studies
Himachal Pradesh University

Resource Persons



Prof. Devinder Sharma



Dr. Manoj Sharma



Dr. Puneet Bhushan

Convener
Prof. Arti Pandit Dhawan

Advisors
Prof. Usha Sharma
Prof. Pratibha Tiwari

Organizing Secretary
Dr. Manish Khangta

Organizing Committee
Sh. Ajit Kumar
Dr.Vipan K. Bhulal
Sh.Tikam Ram
Sh. Kartar Chand
Dr. Rajeev Kumar

Chief Guest: Professor Jyoti Prakash, Hon'ble Pro Vice-Chancellor
Himachal Pradesh University, Shimla

Chief Guest Valedictory: Prof Arvind K.Bhatt Dean Planning & Teachers' Matters
Himachal Pradesh University, Shimla

External Resource Persons:

Professor Devinder Sharma, Department of Commerce, H.P. University, Shimla
Dr. Sahil Raj, Department of Management Studies, Punjabi University, Patiala
Dr. Manoj Sharma, Department of Commerce, H.P. University, Shimla
Dr. Puneet Bhushan, University Business School, Shimla

Internal Resource Persons:

Prof. Meenakshi F Paul
Dr. Sanjeev Kumar Bragta
Dr. Shobha Misra
Sh. Ajit Kumar
Dr Manish Khangta
Dr. Ashok Tiwari
Prof. Arti Pandit Dhawan
Dr.Virender Kumar
Dr. Ashutosh Kumar
Dr.Vipan Kumar Bhulal
Sh.Tikam Ram
Sh. Kartar Chand

About the Institution:

Department of Evening Studies, Himachal Pradesh University, Shimla-171001, was established in July 1962 as Panjab University Evening College, on the recommendation of the University Grants Commission, to provide the facility of continuing education to those who cannot study in day colleges, especially the less privileged persons and those who take employment after schooling. It became a constituent of Himachal Pradesh University when it was established on 22 July 1970. In 1976-77 it moved to its present independent campus—the historical 'Kirk' (Gandhi Bhawan) and 'Manse's buildings.

This was the first institution in the state to introduce M.A. classes in English and Hindi in 1979 and in Public Administration in 1981. B. Com. was introduced in 1975. M.A. in Economics was started in 1990 and M.Com. in 2001. It was renamed Himachal Pradesh University Centre for Evening Studies in July 2001 and as Department of Evening Studies in June 2019.

Outline of the Workshop:

Technology has changed the entire scenario of functioning. The brains which were so far, attempting to create new and innovative ideas through experiences and exhaustive explorations have now turn to technological support. It is undoubtedly a milestone in the direction of excellence in knowledge but excessive comfort has also engendered lethargy and excessive dependence on technology. It has also given rise to large-scale plagiarism. In this perspective, the potential and incumbent scholars as well as researchers need to be oriented in such a manner that they become familiar with new skills and trends in different research activities.

Objectives of the Workshop:

To enable the participants to define the research problem, to develop and approach the research problem and selection of suitable research design. To impart capabilities for formulation and testing of hypothesis based on the nature of research. To comprehend appropriateness of statistical software packages for analyzing research data. To enable the participants to understand writing research proposals and report writing. To make aware the participants about the latest trends in discipline-specific research.

Workshop Outcome:

At the end of the workshop, participants should be able to:

1) Design the research in their respective area of research.
2) Understand the literature review and identify the research gaps.
3) To apply various Skills and Statistical Tools in Reaserch Work
4) Write quality scholarly articles and papers.

Eligibility Conditions:

Teaching faculty, Research Scholars (M. Phil/Ph.D.) and PG students who want to pursue research.

Registration Criteria

Registration will be through Google forms for the participants attending the workshop on the stipulated dates. The Google form will be shared through different communication channels and the last date for applying will be 16.09.2022 (5:00 P.M.)

Fee:

For Teaching Faculty Rs. 500/-
For Research Scholars Rs. 300/-

Schedule of Workshop:

Every participant will attend the Morning Sessions Online from 10:00 a.m. sharp. The session will continue till 01:00 p.m.
The offline session will be held in the H.P. University Department of Evening Studies campus from 2:00 p.m. to 5:00 p.m.

Date	Morning Session (10:00am-01:00pm) Online	Evening Session (2:00pm-5:00pm) Offline
17-09-2022	**Inaugural Session** **Chief Guest: Prof. Jyoti Prakash** Pro Vice Chancellor, HPU Shimla **Keynote Speaker: Dr. Sahil Raj** Topic- New Research Paradigm	**Prof. Devinder Sharma** Topic- "Research Methodology: The Concept."
18-09-2022	**Prof. Arti Pandit Dhawan** Topic- "Research Ethics" **Dr. Shobha Misra** Topic-"Historical Casuation"	**Prof. Meenakshi F. Paul** Topic- "Review of Literature"
19-09-2022	**Dr. Ashok Tiwari** Topic- "Multivariate Technique :Principal Component Analysis" **Dr.Manish Khangta** Topic- "Statistical Techniques"	**Prof. Devinder Sharma and Mr.Ajay Kumar** "Techniques in Research"
20-09-2022	**Dr. Sanjeev Kumar Bragta** Topic- Social Sciences Research: The Issue of Value Neutrality **Sh.Kartar Chand and Sh. Tikam Ram** Topic- "Report Writing"	**Dr. Manoj Sharma** "Quantitative Techniques (T-Test,Chi-Square and F-Test)
21-09-2022	**Dr.Virender Kumar** Topic- Hindi Sahitya main Shodh ki Chunotiyan tatha Sambhavna **Dr. Ashutosh Kumar** Topic- Hindi Sahityoitihas main Anusandhan	**Dr. Puneet Bhushan** Topic-"Getting Started with SPSS"
22-09-2022	**Dr. Vipan Kumar Bhulal** Topic- "Research & Thesis Writing " **Sh. Ajit Kumar** Topic- "Application of Latex in Research and Thesis Writing"	**Valedictory** **Chief Guest: Prof. Arvind K. Bhatt** Dean Planning and Teachers' Matters

Himachal Pradesh University

(NAAC Accredited 'A' Grade University)

Department of Evening Studies

Celebrates

Azadi Ka Amrit Mahotsav

A National Webinar

Topic: Managing Literature Review and References Using Mendeley



Date: 3 September 2022 **Time: 10:30 AM**

Patron and Principal
Prof. Meenakshi F. Paul

Convener
Dr. Vipan Kumar Bhulal

Organizing Secretary
Sh. Ajit Kumar

Advisors
Prof. Usha Sharma
Prof. Arti Pandit Dhawan
Prof. Patibha Tiwari

Organizing Committee
Dr. Manish Khangta
Sh. Tikam Ram
Sh. Kartar Chand
Dr. Rajeev Kumar

Platform: Zoom and Google Meet
No Registration Fee
E-Certificate will be issued to all the participants

INTELLECTUAL PROPERTY INDIA
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Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
Office of the Controller General of Patents, Designs and Trade Marks

CERTIFICATE

This is to certify that, **DR. VIPAN KUMAR BHULAL** of **HIMACHAL PRADESH UNIVERSITY**

DEPARTMENT OF EVENING STUDIES co-ordinated in conducting the Intellectual Property Awareness program under

NATIONAL INTELLECTUAL PROPERTY AWARENESS MISSION

Azadi Ka Amrit Mahotsav

on November 18,2022

Organized by

Intellectual Property Office, India

Date:November 21,2022

(Prof. (Dr) Unnat P. Pandit)
CONTROLLER GENERAL OF
PATENTS, DESIGNS & TRADE MARKS

HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
DEPARTMENT OF EVENING STUDIES
The Mall, Shimla-171001

Dated: 31.08.2022

NOTICE

The SAP Cell of the Department is going to organise a National Webinar on **"MANAGING LITERATURE REVIEW AND REFERENCES USING MENDELEY"** will be held online on 03/09/2022 from 10:30 a.m. to 12:15 p.m.

Dr. Tejinderpal Singh, Associate Professor, University Business Schoool, Panjab University, Chandigarh will be the Resource Person of the webinar.

All are requested to join the webinar.

Principal

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HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
DEPARTMENT OF EVENING STUDIES
The Mall, Shimla-171001

Dated: 03.9.2022

Certificate of Appreciation

A National Webinar was organised by the SAP Cell of Department of Evening Studies, H.P. University-Shimla on the topic **"MANAGING LITERATURE REVIEW AND REFERENCES USING MENDELEY"** on 03/09/2022. Dr. Tejinderpal Singh, Associate Professor, University Business Schoool, Panjab University, Chandigarh was the Resource Person of the webinar.

The program was attended by 300 participants comprising of the faculty, research scholars and students from different universities and colleges of the country through virtual mode on Zoom application and YouTube live streaming.

The program was extremely useful, particularly for young academicians and researchers. The key takeaway of the webinar was organisation of literature review and references through Mendeley software and its different uses.

Dr. Tejinderpal Singh's presentation was greatly appreciated by all the participants and the Department extends its gratitude to Dr. Singh for his special talk.

Principal
HPUDES

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HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
DEPARTMENT OF EVENING STUDIES
The Mall, Shimla-171001

Dated: 06 /09/2022

NOTICE

A national webinar is being organised by the Community Development Committee of the Department of Evening Studies, H.P. University on **"Wealth Awareness Program"** on 7th September, 2022 in two different sessions commenced from first, 11:00 am to 12:00am and second from 02:00pm to 03:00pm in collaboration with the Advisor's Organisation (Association of Mutual Funds in India) under the series of celebrations of "Azadi ka Amrut Mahotsav".

Ms. Manisha Choudhary, Former banker, Image Consultant, NSIM Certified facilitator and Corporate Trainer of the Advisor's Organisation (AMFI) will be the Resource Person for Morning session and **Mr. Shahezad Bodila,** certified corporate Trainer of Advisor's Organisation (AMFI) will be the Resource Person for afternoon session.

You all are cordially invited to attend the same.

Sessions:

1. Morning Session: For Students
2. After Noon Session: For Staff Members (All incl. Non-Teaching)

Principal

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HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
DEPARTMENT OF EVENING STUDIES
The Mall, Shimla-171001

Dated: 07.09.2022

Certificate of Appreciation

Himachal Pradesh University Department of Evening Studies, wishes to place on record their gratitude and thanks to the team of Advisor's Organization for conducting the National Webinars on **"Wealth Awareness Program—Financial Wellness"** on 07-09-2022.

The valuable and informative tips, techniques and methodology provided by Ms. Manisha Chaudhary and Mr. Shahezad Bodila, Certified Corporate Trainer of Advisor's Organization during the webinar were found to be very educational, useful and beneficial by the participants. The quality and explanation was excellent and everyone appreciated the techniques as well suggestions given in the webinar. Information on safegaurds to be followed while investing were also well received.

HPUDES wishes all the best to Mr. M. S. Khan, Program Organizer and special thanks to the whole team of Advisor's Organization for this wonderful training webinar.

Principal
HPUDES

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HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
DEPARTMENT OF EVENING STUDIES
The Mall, Shimla-171001

Dated: 17.11.2022

Notice

The SAP and Research Committee of the Department is going to organized a Special Lecture on "Intellactual Property Rights Awareness" on 18.11.2022 at 5:20 PM in the Department Library.

Dr. Rohit Rathore, Assistant Controller of Patent and Designs, Patent Office, New Delhi will be the resource person of the lecture.

All the faculty members and students are requested to attend the lecture.

Principal

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2.3.1 Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences

In the Department of Physical Education, we provide experiential learning through different teaching-learning methods for practical activities to improve their teaching-learning process. The different teaching-learning methods are:

•By part method

•Whole part method

•Demonstration method

•Explanation method

•Teacher-centered method

•Learner-centered method

•Content-focused method

•Interactive method

•Participative method

An event specific and game specific teaching practice is being conducted in the different athletic events and various games. In which each student acts as student teacher in each athletic event and different games which inculcates the spirit of self-learning, participative learning and leads to the development of self-designed problem solving capacities of and individual. Moreover, the preparation of teaching strategies for his own classmates is a bit tedious job which further provides self-motivation to be superior. In content drafting, teaching, presentation and class control of his fellow mates which serves as an important tool in enhancing the learning experiences of the students as well as his own person learning and development in the overall teaching-learning process.

The Department of Physical Education also conducted a Conditioning Programme for the students of M.A. (Physical Education) 1st year and M.P.Ed 1st students annually at beginning of 2022-2023 academic session for the enhancement of physical fitness and motor fitness components namely; speed, strength, endurance, flexibility, agility, balance, power, reaction time and co-ordinative abilities of the newly enrolled first year students in order to acclimatize them with environmental conditions as well as to prepare them for upcoming vigorous activities, training schedules and skills of various games and sports which are to be mastered and imbibed by these students in the practical activities and theoretical concepts of 2-year of M.A. (Physical Education) and M.P.Ed degree programmes. After the completion of above mentioned one month conditioning programme, the department conducted Cross Country Competition for

these students who underwent the conditioning process to test their physical fitness level and the students of the M.A. (Physical Education) 2nd year and M.P.Ed 2nd perform the role of organizers in conducting this Cross Country Competition to master the skills of officiating and refereeing under the guidance of Faculty members of the Department.

To provide experiential and participative learning, the department organized intramural competitions of different games and sports among the four houses: Milkha Singh House, Major Dhyan Chand House, Mira Bia Chanu House and P.V. Sindhu House. In these competitions, students of assigned houses organized and conducted intramural competitions one by one.








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2.3.1 Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences:

The Department of Mathematics practices teaching methodologies which focus on teaching learning process through the following approaches:

1. Class room teaching is made interactive and encourage innovative thoughts and novel interpretations

2. ICT enabled tools are frequently used by the students and teachers for better understanding.

3. Internal Assessments are planned in such a way to encourage students to work independently.

4. Assignments are required to be submitted by students individually by Articulating/ researching on given topic so as to enhance concept clarity, confidence writing and presentation skills.

5. Seminars are conducted for M.Phil. students periodically in a semester so as to improve the confidence and presentation skills.

Department of Computer Science

2.3.1

Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences.

The teaching-learning process is one major objective and the strength of our department. Students are given a right blend of traditional and modern methods to make learning student-centric and a rewarding experience. Experiential learning, participative learning and problem solving methodologies are well adopted to ensure the holistic development of students and facilitate life-long learning and knowledge management.

Participative learning

- Project works involving latest technologies and use of advanced soft-wares are encouraged.
- Students attempt to develop solutions for complex computer programming problems and design system processes that meet the specified needs of real-time cases.
- Teachers create a central node on a Mind Map and provide students the freedom to expand and develop novel ideas.

Industry interaction and summer training

- Practical training / internship at Industry and/or renowned institutions are mandatory at present.
- Industry projects and collaborations are undertaken to enrich students with pre-employment training.
- Periodical Guest lectures on topics relevant to employment skills by personnel from respective organizations / industry.

Experiential learning

- Practical courses (laboratory) are made compulsory in the curriculum.
- Different learning methods viz. problem-based, case-based, project-based, computation-based, are implemented wherever feasible.

All academic activities are aimed at elevating the students' knowledge, skills and build confidence in them. Department of Computer Science adheres to a student centric teaching methodology that emphasizes providing education with a focus on the learner as the primary focal point. In addition to enhancing student’s confidence and fostering independence, this practice helps shift students from being relegated to passive recipients into active and participating stakeholders. In a classroom centered on the instructor, it is impossible to meet the needs and expectations of individual students while expecting all of them to produce the same level of learning because of the wide range of student’s capacities to grasp and absorb information. Learning is better when the instructor makes it possible for each student to absorb the knowledge at their own pace by ensuring that they participate fully in the activities conducted in the classroom and comprehend concepts with ease.

The department adheres to the principle that student centered approaches should be followed wherever possible. Even the course outlines specify the expected outcome of the course and the levels of attainment like familiarity, assessment and usage. Activities such as Group Projects, Debates, Seminars, Quizzes, and Case Studies are used for teaching various concepts. Similarly, Project work, Field Visits, Industrial Tours, and Guest Lectures are all examples of teaching strategies that are followed to put the focus on the students. Students are given smaller projects to work on, which provides them with a broader perspective on the subject and encourages participative learning practices among them. Learning through Projects has been an essential component of the educational program.

INDEX

2.3.1 Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences

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HIMACHAL PRADESH UNIVERSITY, SHIMLA-171005

DEPARTMENT OF CHEMISTRY

FACULTY OF PHYSICAL SCIENCES

REVISED SYLLABI

FOR M.Sc. CHEMISTRY

Under

Choice Based Credit System (CBCS)

(SEMESTER SYSTEM)

(Effective from SESSION 2022-23 AND ONWARDS)

DEPARTMENT OF CHEMISTRY
HIMACHAL PRADESH UNIVERSITY
SHIMLA, HIMACHAL PRADESH-171005 -INDIA

HIMACHAL PRADESH UNIVERSITY
DEPARTMENT OF CHEMISTRY

PROCEEDINGS OF THE MEETING OF THE BOARD OF STUDIEIS IN (PG) IN THE SUBJECT OF CHEMISTRY

A meeting of the Board of Studies in PG in the subject of Chemistry was held on 24.12.2021 at 2.00PM in the Departmental Library of the Chemistry Department. The following were present:

1	Prof. Baljit Singh	Chairman & Convener
2	Prof. Suman Lata Department of Chemistry, Deenbandu Chhotu Ram University of Science and Technology, Muruthal, Haryana.	External Expert
3	Prof. Gurjaspreet Singh, Department of Chemistry, Punjab University Chandigarh.	External Expert (attended online meeting)
4	Prof. Suvarcha Chauhan	Member
5	Dr. Sandeep Chauhan	Member
6	Dr. Kiran Kumar	Member
7	Dr. Rajesh Kumar	Member

The following decisions were taken:

1. The scheme as well as the course contents of the syllabi of M. Sc. Chemistry (CBCS), spread over four semesters (I-IV) applicable w. e. f. the Academic Session 2022-2023 i.e. July, 2022 onwards, was discussed and recommended for the consideration of the Faculty of Physical Sciences (as per annexure "A") .

2. In order to maintain the academic standard in respect of research and teaching and also to maintain the uniformity in PG courses offered by HP University to the affiliated institutes (both private and Govt. colleges), the BOS recommended that the all the affiliated institutes will conduct the P.G. practical examinations by the panel of examiners recommended by the chairman of the BOS with subsequent approval of the competent authorities of the University. The practical examination conducted without approved panel of the examiner will not be considered valid for M.Sc. Chemistry degree.

3 The BOS authorized the Chairman & Convener of the BOS (PG) to make typographic corrections and mistakes if any.

4. It was resolved by the BOS (PG) that the pass percentage will be 40% for the M. Sc (Chemistry) . The detail of pass percentage will be as under:

A. In Theory - 40% (32/80)
B. In I.A. - 40% (08/20)
C. In Practical - 40% (20/50)

The meeting ended with a vote of thanks to the chair.

Prof. Suman Lata
External Expert

Prof. Gurjaspreet Singh
External Expert

Prof. Suvarcha Chauhan
Member

Dr. Sandeep Chauhan
Member

Dr. Kiran Kumar
Member

Dr. Rajesh Kumar
Member

Prof. Baljit Singh
Chairman & Convener

Annexure-"A"

A Detailed Scheme and Course Contents of the Syllabi for M.Sc. Chemistry Spread Over Four Semesters (I-IV) For Session 2022-23 and Onwards

Course number	Course Title	Course Type	Credits	Teaching Hours per week	Maximum marks theory + Internal assessment =Total Marks
		Semester I			
CHEM 101	Inorganic Chemistry Theory -1	CP	4	4	80+20=100
CHEM 102	Organic Chemistry Theory -1	CP	4	4	80+20=100
CHEM 103	Physical Chemistry Theory -1	CP	4	4	80+20=100
CHEM 104	Mathematics for Chemists	GE	3	3	40+10=50
CHEM 105	Applications of computer in Chemistry	SEC	3	3	40+10=50
CHEM 106	Inorganic Chemistry Practical -1	CP	3	6	50
CHEM 107	Organic Chemistry Practical -1	CP	3	6	50
CHEM 108	Physical Chemistry Practical -1	CP	3	6	50
Total			**27**		**550**
		Semester II			
CHEM 201	Inorganic Chemistry Theory -2	CP	4	4	80+20=100
CHEM 202	Organic Chemistry Theory -2	CP	4	4	80+20=100
CHEM 203	Physical Chemistry Theory -2	CP	4	4	80+20=100
CHEM 204	Chemistry of Life Science	GE	3	3	40+10=50
CHEM 205	Environmental Chemistry	GE	3	3	40+10=50
CHEM 206	Inorganic Chemistry Practical -2	CP	3	6	50
CHEM 207	Organic Chemistry Practical -2	CP	3	6	50
CHEM 208	Physical Chemistry Practical -2	CP	3	6	50
Total			**27**		**550**
		Semester III			
CHEM 301	Inorganic Chemistry Theory -3	CP	4	4	80+20=100
CHEM 302	Organic Chemistry Theory -3	CP	4	4	80+20=100
CHEM 303	Physical Chemistry Theory -3	CP	4	4	80+20=100
CHEM 304	Inorganic Chemistry Special Theory -1	DSE	4	4	80+20=100
CHEM 305	Organic Chemistry Special Theory -1	DSE	4	4	80+20=100
CHEM 306	Physical Chemistry Special Theory -1	DSE	4	4	80+20=100
CHEM 307	Inorganic Chemistry Practical -3	CP	3	6	50
CHEM 308	Organic Chemistry Practical -3	CP	3	6	50
CHEM 309	Physical Chemistry Practical -3	CP	3	6	50
Total			**25**		**550**
	Candidate will choose only one specialization in Semester III & Semester IV				
		Semester IV			
CHEM 401	Inorganic Chemistry Special Theory -2 (Advanced Organometallic)s	DSE	4	4	80+20=100
CHEM 402	Inorganic Chemistry Special Theory -3 (Modern Techniques of Chemical Analysis)	DSE	4	4	80+20=100
CHEM 403	Inorganic Chemistry Special Theory -4 (Inorganic Spectroscopy)	DSE	4	4	80+20=100
CHEM 404	Inorganic Chemistry Special Theory -5 (Bio-Inorganic Chemistry)	DSE	4	4	80+20=100
CHEM 405	Organic Chemistry Special Theory -2 (Organic Synthesis)	DSE	4	4	80+20=100
CHEM 406	Organic Chemistry Special Theory -3 (Natural products)	DSE	4	4	80+20=100
CHEM 407	Organic Chemistry Special Theory -4 (Medicinal Chemistry)	DSE	4	4	80+20=100
CHEM 408	Organic Chemistry Special Theory -5 (Polymer Chemistry)	DSE	4	4	80+20=100
CHEM 409	Physical Chemistry Special Theory -2 (Advanced Quantum Chemistry)	DSE	4	4	80+20=100
CHEM 410	Physical Chemistry Special Theory -3 (Solid State Chemistry)	DSE	4	4	80+20=100
CHEM 411	Physical Chemistry Special Theory -4 (Biophysical Chemistry)	DSE	4	4	80+20=100
CHEM 412	Physical Chemistry Special Theory -5 (Chemistry of Macromolecules)	DSE	4	4	80+20=100
CHEM 413	Inorganic Chemistry Special Practical -1	DSE	6	8	100
CHEM 414	Organic Chemistry Special Practical-1	DSE	6	8	100
CHEM 415	Physical Chemistry Special Practical-1	DSE	6	8	100
CHEM 416	Two Seminar*	AEC	4	8	50 (Single award list) [25] x 2 =50
Total			**26**		**550**
For practical examination, single award list will be prepared which includes marks of practical and internal assessment of practical (20%) for each practical course.					

[1] The abbreviations use in the above course types are as follows:

Core papers = CP
Discipline Specific Elective= DSE
Generic Elective = GE
Ability Enhancement Courses= AEC
Skill Enhancement Courses =SEC

[2] Students will opt DSE course as per their specialization i.e. Inorganic, Organic and Physical chemistry.

[3] The examination time for each theory paper will be of three hours.

[4] The examination time for practicals of first, second and third semester will be of 6 hrs in two sessions (i.e. both morning and evening).

[5] The examination time for practical's of fourth semester will be of 12 hrs in four sessions (i.e. in two days both morning and evening)

[6] For Internal Assessment (I.A.), the following criteria will be implemented with regards to the award of internal assessment:

i) Internal Assessment (I.A.) of 20 % Marks will be added to each paper.
ii) These marks would , however be split as following: (a) 5 Marks for attendance in theory as well as in practical classes. The Weightage to attendance will be as follows: upto 75% with condonation from competent authority as per provision under ordinance-ZERO. Without condonation upto 75%- ONE MARK. 76-80%- TWO MARKS, 81-85% THREE MARKS, 86-90%- FOUR MARKS and above 91% FIVE MARKS.
iii) The award of 15 Marks would be based on the performance of one class test of 15 Marks and this Test will consist of both subjective as well as objective type questions.

[7] Total Marks of all Four Semesters

Semester	**Credits**	**Marks**
Semester I	27	550
Semester II	27	550
Semester III	25	550
Semester IV	26	550
Grand Total	105	2200

SEMESTER-I
CHEM 101
Inorganic Chemistry Theory -1

Lectures-60
Max. Marks-80

Course Objectives: This is an introductory inorganic chemistry course which will help in thoroughly understanding the concepts and the applications of group theory, non aqueous solvents, clusters, supramolecular chemistry and consequently in development of the aptitude for academic and professional skills.

***Note: i.** Ten questions will be set by the examiner selecting **TWO** from each unit. As far as possible every question will be divided into **Two – Three Parts**. The students shall attempt **FIVE** questions selecting **ONE** from each unit .**ii.** Students can ask for Character Tables (except for C2V and C3V point groups) if required.*

UNIT-I

Group theory: The concept of group, Symmetry elements and symmetry operations, Assignment of point groups to Inorganic molecules, some general rules for multiplications of symmetry operations, Multiplication tables for water and ammonia, Representations (matrices, matrix representations for C_2V and C_3V point groups irreducible representations), Character and character tables for C_2V and C_3V point groups. Applications of group theory to chemical bonding (hybrid orbitals for σ-bonding in different geometries and hybrid orbitals for π-bonding. Symmetries of molecular orbitals in BF_3, C_2H_4 and B_2H_6.

UNIT-II

Non-Aqueous Solvents: Factors justifying the need of Non-Aqueous solution Chemistry and failure of water as a Solvent. Solution chemistry of Sulphuric acid: Physical properties, Ionic self-dehydration in H_2SO_4, high electrical conductance in spite of high viscosity, Chemistry of H_2SO_4 as an acid, as a dehydrating agent, as an oxidizing agent, as a medium to carry out acid-base neutralization reaction and as a differentiating solvent. Liquid BrF3: Physical properties, solubilities in BrF3, self-ionization, acid base neutralization reactions, solvolytic reactions and formation of transition metal fluorides.

UNIT-III

Inorganic Hydrides: Classification, preparation, bonding and their applications. Transition metal compounds with bonds to hydrogen, carbonyl hydrides and hydride anions. Classification, nomenclature, Wade's Rules, preparation, structure and bonding in boron hydrides (boranes) and carboranes,

UNIT-IV

Organic Reagents in Inorganic Chemistry: Chelation, factors determining the stability of chelates (effect of ring size, oxidation state of the metal, coordination number of the metal); Use of the following reagents in analysis:
(a) Dimethylglyoxime (in analytical chemistry)
(b) EDTA (in analytical chemistry and chemotherapy)
(c) 8-Hydroxyquinoline (in analytical chemistry and chemotherapy)
(d) 1,10-Phenanthroline (in analytical chemistry and chemotherapy)
(e) Thiosemicarbazones (in analytical chemistry and chemotherapy)
(f) Dithiazone (in analytical chemistry and chemotherapy)

UNIT-V

Supramolecular Chemistry (Ref. Book 15): Introduction, Some important concepts, Introduction to Recognition, information and complementarity, Principles of molecular receptor designs, Spherical recognition (cryptates of metal cations) Tetrahedral recognition by macrotricyclic cryptands, Recognition of ammonium ions, Recognition of neutral molecules and anionic substrates (anionic coordination)

Books Recommended:

1. Chemical applications of Group Theory – F. A. Cotton
2. Inorganic Chemistry – Durrant and Durrant
3. Symmetry in Chemistry- Jaffe and Orchin
4. Non-aqueous solvents – H.Sisler
5. Non-aqueous solvents – T.C.Waddington
6. Non-aqueous solvents – Logowsky
7. Advanced Inorganic Chemistry:Cotton&Wilkinson,VthEdn.
8. Concise course in Inorganic Chemistry- J.D.Lee
9. Nature of Chemical Bond – L. Pauling
10. Chemistry of Elements – Greenwood and Earnshaw
11. Inorganic Chemistry – T. Moeller
12. Inorganic Chemistry – J.E.Huheey 3rd Edn.
13. Topics in Current Chemistry (Inorganic/Bio-Chemistry)–Vol. 64
14. A Text Book of Quantitative Inorganic Analysis- A.I. Vogel
15. Supramolecular Chemistry (Concepts and Perspectives) - Jean Marie Lehn(VCH-1995).

Course Outcomes:

CO 1: Apply the concepts of symmetry operation, character tables, group representation to describe the geometries and chemical bonding of molecules
CO2: Explain the chemistry and mechanisms of transition metal fluorides in the presence of non-aqueous solvents.
CO 3: Classify the various kind of metal clusters with reference the metal boranes and carboranes
CO 4: Understand and describe the role of some organic reagents in inorganic chemistry.
CO 5: Know the basic concepts associated with supramolecular chemistry and their applications.

SEMESTER-I
CHEM 102
Organic Chemistry Theory -1

Lectures: 60
Max. Marks: 80

Course Objectives : The main objective of this course is to provide basic to advance level of knowledge to the students regarding supramolecular chemistry, stereochemistry and reaction mechanism. To develop a basic understanding about the structure and reactivity relationship. To understand mechanistic details of different types of aliphatic nucleophilic substitution, aliphatic electrophilic substitution and free radical reactions.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT I
Supramolecular Chemistry: Introduction, Bonding other than covalent bond. Addition compounds, Crown ether complexes and Cryptands, Inclusion compounds, Cyclodextrins, Catenanes and Rotaxenes and their applications.

UNIT II
Stereochemistry: Introduction to Basic Concepts of Stereochemistry: Isomers and their properties, Threo and Erythro isomers, Chirality, Optical isomerism, Geometrical isomerism, Conventions for configurations- D,L and R,S systems, Racemic mixture and Racimization, Resolution of Racemic mixtures, Measurement of optical activity, optical purity, Streoselective and Streospecific reactions, epimerization, epimers, anomers and mutarotation, Axial Chirality (Allenes and Biphenyls), Planar chirality, Helicity, Chirality involving atoms other than carbon atoms, Prochirality: prostreoisomerism and Asymmetric synthesis.
Conformational and streoisomerism of acylic and cylic systems, cyclohexane, decalins, effect of conformation on reactivity in acylic and cyclohexane systems.

UNIT III
Reaction Mechanism: Structure and Reactivity: Thermodynamic and kinetic requirements, Kinetic and Thermodynamic control, Hammonds postulate, Curtin-Hammett principle. Potential energy diagrams, transition states and intermediates.
Effect of structure on reactivity: resonance and field effects, steric effect. Quantitative treatment: Hammett equation and linear free energy relationship, Substituent and reaction constants, Taft equation. Methods of determining Reaction mechanisms,

UNIT IV
Aliphatic Nucleophilic Substitution: Reactivity effect of substrate structure, leaving group and nucleophile. The SN_2, SN_1, mixed SN_1 and SN_2, SET mechanisms & SNi mechanism. The neighboring group mechanism, neighboring group participation by π and σ bonds, anchimeric assistance. Non-classical carbocations, phenonium ions, norbornyl system, common carbocation rearrangements-Wagner-Meerwein, Pinacol-Pinacolone and Demjanov ring expansion and ring contraction. Nucleophilic substitution at an allylic, aliphatic trigonal and a vinylic carbon. Esterification of carboxylic acid, transesterification, Phase-transfer catalysis, and ultrasound, ambident nucleophile, regioselectivity.

UNIT V
Aliphatic Electrophilic substitution: Bimolecular mechanisms- SE_2 and SE_i. The SE_1 mechanism, electrophilic substitution accompanied by double bond shifts, halogenation of aldehydes, ketones, acids and acyl halides. Effect of substrates, leaving group and the solvent system on reactivity. Aliphatic diazonium coupling, Acylation at aliphatic carbon, alkylation of alkanes, Stork-enamine reactions.
Free radical reactions: Geometry of free radicals, Types of free radical reactions, free radical substitution mechanism, mechanism at an aromatic substrate neighboring group assistance, Reactivity in aliphatic and aromatic substrates at a bridgehead and attacking radicals. Effect of solvents on reactivity. Allylic halogenation (NBS), oxidation of aldehydes to carboxylic acids, auto oxidation, coupling of alkynes and arylation of aromatic compounds by diazonium salts (Gomberg Bachmann reaction), Hoffmann -Loffler- Freytag reaction, Hunsdiecker reaction.

Books Recommended:

1. Advanced Organic Chemistry-Reactions, Mechanism and Structure, Jerry March, John Wiley.
2. Advanced Organic Chemistry, F.A. Carey and R.J. Sundberg, Plenum.
3. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
4. Structure and Mechanism in Organic Chemistry, C.K. Ingold, Cornell University Press.
5. Organic Chemistry, R.T. Morrison and R.N. Boyd, Prentice Hall.
6. Modern Organic Reactions, H.O. House, Benjamin.
7. Principles of Organic Synthesis, R.O.C. Norman and J.M. Coxon, Blackie Academic and Professional.
8. Pericyclic Reactions, S.M. Mukherji, Macmillan, India.
9. Reaction Mechanism in Organic Chemistry, S.M. Mukherji and S.P. Singh, Macmillan.
10. Stereochemistry of Organic Compounds, D. Nasipuri, New Age International.
11. Stereochemistry of Organic Compounds, P.S. Kalsi, New Age International.

Course Outcomes:
CO1: Know about the supramolecular chemistry and bonding to explain its various applications.
CO2: Apply the basic concepts of stereochemistry and various types of stereoisomers of organic molecules to understand the effect of conformation on reactivity of organic molecules.
CO3: Compare the Kinetic and Thermodynamic requirements of the reactions to establish mechanism of organic reaction.
CO4: Analyze the mechanistic details of different types of aliphatic nucleophilic substitution reactions.
CO5: Apply the mechanistic details of different types of aliphatic electrophilic substitution and free radical reactions.

SEMESTER-I
CHEM 103
Physical Chemistry Theory -1

Lectures: 60
Max. Marks: 80

COURSE OBJECRTIVES: This course is introduced to impart students with the knowledge of various spectroscopic techniques viz; NMR, ESR, Mossbaur and molecular spectroscopy along with kinetics of various complex and fast reactions and catalytic activity at surfaces.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT – I
Resonance Spectroscopy: Principle and Theory of nuclear magnetic resonance (NMR). Chemical shift and spin – spin coupling. Factors influencing chemical – shift and spin – spin coupling of ^{1}H-NMR. Spin – spin and spin – lattice relaxation processes. Line –width and rate processes. First and second order ^{1}H-NMR spectra. Principle and theory of Electron Spin Resonance (ESR). Hyperfine structure of ESR. Zero – field splitting of ESR signal., McConnell relation.Introduction to Mossbaur spectroscopy (isomer – shift, quadrupole interaction and magnetic hyperfine interaction).

UNIT - II
Molecular Spectroscopy: Rotational spectra of non – rigid diatomic molecules and symmetric - top molecules. Anharmonic oscillator, overtones and hot bands. Diatomic vibrator – rotator (P, Q and R – branches). Rotational – vibrational spectra of symmetric – top molecules. Raman Spectroscopy. Rotational and vibrational Raman spectra of linear and symmetric top molecules, overtones and mutual exclusion principle.

UNIT - III
Kinetics of complex reactions: Consecutive and competitive (parallel) first order reactions. Kinetic vs. thermodynamic control reaction. Free radical reactions; thermal (H_2 – Br_2) and photochemical H_2 – Cl_2) reactions. Rice – Herzfeld mechanism of dissociation of organic molecules viz. dissociation of ethane, decomposition of acetaldehyde as 3/2 or ½ order reactions. Reaction rates and chemical equilibrium, principle of microscopic reversibility, activation energy and activated complex.

UNIT - IV
Transition state theory and its kinetic and thermodynamic formulation. Introduction to Potential energy surfaces. Kinetics in solutions: diffusion controlled reactions, their rates and influence of the solvent. Collisions and transition state theories in simple gas reactions, Lindman and Hinshelwood treatment.

UNIT - V
Catalytic activity at surfaces: adsorption and catalysis, the Langmuir – Hinshelwood mechanism, the Eley – Rideal mechanism. Examples of catalysis: hydrogenation, oxidation and cracking and reforming (qualitative treatment only). Introduction to fast reactions. Flash photolysis and Stopped flow methods to study the kinetics of fast reactions.

Books Recommended:

1. Chemical Kinetics : K.J. Laidler
2. Kinetics and Mechanism of Reaction Rates: A.Frost and G. Pearson.
3. Modern Chemical Kinetics: H. Eyring
4. Theories of Reaction Rates: K.J. Laidler, H. Eyring and S. Glasston
5. Fast Reactions: J.N. Bradly
6. Fast Reaction:C. Kalidas
7. Fast Reactions in Solutions: Caldin
8. Basic Principles of Spectroscopy: R. Chang
9. NMR and Chemistry: J.W. Akit
10. Introduction to Molecular Spectroscopy: G.M. Barrow
11. Physical Chemistry: P.W. Atkins
12. Fundamentals of Molecular Spectroscopy: C.N. Banwell
13. Physical Chemistry: G.K. Vemulapalli

Course Outcomes:
CO1: Explain principles of various spectroscopic techniques
CO2:Interpret and analyse spectra of the molecules using rules of various spectroscopic techniques
CO3: Solve problems by choosing suitable spectroscopic methods and interpreting corresponding data
CO4: Understand the mechanisms and kinetics of complex and fast reactions
CO5: Explain the function and purpose of a catalyst and mechanisms involved in catalysis.

SEMESTER-I
CHEM 104
Mathematics for Chemists

Lectures: 48
Max. Marks: 40

Objective of the course: To impart the basic knowledge of mathematical tools needed to solve the chemistry problems.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be subdivided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT - I

Differential calculus: Idea of functions, Limit and Continuity, functions of single and several variables, derivatives, partial derivatives, total derivative. Graphical representation of differentiation, Rules of Differentiation, maxima and minima.

Some examples related to chemistry: (i) Calculation of the rate of change of λ with θ in Bragg equation, (ii) Calculation of equilibrium separation between two helium atoms separated by a distance R in the Lennard-Jones potential V, (iii) Calculation of $\left(\frac{\partial V}{\partial T}\right)_p$, $\left(\frac{\partial T}{\partial p}\right)_V$ from the ideal gas equation, (iv) Calculation of $\left(\frac{d}{dv}\right) f(v)$ for The Maxwell Boltzmann Distribution $f(v) = Av^2 e^{-Bv^2}$ of molecular velocities, (v) Calculation of $\left(\frac{dp}{d\zeta}\right)$ for the reaction $N_2O_4 \rightleftharpoons 2\ NO_2$, where $p(N_2O_4)= \frac{1-\zeta}{1+\zeta}$

UNIT – II

Integral calculus: Methods of integration, geometric interpretation of integral, evaluation of some simple definite integrals. Significance of 'exponential' equations. Some integrals related to chemistry:

(i) The significance of 'exponential' equations, (ii) Calculation of work done on an ideal gas compressed isothermally using relation $= -\int_{V_1}^{V_2} PdV$, (iii) Rate expressions for Zero and First order

UNIT-III

Differential equations: Types and classification of differential equations, homogeneous differential equations, exact differential equations, linear equations, and differential equations of first and second orders, Solution of first order differential equations.

Application to simple chemistry problems: Solving Particle in one dimensional box by taking (a) trigonometric functions (b) exponential functions.

UNIT – IV

Matrices and Determinants: Definition of matrix, types of matrices (row, column, null, square, diagonal).

Matrix algebra: Multiplying a matrix by a constant, addition, subtraction and multiplication of two matrices. Transpose and adjoint of a matrix, elementary transformation, representation and applications to solutions of linear equations.

Application of Matrices to simple chemistry problems: (i) Finding the atom connectivity matrix for molecules like but-1-ene (hydrogens ignored), (ii) Writing Huckel Molecular Orbital secular equations for 1,3 butadiene, cyclobutadiene, benzene, water, Ammonia.

UNIT-V

Vectors: representation and simple properties of vectors, addition and subtraction of vectors, addition by the method of triangles, resolution of vectors. Scalar product of vectors. Concept of normalization, orthogonality and complete set of unit vectors. Application to simple chemistry problems:(i) Calculation of speed of particle moving with velocity ($\vec{v}$) in two-dimensional space, three-dimensional space, (ii) calculation of work done (w) by the vector force on a particle of velocity ($\vec{v}$) in the given time interval using $W = \int_{t_1}^{t_2} F.v\ dt$.

Suggested Books:

1. Maths for Chemists, Allan Cunningham, RoryWhelan, University of Birmingham University of Leeds, available online; https://www.birmingham.ac.uk/Documents/college-eps/college/stem/Student-Summer-Education-Internships/Maths-for-Chemists-Booklet.pdf
2. Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill.
3. Mathematical Preparation for General Physics, J.B. Marian, R.C. Davidson Saunder Company.
4. Mathematical Methods for Science Students, G. Stephemen, ELBS.
5. Applied Mathematics for Physical Chemistry: T.R. Barrante
6. Chemical Thermodynamics, C.E. Reid, Mc Graw Hills, College 0^{th} Edition.

Course outcomes:

CO1:Apply basic knowledge of Differential calculus for the use of chemists.

CO2:Apply the general methods of integration for their application to solve chemistry problems.

CO3: Apply basic knowledge of differential equations used in chemistry.

CO4: Apply basic knowledge of Matrices and Determinants to solve chemistry problems.

CO5: Apply basic knowledge of Vectors to evaluate physical parameters related to chemistry.

SEMESTER-I
CHEM 105
APPLICATION OF COMPUTER IN CHEMISTRY

Lectures: 48
Max. Marks: 40

Objectives of the course: To impart basic knowledge of computers to chemistry students and to acquaint them to use tools of computers to solve chemistry problems.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be subdivided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT – I

Introduction: Characteristics of Computer, Evolution of computer, Capabilities and limitations of computer, Generations of computer, Types of computers (micro, mini, main frame, supercomputers), Block diagram of computer, Basic components of a computer system, Input unit, Output unit, Arithmetic logic Unit, Control unit and Central Processing Unit.

UNIT – II

Computer Software: Software and its Need, Types of softwares, System software, Application software, operating system, utility program, programming languages, introduction to operation system for PCs-DOS, windows, linux, application software and its types – word processing, spreadsheet, presentation and graphics.

UNIT – III

Internet Concepts: Basics of Networking – LAN, WAN, Wi-Fi technologies and sharing of printers and other resources, Concept of IP addresses, applications of internet like: e-mail and browsing, concept of search engine and safe searching. Various browsers like Internet explorer/Microsoft Edge, Mozilla Firefox, use of cookies and history, WWW (World Wide Web), hyperlinks and introduction to Anti-virus.

UNIT – IV

Chemistry and FORTRAN Programming: Introductory FORTRAN concepts, character set, constant variables, data types, subscripted variables, and FORTRAN functions.
Data transfer and program execution control: Introduction, format specification for READ and WRITE statements, format commands, control commands and transfer commands. Logical variable and Double precision variables

UNIT – V

Arrays and repetitive computation: Introduction, arrays arrange storage, dimension statement, do continue, Nested do – loop continue statement, implied do. Sub – programme (functions and sub –routines): COMMON and DATA statements. Sub programme, function arguments, subroutines, save variable function vs. subroutine programme.

Books Recommended:

1. Hunt, R.; Shelley, J. Computers and Common Sense, Prentice Hall.
2. Norris, A.C. Computational Chemistry, 1st edition, John Wiley & Sons, 1981.
3. Rajaraman, V. Computer Programming in FORTRAN IV, 4th edition, Prentice Hall India Pvt. Ltd., 1997.
4. Rajaraman, V.; RadhaKrishnan, V. An Introduction to Digital Computer Design, Prentice Hall.
5. Fortran 77 & 90: V. Rajaraman
6. Computer in Chemistry: K.V. Raman
7. Microcomputer Quantum Mechanics, Second Edition; J.P. Killingback and Adam Hilger Ltd., Bristol and Boston, 1985.
8. quick basic Programming for Scientists and Engineers; Joseph H. Noggle; CRC Press, 1992.
9. Meth Norton's; Introduction to Computers; Fourth Edition; McGraw Hill, New York.
10. Computers for Chemists; K.V. Rajoraman; Tata Megraw Hill Co. Ltd.; New Delhi; 1993.

Course outcomes:

CO1: Develop basic knowledge of computers.
CO2: Develop basic knowledge of computer hardware.
CO3: Develop basic knowledge of computer software.
CO4: Explain the functions in FORTRAN for data analysis in chemistry.
CO5: Use of functions in FORTRAN for chemistry applications.

SEMESTER I
CHEM 106
Inorganic Chemistry Practical -1

Time - 6 hr/week
Max. Marks – 50

Course Objectives: The Course is introduced to impart practical knowledge of the chemical methods of analysis with basic titrimetric and gravimetric techniques to students. It will enable the students to develop their experimental skills and creativity.

1. Volumetric Analysis:

(a) Potassium iodate titrations: Determination of iodide, hydrazine, antimony (III) and arsenic (III)

(b) Potassium bromate titrations

i) Determination of antimony (III) and arsenic (III) Direct Method)

ii) Determination of aluminium, cobalt and zinc (by oxine method)

(c) EDTA titrations

i) Determination of copper, nickel, magnesium

ii) Back titration

iii) Alkalimetric titration

iv) Titration of mixtures using masking and damasking agents

v) Determination of hardness of water

Books Recommended:

1. A text Book of Quantitative Inorganic Analysis: A.I.Vogal.
2. Applied Analytical Chemistry: Vermani.
3. Commercial Methods of Analysis: Shell & Biffen

Course Outcomes:

CO 1: Know the various types of titrimetric methods of analysis and their applications.
CO 2: Demonstrate the iodatometric, bromatometric cerimetric and acid base and complexometric titrations in laboratory.
CO 3: Perform experimentation and evaluate the results.
CO 4: Develop the ability to compile interpreted information in the form of lab record and to face viva-voce

SEMESTER I
CHEM 107
Organic Chemistry Practical -1

Time : 6 hr/week
Max. Marks : 50

Course Objectives: The objective of this course is to provide basic knowledge to students regarding laboratory & purification techniques in organic chemistry. To know the concept of stepwise synthesis of the organic compounds and to know the practical applicability of different types of organic reactions.

Demonstrations of Laboratory & Purification techniques: Refluxing, Solvent extraction, Purification of solvents and reagents using various techniques like crystallization, distillation, steam distillation, vacuum distillation. Drying and storage of solvents, sublimation etc.

Preparation of some important organic compounds involving the reactions out of the followings representative reactions Acetylation, Esterification, Oxidation, Reduction, Nucleophilic substitution, Aromatic electrophilic substitution reaction, Condensation reactions, Hoffman's Bromamide reaction.

Oxidation: Adipic acid by chromic acid oxidation of cyclohexanol , Grignard reaction: Synthesis of triphenyl methanol from benzoic acid. Sandmeyer reaction: p-chlorotoluene from p-toluidine, Aldol condensation: Dibenzal acetone from benzaldehyde. Acetoacetic ester condensation: Synthesis of ethyl-n-butylacetoacetate, Preparation of iodoform from acetone (Haloform reaction). Preparation of polystyrene, anthranilic acid, fluoresceine-eosin, and methyl orange dyes, and any other reaction as per requirement.

All the students must submit the recrystallised product along with yield, and melting point for all the stages of preparation.

Books Recommended:

1. Experiments and Techniques in Organic Chemistry, D.Pasto, C. Johnson and M.Miller, Prentice Hall.
2. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C.Heath.
3. Systematic Qualitative Organic Analysis, H.Middleton, Adward Arnold.
4. Handbook of Organic Analysis-Qualitative and Quantitative, H.Clark, Adward Arnold.
5. Vogel's Textbook of Practical Organic Chemistry, A.R. Tatchell, John Wiley.

Course Outcomes:

CO1: Describe and demonstrate the basic principle and techniques of purifications.
CO2: Know the concept of stepwise synthesis of the organic compounds.
CO3: Develop the skill of performing experiments and analysing data to evaluate results.
CO4: Develop the ability to compile interpreted information in the form of lab record.
CO5: Learn to face the viva-voce examinations.

SEMESTER I

CHEM 108

Physical Chemistry Practical -1

Time - 6 hr/week
Max. Marks - 50

Course objectives: This course is introduced to impart knowledge and understanding of various methods used for the determination of refractive index, surface tension and viscosity of various solvents and mixtures along with various experimental methods to analyse the kinetics of various reactions

1. **Refractive Index (RI) Measurements:** Refractive index measurements of pure solvents and analysis of solvent mixtures in terms of composition from the calibration plot.

2. **Surface Tension Measurements:** Surface tension of pure solvents, analysis of mixtures of two miscible solvents, verification of Gibb's Thomson Rule of surface tension.

3. **Viscosity Measurements:** Determination of relative and absolute viscosity of the given solvent, determination of percentage composition of a liquid, determination of molar mass of a polymer.

4. **Chemical Kinetics:** Comparison of strengths of two acids by kinetic study, determination of temperature coefficient of a reaction rate, acid hydrolysis of ethylacetate and Saponification of ethylacetate

Books Recommended:

1. Senior Practical Physical Chemistry: B.D. Khosla, V.C. Garg and A. Khosla
2. Advanced Practical Physical Chemistry : J.B.Yadav
3. Experimental Physical Chemistry: V. Athawale and P. Mathur.
4. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan.
5. Practical in Physical Chemistry: P.S. Sindhu

COURSE OUTCOMES:

CO1: Understand the safe handling of chemicals, environmental issues, and safety measures to be followed during the labs
CO2: Use various methods in determining the refractive index of various solvents and mixtures
CO3: Determine surface tension and viscosity of various solvents and mixtures by using different experimental methods
CO4: Analyse the mechanisms and kinetics of various reactions by using different experimental methods

SEMESTER-II
CHEM 201
Inorganic Chemistry Theory -2

Lectures-60
Max. Marks-80

Course Objectives: To introduce the fundamental concepts of metal ligand bonding and atomic spectroscopy helpful in interpreting the electronic spectra of metal complexes and their magnatochemistry. To enable understanding of various electronic and magnetic properties of metal complexes helpful in the synthesis of new metal complexes leading to the development of advanced inorganic chemistry.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I
Metal-Ligand Bonding-I: Recapitulation of Crystal Field Theory including splitting of *d*-orbitals in different environments, Factors affecting the magnitude of crystal field splitting, structural effects (ionic radii, Jahn-Teller effect), Thermodynamic effects of crystal field theory (ligation, hydration and lattice energy), Limitations of crystal field theory, Adjusted Crystal Field Theory (ACFT), Evidences for Metal-Ligand overlap in complexes, *Molecular Orbital Theory* for octahedral, tetrahedral and square planar complexes (excluding mathematical treatment)

UNIT-II
Atomic Spectroscopy: Energy levels in an atom, coupling of orbital angular momenta, coupling of spin angular momenta, spin orbit coupling, spin orbit coupling *p2* case, Determining the Ground State Terms-Hund's Rule, Hole formulation (derivation of the Term Symbol for a closed sub-shell, derivation of the terms for a *d2* configuration), Calculation of the number of the microstates.

UNIT-III
Electronic Spectra-I: Splitting of spectroscopic terms (S,P,D.F and G,H,I), d^{11}-d^{9} systems in weak fields (excluding mathematics), strong field configurations, transitions from weak to strong crystal fields.

UNIT-IV
Electronic Spectra-II: Correlation diagrams (d^{11}-d^{9}) in Oh and Td environments, spin-cross over in coordination compounds. Tanabe Sugano diagrams, Orgel diagrams, evaluation of B,C and β parameters.

UNIT-V
Magnetochemistry: Origin of Magnetic moment, Magnetic susceptibility (diamagnetic, paramagnetic), spin only moment, Russell Saunder's coupling, quenching of orbital angular moment, orbital contribution to a magnetic moment, magnetic moments from magnetic susceptibilities, temperature dependence of magnetic susceptibility, Factors determining paramagnetism, application of magnetochemistry in co-ordination chemistry in spin free and spin paired octahedral and tetrahedral complexes, Van Vlecks formula for magnetic susceptibility.

Books Recommended:

1. Advanced Inorganic Chemistry – Cotton and Wilkinson
2. Coordination Chemistry- Experimental Methods – K.Burger
3. Theoretical Inorganic Chemistry – Day and Selbin
4. Magnetochemistry – R.L.Carlin
5. Comprehensive Coordination Chemistry – Wilkinson, Gillars and McCleverty.
6. Inorganic Electronic Spectroscopy – A.B.P.Lever
7. Concise Inorganic Chemistry – J.D.Lee
8. Introduction to Ligand Fields – B.N.Figgis
9. Introduction to Magnetochemistry – A.Earnshaw, Academic Press.

Course Outcomes:
CO 1: Explain the crystal field theory and apply the concept of molecular orbital theory to explain stability of coordination complexes.
CO 2: Apply the basic principles of the atomic spectroscopy to identify the energy levels of the atoms, to calculate the number of microstates.
CO 3: Understand the splitting of spectroscopic terms in coordination compounds under applied magnetic field.
CO 4: Interpret the correlation diagrams in octahedral and tetrahedral transition metal complexes.
CO 5:Analyze the magnetic properties of co-ordination compound by applying the basic concepts of magneto-chemistry.

SEMESTER-II
CHEM 202
Organic Chemistry Theory -2

Lectures: 60
Max. Marks: 80

Course Objectives: To understand mechanistic details of different types of aromatic electrophilic substitution, aromatic nucleophilic substitution, elimination and pericyclic reactions. As part of this course, students will be introduced to some reagents used in organic synthesis. To know about some common organic reactions and their mechanisms.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT -I
(A) Aromatic Electrophilic Substitution: Arenium ion mechanism, orientation and reactivity, The ortho/para ratio, ipso attack, orientation in other ring systems. Quantitative treatment of reactivity in substrates and electrophiles, Diazonium coupling, Vilsmeir - Haack reaction, Scholl reaction, Amination reaction, Fries rearrangement, Hofmann-Martius Reaction, Reversal of Friedel Craft alkylation.
(B) Aromatic Nucleophilic Substitution: SNAr, SN_1, benzyne and SRN_1 mechanism. Reactivity, effect of substrate structure, leaving group and attacking nucleophile, Von Richter, Sommelet-Hauser, and Smiles rearrangements, Ullman reaction, Ziegler alkylation, Schiemann reaction.

UNIT -II
Common Organic Reactions and Their Mechanisms: Perkin condensation, Michael reaction, Robinson annulation, Diekmann reaction, Stobbe condensation, Mannich reaction, Knoevenagel condensation, Benzoin condensation, Witting reaction, Hydroboration, Hydrocarboxylation, Ester hydrolysis, Epoxidation.

UNIT -III
Reagents in Organic Synthesis: Synthesis and applications of BF_3, NBS, Diazomethane, Lead tetra-acetate, Osmium tetraoxide, Woodward Prevorst hydroxylation reagent, $LiAlH_4$, Grignard reagent, organozinc and organolithium reagent.

UNIT -IV
Elimination Reactions: Discussion of E_1, E_2, E_1cB and E_2C Mechanisms and orientation, Reactivity: Effects of substrate structures, attacking base, leaving group and medium. Mechanism and Orientation in Pyrolytic eliminations, Cis elimination, elimination in cyclic systems, eclipsing effects, cleavage of quaternary ammonium hydroxides, Shapiro reaction, Conversion of Ketoxime to nitriles.

UNIT -V
Pericyclic Reactions: Molecular orbital symmetry, Frontier orbitals of ethylene, 1,3-butadiene, 1,3,5 hexatrienes and allyl system. Classification of pericyclic reactions, Woodward-Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reactions: conrotatory and disrotatory motions, 4n and 4n+2 and allyl systems. Cycloadditions- antarafacial and suprafacial additions, 4n and 4n+2 systems, 2+2 addition of ketenes, 1,3 dipolar cycloadditions and chelotropic reactions. Sigmatropic rearrangements-Suprafacial and Antarafacial shifts of H, sigmatropic shifts involving carbon moieties, Claisen, Cope and aza-Cope rearrangements, Ene reaction.

Books recommended:
1. Advanced Organic Chemistry-Reactions, Mechanism and Structure, Jerry March, John Wiley.
2. Advanced Organic Chemistry, F.A. Carey and R.J. Sundberg, Plenum.
3. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
4. Structure and Mechanism in Organic Chemistry, C.K. Ingold, Cornell University Press.
5. Organic Chemistry, R.T. Morrison and R.N. Boyd, Prentice Hall.
6. Modern Organic Reactions, H.O. House, Benjamin.
7. Principles of Organic Synthesis, R.O.C. Norman and J.M. Coxon, Blackie Academic and Professional.
8. Pericyclic Reactions, S.M. Mukherji, Macmillan, India.
9. Reaction Mechanism in Organic Chemistry, S.M. Mukherji and S.P. Singh, Macmillan.
10. Stereochemistry of Organic Compounds, D. Nasipuri, New Age International.

Course Outcomes:
CO1: Apply the concept of aromatic electrophilic and nucleophilic substitution reactions to explain their applications.
CO2: Explain the synthesis and applications of some reagents used in organic synthesis.
CO3: Know about some common organic reactions and to explain their mechanisms.
CO4: Understand the mechanistic implications of Elimination Reactions
CO5: Analyze the concept of molecular orbital symmetry to apply in pericyclic reactions.

SEMESTER-II
CHEM 203
Physical Chemistry Theory -2

Lectures: 60
Max. Marks: 80

COURSE OBJECRTIVES: The main objective of the course is to impart basic knowledge of various laws of thermodynamics, thermodynamics of colligative properties, partial molar properties, affinity, fugacity and activity. This course will also impart knowledge and understanding of solution thermodynamic concepts to compute phase diagram, distribution law, non equilibrium thermodynamics and colloidal state of the system.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT – I
Chemical Thermodynamics-I: Brief resume of laws of thermodynamics, Free energy functions, Gibb's and Helmholtz free energy functions and their significance, Gibbs -Helmholtz equation, thermodynamic equilibria and free energy functions, applications of Gibbs-Helmholtz equation, Clapeyron-Clausius equation, Thermodynamics of Elevation in boiling point, depression in freezing point, relation between osmotic pressure and elevation of boiling point, relation between osmotic pressure and depression in freezing point.

UNIT – II
Chemical Thermodynamics-II: Chemical affinity, applications of chemical affinity, methods for determining the chemical affinity ,partial molar properties, Physical significance of partial molar properties, chemical potential, Gibbs - Duhem equation, variation of chemical potential with temperature and pressure, chemical potential of a pure solid or liquid, chemical potential of a pure ideal gas and mixture of ideal gases, thermodynamic functions of mixing, fugacity, fugacity coefficient, determination of fugacity, variation of fugacity with temperature and pressure, Lewis Randall rule, Duhem-Margules equation, activity, activity coefficient, determination of activity and variation with temperature and pressure.

UNIT–III
Nernst heat theorem and third law of thermodynamics and its application. Thermodynamic derivation of phase rule and its application to two component systems. Distribution law, its thermodynamic derivation and application.

UNIT –IV
Non–Equilibrium Thermodynamics: Basic principles of non – equilibrium thermodynamics: Rate laws, second law of thermodynamics for open system, law of conservation of mass, charge and energy flow, electrokinetic phenomena and expressions for streaming potential, electro- osmotic pressure difference, streaming potential using the linear phenomenological equation.

UNIT – V
Colloidal State: Classification of colloids, charge and stability of colloidal dispersions, Hardy-Schulze Law, gold number, electrical properties of colloids, electrical double layer and its structure, Stern's theory of double layer, zeta-potential, electrophoresis and electro-osmosis, emulsions and their classification, emulsifiers, gels and their classification.

Books Recommended:

1. Thermodynamics for Chemists: S. Glasstone
2. Physical Chemistry: G.M. Barrow
3. Non – equilibrium Thermodynamics: C. Kalidas
4. Non – equilibrium Thermodynamics: I. Prigogene
5. Electrochemistry: S. Glasstone
6. Electrochemistry: P.H. Reiger
7. Thermodynamics; R.C. Srivastava, S.K. Saha and A.K. Jain
8. Modern Electrochemistry Vol. I: J.O'M Bockris and A.K.N. Reddy
9. Physical chemistry: P.W. Attkin.
10. Introduction to colloid and surface chemistry / Duncan J. Shaw

Course Outcomes:
CO1: Explain principles of laws of thermodynamics and other phenomenon of Chemical Thermodynamics.
CO2: Use of laws of Chemical Thermodynamics to derive other thermodynamic properties.
CO3: Solve problems by choosing suitable thermodynamic derivations and relations.
CO4: Understand the basic laws of non-equilibrium thermodynamics and various electro-kinetic phenomenon.
CO5: Know about the colloidal state of the matter and various electrical properties of colloids.

SEMESTER-II
CHEM 204
Chemistry of life science

Lectures: 48
Max. Marks: 40

COURSE OBJECRTIVES: The main objectives of the course is to learn the basic concepts of biological systems and to understand the fundamentals of cell structure, functions and different metabolic processes involved in cells. It will also impart the knowledge about the role of carbohydrates, proteins, lipids and nucleic acids in biological system.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I
Cell structure and function: Basic concepts, Structure of prokaryotic and eukaryotic cells, intracellular organelles and their functions, comparison of plant and animal cells.

UNIT-II
Carbohydrates: Structure and biological functions of important monosaccharides (excluding detailed conformational analysis), Disaccharides- sucrose, lactose and maltose, and polysaccharides (cellulose and chitin).

UNIT-III
Carbohydrate Metabolism: Overview of metabolic processes (catabolic and anabolic), energy transfer processes, role and significance of ATP (the biological energy currency). Carbohydrate metabolism: glycolysis and Kreb's cycle.

UNIT-IV
Proteins and lipids: Amino acids, Peptide bond, Chemical and enzymatic hydrolysis of proteins to peptides, Denaturation of Proteins. Biosynthesis of proteins.
Lipid aggregates-micelles, bilayers, and their possible biological functions. Biological membranes. . Introductory idea of metabolism of proteins and lipids

UNIT-V
Nucleic acids: Purine and pyrimidine bases of nucleic acids, base pairing via H-bonding. Structure of ribonucleic acids (RNA) and deoxyribonucleic acids (DNA), double helix model of DNA and forces responsible for holding it. Chemical and enzymatic hydrolysis of nucleic acids. The Chemical basis for heredity, an overview of replication of DNA, transcription, translation and genetic code. Chemical synthesis of mono and trinucleoside.

Books Recommended:

1. Principles of Biochemistry, A. L. Lehninger, Worth Publishers.
2. Biochemistry, L.Stryer, W.H. Freeman.
3. Biochemistry, J. David Rawn, Neil Patterson.
4. Biochemistry, Voet and Voet, John Wiley.
5. Outlines of Biochemistry, E. E.Conn and P. K. Stumpf, John Wiley.
6. Introduction to Chemistry of Life-H.J.DeBay

Course outcome :
CO1: Understand the cell structure, functions and different metabolic processes involved in cells.
CO2: Explain the structure and biological functions of carbohydrates and proteins.
CO3: Know the role of various biological membranes.
CO4: Understand the structure of DNA and RNA and their role in cell replication.
CO5: Explain the structure and bonding of nucleic acids and can explain different enzymatic and chemical processes involved.

SEMESTER-II
CHEM–205
Environmental Chemistry

Lectures: 48
Max. Marks: 40

Course objectives: The main objective of this course is **t**o know the various environmental segments and their chemical composition and to impart the basic knowledge about the air, water, and soil pollution. To create awareness among the students about their ill effects. To understand the basis techniques to monitor environmental pollution along with basic knowledge of green approach in chemical synthesis.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I
Environmental Chemistry: Atmosphere, environmental segments, composition of the atmosphere, earth's radiation balance, particulates, ions and radicals and their formation, chemical and photochemical reactions in the atmosphere, air pollution, oxides of C,N,S and their effects, acid-rain, smog formation, Green house effects (global warming and ozone depletion, air pollution controls.

UNIT-II
Hydrosphere: Chemical composition of water bodies-lakes, streams, rivers, sea etc, hydrological cycle, complexation in natural and waste water and microbially mediated redox reactions. Water pollution-inorganic, organic, pesticides, industrial and radioactive materials, oil spills and oil pollutants, eutrophication, acid-mine drainage, waste water treatment, domestic waste water (aerobic and anaerobic treatment), and industrial waste water treatment.

UNIT-III
Water quality parameters and standards: Analytical methods for measuring DO, BOD, COD, fluoride, oils and grease and metals (As, Cd, Hg, Pb, Zn,Cu,Cr), Biochemical effects of As, Cd, Hg, Pb, Cr, CN and pesticides.
Lithosphere: Soil composition, micro and macro nutrients, soil pollution-fertilizers, pesticides.

UNIT-IV
Environmental analytic chemistry: Introduction to analytical methods for monitoring air and water pollution. Theory and applications of Atomic absorption spectroscopy, UV-Visible and Infrared Spectroscopy, HPLC (High performance liquid chromatography) and Gas chromatography techniques used in pollution analysis.

UNIT-V
Green Chemistry: Introduction and need for Green Chemistry. Goals of Green Chemistry. Principles of Green Chemistry with their explanations. Green chemistry in sustainable development.

Books recommended
[1] Environmental Chemistry-A.K.De
[2] Environmental Chemistry-Manaham
[3] Environmental Pollution Analysis-Khopkar
[4] Vogel's text book of Quantitative Chemical Analyses.
[5] Ahluwalia, V.K. and Kidwai, M.R. New Trends in Green Chemistry, Anamalaya Publishers, 2005
[6] Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker, 2001

Course outcomes:
CO1: Analyze composition of atmosphere, hydrosphere and lithosphere and pollution involved and waste water treatment methods.
CO2:Understand the fundamentals of environmental analysis.
CO3: Identify different types of analytical methods and to apply them to analyze air and water pollution.
CO4: Analyse composition of atmosphere, hydrosphere, lithosphere and pollution involved and waste water treatment methods.
CO5: To understand the need of green chemistry and its principles

SEMESTER II
CHEM 206
Inorganic Chemistry Practical -2

Time - 6 hr/week
Max. Marks -50

Course Objectives: The Course is introduced to impart students with practical knowledge of the chemical methods of analysis along with green methods of synthesis with a view to develop their experimental skills and creativity.

1. Analysis of mixtures by gravimetric and volumetric methods from the mixture solutions:

1. Copper- Nickel
2. Copper -Magnesium
3. Copper-Zinc
4. Iron-Magnesium
5. Silver-Zinc
6. Copper-Nickel-Zinc
7. Fe(II)-Fe(III)
8. Analysis of Ores (Dolomite, Pyrolusite) and alloys (Coin, Brass, Bronze).

2. Commercial Analysis:

i) Determination of available chlorine in bleaching powder
ii) Determination of Oxygen in hydrogen peroxide.
iii) Determination of Phosphoric acid in commercial phosphoric acid.
iv) Determination of Boric acid in borax.

2. **Green methods of Preparation of the following:**

(i) Bis(acetylacetonato)copper(II)
(ii) Tris(acetylacetonato)iron(III)
(iii) Tris(acetylacetonato)manganese(III)

Books Recommended:

1. A text Book of Quantitative Inorganic Analysis: A.I.Vogal.
2. Applied Analytical Chemistry: Vermani.
3. Commercial Methods of Analysis: Shell & Biffen

Course Outcomes:

CO 1: Demonstrate the application of chemical method in commercial analysis of industrial products as quality control measure.
CO 2: To understand the various measures to control environmental pollution by some green synthesis experiments as alternative to conventional methods.
CO 3: To perform experimentation and evaluate the results.
CO 4: Develop the ability to compile interpreted information in the form of lab record and to face viva-voce

SEMESTER II
CHEM- 207
Organic Chemistry Practical -2

Time : 6 hr/week
Max. Marks : 50

Course Objectives: The main objective of this course is to provide basic knowledge of principle and techniques of separation, purification and identification of binary mixture of organic compounds. To understand and develop the capabilities of preparing derivatives of different organic compounds bearing various organic functionalities. To know the significance of melting point mixed melting point, boiling point in identification of organic compounds

Qualitative Organic Mixture Analysis: Separation, purification and identification of binary mixture of organic compounds by chemical tests. Separation of binary mixtures: using H_2O, HCl, NaOH, $NaHCO_3$, Ether or other reagent as may be necessary along with required conditions for their use.

Systematic identification of mixtures of pure organic compounds: separation and identification of simple binary mixtures having acidic, basic and neutral components. Preparation of their derivatives, determination of b.p./m.p. for components and their derivatives.

Any other experiment to be added as per requirement.

Books Recommended:

1. Experiments and Techniques in Organic Chemistry, D.Pasto, C. Johnson and M.Miller, Prentice Hall.
2. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C.Heath.
3. Systematic Qualitative Organic Analysis, H.Middleton, Adward Arnold.
4. Handbook of Organic Analysis-Qualitative and Quantitative, H.Clark, Adward Arnold.
5. Vogel's Textbook of Practical Organic Chemistry, A.R. Tatchell, John Wiley.

Course Outcomes:

CO1: Describe and demonstrate the basic principle and techniques of separation of binary organic mixture.
CO2: Analyse qualitatively the presence of extra elements and functional groups in the binary organic mixture along with understanding of chemical reaction involved.
CO3: Understand and develop the capabilities of preparing derivatives of different organic
CO4: Understand significance of melting point mixed melting point, boiling point in identification of organic compounds.
CO5: Develop the ability to compile interpreted information in the form of lab record and to face the viva-voce.

SEMESTER II
CHEM 208
Physical Chemistry Practical -2

Time - 6 hr/week
Max. Marks - 50

COURSE OBJECTIVES: This course will impart basic knowledge of various methods used for the determination of partition coefficient, heat of neutralisation, heat of solution and heat of hydration. This course will also impart knowledge and understanding for the verification of Freundlich adsorption isotherm, preparation of sol and construction of Phase diagrams for liquids

1. **Partition – Coefficient**: Determination of partition – coefficient for iodine (I_2) and benzoic acid between two immiscible solvents.

2. **Thermochemistry:** Determination of water equivalent of thermos flask, and estimation of heat of neutralization for strong acid strong base, weak acid strong base or vice – versa, heat of hydration and solution of salts.

3. **Adsorption Measurements:** Verification of Freundlich adsorption isotherm for I_2, and acetic acid on charcoal.

4. **Colloidal Solution:** Preparation of sol solution of arsenic sulphide and estimation of flocculation value for NaCl, KCl, $BaCl_2$,$AlCl_3$.

5. **Construction of Phase Diagram:** Phase diagram for liquids, (benzene and methanol) and phase diagram for solids, (benzoic acid and cinnamic acid, benzoic acid and naphthalene and acetamide and salicylic acid).

Books Recommended:

1. Senior Practical Physical Chemistry: B.D. Khosla, V.C. Garg and A. Khosla
2. Advanced Practical Physical Chemistry : J.B.Yadav
3. Experimental Physical Chemistry: V. Athawale and P. Mathur.
4. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan.
5. Practical in Physical Chemistry: P.S. Sindhu

COURSE OUTCOMES:

CO1: Understand the safe handling of chemicals and safety measures to be followed in the labs.
CO2: Use various methods in determining partition coefficient of iodine between two immiscible liquids
CO3: Determine heat of neutralisation and heat of solution for different acid and base combinations
CO4: Verify the Freundlich Adsorption Isotherm for I_2, and acetic acid on charcoal
CO5: Prepare the colloidal solution arsenic sulphide
CO6: Construct phase diagrams for liquids and solids

SEMESTER-III
CHEM 301
Inorganic Chemistry Theory -3

Lectures-60
Max. Marks-80

Course Objectives: The Course is introduced to provide basic to advance level of knowledge to student like bonding considerations in metal pi complexes, statistical treatment of analytical data, transuranium and translawrencium elements and photoelectron spectroscopy and applications of nuclear chemistry.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I
Metal π Complexes: Preparation, reactions, structures and bonding in carbonyl, nitrosyl and phosphine complexes, structural evidences from vibrational spectra. Structure and bonding in metal cyanides, stabilization of unusual oxidation states of transition metals.

UNIT-II
Introductory Analytical Chemistry: Data Analysis-Types and sources of errors, propagation of errors, detection and minimization of various types of errors. Accuracy and precision, average and standard deviation, variance, its analysis and confidence interval, tests of significance (F-test, t-test and paired t-test), criteria for the rejection of analytical data (4d rule, 2.5d rule, Q-test, average deviation and standard deviation), least-square analysis.

UNIT-III
Photoelectron Spectroscopy: Basic principle, photoionization process, ionization energies, Koopman's theorem, ESCA, photoelectron spectra of simple molecules, (N_2, O_2) Photoelectron spectra for the isoelectronic sequence Ne, HF, H_2O, NH_3 and CH_4 , chemical information from ESCA, Auger electron spectroscopy – basic idea.

UNIT-IV
Lanthanides and Actinides:- Spectral and magnetic properties, comparison of Inner transition and transition metals, Transuranium elements (formation and colour of ions in aqueous solution),uses of lanthanide compounds as shift reagents, periodicity of translawrencium elements.

UNIT-V
Nuclear Chemistry: Nuclear binding energy and stability, nuclear models (nuclear shell model and collective model). Nuclear reactions: types of reactions, nuclear cross-sections, Q-value. Natural and artificial radioactivity, radioactive decay and equilibrium, Nuclear fission, fission product and fission yields, Nuclear fusion.
Radioactive techniques: Tracer technique, (neutron activation analysis), Counting techniques such as G.M. Ionization and proportional counters.

Books Recommended:
1. Advanced Inorganic Chemistry – Cotton and Wilkinson
2. Fundamentals of Analytical Chemistry – Skoog and West
3. Quantitative Inorganic Analysis – Vogel
4. Chemistry of the Elements – Greenwood and Earnshaw
5. Nuclear Chemistry-U.C.Dash
6. Nuclear Chemistry – B.G.Harvey
7. Nuclear Chemistry – Arnikar
8. Techniques in Inorganic Chemistry Vol. II (Nuclear Chemistry-Johnson and Others).
9. Modern Aspects of Inorganic Chemistry-H.J.Emeleus and A.G.Sharpe
10. Inorganic Chemistry, 4th Edition, - J.E.Huheey, E.A.Keiter and R.L.Keiter.
11. Analytical Chemistry-G.D.Christian
12. Chemical Structure and Bonding- Dekock and Gray
13. The Organometallic Chemistry of Transition metals: R.H. Crabtree.14. Electronic absorption spectroscopy and related techniques: D.N. Sathyanarayan

Course Outcomes:
CO 1:Explain the various aspects of and properties of metal-pi complexes of transition metals.
CO 2: Describe basic concept of analytical Chemistry and apply the same to data analysis.
CO 3: Understand and explain the basic principle of photoelectron spectroscopy.
CO 4: Explain the spectral and magnetic properties of lanthanide and Actinide compound.
CO 5: Apply the basic concepts of nuclear chemistry to explain, nuclear reactions and radioactive techniques.

SEMESTER-III
CHEM 302
Organic Chemistry Theory -3

Lectures: 60
Max. Marks: 80

Course Objectives: The main aim of the course is to provide the basic knowledge about the principles and instrumentation of spectroscopic techniques like ultra violet-visible spectroscopy, infrared spectroscopy, nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry along with their application for the structure elucidation of organic compounds. This course will also provide the knowledge about the basic principles of photochemistry and photochemical reactions.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

Unit -I

Ultra Violet and Visible Spectroscopy: Electronic transitions (185-800 nm), Beer- Lambert Law, Effect of solvent on electronic transitions, Ultra Violet bands of carbonyl compounds, unsaturated carbonyl compounds, dienes, conjugated polyenes, Steric effect in biphenyls, Fieser- Woodward rules for conjugated dienes and carbonyl compounds, ultra violet spectra of aromatic and heterocyclic compounds.. Applications of UV- visible spectroscopy in organic chemistry.

Unit -II

Infrared Spectroscopy: Principle, Instrumentation and sample handling, Characteristic vibrational frequencies of common organic compounds, Effect of hydrogen bonding and solvent effect on vibrational frequencies, overtones, combination bands and Fermi resonance. Introduction to Raman spectroscopy. Applications of IR and Raman spectroscopy in organic chemistry.

Unit -III

Nuclear Magnetic Resonance (NMR) Spectroscopy: General introduction, chemical shift, spin-spin interaction, shielding mechanism, chemical shift values and correlation of protons present in different groups in organic compounds. chemical exchange, effect of deuteration, complex spin-spin interaction between two, three, four and five nuclei, virtual coupling. Stereochemistry, hindered rotation, Karplus- relationship of coupling constant with dihedral angle. First and second order spectra, Simplification of complex spectra-nuclear magnetic double resonance, spin tickling, INDOR, contact shift reagents, solvent effects. Fourier transform technique, nuclear Overhauser effect (NOE). Introduction to resonance of other nuclei –^{13}C NMR, 2-D and 3-D NMR, Applications of NMR in organic chemistry.

Unit -IV

Mass Spectrometry: Introduction, ion production—EI, CI, FD and FAB, factors affecting fragmentation, ion analysis, and ion abundance. Mass spectral fragmentation of organic compounds with common functional groups, Molecular ion peak, Meta-stable peak, McLafferty rearrangement. Nitrogen Rule. Examples of mass spectral fragmentation of organic compounds with respect to their structure determination. Introduction to negative ion Mass spectrometry, TOF-MALDI.
Problems based upon IR, UV, NMR and mass spectroscopy.

Unit -V

Photochemistry – I: Introduction and Basic principles of photochemistry. Interaction of electromagnetic radiations with matter, Types of excitations, fate of excited molecules, quantum yield, transfer of excitation energy, actinometry. Photochemistry of alkenes: cis-trans isomerization, dimerization of alkenes, photochemistry of conjugated olefins, photo-oxidation of alkenes and polyenes Photochemistry of Aromatic compounds: Isomerization, addition and substitution, photo-reduction of aromatic hydrocarbons

Photochemistry – II: Photochemistry of Carbonyl compounds: Norrish Type I and II, Intermolecular and Intramolecular hydrogen abstraction, Paterno-Buchi reaction, α and β- cleavage reactions of cyclic and acyclic carbonyl compounds, Formation of oxetane and cyclobutane from α,β unsaturated ketones, Photo-reduction of carbonyl compounds, Photo-rearrangement of enones, dienones, epoxyketones, Photo Fries rearrangement.

Books Recommended:

1. Practical NMR Spectroscopy, M.L. Martin, J.J. Delpeuch and G.J. Martin, Heyden.
2. Spectrometric Identification of Organic Compounds, R.M. Silverstein, G.C.Bassler and T.C.Morrill, John Wiley.
3. Introduction to NMR Spectroscopy, R.J. Abraham, J. Fisher and P. Loftus, Wiley.
4. Application of Spectroscopy of Organic Compounds, J.R. Dyer, Prentice Hall.
5. Spectroscopic Methods in Organic Chemistry, D.H. Williams,I. Fleming, Tata McGraw-Hill.
6. Organic spectroscopy by Jagmohan
7. Organic spectroscopy by W. Kemp.
8. Fundamentals of Photochemistry, K.K.Rohtagi - Mukherji, Wiley-Eastern.
9. Essentials of Molecular Photochemistry, A. Gilbert and J.Baggot, Blackwell Scientific Publication.
10. Molecular Photochemistry, N.J. Turro, W.A. Benjamin.
11. Introductory Photochemistry, A. Cox and T. Camp, McGraw-Hill.
12. Photochemistry, R.P. Kundall and A. Gilbert, Thomson Nelson.
13. Organic Photochemistry, J. Coxon and B. Halton, Cambridge University Press.
14. Organic Photochemistry Vol.I, II, III. Ed. Orville L. Chapman.
15. Organic Photochemistry, Ed. Robert O. Kan.
16. Spectroscopy by Pavia

Course Outcomes:

CO1: Apply the basic concepts of Ultraviolet and Visible Spectroscopy and its applications.
CO2: Understand the basic principle of IR spectroscopy and its applications.
CO3: Understand the basic principle of NMR spectroscopy and to apply its role for the structure elucidation.
CO4:Apply the concept of mass spectrometry for the determination of structure of organic compounds based on fragmentation.
CO5: Understand the basic principles of photochemistry and various photochemical reactions.

SEMESTER-III
CHEM 303
Physical Chemistry Theory -3

Lectures: 60
Max. Marks: 80

COURSE OBJECRTIVES: This course is introduced to impart students with the knowledge of terms and concepts used in statistical thermodynamics, partition functions and theories. This course also imparts knowledge and understanding of basics of quantum chemistry and other photophysical processes.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

Statistical Thermodynamics

UNIT – I

Basic Terminology: probability, phase space, micro and macro states, thermodynamic probability, statistical weight, assembly, ensemble, The most probable distribution: Maxwell-Boltzmann distribution, quantum statistics: The Bose-Einstein statistics and Fermi- Dirac Statistics. Thermodynamic probability (W) for the three types of statistics. Lagrange's undetermined multipliers. Stirling's approximation, Molecular partition function and its importance.
Applications to ideal gases: The molecular partition function and its factorization. Evaluation of translational, rotational and vibrational partition functions, the electronic and nuclear partition functions. for monatomic, diatomic and polyatomic gases.

UNIT – II

Thermodynamic properties of molecules from partition function: Total energy, entropy, Helmholtz free energy, pressure, heat content, heat capacity and Gibb's free energy, equilibrium constant and partition function, Heat capacity of crystals and statistical thermodynamics, Third law of thermodynamics and entropy. Ortho- and para-hydrogen, statistical weights of ortho and para states, symmetry number. Calculation of equilibrium constants of gaseous solutions in terms of partition function, Einstein theory and Debye theory of heat capacities of monatomic solids.

Basic Quantum Chemistry

UNIT – III

Operators in quantum mechanics. Introduction to angular momentum. Eignvalues and eignfunctions. Hermitian operator. Postulates of quantum mechanics. Time dependent and time independent Schrodinger wave equations.

UNIT – IV

Some analytically soluble problems (complete solutions) of particle in a one and three dimensional box, harmonic – oscillator, the rigid rotor, the hydrogen atom and the quantum mechanical tunnelling.

Photochemistry

UNIT – V

Photophysical processes of electronically excited molecules (Jablonski Diagram). Franck-Condon principle. Kinetics of Excimer and exciplex formation. Energy transfer from electronically excited molecules (Stern – Volmer mechanism). E- type and P- type delayed fluorescence.

Suggested Reading:

1. Physical Chemistry: P.W. Atkins
2. Theoretical Chemistry by S. Glasston
3. Statistical Chemistry by I. Prigogine
4. Quantum Chemistry An Introduction: H.L. Strauss
5. Introductory Quantum Chemistry: A.K. Chandra
6. Quantum Chemistry: A. Mcquarrie
7. Quantum Chemistry: I.N. Levine

By the end of the course, students will be able to

CO1: explain various terms and concepts used in statistical thermodynamics
CO2:use of concepts of statistical thermodynamics to derive various expressions and equations
CO3: solve problems by using suitable statistical thermodynamic relations and equations
CO4: understand the basics of quantum chemistry and their use in solving various problems
CO5: know about the various photophysical processes and their kinetics

SEMESTER-III
CHEM 304
Inorganic Chemistry Special Theory -1

Lectures-60
Max. Marks-80

Course Objectives: The objective of this course is to provide advance level of specialized knowledge in inorganic chemistry to student regarding photochemistry, reaction mechanism and polymeric inorganic compounds and electronic spectra of complex ions. The concept of stability of inorganic compounds and their determination by various techniques has also been incorporated which will be helpful in synthesizing new compounds.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be subdivided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I

Inorganic Photochemistry: Basic principles, absorption, excitation, kasha rule, electronically excited state, its life-time and energy dissipation process. Photochemical behavior of transition metal complexes, charge transfer spectraof crystalline and gasous alkali halides. Photochemistry of chromium(III) octahedral complexes, $[Cr(H_2O)_6]^{3+}$ and $[Cr(NH_3)_6]^{3+}$. Photochemistry of cobalt (III) complexes, $[Co(NH_3)_5X]^{2+}$ and $[Co(en)_3]^{3+}$.

UNIT-II

Inorganic Reactions and Mechanism: Substitution reactions in octahedral complexes, acid hydrolysis reactions, base hydrolysis and anation reactions, substitution reaction, reactions occurring without rupture of metal-ligand bond. Substitution reactions of square planar complexes. Theories of trans-effect, labile and inert complexes. Mechanism of redox reactions.

UNIT-III

Polymeric Inorganic Compounds: General chemical aspects (synthesis, properties and structure)of phosphazenes, borazines, silicones, sulphur- nitrogen cyclic compounds and condensedphosphates.

UNIT-IV

Stability of Coordination Compounds – Stability constants, stepwise formation constants, overall formation constants, relationship between stepwise and overall formation constants, factors affecting the stability constants (with special reference to metal and ligand ions), Difference between thermodynamic and kinetic stability. Determination of stability constants by:

(i) Spectrophotometric methods (Job's method, Mole ratio and slope ratiomethod).
(ii) Bjerrum's method
(iii) Polarographic method

UNIT-V

Electronic Spectra – III (Electronic spectra of complex ions): Selection rules (Laporte, orbital and spin selection rules), band intensities, band widths, spectra in solids, spectra of aqueous solutions of d1-d9 ions in Oh and Td environments, Evaluation of 10 Dq, Spectrochemical and Nephelauxetic series, charge- transfer spectra.

Books Recommended:

1. Instability Constants- Yttermiskii
2. Advanced Inorganic Chemistry- Cotton and Wilkinson
3. Inorganic Chemistry- T.Moeller
4. Concise Inorganic Chemistry- J.D.Lee
5. Introduction to Ligand Fields- B.N.Figgis
6. Modern Aspects of Inorganic Chemistry-H.J.Emeleus and A.G.Sharpe
7. Inorganic chemistry: A Unified Approach W.W.Porterfield
8. Inorganic Reaction Mechanism – Edberg
9. Inorganic Reaction Mechanism – BasoloavdPearsor

Course Outcomes:

CO 1: Apply the basic principles of inorganic photochemistry to explain the transition metal complexes.
CO 2: Explain the inorganic reactions and mechanism of transition metal complexes.
CO 3: Explain general aspects and classification of inorganic polymers and their comparison with organic polymers with application.
CO 4: Understand and explain the kinetic and thermodynamic stability coordination compounds.
CO 5: Analyze electronic spectra of transition metal complex ions.

SEMESTER-III
CHEM 305
Organic Chemistry Special Theory -1

Lectures: 60
Max. Marks: 80

Course Objectives: The main objective of this course is to provide basic knowledge of biochemistry to the students regarding some biomolecules including carbohydrate, proteins, vitamins, enzymes and coenzymes. To provide knowledge about the enzyme catalyzed reactions, mechanism of enzyme action and various theories of enzyme catalysis. To get knowledge about coenzymes derived from vitamins and their structure and biological functions. To understand the mechanism of biochemical reaction catalysed by coenzymes.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

Unit-I
Carbohydrates: Types of naturally occurring sugars: Deoxy-sugars, amino sugars, branched chain sugars. General methods of structure and ring size determination with particular reference to maltose, lactose, sucrose, pectin, starch and cellulose, photosynthesis of carbohydrates, metabolism of glucose, Glycoside- (amygdalin).

Unit-II
Amino acid, peptides and proteins: General methods of peptide synthesis, sequence determination. Chemistry of insulin and oxytocin. Purines and nucleic acid. Chemistry of uric acid, adenine, protein synthesis.

Unit-III
Vitamins: A general study, detailed study of chemistry of thiamine (Vitamin B1), Ascorbic acid (Vitamin C), Pantothenic acid, biotin (Vitamin H), α-tocopherol (Vitamin E), Biological importance of vitamins.

Unit-IV
Enzymes: Remarkable properties of enzymes like catalytic power, specificity and regulation, Mechanism of enzyme action: Proximity effects and molecular adaptation, Chemical and biological catalysis, Transition state theory, orientation and steric effects, acid base catalysis, covalent catalysis, strain or distortion. Examples of some typical enzyme mechanisms (chymotrypsin, ribo nuclease, lysozyme and carboxypeptidase A). Fischer's lock and key and Koshland's induced fit hypothesis, Enzyme kinetics, Michaelis-Menten and Lineweaver-Burk plots, reversible and irreversible inhibition.

Unit-V
Coenzyme Chemistry: Cofactors as derived from vitamins, coenzymes, prosthetic groups, and apoenzymes. Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD^+, $NADP^+$, FMN, FAD, Lipoic acid, vitamin B_{12}. Mechanism of reactions catalyzed by the above coenzymes.

Books recommended:

1. Bioinorganic Chemistry: A Chemical Approach to Enzyme Action, Herman Duags and C. Penny, and Springer-Verlag.
2. Understanding Enzymes, Trevor Palmer, Prentice Hall.
3. Enzyme Chemistry; Impact and Applications, Ed. Collin J Suckling, Chapman and Hall.
4. Enzyme Mechanisms Ed, M.I. Page and A. Williams, Royal Society Of Chemistry.
5. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford Univ. Press.
6. Immobilized Enzymes: An Introduction and Applications In Biotechnology, Michael D. Trevan, John Wiley.
7. Enzymatic Reaction Mechanisms. C. Walsh, W. H, Freeman.
8. Enzyme Structure and Mechanism, A. Fersht, W.H. Freeman.
9. Biochemistry the Chemical Reactions of Living Cells, D.E. Metzler, Academic Press.
10. Carbohydrates by N. Sharon.
11. Carbohydrates by Gutherie.
12. Carbohydrates by Pigman and Wolfrom.
13. The Nucleic Acids (Vol I-III) by Chargoff and Davidson.
14. Protein Structures and Functions by A. Light.
15. Chemistry of Natural Products Vol. I by K. Nakanishi.
16. Peptides and Amino Acids by R.H. Thomson.
17. The chemistry of Natural Products by P.S. Kalsi.

Course Outcomes:
CO1: Know about carbohydrates and methods of structure and ring size determination.
CO2: Understanding about general methods of peptide synthesis, sequence determination and protein synthesis.
CO3: Explain the structure of enzymes, properties of enzymes, mechanism and theories of enzyme action.
CO4: Understand the structure, biological function and method of structure determinations of vitamins.
CO5: Understand the mechanistic implications of the reactions catalysed by the coenzymes.

SEMESTER-III
CHEM 306
Physical Chemistry Special Theory -1

Lectures: 60
Max. Marks: 80

COURSE OBJECRTIVES: This course is introduced to impart students with the knowledge of various mechanisms of adsorption at solid – gas interface and solid – liquid interface. This course also imparts knowledge and understanding of solutions and interfacial behaviour of surfactants, theories and laws of electrochemistry and chemistry of nanomaterials.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT –I
Adsorption at solid – gas interface: Concept of ideal and non – ideal adsorption. Heat of adsorption. Types of adsorption isotherms. Single – layer adsorption – Langmuir adsorption isotherm and its derivation. Multilayer adsorption – B.E.T. theory and its kinetic derivation. Application of BET theory in its determination of surface area of the solid. Catalytic activities at surfaces: adsorption and catalysis.

UNIT –II
Adsorption at solid – liquid interface: Gibbs adsorption equation. Isotherms of concentration and temperature change for the adsorption in solutions. Chromatographic adsorption: column chromatography and its theory. Theory of chromatography involving one solute and several solutes.

UNIT –III
Solution and Interfacial Behaviour of Surfactants: Definition and classification of surfactants. Solution properties of surfactants: micelle formation, critical micelle concentration (CMC), dependence of CMC on chain length of the surfactant, micelle shape and size. Thermodynamics of micelle formation, hydrophobic effect (a qualitative view only). Aggregation at high surfactant concentration (a qualitative aspect). to micelles. Surface tension and detergent., Practical application of surfactants.

UNIT –IV
Electrochemistry: Quantitative treatment of Debye - Hückel and Debye-Hückel-Onsagar (D-H-O) theory of conductance of electrolyte solution their limitations and modifications. Pair-wise association of ions (Bjerrum and Fuoss treatment). Determination of association constant (KA) from Debye – Huckel Limiting Law. Extended Debye – Huckel Law. Qualitative treatment of ion – solvent interactions (ion solvation).

UNIT –V
Chemistry of nano – materials: Definition and historical perspective. Effect of nanoscience and nanotechnology in various fields. Synthesis of nanoparticles by chemical routs and their characterization techniques. Properties of nanostructured material: optical, magnetic and chemical properties. An overview of applied chemistry of nanometerials.

Books Recommended:

1. Physical Chemistry of Surfaces: A.W. Admson
2. Adsorption from Solutions: J.J. Kipling
3. Micelles (Theoretical and Applied Aspects): Y. Moroi
4. Foundation of Colloid Science Vol. I and II: R.J. Hunter
5. Physical Chemistry: P.W. Atkins
6. Frontiers in Applied Chemistry: A.K. Biswas

Course Outcomes:
CO1: explain various adsorption processes at solid – gas interface and solid-liquid interfaces
CO2: use of various phenomenon to derive various expressions and equations involving adsorption
CO3: solve problems by using suitable expressions and equations involving adsorption
CO4: understand the solution properties and interfacial behaviour of surfactants and their practical applications
CO5: know about the various theories and laws of electrochemistry
CO6: apply applications of nano chemistry in fabricating some useful nanomaterials.

SEMESTER III
CHEM 307
Inorganic Chemistry Practical -3

Time - 6 hr/week
Max. Marks –50

Course Objectives: This practical Course is introduced to impart students with practical knowledge of the various methods of synthesis of inorganic compounds and their subsequent characterization by elemental analysis, molar conductance and thermal analysis and spectral techniques.This training is very important for any synthetic chemists involved in the synthesis of new compounds for varied applications and thus will help to develop their experimental skills and creativity.

Preparation of following compounds:

1. Tetrapyridine copper (II) persulphate
2. Dinitritotetrapyridine nickel (II)
3. Mercury (tetraisothiocyanato)cobaltate(II).
4. Potassium tris(oxalato)aluminate(III)
5. Sodium hexa(nitro)cobaltate(III)
6. Potassium tris(oxalato)cobaltate(III)
7. Hexa(ammine)cobalt (III)chloride

Characterization of above compounds by the following techniques:

i) Elemental analysis
ii) Molar conductance values
iii) I.R. Spectral interpretation
iv) Thermal analysis
v) UV-Visible Spectra

Books Recommended:

1. A Text Book of Qualitative Inorganic Analysis – A.I. Vogel
2. Synthetic Coordination Chemistry: Principles and Practice- J.A. Davies, C.M. Hockensmith, V.Y.Kukushkin and Y.N. Kukushkin.

Course Outcomes:

CO1: Know about carbohydrates and methods of structure and ring size determination.
CO2: Understanding about general methods of peptide synthesis, sequence determination and protein synthesis.
CO3:Explain the structure of enzymes, properties of enzymes, mechanism and theories of enzyme action.
CO4: Understand the structure, biological function and method of structure determinations of vitamins.
CO5: Understand the mechanistic implications of the reactions catalysed by the coenzymes.

SEMESTER III
CHEM 308
Organic Chemistry Practical -3

Time : 6 hr/week
Max. Marks : 50

Course Objectives: The main objectives of the practical course are to understand the basics of quantitative analysis and application in analysis of functional groups in organic compounds. To understand the concept of stepwise synthesis of a product and their purification. To know the practical applicability of different types of organic reactions.

Quantitative Analysis: Determination of the percentage/ number of hydroxyl groups in an organic compound by acetylation method. Estimation of amines/ phenols using bromate – bromide solution/ acetylation method. Determination of iodine and sponification values of an oil sample. Determination of DO, COD and BOD of water sample.
Multistep Synthesis: Cannizzaro reaction: 4-chlorobenzaldehyde as substrate.
Benzilic Acid Rearrangement: Benzaldehyde → Benzoin →Benzil → Benzilic acid.
Hofmann bromamide Rearrangement: Phthalic anhydride→ Phthalimide→ Anthranilic acid
Beckmann Rearrangement: Benzene→ Benzophenone→ Benzophenone oxime →Benzanilide.
Skraup Synthesis: Preparation of quinoline from aniline.
Synthesis using Phase Transfer Catalysis: Alkylation of diethyl malonate or ethyl acetoacetate and an alkyl halide.
Synthesis of p- nitro aniline and any other reaction as per requirement.
TLC and column chromatography.
All the students must submit the recrystallised product along with yield, melting point and R_f value for all the stages of preparation

Books Recommended:
1. Experiments and Techniques in Organic Chemistry, D.Pasto, C. Johnson and M.Miller,
Prentice Hall.
2. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C.Heath.
3. Systematic Qualitative Organic Analysis, H.Middleton, Adward Arnold.
4. Handbook of Organic Analysis-Qualitative and Quantitative, H.Clark, Adward Arnold.
5. Vogel's Textbook of Practical Organic Chemistry, A.R. Tatchell, John Wiley.

Course Outcomes:
CO 1: Apply the basic concepts of quantitative analysis to analyze the functional groups in organic compounds.
CO 2: Understand the concept of stepwise synthesis of a product and their purification.
CO 3: Perform experimentation and evaluate the results.
CO 4: Develop the ability to compile interpreted information in the form of lab record.
CO 5: Know about how to face viva-voce.

SEMESTER III
CHEM 309
Physical Chemistry Practical -3

Time - 6 hr/week
Max. Marks - 50

COURSE OBJECTIVES: This course is introduced to impart knowledge of various experimental methods and techniques used for the determination of heat of solution and heat of transfer for various electrolytes. This course will also impart knowledge and understanding of various conductometric measurements and including verification of verification of Beer – Lambert's law for various aqueous solutions.

1. **Solubility Measurements:** Heat of solution of electrolytes by solubility measurements.

2. **Heat of transfer Measurements:** Heat of transfer for benzoic acid and I_2 between two immiscible solvents.

3. **Conductometric Measurements:** Determination of cell constant, limiting molar conductance of simple electrolytes in water, verification of Ostwald, dilution law for week acetic acid.

4. **Conductometric Titrations:** Precipitation, and acid base titration., determination of relative strength of acids in the given mixtures of acids, solubility of sparingly soluble salt.

5. **Colorimetric Measurements:** Verification of Beer – Lambert's law for aqueous solutions of $KMnO_4$, $K_2Cr_2O_7$ and $CuSO_4$ and construction of calibration plot to estimate the unknown concentration.

Books Recommended:

1. Senior Practical Physical Chemistry: B.D. Khosla, V.C. Garg and A. Khosla.
2. Advanced Practical Physical Chemistry : J.B.Yadav
3. Experimental Physical Chemistry: V. Athawale and P. Mathur.
4. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan.
5. Practical in Physical Chemistry: P.S. Sindhu

Course Outcomes:

CO1: understand the safe handling of chemicals and safety measures to be followed during the laboratory
CO2: determine heat of solution and heat of transfer for various electrolytes
CO3: determine cell constant and limiting molar conductance of simple electrolytes in water
CO4: compare the relative strength of acids in the given mixtures conductometrically
CO5: determine the solubility of sparingly soluble salt by conductometric titrations.
CO5: verify Beer-Lambert's law for different aqueous solutions

SEMESTER-IV
CHEM 401
Inorganic Chemistry Special Theory -2
(Advanced Organometallics)

Lectures-60
Max. Marks-80

Course Objectives: The objectives of this course is to provide advance knowledge in one of the fast growing fields in inorganic chemistry. The course covers all the aspects of the chemistry of organometallics starting from synthesis and structural considerations to their applications as homogeneous catalysts including mechanism and other applications in biological field. The structural chemistry of carbonyl clusters and metal multiply bonded to carbon are also included.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I
Organometallic Compounds of transition elements: Types of ligands and their classifications in organometallic compounds , 16 and 18 electron rule and its limitations. Hapto-nomenclature, synthesis, structure and bonding aspects of following organometallic compounds with carbon- π donor ligands: (a) Two electron donor (olefin and acetylenic complexes of transition metals): (b) Three electron donor (π-allyl complexes of transition metals): (c) Four electron donor (butadiene and cyclobutadiene complexes of transition metals): (d) Five electron donor cyclopentadienyl complexes of transition metals – metallocenes with special emphasis to ferrocenes): (e) Six electron donor [Benzene (arene) complex]. Fluxional Organometallic compounds (classification)

UNIT-II
Homogeneous Transition metal catalysis: General considerations, Reason for selecting transition metals in catalysis (bonding ability, ligand effects, variability of oxidation state and coordination number), basic concept of catalysis (molecular activation by coordination and addition), proximity interaction (insertion/inter-ligand igration and elimination, rearrangement). Phase transfer catalysis. Homogeneous hydrogenation of unsaturated compounds (alkenes, alkynes, aldehydes and ketones). Asymmetric hydrogenation (Olefins).

UNIT-III
Some important homogeneous catalytic reactions:- Ziegler Natta polymerization of ethylene and propylene, oligomerisation of alkenes by aluminumalkyl, Wackers acetaldehyde synthesis, hydroformylation of unsaturated compounds using cobalt and rhodium complexes, Monsanto acetic acid synthesis, carbonylation of alkenes and alkynes using nickel carbonyl and palladium complexes.

UNIT-IV
Metal-metal bonding in carbonyl and halide clusters:- Polyhedral model of metal clusters, effect of electronic configuration and coordination number, Structures of metal carbonyl clusters of three atoms $M_3(CO)_{12}$ (M=Fe, Ru & Os), Four metal atoms (tetrahedra) $[M_4(CO)_{12}$ {M= Co, Rh &Ir}] and octahedron of type $M_6(CO)_{16}$ [M= Co & Rh], and halide derivatives of Rhenium (III) triangles, metal carbonyls involving bridged-terminal exchange and scrambling of CO group.

UNIT-V
Transition Metal-Carbon multiple bonded compounds:-Metal carbenes and carbines (preparation, reactions, structure and bonding considerations). Biological and industrial applications, and environmental aspects of organometallic compounds.

Books Recommended:

1. Principles of organometallic compounds – Powell
2. Organometallic chemistry (an Introduction) – Perkin and Pollar
3. Advanced Inorganic Chemistry – Cotton and Wilkinson
4. Organometallic Chemistry-R.C.Mehrotra
5. Organometallic compounds of Transition Metal-Crabtree
6. Chemistry of the Elements – Greenwood and Earnshaw
7. Homogeneous transition metal catalysis – Christopher Masters
8. Homogeneous Catalysis – Parshall
9. Principles and Application of HomogeneousCatalysis – Nakamura and Tsutsui
10. Progress in Inorganic Chemistry Vol. 15 – Lipard. (Transition metal clusters – R.B.King)
11. Organotransition metal chemistry by S.G.Davis, Pergamon press 1982.
12. Principles and applications of organotransition metal chemistry by Ccollmen and Hegden

Course Outcomes:
CO1:Classify organometallic compounds and describe the bonding and fluxionality in organometallic compounds of transition elements.
CO2:Understand various aspects of homogeneous transition metal catalysis and apply them to explain hydrogenation of organic compounds. .
CO3:Explain important homogeneous catalytic reactions and their utility in organic synthesis.
CO4:Classify metal clusters and explain metal-metal bonding in metal clusters.
CO5:Apply different aspects the metal-carbon multiple bonded organometallic compounds and their different applications.

SEMESTER-IV
CHEM 402
Inorganic Chemistry Special Theory -3
(Modern Techniques of Chemical Analysis)

Lectures-60
Max. Marks-80

Course Objectives: The key objective to frame this course is to acquire a foundational understanding of various analytical techniques employed in quantitation of chemical compounds. As part of this course, students will be introduced to optical, electro analytical, chromatographic and thermal techniques of analysis with detailed description of instrumentation, principle and applications in various fields.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be subdivided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I

Spectrophotometry: i) Introduction, fundamental laws of photometry, the electromagnetic spectrum and spectrochemical methods, UV/Visible instrumentation, absorption spectra, Beer-Lambert's Law, deviation from Beer-Lambert's Beer's Law. ii) *Photometric Titrations:*-Simultaneous spectrophotometric determination, differential spectrophotometry, titration curves and applications to quantitative analysis. iii) *Molecular Fluorescence Spectroscopy:*- Theory, relaxation processes, relationship between excitation spectra and florescence spectra, florescencent species, effect of concentration on florescence intensity, instrumentation and
application of florescence methods.

UNIT-II

Atomic Spectroscopy: Theory of flame photometer, intensities of spectral lines, selection of optimal working conditions, applications of flame photometry to quantitative analysis. The Theory of Atomic Absorption Spectroscopy (AAS), Origin of atomic spectra, line width effects in atomic absorption, instrumentation and its application, Atomic emission spectroscopy (AES) and the detailed description of the techniques of inductively coupled plasma AES (ICP-AES) and its instrumentation. Chemical and spectral interferences encountered in both techniques and how to overcome them.

UNIT-III

Chromatographic methods: Introduction, terminology and basic principleclassification of chromatographic methods. Chromatographic behavior of solutes. Column efficiency and resolution. Instrumentation, columns, solvent systems and detection methods and applications and comparison ofGas chromatography (GC) and High-Performance Liquid Chromatography (HPLC).

UNIT-IV

Polarographic Methods: General introduction: Theoretical measurements of classical polarography, polarographic measurements, polarograms, interpretation of polarographic waves, equation for polarographic waves, half-wave potential, effect of complex formation on polarographic waves, dropping mercury electrode (advantages and limitations), current variation with a dropping electrode, polarographic diffusion current, the ilkovic equation, effect of capillary characterization on diffusion current, diffusion coefficient temperature, kinetic and catalytic current, polarograms for mixtures of reactants, anodic waves and mixed anodic and cathodic waves, current maxima and its suppression, residual current, supporting electrolytes, oxygen waves, instrumentation and applications to inorganic and organic analysis.

UNIT-V

Thermoanalytical methods: (a) Thermogravimatric analysis: Introduction, Factors affecting thermogravimetric curves, Instrumentation, Applications to inorganic compounds (analysis of Ca and Mg in binary mixture, calcium oxalate, determination of Ca, Sr & Ba in the mixture, drying of sodium carbonate) and analysis of clays and soils, and determination of titanium content of non-stoichiometric sample of titanium carbide).
(b) ***Differential thermal analysis:*** Introduction, Factors affecting DTA curves, Instrumentation, Applications to inorganic compounds : Mixtures of lanthanum-cerium and praseodymium oxalate, $CuSO4.5H2O$, detection of organic contamination in ammonium nitrate, different magnesium carbonate samples and determination of uncalcined gypsum in plaster of paris.

Books Recommended:

1. Instrumental methods of analysis.-H.H.Willard, LL.Marritt and J.A.Dean
2. Fundamentals of Analytical Chemistry – Skoog , West, Holler and Crouch.
3. Instrumental Methods of Chemcial Analysis-G.K.Ewring
4. Modern Polarographic Methods in Analytical Chemistry -A.M.Bond
5. Thermal Methods of Analysis-W.W. Wendlandt.

Course Outcomes:

CO 1:Understand the fundamental laws of absorption, photometric titrations, molecular fluorescence spectroscopy and their applications in quantitative analysis.
CO 2:Describe the different types absorption and emission spectroscopy and removal of interferences.
CO 3: Understand and explain the separation techniques with reference to chromatography and their applications.
CO 4: Explain general aspects of polarography and its applications to inorganic and organic quantitative analysis.
CO 5:Describe thermoanalytical techniques and their applications to the analysis of Inorganic compounds.

SEMESTER-IV
CHEM 403
Inorganic Chemistry Special Theory -4
(Inorganic Spectroscopy)

Lectures-60
Max. Marks-80

Course Objectives: Spectroscopy is one of the versatile field in chemistry and other science streams.This course is designed to provide application of spectroscopy in inorganic chemistry for characterization purposes very valuable tool in synthetic inorganic chemistry. The most commonly used techniques like IR, NMR,ESR,Mossbaur and NQR have thus been included with a view the students can use them in their research and scientific jobs.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I
Infrared Spectroscopy: Theory of IR absorption, Types of vibrations, Observed number of modes of vibrations, Intensity of absorption bands, Theoretical group frequencies, Factors affecting group frequencies and band shapes (Physical state, Vibrational Coupling, Electrical effects, Resonance, Inductive effects, Ring strain) Vibrational-rotational fine-structure. Experimental method.
Applications of IR to the following: (i) Distinction between (a) Ionic and coordinate anions such as NO^{3-}, SO_4^{2-} and SCN^- (b) Lattice and coordinated water. (ii) Modes of bonding of ligands such as urea and dimethylsulphoxide.

UNIT-II
Nuclear Magnetic Resonance Spectroscopy: Introduction, Chemical shift, Mechanism of electron shielding and factors contributing to the magnitude of chemical shift, Nuclear overhausser effect, Double resonance, Chemical exchange, Lanthanide shift reagents and NMR spectra of paramagnetic complexes. Experimental techniques (CW and FT).
Stereochemical non-rigidity and fluxionality: Introduction, use of NMR in its detection in PF_5, $Ti(acac)_2Cl_2$, $Ti(acac)_2Br_2$, $Ta_2(OMe)_{10}$.

UNIT-III
Nuclear Quadrupole Resonance Spectroscopy: Basic concepts of NQR (Nuclear electric quadrupole moment, Electric field gradient, Energy levels and NQR frequencies), Effect of magnetic field on spectra, Factors affecting the resonance signal (Line shape, position of resonance signal) Relationship between electric field gradient and molecular structure. Structural information of the following: PCl5, TeCl4, Na^+GaCl4^-, BrCN, and Hexahalometallates

UNIT-IV
Mössbauer Spectroscopy: Introduction**,** Principle, Conditions for Mössbauer Spectroscopy, Parameters from Mössbauer Spectra- Isomer shift, Electric Quadrupole Interactions, Magnetic Interactions, MB instrumentation, Applications of MB spectroscopy in structural determination of the following:

i) High spin Fe (II) and Fe (III) halides- FeF2, FeCl2.2H2O, FeF3, FeCl3.6H2O.
ii) Low spin Fe(II) and Fe(III) Complexes- Ferrocyanides, Ferricyanides, Prussian Blue.
iii) Iron carbonyls. Fe(CO)5, Fe2(CO)9 and Fe3 (CO)12
iv) Inorganic Sn(II) and Sn(IV) halides.

UNIT-V
Electron Spin Resonance Spectroscopy:-. Introduction, Similarities between ESR and NMR, Behaviour of a free electron in an external Magnetic Field, Basic Principle of an Electron Spin Resonance Spectrometer, Presentation of the spectrum, Hyperfine coupling in Isotropic Systems (methyl, benzene and Naphthalene radicals). Factors affecting the magnitude of g-values. Zero field splitting and Kramer's Degeneracy, Line width in solid state ESR, Double resonance technique in e.s.r. (ENDOR) Experimental method. Applications of ESR to the following:
1. Bis-Salicylaldiimine – Copper (II)
2. $CuSiF_6.6H_2O$ & $(NH_3)_5Co\text{-}O.Co(NH_3)_5$

Books Recommended:
1. Physical methods in Inorganic Chemistry - R.S.Drago.
2. Modern Optical methods of Analysis - Eugens D.Olsen
3. Infrared spectra of Inorganic and coordination compounds - Kazuo Nakamoto
4. Introduction to Chemistry –Donald L.Pavia and G.M.Lampman.
5. Fundamentals of Molecular Spectroscopy-C.N.Banwel
6. Spectroscopy in Inorganic Chemistry - Rao & Ferraro Vol I & II
7. Advances in Inorganic and Radiation Chemistry Vol 6 & 8.
8. Quarterly reviews Vol 11 (1957)
9. Progress in Inorganic Chemistry Vol 8
10. Organic Spectroscopy-W. Kemp

Course Outcome
CO 1: Explain the principle IR spectroscopy and its use in characterization of inorganic compounds
CO 2:Explain the basic aspects of NMR spectroscopy and its application for detection of inorganic compounds.
CO 3: Discuss basic concepts of NQR spectroscopy and its application in inorganic chemistry.
CO 4: Apply basic concepts of Mossbauer spectroscopy and its application in inorganic chemistry.
CO 5: Explain the basic principle of ESR spectroscopy and its significance in transition metal complexes.

SEMESTER-IV
CHEM 404
Inorganic Chemistry Special Theory -5
(Bio-Inorganic Chemistry)

Lectures-60
Max. Marks-80

Course Objectives: The goal of this course is to teach the fundamentals of bio inorganic chemistry at master level. A variety of topics will be covered that are important in biological system and is the fast growing interdisciplinary science. The course aims to impart knowledge of the concepts related to transport and storage of metals, oxygen carriers, enzymes, nitrogen fixation. The current trends of the use of inorganic compounds as biologically active compounds.are gaining importance and hence this course will help students to peruse their research programme.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT-I
(a) **Metalloporphyrins:** Porphyrins and their salient features, characteristic absorption spectrum of porphyrins, chlorophyll (structure and its role in photosynthesis). Transport of Iron in microorganisms (siderophores), types of siderophores (catecholate and Hydroxamato siderophores).
(b) **Metalloenzymes**: Definitions: Apoenzyme, Coenzyme, Metalloenzyme, structure and functions of Carboxy peptidases and Carbonic anhydrase.

UNIT-II
Oxygen Carriers: a) ***Natural oxygen carriers:*** Structure of hemoglobin and myoglobin, Bohr effect, Models for cooperative interaction in hemoglobin, oxygen Transport in human body (-perutzmachanism), Cyanide poisoning and its remedy. Non-heme protiens (Hemerythrin & Hemocyanin).
b) ***Synthetic oxygen carriers:*** Oxygen molecule and its reduction products, model compounds for oxygen carrier (Vaska's Iridium cjomplex, cobalt complexes with dimethyl glyoxime and Schiff base ligands).

UNIT-III
Transport and storage of metals: The transport mechanism, transport of alkali and alkaline earth metals, ionophores, transport by neutral macrocycles and anionic carriers, sodium/potassium pump, transport and storage of Iron (Transferrin & Ferritin).

UNIT-IV
Inorganic compounds as therapeutic Agents :- Introduction chelation therapy, synthetic metal chelates as antimicrobial agents, antiarthritis drugs, antitumor, anticancer drugs (Platinum complexes), Lithium and mental health.

UNIT-V
Nitrogen fixation :A. Nitrogen molecule (MO picture) and its transition metal complexes, reactivity of coordinated dinitrogen, *in-vivo* and *in-vitro* nitrogen fixation, symbiotic and asymbiotic nitrogen fixation.
B. Nitrogen metabolism : Introduction, elementary idea about nitrogen nutrition in various forms (nitrate and ammonia nitrogen).

Books Recommended:
1. The Inorganic Chemistry of Biological processes - M.N.Hughes.
2. Bio Inorganic Chemistry - Robert Hay
3. Advanced Inorganic Chemistry (4th Edn) - Cotton and Wilkinson.
4. Topics in current chemistry (Inorganic Biochemistry) vol. 64 (1976) – Davison and Coworkers.
5. General Biochemistry - Fruton J.S. and Simmonds S.
6. Plant Physiology - Robert N.Devlin.
7. Inorganic chemistry – James E. Huheey.

Course outcomes:
CO 1:Discuss basic concepts of bioinorganic chemistry and the role of metalloporphyrin, metalloenzymes in biological systems.
CO 2:Discuss natural and synthetic oxygen carriers.
CO 3:Explain the electron transfer processes in living organisms with reference to transport and storage of iron.
CO 4: Explain the therapeutic importance of and chelation therapy of synthetic metal chelates.
CO 5:Explain the importance of nitrogen containing compounds in nutrition and plants.

SEMESTER-IV
CHEM 405
Organic Chemistry Special Theory -2
(Organic Synthesis)

Lectures: 60
Max. Marks: 80

Course Objectives: The basic objective of this course is to understand mechanistic details of different types of oxidation, reduction and rearrangement reactions. As part of this course, students will know about some common reagents used in organic synthesis and their applications. To get knowledge about various terms used in disconnection approach and to apply the concepts of disconnection approach for the synthesis of different target molecules in organic chemistry.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

Unit- I
Organic Reagents: Reagents in organic synthesis: Willkinson catalyst, Lithium dialkyl cuprates (Gilman's reagents), Lithium diisopropylamide (LDA), 1,3-Dithiane (Umpolung) Dicyclohexylcarbobiimide (DCC), and Trimethylsilyliodide, DDQ, SeO_2, Baker yeast, Tri-n-butyltinhydride, Nickel tetracarbonyl, Trimethylchlorosilane. Grubbs Catalysts.

Unit- II
Oxidations: Introduction, Different oxidative process. Aromatiztion of six membered ring, dehydrogenation yielding C-C double bond, Oxidation of alcohols, Oxidation involving C-C double bond, Oxidative cleavage of ketones, aldehydes and alcohols, double bonds and aromatic rings, Ozonolysis, Oxidative decarboxylation, Bisdecarboxylation, Oxidation of methylene to carbonyl, Oxidation of olefines to aldehydes and ketones

Unit- III
Reductions: Introduction, Different reductive processes. Reduction of carbonyl to methylene in aldehydes and ketones, Reduction of nitro compounds and oximes, Reductive coupling, Bimolecular reduction of aldehydes or ketones to alkenes, metal hydride reduction, Acyloin ester condensation, Cannizzaro reaction, Tishchenko reaction, Willgerodt reaction .

Unit- IV
Rearrangements: General mechanistic considerations-nature of migration, migratory aptitude, memory effects. A detailed study of the following rearrangements: Benzil-Benzilic acid, Favorskii, Arndt-Eistert synthesis, Neber, Backmann, Hofmann, Curtius, Schmidt, Benzidine, Baeyer-Villiger, Shapiro reaction, Witting rearrangement and Stevens rearrangement.

Unit- V
Disconnection Approach: An introduction to synthons and synthetic equivalents, disconnection approach, functional group inter-conversions, the importance of the order of events in organic synthesis, one group C-X and two group C-X disconnections, chemoselectivity, reversal of polarity cyclisation reactions, amine synthesis. Protecting Groups: Principle of protection of alcohol, amine, carbonyl and carboxyl groups. Alkene synthesis, use of acetylenes in organic synthesis.

Books Recommended:
1. Designing Organic Synthesis, S. Warren, Wiley.
2. Organic Synthesis- Concept, Methods and Starting Materials, J. Fuhrhop and G. Penzillin, Verlage VCH.
3. Some Modern Methods of Organic Synthesis, W. Carruthers, Cambridge Univ. Press.
4. Modern Synthetic Reactions, H.O. House, W. A. Benjamin.
5. Advanced Organic Chemistry-Reactions Mechanisms and Structure, J. March, Wiley.
6. Principles of Organic Synthesis, R. Norman and J.M. Coxon, Blakie Academic and Professional.
7. Advanced Organic Chemistry Part-B, F.A. Carey and R. J. Sundburg, Plenum Press.
8. Organomettalic Chemistry-A Unified Approach, R.C. Mehrotra, A. Singh.

Course Outcomes:
CO1: Explain the mechanistic implications of some common reagents used in organic synthesis and their applications.
CO2: Understand the concept of oxidation reactions and their applications.
CO3: Understand the concept of reduction reactions and their applications.
CO4: Mechanistic implications of rearrangement reactions and their applications
CO5: Apply the concepts of disconnection approach for the synthesis of organic molecules.

SEMESTER-IV
CHEM 406
Organic Chemistry Special Theory -3
(Natural Products)

Lectures: 60
Max. Marks: 80

Course Objectives: To understand general aspects of isolation and structure elucidation of natural products including terpenoids, carotenoids and xanthophylls, alkaloids, steroids and plant Pigments. To provide the knowledge about the synthesis and biosynthesis of these natural products.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

Unit- I
Terpenoids: Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule. Structure determination, biosynthesis and synthesis of the following representative molecules: Monoterpenoids: Citral, geraniol (acyclic), α-terpeneol, menthol (monocyclic). Sesquiterpenoids: Farnesol (acyclic), zingiberene (monocyclic), santonin (bicyclic), Diterpenoids: Phytol and abietic acid.

Unit- II
Carotenoids and Xanthophylls: General methods of structure determination of Carotenes: β-carotene, α- carotene, γ-carotene, lycopene and vitamin A. Xanthophylls: Capsorubin, Fucoxanthin. Carotenoid acids (Apocarotenoids): Bixin and Crocetin. Bio synthesis of carotenoids

Unit- III
Alkaloids: Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on nitrogen heterocyclic ring, role of alkaloids in plants. Structure, synthesis and biosynthesis of the following: Ephedrine, Coniine, Nicotine, Atropine, Quinine and Morphine.

Unit- IV
Steroids: Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry. Isolation, structure determination and synthesis of Cholesterol, Androsterone, Testosterone, Estrone, Progestrone. Biosynthesis of steroids

Unit- V
Plant Pigments: Occurrence, nomenclature and general methods of structure determination. Isolation and synthesis of Anthocyanins (Cyanin and pelargonidin), polyphenols: Flavones (chrysin), Flavonols (quercitin) and isoflavones (daidzein) coumarin, Quinones (lapachol), Hirsutidin. Biosynthesis of flavonoids: Acetate pathway and Shikimic acid pathway.

Books Recommended:
1. Natural Products- Chemistry and Biological Significance, J. Mann, R.S. Davidson, J. B. Hobbs, D.V. Banthrope and J. B. Harborne, Longman, Essex.
2. Organic Chemistry Vol. II, I.L. Finar, ELBS.
3. Stereo selective synthesis- A Practical Approach, M. Nogradi, VCH.
4. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.
5. Chemistry, Biological and Pharmacological Properties of Medicinal Plants From the Americas, Ed. Kurt Hostettmann, M.P. Gupta and A. Marston, Harwood Academic Publishers.
6. Introduction to Flavonoids, B.A.Bohm, Harwood Academic Publishers.
7. New Trends in Natural Product Chemistry, Atta-ur-Rahman M. I. Choudhary, Harwood Academic Publishers.
8. Insecticides of Natural Origin, Sukh Dev, Harwood Academic Publishers.

Course Outcomes:
CO1: Understand the concept of natural product isolation and structural illucidation terpenoids.
CO2: Apply the general methods of structure elucidation to analyze alkaloids.
CO3: Analyse the structure elucidation methods and biosynthesis of steroids.
CO4: Describe the general methods of structure determination of carotenoids
CO5: Understanding about the general methods of structure determination of some plant pigments.

SEMESTER-IV
CHEM 407
Organic Chemistry Special Theory -4
(Medicinal Chemistry)

Lectures: 60
Max. Marks: 80

Course Objectives: The main objectives of the course is to provide basic as well as advance knowledge of medicinal chemistry. To know about the procedure followed in drug design. To understand the basic concept of lead compound, lead modification, prodrugs and structure-activity relationships. To understand the concepts of drug receptors and various theories of drug activity. To familiarize with pharmacokinetics (ADME) and important pharmacokinetic parameters. To understand pharmacodynamics and significance of drug metabolism in medicinal chemistry. To provide the knowledge about structure-activity relationships (SAR) and mode of action of some antibiotics and anti-infective drugs. To know about the SAR and mode of action of some central nervous system depressant and stimulants drugs, along with some antineoplastic, cardiovascular, antihistaminic, antifertility and diuretics agents.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

Unit- I

Drug Design: Development of new drugs, procedures followed in drug design, concepts of lead compound and lead modification, concepts of prodrugs and soft drugs, structure-activity relationships (SAR), factors affecting bioactivity, resonance, inductive effect, isosterism, bio-isosterism, spatial considerations. Theories of drug activity: occupancy theory, rate theory, induced fit theory. Quantitative structure activity relationship. Concepts of drug receptors. Elementary treatment of drug receptor interactions. Physico-Chemical parameters: lipophilicity, partition coefficient, electronic ionization constants, steric, Free-Wilson analysis, Hansch analysis relationships between Free-Wilson and Hansch analysis. Naming of drugs-Trade names and Generic names

Unit- II

Pharmacokinetics and Pharmacodynamics: Pharmacokinetics: Introduction to drug absorption, distribution, metabolism, elimination using pharmacokinetics. Importance of pharmacokinetic parameters in defining drug distribution and in therapeutics. Importance of pharmacokinetics in drug development process.

Pharmacodynamics : Introduction, elementary treatment of enzyme stimulation, enzyme inhibition, membrane active drugs, drug metabolism, xenobiotics, biotransformation, Significance of drug metabolism in medicinal chemistry.

Unit- III

Antibiotics and Antiinfective Drugs: Antibiotics: Historic development in the structural modifications of Penicillin antibiotics. Structure, SAR and biological action of antibiotics. Examples: penicillin: penicillin-G, penicillin-V, ampicillin, amoxycillin, chloramphenicol, cephalosporin, tetracycline and streptomycin. Sufonanmides: Structure, SAR and mode of action of sulfonamides, sulfonamide inhibition and probable mechanisms of bacterial resistance to sulfonamides. Examples: sulfodiazine sulfofurazole, Acetyl Sulfafurazole, Sulfaguanidine, Dapsone, Introduction and general mode of action of Local antiinfective drugs, Examples: sulphonamides, furazolidone, ciprofloxacin, norfloxacin, chloroquin and primaquin

Unit- IV

Psychoactive Drugs: Introduction, neurotransmitters-receptor interaction, CNS depressants and stimulants. SAR and Mode of action, Central Nervous System Depressant: **General anaesthetics, Sedatives & Hypnotics:** Barbiturates and Benzodiazepines. **Anticonvulsants:** Barbiturates, Oxazolidinediones, Succinimides, Phenacemide and Benzodiazepines. **Psycotropic Drugs:** The neuroleptics (Phenothiazines and butyrophenones), **antidepressants** (Monoamine oxidases inhibitors and Tricyclic antidepressants) and anti-anxiety agents (Benzodiazepines). Central Nervous System Stimulants: Strychnine, Purines, Phenylethylamine, analeptics, Indole ethylamine derivatives.

Unit- V

Therapeutic Agents, SAR and Their mode of Action: Antineoplastic Agents: Cancer chemotherapy, role of alkylating agents and antimetabolites in treatment of cancer. Biological action of mechlorethamine, cyclophosphamide, melphalan, uracil,and 6-mercaptopurine.

Cardiovascular Drugs: Biological action of methyldopa, propranolol, amyl nitrate, verapamil, Atenolol.

Antihistaminic agents: Ethylene diamine derivatives, amino alkyl ether analogues, cyclic basic chain analogues.

Antifertility agents: General antifertility agents. HIV and anti AIDS drugs,

Diuretics: Mercurial diuretic, Non mercurial diuretics (Thiazides, carbonic-anhydrase inhibitors, xanthine derivatives, pyrimidine diuretics and osmotic diureteics)

Books Recommended:

1. An Introduction to Medicinal Chemistry, Graham L. Patrick.
2. Medicinal Chemistry: Principles and Practice Edited by F.D. King.
3. Textbook of Organic Medicinal and Pharmaceutical Chemistry, Edited by Charles O. Wilson, et al.
4. Introduction to Medicinal Chemistry, Alex Gringuage.
5. Principles of Medicinal Chemistry, William O. Foye, Thomas L. Lemice and David A. Williams.
6. Introduction to Drug Design, S.S. Pandeya and J. R. Dimmock, New Age International.
7. Burger's Medicinal Chemistry and Drug Discovery, Vol-1 Ed. M.E. Wolff, John Wiley.
8. Goodman and Gilman's Pharmacological Basis of Therapeutics, Mc Graw-Hill.
9. The Organic Chemistry of Drug Design and Drug Action, R.B. Silverman, Academic Press.
10. Strategies for Organic Drug Synthesis and Design, D. Lednicer, John Wiley.

Course Outcomes:

CO1: Demonstrate understanding of the basic principles of drug design and drug action.
CO2: Apply the knowledge of pharmacokinetics and pharmacodynamics in drug design.
CO3: Understand the SAR and mode of action of antibiotics.
CO4: Know the neurotransmitters SAR and their mode of action.
CO5: Analyze the SAR and mode of action of some antineoplastic, cardiovascular, antihistaminic, antifertility and diuretics agents.

SEMESTER-IV
CHEM 408
Organic Chemistry Special Theory -5
(Polymer Chemistry)

Lectures: 60
Max. Marks: 80

Course Objectives: The main objective of this course is to understand the fundamental concepts of polymerization. To know about various types of polymerization reaction and their mechanisms. To learn the various techniques of polymer synthesis and polymer characterization. To know various applications of biodegradable polymers.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT -I

Chemistry of Polymerization: Macromolecular Concept, Chain polymerization – Radical, Cationic and Anionic polymerization, Step Growth polymerization, Co-ordination polymerization, Kinetics of chain and step growth polymerization. Concept of chain transfer, Concept of copolymerization, Graft and Block copolymers, Copolymer equation, Monomer reactivity ratio, Alfrey-price scheme.

UNIT- II

Polymer synthesis: Bulk, solution, suspension, polycondensation, interfacial condensation and emulsion techniques of polymer synthesis

Polymer Characterization: Average molecular weight concept. Number, weight and viscosity, average molecular weights, Polydispersity and molecular weight distribution, The practical significance of molecular weight. Measurement of molecular weights - End group, viscosity, light scattering, osmotic and ultra centrifugation methods. Analysis and testing of polymers - Chemical analysis, Spectroscopic methods, Thermal Analysis, XRD and SEM.

Unit III

Stereoisomerism in polymers: Types of stereoisomerism in polymers, Monosubstituted ethylenes (Site of steric isomerism, Tacticity), Disubstituted ethylenes (1,1-disubstituted ethylenes, 1,2- disubstituted ethylenes), Stereoregular polymers: Significance of stereo-regularity (isotactic, syndiotactic, and atactic polypropenes), Cis- and trans-1,4-poly-1,3-dienes, Cellulose and amylose.

Morphology and order in crystalline polymers: Configuration of polymer chains. Crystal structures of polymers, Strain-induced morphology, Crystallization and melting, Polymer structures and physical properties - crystalline melting point, Tm, Effect of chain flexibility and other steric factors, entropy and heat of fusion, Glass transition temperature, Tg, Relationship between Tm and Tg, Effect of molecular weight, diluents, chemical structure, chain topology, branching and crosslinking on polymer properties.

UNIT- IV

Polymer Reactions: General introduction to the polymer reactions, Vulcanization, Chemical and radiation crosslinking, Graft co-polymerization, Methods of Graft Copolymerization. Polymer as carriers or supports, polymeric reagents, polymeric substrates, Merrifield resins.

UNIT-V

Commercial and Specialty Polymers: Applications of polyethylene, polyvinyl chloride, polyamides, polyesters, polyurethanes, phenolic and epoxy resins and Silicone polymers. Applications of starch, gelatin, pectin and chitosan in polymer industry. Biodegradable polymers (lactic and glycolic acid). Biomedical applications of polymers.

Books Recommended:

1. Molecular Mechanics, U. Burkert and N.L. Allinger, ACS Monograph 177, 1982.
2. Organic Chemist's Book of Orbitals. L. Salem and W.L. Jorgensen, Academic press.
3. Mechanism and Theory in Organic Chemistry, T.H.Lowry and K.C. Richardson, Harper and Row.
4. Introduction to Theoretical Organic Chemistry and Molecular Modeling, W.B. Smith, VCH,
5. Physical Organic Chemistry, N.S. Isaacs, ELBS/Longman.
6. Supramolecular Chemistry; Concepts and Perspectives, J.M. Lehn, VCH.
7. The Physical Basis of Organic Chemistry, H.Maskill, Oxford Univ. Press.
8. Textbook of Polymer Science, F.W. Billmeyer Jr. Wiley.
9. Polymer Science, V.R. Gowarikar, N.V. Visvanathan and J. Sreedhar, Wiley Eastern.
10. Functional Monomers & Polymers, K. Takemoto, Y. Inaki and R.M. Ottanbrite.
11. Contemporary Polymer Chemistry, H.R. Alcock and F.W. Lambe, Prentice Hall.
12. Physics & Chemistry of Polymers, J.M.G. Cowie, Blakie Academic and Professional.

Course Outcomes:

CO1: Apply the basic concepts of polymerization reactions in polymer synthesis.
CO2: Understand the various techniques of polymer synthesis and characterization.
CO3: Explain the stereoisomerism and its effect on polymer structures and physical properties
CO4: Understand the importance of polymer as carriers, reagents and polymeric substrates in polymer applications.
CO5: Compare the applications of various natural and synthetic polymers.

SEMESTER-IV
CHEM 409
Physical Chemistry Special Theory-2
(Quantum Chemistry)

Lectures:60
Max. Marks:80

COURSE OBJECRTIVES: This course is introduced to impart students with the knowledge of various theories for non – degenerate states, quantum mechanical treatments of molecular systems and Huckel Molecular Orbital Theory of conjugated π - electron Systems.

NOTE: *Ten questions will be set by the examiner selecting TWO from each unit. As far as possible, each question will be sub-divided into two – Three parts. The student shall attempt FIVE questions in total, selecting ONE question from each unit.*

UNIT-I
Time-independent perturbation theory for non-degenerate states. First order correction to the energy and wave-function. Application to particle in one-dimensional box, ground state helium atom (without spin consideration) and harmonic oscillator. First order perturbation for degenerate states. Effect of perturbation on ground and excited state hydrogen atom (Stark effect).

UNIT-II
Variation theory for ground and excited state energy and wave function. Linear and non-linear variation functions. Application of variation method to ground stae helium atom, hydrogen atom, one dimensional harmonic oscillator and particle in one dimensional box. Basic concept of Hellmann-Feynman theorm.

UNIT-III
Many -Electron Atoms: Concept of spin and Pauli exclusion principle. Slater determinants. Hartree Self Consistent –Field Method and Hartree –Fock Self Consistent –Field Method. Electron correlation and configuration interaction. Condon-Slater rules. Concept of Koopman's theorm.

UNIT-IV
Quantum Mechanical Treatments of Molecular Systems: The Born-Oppenheimer Approximation. The linear combination of atomic orbital (LCAO)-approximation. Molecular orbital and Valence –Bond treatments with respect to H_2 and H_2^+. Basic concept of Density Functional Theory

UNIT-V
Huckel Molecular Orbital Theory of conjugated π - electron Systems (conjugated linear and cyclic hydrocarbon systems). Application to ethylene, allyl systems (radical, cation and anion), Butadiene, cyclobutadiene and benzene and their physical representations.

Books Recommended:
1. Quantum Chemistry: An Introduction By H.L. Strauss
2. Quantum Chemistry By D.A. McQuarri
3. Quantum Chemistry By I.N. Levine
4. Molecular Quantum Chemistry By P.W. Atkin
5. Fundamental of Quantum Chemistry By T.E. Peacock
6. Elementary Quantum Chemistry By F.L. Pilar

By the end of the course, students will be able to
CO1: derive expressions for wave function and energy of a particle in one dimensional box
CO2: apply variation method to ground state helium and hydrogen atom
CO3: solve problems by using suitable expressions and equations of quantum chemistry
CO4: understand the quantum mechanical treatment of molecular systems
CO5: know about the various theories and laws of conjugated π - electron Systems
CO6: apply Huckel Molecular Orbital theory to different conjugated systems

SEMESTER-IV
CHEM 410
Physical Chemistry Special Theory-3
(Solid State Chemistry)

Lectures: 60
Max. Marks: 80

COURSE OBJECRTIVES: This course is introduced to impart students with the knowledge of crystal structure, various properties of crystals and bonding in crystals. This course will also impart knowledge and understanding of superconductivity phenomenon and solid-state reactions.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT - I

X-ray Diffraction & Crystal Structure: X-rays Diffraction by crystals. The Laue equations and Bragg's law. Definitions related to crystal structure. Crystallographic direction and crystallographic phases. X-ray diffraction experiments: The powder method and the single crystal method. Reciprocal lattice. Structure factor and its relation to intensity and Electron density.

UNIT - II

Bonding in crystals: Ionic crystals, lattice energy of ionic crystals, metallic crystals. Band theory. Imperfections: Point defects (Schottky and Frankel defects). Thermodynamic derivation of these defects. Theories of Bonding: Free electro theory (a qualitative treatment) Zone theory; allowed energy zones ,Brillioun zones, k – space, Fermi surfaces and density states.

UNIT - III

Properties of crystals: Electrical properties of metals; conductors and non – conductors, conductivity in pure metals. Hall effect. Thermal properties: Theories of specific heat. Electrical properties of semiconductors: Band theory, intrinsic and extrinsic semiconductors. Electrons and holes. Temperature dependence and mobility of charge carriers. Optical properties: Dielectric properties: Piezoelectricity, Ferro electricity, Ionic conductivity and electric breakdown.

UNIT – IV

Superconductivity: occurrence of superconductivity, destruction of superconductivity by magnetic fields (Meissner effect). Thermodynamic effects of superconducting species (entropy, thermal conductivity and energy gap). Theoretical survey (thermodynamics of superconducting transition, London equation, coherence length). BCS theory of superconductivity.

UNIT - V

Solid State Reactions: General principles: experimental procedures, kinetics of solid state reactions, vapour phase transport methods, interaction or ion exchange reaction, electrochemical reduction methods, preparation of thin films, growth of single crystal.

Books Recommended:

1. Introduction to Solids: Azaroff
2. Solid State Chemistry and its applications: West
3. Solid State Chemistry: Charkrabarty
4. Solid State Chemistry: N.B. Hannay
5. Solid State Physics: Kiittal

By the end of the course, students will be able to

CO1: analyse the structure and properties of crystals
CO2: know the bonding pattern and defects in solids
CO3: solve problems by using suitable expressions and equations of crystals structures
CO4: understand various theories of superconductivity
CO5: know about the various solid state reactions
CO6: develop and synthesise thin film and single crystal

SEMESTER-IV
CHEM 411
Physical Chemistry Special Theory-4
(Biophysical Chemistry)

Lectures: 60
Max. Marks: 80

COURSE OBJECRTIVES: This course is introduced to impart students with the knowledge of cell membrane and its structure, crystal structure, statistical mechanics in biopolymers and different mechanism of membrane transport. This course will also impart knowledge and understanding of biomolecular interactions and sequence and structure of protein molecules.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT – I

Cell membrane and its structure: The Cell Membrane, lipids in biological membranes, phospholipids, sphingolipids, glycolipids, cholesterol, gangliosides, lipoproteins, types and arrangements of proteins in membranes. Danielli and Davson model, Fluid Mosaic Model, permeability of cell membrane. Bio-Energetics: Thermodynamic Considerations: standard free energy change in bio-chemical reactions, exergonic, endergonic reactions, High energy molecules, hydrolysis of ATP and its synthesis from ADP.

UNIT – II

Statistical mechanics in biopolymers chain configuration of macromolecules, statistical distribution end – to - end dimensions, Polypeptide and protein structures and protein folding. calculation of average dimensions for various chain structures. Neurobiophysics: neurons, synapse, physics of membrane potential,neurotransmitters: Serotonin, GABA.

UNIT – III

Mechanism of Membrane Transport: Transport through cell membrane, active and passive transport (chemi-osmotic theory) systems, Irreversible thermodynamic treatment of membrane transport, Donnan effect in Osmosis, its dependence on pH difference across the membrane, Bio-mechanics: striated muscles, contractile proteins, mechanical properties of muscles and role of calcium.

UNIT – IV

Biomolecular Interactions: Interactions between biomolecules (proteins), Interaction of biomolecules with small ligands, independent ligand binding sites, the Scatchard plot, forces involved in the stability of proteins, hydrophobic interactions, hydrogen bonding, electrostatic interactions, electron delocalization, van der Waal's forces weak interactions crucial to macromolecular structure and function, blood –the buffering system.

UNIT –V

Protein molecules: Protein sequence and structure (primary structure), secondary structure: Ramachandran plot, (α-helix, β-strand, β-sheet, turns and loops), torsion angles, tertiary structure (ion-ion, ion-dipole and dipole-dipole interactions), quaternary structure, globular and fibrous proteins, structure of heamoglobin and myoglobin and their physiological roles, Protein folding and refolding, Protein misfolding, Chaperones and chemical factors (Intra and intermolecular interactions) leading to folding/refolding/misfolding. Brain diseases associated with it, structure of virus.

Books Recommended:

1. Physical Chemistry of Macromolecules: S.F.Sun
2. The Enzyme Molecules: W. Ferdinand
3. Outlines of Biochemistry: E.E. Conn and P.K. Stumph
4. Biochemistry: Zubay
5. Principles of Biochemistry: A.I. Leninger
6. Physical Biochemistry: D. Friefelder
7. Biophysics: Volkenstein
8. Biophysical Chemistry (Vol. I-III): Schimell and Cantour
9. Biophysics : VasanthaPattabhi, N.Gautam
10. Biophysical Chemistry: Gurtu&Gurtu

By the end of the course, students will be able to

CO1: know about the cell membrane and its structure and thermodynamic considerations
CO2: understand mechanism of membrane Transport phenomenon
CO3: solve problems by using suitable expressions and equations of crystals structures
CO4: explain miomolecular Interactionsbetween biomolecules
CO5: understand sequence and structure of protein and other biomolecules

SEMESTER-IV
CHEM 412
Physical Chemistry Special Theory-5
(Chemistry of Macromolecules)

Lectures: 60
Max. Marks: 80

COURSE OBJECRTIVES: This course is introduced to impart students with the knowledge of macromolecules including their thermodynamics and crystallinity. This course will also impart knowledge and understanding of mechanical properties of polymers, flow behaviour of polymer fluids along with their kinetics.

Note: *Ten questions will be set by the examiner selecting* ***TWO*** *from each unit. As far as possible, every question will be divided into* ***Two – Three Parts****. The students shall attempt* ***FIVE*** *questions selecting* ***ONE*** *from each unit.*

UNIT – I

Introduction to Macromolecules: Introduction, classification and importance of macromolecules, synthetic and natural polymers, polymerization (condensation and addition reactions), molecular forces and chemical bonding in macromolecules and their effects on the physical properties, polymer solutions, criteria for polymer solubility, conformations of dissolved polymer chains, the amorphous, semicrystalline and crystalline states of polymers.

UNIT – II

Thermodynamics of Polymer solutions: Introduction and Criteria for polymer solubility, the Flory – Huggins Theory (changes in enthalpy, entropy, free energy and chemical potentials of mixing), determination of interaction parameter; θ temperature and cloud point, strengths and weaknesses of the Flory – Huggins Theory, concept of free volume theories, Flory-Krigbaum theory for dilute polymer solutions.

UNIT – III

Polymer Crystallization and Molecular weights determination: Introduction, configuration and crystallinity of polymer materials, energetics of phase change: homogeneous and heterogeneous nucleations, polymer bends and crystallization of miscible blends, melting of crystals, polymers with liquid crystal order, histogram of the degree of polymerization, molecular weight determination by Osmometry, light scattering, ultracentrifugation, intrinsic viscosity and gel permeation chromatography.

UNIT – IV

Mechanical Properties of Polymers and flow behaviour of polymer fluids:

Introduction, stress-strain behaviour and influence of molecular weight and temperature, the glassy transition temperature, polymer fracture and fatigue failure. Steady shear viscosity of polymer fluids (qualitative behaviour), theory of shear viscosity, viscometric flow (capillary viscometer) and kinetic theory of rubber elasticity.

Unit-V

Polymerization Kinetics:

Chain growth polymerization: Radical polymerization, kinetic model of radical polymerization and its verification, equilibrium of radical polymerization and temperature effect in radical polymerization. Ionic polymerization (cationic and anionic), kinetics of Ziegler – Natta catalysis in stereoregular polymerization (only qualitative discussion), step – growth polymerization., kinetics using equal reactivity hypothesis and equilibrium step-growth polymerization.

Books Recommended:

1. Text Book of Physical Chemistry: G.M. Barrow
2. Text Book of Polymer Chemistry: Billmeyer
3. Polymer Chemistry: P.J. Flory
4. Physical Chemistry of Polymers: A Tagger
5. Physical Chemistry of Macromolecules: C. Tanford
6. Introduction to Polymer Science: V.R. Gowarikar, N.V. Vishwanathan and J. Sridhar
7. Principles of Polymer Science: P. Bhadur and N.V. Sastry
8. Fundamental of Polymers:Prof. Anil Kumar, R.K.Gupta, McGraw-Hill Publications

By the end of the course, students will be able to

CO1: know about the classification and thermodynamics of themacromolecules
CO2: apply different methods of molecular mass determination of polymers
CO3: explain the mechanical properties and flow behaviour of polymers
CO4: understand the kinetics of polymerisation

SEMESTER IV
CHEM 413
Inorganic Chemistry Special Practical -1

Max. Marks – 100

Course Objectives: This course aims at to provide the students with the opportunity to develop experimental skills by exposing them to work independently with instruments and will be allowed to explore various synthetic protocols in inorganic synthesis followed by preparation of database and also to be able to check the correctness of the results Very important course work aiming at developing analytical and synthetic skills finding use both in research and industry.

Preparation of the following compounds and a study of the important properties *viz*. Molar conductance, magnetic susceptibility, electronic and infrared spectra. 1. Stannic iodide, 2. Bis(acetylacetonato) oxovanadium (IV), 3. Mercuration of phenol, 4. Hexa ammine nickel (II) chloride. 5. Lead tetraacetate, 6. Cis- and trans- $[Co(en)_2Cl_2]Cl$

INSTRUMENTAL ANALYSIS:

A) Conductometric Titrations:

i) Differential behaviour of acetic acid to determine the relative acid strength of various acids.
ii) Strong acid-strong base titration in acetic acid.
iii) Potassium acetate- pyridine titration in acetic acid.

B) Potentiometric Titration:. 1. *Neutralisation reactions*: i) Sodium hydroxide-hydrolchloric acid, ii) Sodium hydroxide-Boric acid, iii) Acetic acid and hydrochloric acid-sodium hydroxide.
2. *Oxidation-Reduction Reactions*: i) Ferrous-dichromate, ii) Ferrous-Ceric, iii) Iodine-Thiosulphate
3. *Precipitation Reactions*: i) Silver nitrate-sodium halides, ii) Chloride-Iodide mixture.

C) **Colorimetric Analysis:**

1) Verification of Beer's law for KMnO4, K2Cr2O7 solutions and determination of the conc. of KMnO4, K2Cr2O7.
2) Colorimetric determination of Iron (II) with o-Phenanthroline method.
3) Determination of traces of manganese (in steel samples) colorometrically by oxidation to permanganic acid with potassium periodate.
4) Spectrophotometric determination of pK value of an indicator (acid dissociation constt. of methyl red)
5) Simultaneous determination of chromium (as $Cr_2O_7^{2-}$) and manganese (as MnO_4^-) in mixture.
6) Simultaneous determination of Fe(II) and Fe(III).
7) Photometric titration (simple illustrations)
8) Determination of stability constant of a complex by spectrophotometric method.

(D) pH metric –titrations

1) Acid base titrations.
2) Mixtures of acids with a base.

E) Polarography/Pulse polarography:

1) Determination of half wave potentials of cadmium, zinc and manganous ions in potassium chloride solution.
2) Investigation of the influence of dissolved oxygen.
3) Differential pulse polarographic determination of copper and zinc.
4) Determination of formation constant of a complex metal ion by polarography/pulse polarography.

(F) Cyclic voltammetry:

1. Determination of E^o and n values of $[Fe(CN)_6]^{3-}$/ $[Fe(CN)_6]^{4-}$ couple.
2. Study of electrode mechanism of cyclic voltammetry.

(G) Flame Photometry: Determination of sodium, potassium and calcium

Books Recommended:

1. A Text Book of Quantitative Inorganic Analysis- A.I. Vogel
2. Chemistry Experiments for Instrumental Methods: D.T. Sawyer, W.R. Heinemanand J.M. Beebe.
3. Inorganic Synthesis- R.A. Rowe and M.M. Jones (1957)5, 113 – 116.

Course Outcomes:

CO 1:Understand various synthetic techniques to prepare inorganic complexes.
CO2: Explain the characterization by inorganic complexes with elemental analysis and spectral techniques.
CO 3:Apply the fundamentals of conductometric, potentiometric and pH metric titrations for analysis of given sample solutions.
CO 4:Apply the fundamentals of spectrophotometric, voltammetic and polarographic techniques for quality control.
CO 5:Learn data handling and analysis and also to develop problem solving ability.

SEMESTER – IV
CHEM 414
Organic Chemistry Special Practical-1

Max. Marks: 100

Course Objectives: The objective of this course is to provide the practical knowledge of the isolation of active component from natural sources and to know the concept of stepwise synthesis. To be acquainted with various combinations of reactions that can be exploited to form a product and to have experience to work under different reaction conditions.

Extraction of Organic Compounds from Natural Sources: Isolation of Caffeine from tea leaves, casein from milk (the students are required to try some typical color reactions of proteins), lactose from milk (purity of sugar should be checked by TLC and PC and R_f value reported). Isolation of diosgenin from Fenugreek seeds (Methi seeds), lycopene from tomatoes and β- carotene from carrots.
Multistep Synthesis: Synthesis of Vacor or vacor type compound, Synthesis of Indigo etc,
Synthesis of polymers, Preparation of polyacrylamide from acrylamide, Preparation of polyacrylic acid from acrylic acid. and Any other reaction as per requirement.
TLC and Paper Chromatography: Separation and identification of the sugars present in the given mixture of glucose, fructose and sucrose by paper chromatography and determination of R_f values.
Spectroscopy: Identification of some organic compounds by the analysis of their spectral data (UV, IR, PMR, CMR and MS)
All the students must submit the recrystallised product along with yield, melting point and Rf value of the compounds for all the stages of preparation.

Books Recommended:

1. Experiments and Techniques in Organic Chemistry, D.Pasto, C. Johnson and M.Miller, Prentice Hall.
2. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C.Heath.
3. Systematic Qualitative Organic Analysis, H.Middleton, Adward Arnold.
4. Handbook of Organic Analysis-Qualitative and Quantitative, H.Clark, Adward Arnold.
5. Vogel's Textbook of Practical Organic Chemistry, A.R. Tatchell, John Wiley.
6. Laboratory Experiments in Organic Chemistry, R. Adams, J. R. Johnson and C. F. Wilcox. The Macmillan Limited, London.

Course Outcomes:
CO1: Apply the knowledge of basis procedure of isolation for the isolation of active component from natural sources.
CO2: Understand the concept of multistep synthesis under different reaction conditions.
CO3: Develop the ability to compile interpreted information in the form of lab record.
CO4: Able to interpret the structure of synthesized organic compound by applying the spectroscopic techniques.
CO5: Know about how to defend viva-voce.

SEMESTER IV
CHEM 415
Physical Chemistry Special Practical - 1

Max. Marks – 100

COURSE OBJECTIVES: This course is introduced to impart knowledge of various experimental methods and techniques used for the determination of viscosity of solutions and Walden's product. This course will also impart knowledge and understanding of various potentiometric titrations, flame photometric measurements, colorimetry and polarimetry measurements.

1. **Viscosity Measurements:** Verification of the Jones – Dole equation for simple electrolytes in water and in aqueous mixtures of organic solvents.
2. **Conductometric Measurements:** Determination of Walden's product in case of simple electrolytes.
3. **Potentiometric Titration:** Titration of HCl with NaOH, determination of dissociation constant of acetic acid and phosphoric acid. Oxidation – reduction titration.
4. **Flamephotometric Measurements:** Estimation of concentration of Ca^{+2}, Na^{+} and K^{+} ions and in the given aqueous solution at ppm level.
5. **Determination of Molar Mass:** (i) Cryoscopic and Rasts's methods.
6. **Colorimetry Measurements:** Determination of composition and free energy of formation of ferric ions – salicylic acid complex using Job's continuous method.
7. **Polarimetry Measurements:** Determination of specific and molecular rotation, percentage of tow optically active substances, kinetics of acid catalysed inversion of cane sugar and comparison of strengths of two acids.

Books Recommended:

1. Senior Practical Physical Chemistry: B.D. Khosla, V.C. Garg and A. Khosla.
2. Advanced Practical Physical Chemistry : J.B.Yadav
3. Experimental Physical Chemistry: V. Athawale and P. Mathur.
4. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan.
5. Practical in Physical Chemistry: P.S. Sindhu.

By the end of the course, students will be able to

CO1: understand the safe handling of chemicals and safety measures to be followed during the laboratory
CO2: verify Jones-Dole equation by using viscosity measurements
CO3: determine Walden's Product using conductance of simple electrolytes in water
CO4: estimate the concentration of Ca^{+2}, Na^{+} and K^{+} ions and in the given aqueous solution by using flame photometric measurements.
CO5: Determine composition and free energy of formation of ferric ions – salicylic acid complex using Job's continuous method
CO6: Determine specific and molecular rotation of optically active substances,
CO7: analyse the kinetics of acid catalysed inversion of cane sugar and comparison of strengths of two acids.

SEMESTER - IV

CHEM 416
(SEMINARS)
FOR ALL THREE SPECIALIZATIONS

Time: ½ hr
Max. Marks: 25x2=50

Every candidate will have to deliver a seminar of 20-30 minutes duration on a topic (not from the syllabus) which will be chosen by him / her in consultation with the teacher of the department. The seminar will be delivered before the students and teachers of the department. A three member committee (one coordinator and two teachers of the department of different specializations) duly approved by the departmental council will be constituted to evaluate the seminar. The following factors will be taken into consideration while evaluating the candidate.

(i) Content
(ii) Expression
(iii) Presentation
(iv) Depth of the subject matter and answers to the questions.

HIMACHAL PRADESH UNIVERSITY, SHIMLA-171005

FACULTY OF PHYSICAL SCIENCES

REVISED SYLLABI

FOR Ph. D. CHEMISTRY COURSE WORK

(SEMESTER SYSTEM)
(SESSION 2019-20 AND ONWARDS)

HIMACHAL PRADESH UNIVERSITY
DEPARTMENT OF CHEMISTRY, SHIMLA-171005
INDIA

Annexure-"C"

A Detailed Scheme and Course Contents of the Syllabi for PhD . Chemistry Spread Over two Semesters (I-II) For Session 2019-20 and Onwards

SEMESTER-I			
Each candidate has to study three papers in first semester. Paper I (Research Methodology) is compulsory paper and two papers (optional Paper-II and III) from the respective specialization i.e. Inorganic Chemistry, or Organic Chemistry or Physical Chemistry. Each paper will be of 100 marks.			
Paper No.	**Title**	**Max. Marks**	
Paper 1	**Research Methodology** **Compulsory for all specialization)**	**100**	
	Inorganic Chemistry		
Paper -II	Inorganic Chemistry (Advanced Inorganic Chemistry)	100	
Paper -III	Inorganic Chemistry (Inorganic and Superamolecular Chemistry)	100	
Organic Chemistry			
Paper -II	Organic Chemistry (Organic Synthesis)	100	
Paper -III	Organic Chemistry (Polymer Chemistry)	100	
Physical Chemistry			
Paper -II	Physical Chemistry (Kinetics of Fast Reactions and Advanced Electrochemistry)	100	
Paper -III	Physical Chemistry (Non-Equilibrium Physical Chemistry and Theoretical and Applied Aspects of Surfactant System)	100	

Semester 1

M.Phil. Chemistry

Paper-I (Research Methodology)

Lectures: 60

Max. Marks: 100

Note: Examiner will set 10 questions, two from each section and the candidates will be required to attempt five questions in all selecting at least one question from each section. All questions will carry equal marks.

Section A

Research Methodology: Types and methods of research, classification of research, pure and applied research, exploring or formulative research, descriptive research, diagnostic research/study, Evaluation of research/study, action research, and experimental research-problem selection. Meaning, Scope, Primary sources of literature survey, Journals, patents etc., secondary sources of literature survey, Books, Reference books, Text books, listing of letters.

Section B

Scientific Writing : Scientific Document; Organization and writing of research paper, short communications, review articles, monographs, technical and survey reports, authored books, and edited books and dissertation. Abstracts and Journals in chemistry, Electronic forms of Journals, major libraries, subscribing Journals related to chemistry in the region and country and Patents and Patents writing.

Section C

Concepts of chemical safety: Chemical safety and ethical handling of chemicals, safe working procedure and protective environment, emergency procedure and first aid, laboratory ventilation, safe storage and use of hazardous chemicals, procedure for working with substances that pose hazards, flammable or explosive hazards, procedures for working with gases at pressures above or below atmosphere, safe storage and disposal of waste chemicals, recovery, recycling and reuse of laboratory chemicals.

Section D

Research ethics: Ethical issues, copy right, royalty, intellectual property rights, citation and acknowledgement. Reproducibility. Safety rules of laboratory acquaintance of experimental set up, importance of safety and security of data. Review of published research in the relevant field, training, field work.

Section E

Computer applications in research: Application and uses of common softwares in chemistry-origin, chemsketch, chemdraw, basic ideas on the use of internet in chemistry education.

Reference Books:

1 William Kemp, Organic Spectroscopy, ELBS London, 1987.

2 RM Silverstein, CG Bassler and TC Morril, Spectroscopic Identification of Organic Compounds, 4th Edition, John Wiley & Sons, New York, 1981.

3 Donald L Pavia, Gary M Lampman and George S Kriz, Introduction to Spectroscopy, 3 rd Edition, Saunders Golden Sunburst Series.

4 CN Banwell and Elaine M McCash, Fundamentals of Molecular Spectroscopy, 4th Edition.

5 Raymond Chang, Basic Principals of Spectroscopy, RE Krieger Publishing Co., Huntington, New York, 1978.

6 Paul D Leedy, Jeanne E Ormrod and Jeanne Ellis Ormrod, Practical Research: Planning and Design, Prentice Hall, 2004.

7 Robert V Smith, Graduate Research: A Guide for Students in the Sciences, University of Washington Press, 1998.

8 Anthony M Graziano and Michael L Rau, Research Methods: A Process of Inquiry, Prentice Hall, 2006.

9 Peter C Jurs, Computer Software Applications in Chemistry, 2nd Ed., John Wiley & Sons, New York, 1996.

10 Practical Skills in Chemistry, J. R. Dean, A. M. Jones, D. Holmes, R. Reed, J. Weyers and A Jones, Pearson Education Ltd. [Prentice Hall] (2002)

11. Research Methodology. Methods and Techniques : C. R. Kothari,

Semester 1

M.Phil. (Inorganic Chemistry)
PAPER – II (Advanced Inorganic Chemistry)

Lectures: 60
Max. Marks: 100

NOTE: Ten questions will be set by the examiner selecting TWO from each unit. As far as possible, every question will be subdivided into two to three parts. The students shall attempt FIVE questions selecting ONE from each unit.

UNIT-I

Catalysis Involving Organometallic compounds: Homogeneous hydrogenation and hydroformylation of unsaturated compounds (Olefins). Hydroformylation, hydrosilylation of unsaturated compounds, hydrocyanation of alkenes; alkenes and alkynes metathesis.

UNIT-II

Co-ordination Addition Polymerisation: Zeigler Natta catalysts, composition, nature and mechanism of stereo specific placement in polymerisation, bimetallic and monometallic mechanism, stereoregulation, Supported metal oxide catalysts, polymerisation mechanism, bound-ion radical mechanism and bound-ion co-ordination mechanism. Metallocene based Zeigler Natta catalysts, catalysts composition, active centre and polymerisation mechanism.

UNIT-III

Synthesis of Coordination compounds:- Theoratical consideration: Labile and Inert Coordination compounds, synthesis of mixed ligand complexes by co-proprtionation, chelate effect, trans effect (Peyrone's rule, Jorgonson's rule and Kurnakov's rule), Cis effect, Geometric isomerization of square planer platinum(II) and Palladium(II) complexes, hard-soft acid-base (HSAB) principle, factors affecting the acid base properties of coordination compounds, ligand effects on redox potentials of coordination compounds.

UNIT-IV

Voltammetric methods of analysis: Principle, excitation signals, mass transfer mechanism, instrumentation, methods of analysis and applications of pulse polarography, cyclic voltammetry and anode stripping voltammetry. Use of cyclic voltammetry for the determination of formal reduction potential and number of electron change for ferri/ferrocyanide couple and to study electrode mechanisms of electron reduction of nitrobenzene and voltammetry with microelectrodes.

UNIT-V

Chemistry of High Temperature Solvents – Introduction, structures, solutions of elements (metals and non-metals) in fused salts, reactions in fused salts (acid- base reactions, oxidation-reduction reactions, metathetic reactions), experimental methods (general discussion).

Books Recommended:

1. Homogeneous transition metal catalysis – Christopher Masters
2. Principles and Application of HomogeneousCatalysis – Nakamura and Tsutsui
3. Advanced Polymer Chemistry- Manas Chanda
4. Synthetic Coordination Chemistry: Principles and Practice- J.A. Davies, C.M. Hockensmith, V.Y.Kukushkin and Y.N. Kukushkin.
5. Fundamentals of Analytical Chemistry- Skoog, West, Holler and Crouch
6. Chemistry experiments for Instrumental methods- Sawer, Heineman and Beebe.
7. Electronic absorption spectroscopy and related techniques: D.N. Sathyanaray.
8. The Organometallic Chemistry of Transition metals: R.H. Crabtree.
9. Principles and applications of organotransition metal chemistry by Ccollmen and Hegden

Semester 1

M.Phil. (Inorganic Chemistry)
PAPER – III (Inorganic and Superamolucular Chemistry)

Lectures: 60
Max. Marks: 100

NOTE: Ten questions will be set by the examiner selecting TWO from each unit. As far as possible, every question will be subdivided into two to three parts. The students shall attempt FIVE questions selecting ONE from each unit.

UNIT-I

a) **Role of Metal-ions in Biological Systems:** Metal-ion-interactions with Nucleosides and Nucleotides, Metal-ion-interactions with DNA, Metal-ion-interactions with RNA.

b) **Electron-Transfer Agents in Biological Systems**: Cytochromes, Iron sulphur proteins, Vitamin B_{12} and B_{12} Coenzymes Xanthane oxidase, Superoxide dismutase.

UNIT-II

a) **Supramolecular Reactions and Catalysis:** Introduction, Catalysis by reactive macrocyclic cation receptor molecule, by reactive macrocyclic anion receptor molecule Supramolecular metallocatalysis.

b) **Supramolecular Assemblies**: Introduction, Supramolecular solid materials, Molecular recognition at surfaces (Endoreceptors vs Exoreceptors), Molecular and Supramolecular Devices, Photonic, electronic and Ionic Devices.

UNIT-III

Reactions at Coordinated Ligands:-Reactions due to metal ion polarization of co-ordinated ligands, Aldol Condensation, Imine formation, hydrolysis and substituent exchange. Template effect and macrocyclic ligands.

UNIT-IV

Electron-Transfer Reactions of Complexes: Electron-transfer theory, Outer-sphere exchange reaction. Bridge mechanism, Two-electron transfers, Non-complementary reactions. Replacement through Redox Mechanism, Photochemical Reactions of Chromium and Ruthenium complexes.

UNIT-V

Reactions of Oxyanions: Factors affecting rates, Oxygen exchange between phosphate and water, Induced Reactions, Chromate-Arsenite Reactions, Urea formation Reactions.

Books Recommended:

1. Elements of Bioinorganic Chemistry- G.N. Mukherjee and Arabinda Das (1993).
2. Inorganic Chemistry - Purcell and Kotz.
3. The Inorganic Chemistry of Biological Process-M.N. Hughes (2^{nd} Edn.)
4. Inorganic Reaction Mechanism- Edward.
5. Inorganic Reaction Mechanism - Bassolo and Pearson.
6. Supramolecular Chemistry concepts and Perspectives- Jean-Marie Lehn(VCH-1995)

Semester 1

M.Phil. (Organic Chemistry)

PAPER – II (Organic Synthesis)

Lectures: 60
Max. Marks: 100

NOTE: Ten questions will be set by the examiner selecting TWO from each unit. As far as possible, every question will be subdivided into two to three parts. The students shall attempt FIVE questions selecting ONE from each unit.

UNIT –I

Spectroscopy: Basic theory, Instrumentation and applications of UV spectroscopy, IR Spectroscopy, NMR Spectroscopy and Mass spectrometry in organic compounds. Problems based on IR, UV, NMR and mass spectral data.

UNIT - II

Reaction –Mechanism: Reaction and mechanism of following organic reactions: Stevens rearrangement, Cope rearrangement , Claisen rearrangement, Metathesis of olefins, Di- π methane rearrangement, Hofmann-Loffler reaction, Sharpless assymatric epoxidation and Stork-enamine reaction.

Reagents in Organic Synthesis: Reagents in organic synthesis: Willkinson catalyst, Triphenylphosphine-alkyl halid reagent, Lithium dialkyl cuprates (Gilman's reagents), Lithium diisopropylamide (LDA), Dicyclohexylcarbobiimide (DCC), and Tri-n-butyltinhydride. Nickel tetracarbonyl, Trimethylchlorosilane.

UNIT–III

New Concepts in Organic Chemistry: Green Chemistry: Principles of green chemistry, green reagents , green catalysts: Bio-catalysts, PTC and Crown ether, ionic liquids as solvent and catalysts. Organic synthesis in solid state: Michael addition and Aldol condensation,

Combinatorial Chemistry: Concepts of Combinatorial chemistry and its use in organic synthesis,

Click Chemistry: Concepts and uses in organic and polymer synthesis.

UNIT- IV

Stereochemistry; Stereoselective and stereospecific reactions: Stereoselective reactions: Hydride reduction of cyclic ketones, catalytic hydrogenation, Stereoselective nucliophilic addition to acyclic carbonyl groups stereospecific reactions :Bromination of alkene, Epoxidation and dihydroxylation of alkenes,Hydroboration oxidation. Analysis and separation of enantiomeric mixture:

Chiral shift reagent and chiral solvating agents, Separation of enantiomers by chromatography. Enzymatic separation and desymmetrization using lipasases, proteases, Acylases and epoxide hydrolases.

UNIT- V

Drug design and development: Pharmacokinetics and Pharmacodynamics: Introduction to drug absorption, distribution, metabolism, elimination using pharmacokinetics. Importance of pharmacokinetics in drug development. Drug design, concepts of lead compound and lead modification, Example: Development of cimetidine-A rational approach to drug design: Anti ulcer therapy, Biological activity of cimetidine ,Structure and activity of cimetidine, Metabolism of cimetidine, cimetidine analogues.

Books Recommended:

1. Practical NMR Spectroscopy, M.L.Martin, J.J. delpeuch and G.J.Martin, Heyden.
2. Spectrophotometric Identification of Organic Compounds, R.M. Silverstein, G.C.Bassler and T.C.Morrill, John Wiley.
3. Introduction to NMR Spectroscopy, R.J. Abraham, J. Fischer and P. Loftus, Wiley.
4. Appliation of Spectroscopy of Organic Compounds, J.R. Dyer, Prentice Hall.
5. Spectroscopic Methods in Organic Chemistry, D.H.Williams, I.Fleming, Tata McGraw-Hill.
6. Organic Spectroscopy by Jagmohan.
7. Organic Spectroscopy by W. Kemp.
8. Stereochemistry of Organic Compounds, D.Nasipuri, New Age International.
9. Stereochemistry of Organic Compounds, P.S.Kalsi, New Age International.
10. Organic Synthesis: Jagmohan Singh and Yadav
11. Organic Synthesis: Feiser and Feiser.
12. An Introduction to Medicinal Chemistry, Graham L. Patrick.
13. Medicinal Chemistry: Principles and Practice Edited by F.D. King.
14. Textbook of Organic Medicinal and Pharmaceutical Chemistry, Edited by Charles O. Wilson, et al.
15. Introduction to Medicinal Chemistry, Alex Gringuage.

Semester 1

M.Phil. (Organic Chemistry)
PAPER – III (POLYMER CHEMISTRY)

Lectures: 60
Max. Marks: 100

NOTE: Ten questions will be set by the examiner selecting TWO from each unit. As far as possible, every question will be subdivided into two to three parts. The students shall attempt FIVE questions selecting ONE from each unit.

UNIT-I

Polymer Synthesis: Kinetic and mechanism of radical, cationic, and anionic addition polymerization, Living polymerization. Significance of chain transfer reactions, Chemistry and kinetics of inhibition and retardation.

Miscellaneous polymerization reactions: Monomers with two different polymerizable groups, Hydrogen transfer polymerization, Polymerization and cyclotrimerization of isocyanates, Monomers with triple bonds, Ring opening polymerization: Scope, polyermerizability, polymerization mechanism and kinetics, examples of cyclic amide and ethers; Monomers containing the same functional groups, Monomers containing different functional groups, Zwitterionic copolymerization.

UNIT –II

Copolymer Synthesis: Principles of polymer reactivity, factors affecting polymer reactivity , Chain transfer copolymerization, Chemistry and methods of graft copolymerization, radical graft copolymerization, ionizing and UV radiation and redox initiation, and other grafting systems.

Block copolymer formation, sequential monomer addition, charge formation reactions, telechelic polymers, Reactions of block copolymers, mechanochemical bond scission, special initiators.

Crosslinking processes, chemical and radiation crosslinking, vulcanization. Halogenations reactions, aromatic substitution and cyclization of aromatic polymers.

UNIT- III

Polymer Characterization: Determination of molecular weight of polymers by colligative properties, viscosity measurement, end group analysis, sedimentation velocity and equilibrium method.

Analysis and Characterization of polymers by chemical analysis, FTIR, NMR,TGA, GPC, DSC, XRD, SEM techniques.

UNIT- IV

Special Polymer Reactions : General introduction to the polymer reactions, Derivatization reactions of biopolymers – cellulose, chitosan, starch and natural gums

Polymer as carriers or supports, polymeric reagents, polymeric substrates, polymeric catalysts, immobilized enzymes.

Polymer stability and degradation: Type of degradation, mechanism, ultrasonic, photo, high energy and oxidative degradation, Fire retardants, UV stabilizers and absorbers. Biodegradation by alkali, acid, ionic liquids and enzymes, hydrolytic reactions of biopolymers and their special technological potential with respect to bio-ethanol .

UNIT-V

Specialty Polymers: Biodegradable polymers (lactic and glycolic acid based). Conducting polymers, applications of conducting polymers. Hydrogels. Biomedical polymers, contact lenses, dentures, implants, artificial – heart, kidney and blood.

Polymers and environment: Environmental aspects of polymers, energy and feedstock utilization, Problems of non-degradability of synthetic polymers, biomass utilization, bioplastics.

Books Recommended

1. Textbook of Polymer Science, F.W. Billmeyer Jr. Wiley.
2. Polymer Science, V.R. Gowarikar, N.V. Visvanathan and J. Sreedhar, Wiley Eastern.
3. Functional Monomers & Polymers, K. Takemoto, Y. Inaki and R.M. Ottanbrite.
4. Contemporary Polymer Chemistry, H.R. Alcock and F.W. Lambe, Prentice Hall.
5. Physics & Chemistry of Polymers, J.M.G. Cowie, Blakie Academic and Professional.
6. Supramolecular Chemistry , Edited by Alberto Ciferri, Taylor and Francis.
7. The chemistry of Nanomaterials Vol.I and Vol II, Edited by C. N. R. Rao, A Muller, A.K. Cheetham, Wiley VCH. 2005.
8. Metal-Polymer Nanocomposites, Edited L. Nicolais and G Carotenuto, Wiley Interscience 2005.
9. Polymer Chemistry and Physics of Modern Materials, J.M.G. Cowie and V. Arrighi,Taylor and Francis Group 2008.
10. Designing Safer Polymers by P.T.Anastas, P.H. Bickart, M.M. Kirchhoff , Wiley Interscience, 2001.

Semester 1

M.Phil. (Physical Chemistry)

PAPER – II (Kinetics of Fast Reactions and Advanced Electrochemistry)

Lectures: 60
Max. Marks: 100

NOTE: Ten questions will be set by the examiner selecting TWO from each unit and every question will be subdivided into two to three parts. The students shall attempt FIVE questions selecting ONE from each unit.

Kinetics of Fast Reactions

UNIT – I

Basic Principles of Chemical Relaxation Techniques: Relaxation time and its significance, determination of rate constants from relaxation data. Evaluation of relaxation time form a relaxation oscillogram. Relaxation time in multi step systems. Chemical relaxation in two and multi step systems. Thermodynamic aspects in relation to chemical relaxation; Gibbs free energy, affinity of a reaction and advancement of a reaction.

UNIT - II

Experimental Techniques for the Study of Relaxation Kinetics (Theory and Applications):

- **Pressure Jump Technique:** Application to mechanistic investigation of relaxation behaviour in Beryllium Sulphate solution and determination of thermodynamic quantities from amplitude data of relaxation oscillogram.
- **Temperature Jump Technique:** Application to mechanism of water addition to carbonyl functional group of organic carbonyl compounds.
- **Electric Field Jump Technique:** Application to neutralization reaction.

Advanced Electrochemistry

UNIT - III

Physical Chemistry of Ionic Solution: Ion – Solvent and Ion – Ion interactions: Ion – quadrupole model of ion – solvent interactions, ion – induced dipole interactions in primary salvation sheath. Heats and entropy changes accompanying hydration. Hydrophobic effect in salvation. Poisson's equation and Debye – Huckel Theory of charge distribution around ions (Linearzation of Boltzmann equation).

UNIT - IV

Physical Chemistry of Ion – Transport in Solution: The driving force for diffusion, Fick's law of steady – state diffusion, and diffusion – coefficient. The Einstein – Smoluchowski equation. Gross view of non – steady – state diffusion (Fick's second law). Diffusion process stimulated by a constant current (or Flux). Einstein relation between absolute ion mobility and diffusion coefficient.

UNIT – V

Surface Electrochemistry: The electrified interface, introduction and basic facts of electrocapillarity, thermodynamics of the electrocapillary effect. Thermodynamic treatment of polarizable interface, determination of charge density on the electrode (Lippmann equation), determination of surface excess (variation of surface tension with solvent composition of electrochemical system). The structure of electrified surfaces. The Helmholtz – Perrin theory, the Gouy – Chapman Diffuse – Charge Model of double layer and Stern Model.

Books Recommended:

1. Modren Electrochemistry Vol. 1 & 2: J.O'M Bockris, A.K.N. Reddy and M.G.- Aldeco
2. Physical Chemistry of Surfaces: A.W. Adamson
3. Electrochemistry: S. Glasstone
4. Chemical Kinetic Method: Principles and Applications: C. Kalidas

Semester 1

M.Phil. (Physical Chemistry)

PAPER – III (Non – equilibrium Physical Chemistry and Theoretical and Applied Aspects of Surfactant System)

Lectures: 60

Max. Marks: 100

NOTE: Ten questions will be set by the examiner selecting TWO from each unit. Each question will be subdivided into two to three parts. The students shall attempt FIVE questions selecting ONE from each unit.

UNIT – I

Linear Non – Equilibrium Thermodynamics (LNT): Applications of Non – Equilibrium Thermodynamics to linear steady state phenomena: membrane transport (osmosis) thermodynamic theory of thermo – osmosis, thermodynamic theory of non – reacting gaseous mixtures, kinetic theory of thermo – osmosis (a brief introduction to some experimental results). Electro - osmosis phenomena: non – equilibrium steady – states. Theories based on models of uncharged and charged membranes (a brief introduction to some experimental results).

UNIT – II

Non Linear Steady States: Non – linear flux equations in respect of electro – kinetic phenomena (expressions as well as some qualitative insight to some experimental results). Non – linear flux equation and non – linear steady state in chemical reactions (i) linear (rate) and non linear flux equation for a single reversible reaction and (ii) linear phenomennlogical relation and non – linear flux equation for coupled reactions.

UNIT – III

Micelle formation, critical micelle concentration, monodisperse micelles of ionic and non – ionic surfactants and thermodynamics of micelle formation (Mass Action Model). Counterion binding to micelles (Evan and Ninham - model). Kinetics of micelle formation. Effect of temperature and pressure on micelle formation (a qualitative treatment). Micelle Temperature Range (MTR) or Kraft phenomenon, physicochemical meaning of MTR and effect of salt on MTR.

UNIT – IV

Micellar Solubilization: Thermodynamics of micellar solubilization, distribution of solubilizate molecules among micelles. Factors affecting solubilization. Solubilization in micellar liquid chromatography (MLC): partition theory, and application of MLC to drug and protein analysis (brief outline only). Electrokinetic chromatography on micellar solubilization (MEKC): theory of separation and applications of MEKC: biological system, environment and drug analysis (brief outline only).

UNIT - V

Micellar Catalysis and Photochemistry of Micellar System: Effect of micelles on chemical reactions, micelle catalyzed reactions, distribution of reactants among micelles: Poisson and Gaussian distributions. Inhibition in micellar solutions. Determination of CMC by fluorescence probe method (Qualitative view) and micellar aggregation number by fluorescence probe method (Static and dynamic methods).

Books Recommended:

1. Introduction to Non – Equilibrium Physical Chemistry: R.P. Rastogi
2. Thermodynamics: R.C. Srivastava, S.K. Saha and A.K. Jain
3. Solubilization in Surfactant Aggregates: Eds S.D. Christian and J.F. Scamehorn (Surfactant Science Series Vol. 55)
4. Polymer – Surfactant System: Ed. J.C.T. Kwak (Surfactant Science Series Vol. 77)
5. Micelles (Theoretical and Applied Aspects): Y. Moroi
6. Non – equilibrium Thermodynamics: C. Kalidas
7. Non – equilibrium Thermodynamics: I. Prigogene

Time Table

Department of Chemistry, H.P. University, Shimla-171005 (NAAC Accredited 'A' Grade University)

M.Sc. -3rd semester and M.Sc. -1st semester classes for the academic session 2022-23 (w.e.f. 30.08.2022)

Day	Sem.	10 – 10:50	10:50-11:40	11:40-12:30	12:30-1:30	1:30 - 02:00	02 - 2:30	2:30-3:20	3:20-4:10	4:10-5:00
Monday	Ist	Inorg/(NS)	Org./(BS)	Phys./ (RT)	Mathematics	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(SCh)		PRACTICAL (ORG.) / (SCh+KK+Rajesh)		
	IIIrd	PRACTICAL (ORG.)/(BS+VS)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(BS)		Inorg.(JS) (G)	Phys.(SC) (G)	Spl. Theory (Inog/Org/Phys) (MT/VS./Inesh)
Tuesday	Ist	Inorg./MK)	Org./(BS)	Phys./(RT)	Mathematics	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(KK)		PRACTICAL (ORG.) / (SCh+KK+Rajesh)		
	IIIrd	PRACTICAL (ORG. /(BS+VS)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(BS)		Inorg.(NS) (G)	Phys.(SC) (G)	Spl. Theory (Inog/Org/Phys) (MK/BS./SK)
Wednesday	Ist	Inorg./(MK)	Org/(SCh)	Phys./(RT)	Mathematics	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(RT)	LUNCH	PRACTICAL (PHYS.)/(RT+Manish)		
	IIIrd	PRACTICAL (PHYS.)/(SK+Inesh)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(SK)		Org.(KK) (G)	Inorg.(MT/MK) (G)	Spl. Theory (Inog/Org/Phys) (NS/Rajesh/SK)
Thursday	Ist	Inorg./(MT)	Org./(SCh)	Phys./(Manish)	Computer	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(RT)		PRACTICAL (PHYS.)/(RT+Kiran)		
	IIIrd	PRACTICAL (PHYS.)/(SK+Palak)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(SK)		Org.(Rajesh) (G)	Inorg(Santosh) (G)	Spl. Theory (Inog/Org/Phys) (JS/KK./SK)
Friday	Ist	Inorg./(Santosh)	Org./(VS)	Phys./(Palak)	Computer	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(JS)		PRACTICAL (INORG.)/(JS+MT+Santosh)		
	IIIrd	PRACTICAL (INORG.)/(NS+MK)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(NS)		Phys(SK) (G)	Org.(SCh) (G)	
Saturday	Ist	Inorg./(JS)	Org./(KK)	Phys./(RT/Kiran)	Computer	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(JS)		PRACTICAL (INORG.)/(JS+MT+Santosh)		
	IIIrd	PRACTICAL (INORG.)/(NS+MK)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(NS)		Phys (SC) (G)	Org.(SCh) (G)	

M.Sc -Ist Semester classes (Morning Session) and IIIrd semester general theory classes (Evening Session) will be held in Room No. 313.
M.Sc-IIIrd **semester Special theory classes** will held as following:
Organic Chemistry : Room No. 309, **Inorganic Chemistry** : Room No. 310 and **Physical Chemistry** : Room No. 313.

Baljit Singh
29.08.2022
Chairperson
Department of Chemistry
H.P.U. Summer Hill Shimla - 5

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Time Table

Department of Chemistry, H.P. University, Shimla-171005

(NAAC Accredited 'A' Grade University)

2nd Revised Time Table for M.Sc 2nd and 4th Semesters A.S. 2022-23 w.e.f 22.02.2023

Day	Sem.	10:00-10:50	10:50-11:40	11:40-12:30	12:30-1:30	1:30 - 02:00	2:00 - 2:30	2:30-3:20	3.20-4:10	4:10-5:00
Mon	II	Inorg(Meena)	Org(KK)	Phy(Renuka)	Environmental Chemistry (MT)	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(SCh)		Org. Practical (SCh+KK+RD)		
	IV	Pract.Org / Inorg / Phy (BS+ VS)/ (NS+Meena) /(RCT+ Manish)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(BS/NS/RCT)		Inorg/Org/Phy JS/BS/ Santosh	Inorg/Org/Phy NS/BS/ Kiran	Inorg/Org/Phy Santosh/VS/SK
Tue	II	Inorg/MT	Org(KK)	Phy(RCT)	Environmental Chemistry (Meena)	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(KK)		Org. Practical (SCh+KK+RD)		
	IV	Pract.Org / Inorg./ Phy (BS + VS) /(NS+Meena)/(SK + Palak)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(BS/NS/RCT)		Inorg/Org/Phy JS/BS/Manish	Inorg/Org/Phy NS/VS/RCT	Inorg(/Org/Phy MT/RD/SK
Wed	II	Inorg(MT)	Org(SCh)	Phy(RCT)	Environmental Chemistry (Santosh)	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(JS)		Phy Pract. (RCT +Praveen)		
	IV	Pract.Org / Inorg/ Phy (BS + VS) / (NS+Meena)/ (SK + Kiran)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(BS/NS/RCT)		Inorg/Org/Phy JS/BS/Manish	Inorg/Org/Phy NS/VS/SK	Inorg/Org/Phy Meena/RD /Palak
Thus	II	Inorg(Meena)	Org(SCh)	Phy (RCT)	Chemistry of Life Science (Vikul)	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(JS)		Phy Pract. (RCT+ Kiran)		
	IV	Pract.Org/ Inorg/ Phy (BS +VS) /(JS+MT) /(SK +Manish)				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(BS/NS/RCT)		Inorg/Org/Phy JS/RD/Santosh	Inorg/Org/SK NS/SCh/SK	Inorg/Org/Phy MT/KK /Palak
Fri	II	Inorg(NS)	Org(VS)	Phy (Akshay)	Chemistry of Life Science (Vikul)	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(SCh)		Inorg Pract. (JS+MT+Santosh)		
	IV	Seminar				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(KK)		Inorg/Org/Phy Santosh/RD/Parveen	Inorg/Org/Phy MT/SCh/Kiran	Inorg/Org/Phy Meena/KK/Parveen
Sat	II	Inorg(JS)	Org(RD)	Phy (RCT)	Chemistry of Life Science (Vikul)	Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(SK)		Inorganic (Pract.) (JS+MT+Santosh)		
	IV	Seminar				Lib./Counseling/Teacher Consultation /Coaching/ Cleanliness Drive/(SK)		Inorg/Org/Phy Santosh/VS/SK		

LUNCH

2nd Semester theory classes will be held in Room No. - 313

4th Semester Classes will be held as :Physical, Room No. - 313

Inorganic, Room No. - 310

Organic, Room No. - 309

Chairperson
Department of Chemistry
H.P. University, Summer Hill Shimla - 5

a/c Chairman

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2.3.1 – STUDENT CENTRIC METHODS

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01.	Experiential Learning	1 - 11

LEADERSHIP DEVELOPMENT CAMP REPORT
ON
FOREIGN CLIMBING EXPEDITIONS IN INDIAN HIMALAYAS

Submitted by – Vedant Sharma

Roll no. – 1309

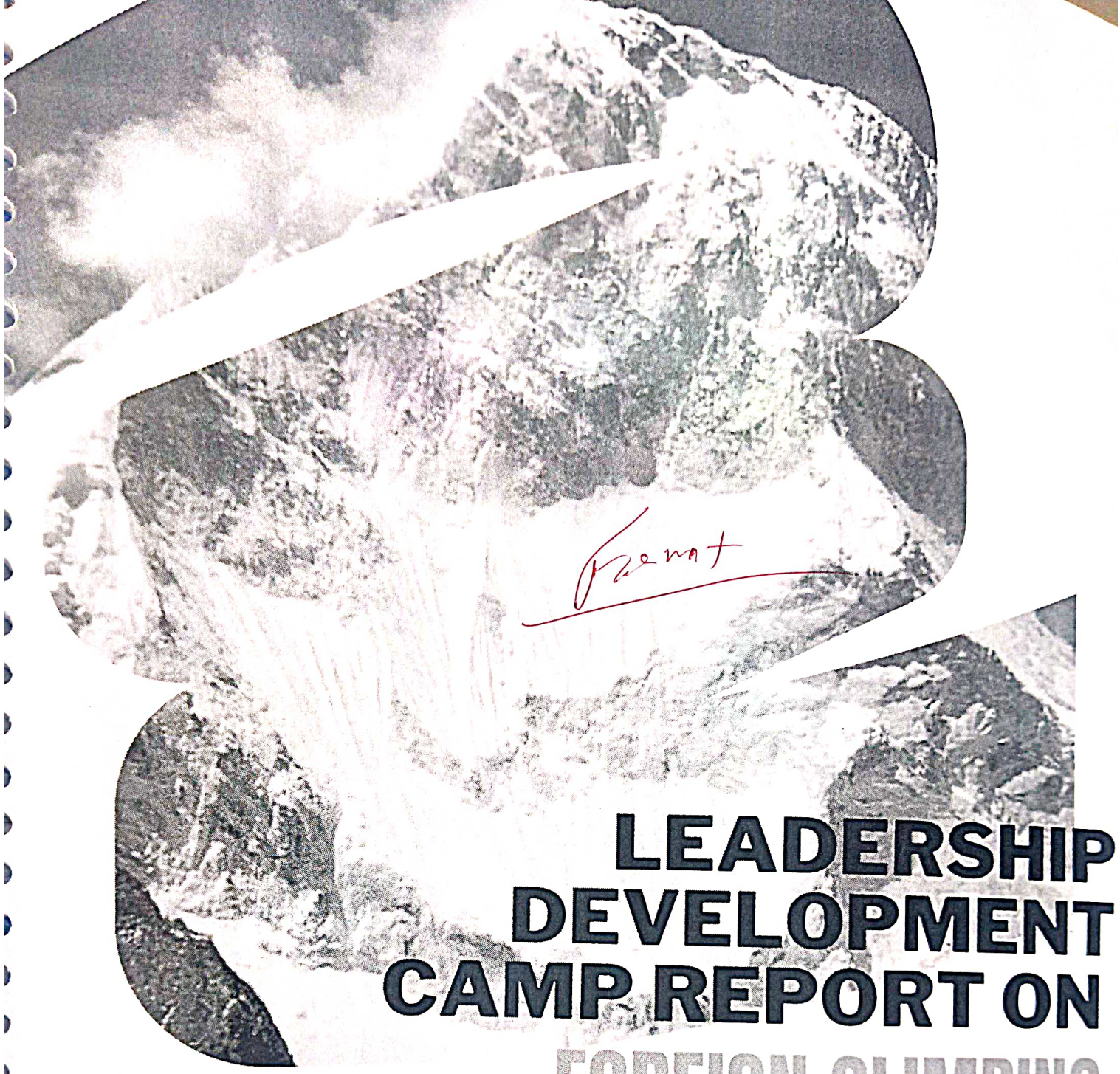
University no. -200741221220046

MTTM 3rd Semester

Submitted To – I.V.S Department
Himachal Pradesh University

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LEADERSHIP DEVELOPMENT CAMP REPORT ON

FOREIGN CLIMBING EXPEPEDITIONS IN INDIAN HIMALAYAS

SUBMITTED BY - LAKSHAY SHANDIL
ROLL NO.-109
UNIVERSITY ROLL NO.-200741220023
FYICTTM 9TH SEMESTER

SUBMITTED TO - I.V.S
DEPARTMENT H.P.U

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PROJECT REPORT ON ROAD MAP FOR DEVELOPING TOURISM IN HIMACHAL PRADESH - MAKING HIMACHAL AS DESTINATION BRAND

INSTITUTE OF VOCATIONAL STUDIES

MASTER'S IN TOURISM AND TRAVEL MANAGEMENT

HIMACHAL PRADESH UNIVERSITY SHIMLA

Submitted to

Dr. Nitin Vyas

Assitant Professor

IVS

Submitted By

Vijay Chauhan

Roll No. 1322

Univ. 200741221220047

MTTM 4th Semester

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JOB TRAINING REPORT ON

HIMACHAL PRADESH TOURISM DEVELOPMENT CORPORATION LIMITED

DEGREE IN MASTER IN TOURISM &TRAVEL MANGEMENT

SUBMITTED TO :

Director I.V.S.

SUBMITTED BY:

Mukul Kapta

Roll No. 180741220024

MTTM 4TH SEM.









Student Centric methods for teaching Foreign Languages

In order to facilitate the learning process the 'Direct Communicative' methodology is used in class. Listening to original accents, sound and words in the French language helps the students to familiarize themselves with the sounds of the language.

In addition to this the 'Intercultural' approach is used. Illustrating and sharing the different cultural aspects is of uttermost importance in learning a language. Discussion of various festivals, foods, lifestyles, social norms, etc aid the students in comprehending the living oft these people and their society.

'Grammar Translation' method is employed for senior students for better understanding of Historical events, happening and various movement of literature.

Teaching Methodology

Certificate Course in German:

Certificate Course in German is the elementary level of acquiring German as a foreign language. It is attempted that the most natural way of getting exposed to German be put in practice. The adoption of the Indirect method of teaching enables the students to get acquainted with the structures of German languages by tracing the correlation at the grammatical level with the own language viz. English.

Emphasis is put also on the practice of translation method so that the learners acquire the ability to transfer the grammatical peculiarities of German into English and that of English into German.

Glossary based exercises are pursued in the class room in order to promote the vocabulary strength of the elementary Teaching Methodology- Diploma in German

Diploma Course in German constitutes an ascendance from Certificate towards higher level of competence in German. Attempt is made to gradually put the direct level of teaching German into practice. The text-books are explained and discussed in the class room with the help of German language as far as possible. Translation method of acquiring the language skills is pursued though at the same time it is endeavored that the learners get exposed to the phrasal and idiomatic expressions in German. Students are step by step oriented towards composing essays on the topics related to culture, history and civilization of Germany as well as writing letters and short communications viz. emails. At this level, learners are motivated to use bilingual dictionary viz. German- English / English- German dictionary. Learners get to read some short literary texts at this level

learners.

Teaching Methodology: Advanced Diploma in German

At this level, the emphasis is put on making students capable of mastering the complex grammatical structures of German. Apart from imparting grammatical knowledge, it is attempted that the students should involve themselves with literature. Detailed study of the history of German Literature is introduced at this level. Special attention is paid to the need of the development oral communication skills in German among the students. Gradually, the learners use monolingual dictionary, viz. German-German dictionary at this level. After completing this level, Students are competent to pursue higher studies in German language and literature.

Teaching Methodology (Russian) - The objective of the course is to introduce learners to the basics of Russian grammar, so that they can read, write, speak and understand Russian in accurate manner. we use so many teaching methods to achieve this goal. we use grammar - translation method to teach them the formation of elementary grammar concepts and spelling skills. they learn how to properly construct sentences as well as improve proper writing skills. With the help of audio-visual method we help students to develop the two most important language skills: speaking and listening. Moreover, role play and group discussion also help them to improve their communication skills.

DEPARTMENT OF BIOTECHNOLOGY, H.P. UNIVERSITY, SHIMLA-5
TIME TABLE-M.Sc. (Biotechnology) III Semester (w.e.f. 08.09.2023)

DAYS/ TIME	10.00-11.00 AM (Lecture I)	11.00-12.00AM (Lecture II)	12.00-1.00 PM (Lecture III)	1.00-2.00 PM	2.00-5.00 PM (Practical)
Monday	Metabolic Engineering [MBT-EL-301] (WA)	Fermentation Technology [MBT-302] (AKB)	Enzyme Technology [MBT-304] (SK)	LUNCH	Environmental Microbiology & Biotechnology (RKB & NK)
Tuesday	-do-	-do-	-do-	LUNCH	Fermentation Technology (AKB & WA)
Wednesday	-do-	-do-	-do-	LUNCH	Enzyme Technology (SK & RG)
Thursday	Environmental Microbiology & Biotechnology [MBT-301] (RKB)	Computer and Bioinformatics [MBT-303] (JSS)	Project Work (All Faculty)	LUNCH	Computer and Bioinformatics (JSS & NS)
Friday	-do-	-do- (JSS/NS)	Project Work (All Faculty)	LUNCH	Computer and Bioinformatics (NS & JSS)
Saturday	-do-	-do- (NS)	General Seminar	LUNCH	Cleanliness activity/ Class Seminars/ Tutorials*

**Soft skill development/ technical writing/ student counseling/ career guidance etc.*

RG: Professor Reena Gupta
SK: Dr. Savitri Kapoor
JSS: Er. J. S. Sodhi
AKB: Professor Arvind K Bhatt
NK: Dr. Neelam Kaushik
NS: Dr. Nikhil Sharma
WA: Professor Wamik Azmi
RKB: Dr. Ravi Kant Bhatia

Chairman
Sept. 08, 2023

Teaching Methodology

Student centered methods are an integral part of the pedagogy adopted by the faculty. The department has made a conscious effort to shift from the traditional teacher–centric approach to a student-centric one. Experimental learning, participative learning, and problem solving methodologies are used for enhancing learning experiences. The teacher's role is that of a facilitator who supports self-development of knowledge, holistic development and skill formation through participatory learning activities

The department always focusses upon students centred methods of instructions. Teaching aids are used by the faculty members so as to make the lectures more understandable. The projectors have been installed in each and every classroom for power point presentations. The emphasis is laid on involvement of students at the end of lecture. Group discussions are carried out with students in regular intervals. The expert lectures are arranged by the department for the welfare of students for which eminent speakers from national as well as international institutions are invited. The demonstration of practicals (dissections) is also made through digital means.

Following methods of teaching learning have been adopted by the department:

1. Learner centred method
2. Content focussed learning
3. Interactive learning
4. Participative learning
5. Brainstorming sessions
6. Group discussions
7. Cooperative learning
8. Problem based learning
9. Motivational learning
10. Competency based learning
11. Interdisciplinary learning
12. Guest Lectures/Invited Lectures by Industry Experts
13. Workshops/Value Added Courses
14. Placement related Training
15. Industry Visits
16. Organizing Seminars/Technical Symposia
17. Presentations by using LCD and Over Head Projector (OHP).
18. E-learning methods
19. Delivery of lectures through Video Conference

The department has ample facilities to teach the students using various audio-visual aids. The creativity in teaching is the first and foremost task of all the faculty members as under:

1) Expressive creativity: Encourage students for unique idea
2) Technical creativity: Encourage students for creation of products with consummate skills
3) Inventive creativity: Encourage students to develop new ways of learning
4) Innovative creativity: Encourage students to develop fundamental principles and thoughts
5) Emergent creativity: Encourage students to develop most realistic principle

In the year 2020, when the institutions were closed down due to COVID-19 lockdown, the department shifted to online classes so that academics may not be harmed. All the faculty members adopted online teaching methodology using various online applications like ZOOM, Googlemeet and Cisco Webex etc. The students' groups were created and lectures were delivered as well as study material was provided to the students.

For quality teaching to be performed, regular and qualified faculty from inside the department as well as eminent faculty from many institutions of national and international repute used to deliver lectures and trained the students on various aspects of biosciences/life sciences. Common courses have been inducted in the syllabi for combined learning by the students.

Chairman
Department of Bio-Sci

Himachal Pradesh University, Shimla - 171005
(NAAC Accredited 'A' Grade University)
Department of Journalism and Mass Communication

Proceedings of the meeting of PG Board of Studies in Journalism and Mass Communication

Date and time: 17 November 2022 (12.15 pm)
Venue: Online (Link: https://meet.google.com/cfm-apta-pzi)

The following were present:

1. Dr. Kanwaljit Singh, Associate Professor, Dept. of Journalism and Mass Communication, HPU – Chairman/Convener
2. Mr. Jyoti Kamal, Executive Editor, Network 18 Punjab – External Expert
3. Prof. Shashi Kant, Dept. of Journalism and Mass Communication, HPU – Member
4. Prof. Vikas Dogra, Dept. of Journalism and Mass Communication, HPU – Member
5. Mr. Ajai Srivastava, Associate Professor (Journalism and Mass Communication), ICDEOL, HPU – Member
6. Dr. Ajay Kumar, Assistant Professor, Dept. of Journalism and Mass Communication, HPU – Member

Item 1: To update and modify norms and syllabus of Master of Arts in Journalism and Mass Communication in view of the introduction of CBCS with effect from academic session 2022-23.
Decision: After a detailed discussion, the members recommended the modifications to the norms, programme structure and syllabus of Master of Arts in Journalism and Mass Communication according to CBCS norms to be applicable w.e.f. Academic Session 2022-23 as per Annexure A.

Item 2: To decide the norms and course work for Doctor of Philosophy in Journalism and Mass Communication (Ph.D. in Journalism and Mass Communication).
Decision: After a detailed discussion, the BoS members recommended the norms and course work for Doctor of Philosophy in Journalism and Mass Communication (Ph.D. in Journalism and Mass Communication) to be applicable w.e.f. Academic Session 2022-23 as per Annexure B.

(Ajay Kumar) (Ajai Srivastava) (Vikas Dogra)

(Shashi Kant) (Jyoti Kamal) (Kanwaljit Singh)

विभागाध्यक्ष
पत्रकारिता एवं जन संचार विभाग
हि०प्र० विश्वविद्यालय, शिमला-5

Annexure A

Himachal Pradesh University, Shimla – 171005

Department of Journalism and Mass Communication

Norms, Structure and Programme Contents

Master of Arts in Journalism and Mass Communication MA(JMC)

w.e.f. Academic Session 2022-23

<u>As Per CBCS Norms</u>

Approved in PG-BoS held on 17.11.2022

(Ajay Kumar) sd	(Ajai Srivastava) sd	(Vikas Dogra) sd
(Shashi Kant) sd	(Jyoti Kamal) sd	(Kanwaljit Singh) sd

Contents

Norms and Structure 4
Details of Written Test for Admission 5
List of abbreviations 7
MA(JMC) Programme Structure 8

Course Contents

Communication Theory 9
Modern Journalism 11
Social Media and Mobile Journalism 14
Convergence Media 17
Advertising and Online Promotion 19
Broadcast Journalism and Production 22
Communication Research 25
Public Relations and Public Opinion in Digital Age 27
Media Ethics, Laws and Development 30
Visual Communication and Design 33
Value added Communication Practice-1 36
Value added Communication Practice-2 37
Value added Communication Practice-3 38
Comprehensive Viva Voce 40
Industry Internship 41
Community and Community Media 42
Development Communication 44
Media and Cultural Studies 47
Dissertation 49
Major Project 50
Basics of Convergence Media 51
Ethico-legal Issues in Media 53

Norms and Structure

for Master of Arts in Journalism and Mass Communication/ MA(JMC)

Programme Information

Duration: Two years (Full-time)

Minimum credits: 100

Total seats: 30 (25 subsidized + 05 non-subsidized)

Supernumerary seats: As per Himachal Pradesh University norms.

Reservation: As per Himachal Pradesh University norms. The reserved seats shall be worked out on the basis of the existing 120-point roster.

Fee structure:

- Subsidized seats: Fees and charges as per Himachal Pradesh University Rules
- Non-subsidized seats: Rs.20000 per semester along with other charges/fees of the University

Eligibility Criteria

Age Limit: As per Himachal Pradesh University norms.

Educational Qualifications: Graduation (or equivalent) degree in any discipline from a recognized University established by law with at least 50% marks (45% marks) in case of SC/ST candidates).

Admission: The admission shall strictly be on the basis of merit achieved in the entrance process. The entrance process will be of 100 marks and will be held in two stages: Stage 1 – Written Test (80 marks); and Stage 2 – Personal Interview (20 marks). The marks of both the written test and personal interview will be added for the final merit. A maximum of three-times the candidates in each category will be invited for the personal interview stage. A minimum of 35 percent (aggregate of Stage 1 and Stage 2) in the entrance process are required to qualify for admission.

Degree requirements:

i. To be eligible for the award of the degree of MA(JMC) a candidate must secure a minimum of **100 credits, subject to the following minimum conditions:**
   a) Core Courses: 14 courses (or 80 credits), including 10 Discipline Specific Core (or 60 credits) and four Skill Enhancement Core Courses (or 20 credits). In addition to this one non-CGPA Ability Enhancement Course is mandatory.
   b) Discipline Specific Elective Courses: Three courses (or 12 credits)
   c) Generic Elective Courses: Two courses (or 08 credits) from other disciplines

ii. In each individual course, a candidate must secure a minimum of 40% marks each in internal assessment, practical exam, and semester-end theory exam to pass a course and earn credits in that course.

iii. Attendance: 75% of total lectures delivered in all courses/papers, including Cleanliness Drive and Mentorship programme.

Internal Assessment (IA): Internal Assessment shall be based on the performance in the class (CCA) along with attendance. CCA shall be based on one or some of the following: class tests, quiz, assignments, classroom participation, seminars, presentations, discussions, group exercises, etc. The marks for attendance shall be awarded to regular students as follows:

Classroom Attendance Incentive: Those having greater than 75% attendance (25% will be added to percent attendance of students representing the University in co-curricular activities) will be awarded IA marks as follows: ≥ 75% but < 80% – 1 mark; ≥ 80% but < 85% – 2 marks; ≥85% but <90% – 3 marks; ≥ 90% but < 95% – 4 marks; and ≥95% – 5 marks.

Details of Written Test for Admission
to Master of Arts in Journalism and Mass Communication

The written test will be of 90 minutes. There will be no negative marking. The written test shall have two parts, A and B, as follows:

Part A – General Aptitude Test – 60 marks
Part B – Subjective-type Test– 20 marks

Part A

General Aptitude Test (60 Multiple Choice Questions of one mark each). All questions are compulsory.
Instructions:

1. Logical Ability – 10 marks
2. Current Affairs – 10 marks
3. General Knowledge – 10 marks
4. English Language Ability – 15 marks

   One Comprehension para graph (to evaluate analytical ability and reasoning) – 5
   Vocabulary – Synonyms (2); Antonyms (2)
   Grammar – Sentence improvement (2); Word substitution (2); Spotting the errors (2)
5. Hindi Language Ability – 15

   One Comprehension para graph (to evaluate analytical ability and reasoning) – 5
   Vocabulary – Synonyms (2); Antonyms (2)
   Grammar – Sentence improvement (2); Word substitution (2); Spotting the errors (2)

Part B

Subjective-type Test (Two long-answer questions of 10 marks each)

1. English paragraph – 10 marks

   One paragraph in English in 200 words on one out of the two given current affairs topics. The candidate should strictly adhere to the word limit and write the paragraph in English only.
2. Hindi paragraph – 10 marks

   One paragraph in Hindi in 200 words on one out of the two given current affairs topics. The candidate should strictly adhere to the word limit and write the paragraph in Hindi only.

List of Courses

Discipline Specific Core Courses

Course Code					Title of the course	Credits				Marks Distribution			
LE	SUB	YR	SEM	NO.		L	T	P	TOT	IA ~	PR	ESE	TOT
Semester – I													
M	JMC	22	1	01	Communication Theory	5	1	0	6	20	0	80	100
M	JMC	22	1	02	Modern Journalism	4	1	1	6	20	0	80	100
M	JMC	22	1	03	Social Media and Mobile Journalism	4	1	1	6	20	0	80	100
M	JMC	22	1	04	Convergence Media	4	1	1	6	20	0	80	100
Semester – II													
M	JMC	22	2	01	Advertising and Online Promotion	4	1	1	6	20	0	80	100
M	JMC	22	2	02	Broadcast Journalism and Production	4	1	1	6	20	0	80	100
Semester – III													
M	JMC	22	3	01	Communication Research	5	1	0	6	20	0	80	100
M	JMC	22	3	02	Public Relations and Public Opinion in Digital Age	4	1	1	6	20	0	80	100
Semester – IV													
M	JMC	22	4	01	Media Ethics, Laws and Development	5	1	0	6	20	0	80	100
M	JMC	22	4	02	Visual Communication and Design	4	1	1	6	20	0	80	100

Skill Enhancement Core Courses

Semester – I													
M	JMC	22	1	05	Value-added Communication Practice-1	0	0	4	4	20	80	0	100
Semester – II													
M	JMC	22	2	03	Value-added Communication Practice-2	0	0	6	6	20	80	0	100
Semester – III													
M	JMC	22	3	03	Value-added Communication Practice-3	0	0	6	6	20	80	0	100
Semester – IV													
M	JMC	22	4	03	Comprehensive Viva Voce	0	0	4	4	0	100	0	100

Ability Enhancement Core Course*

Semester-III													
M	JMC	22	3	04	Industry Internship*	0	0	4	4	20	80	0	100

Discipline Specific Elective Courses

Semester-I													
M	JMC	22	1	06	Community and Community Media	3	1	0	4	20	0	80	100
Semester – II													
M	JMC	22	2	04	Development Communication	3	1	0	4	20	0	80	100
Semester-III													
M	JMC	22	3	05	Media and Cultural Studies	3	1	0	4	20	0	80	100
Semester-IV													
M	JMC	22	4	04	Dissertation	0	1	3	4	20	80	0	100
M	JMC	22	4	05	Major Project	0	0	4	4	20	80	0	100

Generic Elective Courses^

Semester II													
M	JMC	22	2	05	Basics of Convergence Media	4	0	0	4	20	0	80	100
Semester IV													
M	JMC	22	4	06	Ethico-legal Issues in Media	4	0	0	4	20	0	80	100

^Generic Elective Courses listed here are inter-departmental and are available only for students of other disciplines. A maximum of 30 seats are available per course per semester on first-come-first-serve basis.

*Mandatory Non-CGPA Core Course.

List of abbreviations

ESE End-semester Examination
IA Internal Assessment
JMC Journalism and Mass Communication
L Lecture
LE Level
M Master of Arts
PR Practical Exam
SEM Semester
SUB Subject
T Tutorial
TOT Total marks
YR Year of introduction

MA(JMC) Programme Structure

Sem	Core Courses[&] (80 credits)		Non-credit Core Course	Elective Courses (20 credits)	
	Discipline Specific Core (60 credits)	**Skill Enhancement Core (20 credits)**	**Ability Enhancement Core Course**	**Discipline Specific Elective[$] (12 credits)**	**Generic Elective (8 credits)***
I	Communication Theory (6) Modern Journalism (6) Social Media and Mobile Journalism (6) Convergence Media (6)	Value-added Communication Practice-1 (4)		Community and Community Media (4)	
II	Advertising and Online Promotion (6) Broadcast Journalism and Production (6)	Value-added Communication Practice-2 (6)		Development Communication (4)	Generic Elective -1 (4)
III	Communication Research (6) Public Relations and Public Opinion in Digital Age (6)	Value-added Communication Practice-3 (6)	Industry Internship[@]	Media and Cultural Studies (4)	
IV	Media Ethics, Laws and Development (6) Visual Communication and Design (6)	Comprehensive Viva Voce (4)		Dissertation[#] (4) Or Major Project (4)	Generic Elective -2 (4)

[&] All core courses are compulsory, including Discipline Specific and Skill Enhancement Core Courses.

[#] Only regular students (with the exception of foreign nationals) who have accumulated 54 credits with an aggregate of at least 60 percent marks in semesters I and II can opt for this course.

[*] Each candidate has to earn eight credits from the basket of generic elective (GE) courses *offered by other Departments of the University.* Each GE course is of four credits.

[$] A student has to opt for at least three Discipline Specific Elective Courses throughout the duration of the degree programme, selecting a maximum of one course per semester.

[@] Industry Internship can be undertaken after 3rd semester end-semester examinations. This is a non-CGPA mandatory course. The credits for this course will not be added to the aggregate credits earned by a candidate for the degree programme.

Communication Theory

Course Code	MJMC22101							
Course Title	Communication Theory							
Course Credits	Lecture		Tutorial		Practice		Total	
	5		1		0		6	
Contact hours	75		15		0		90	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	This course aims to steer a student towards understanding the role and importance of communication in society. The course also builds a theoretical background for understanding how communication works. This course lays the theoretical base for applied communication courses.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	BASIC CONCEPTS Communication: Meaning, Forms, Functions; 'Mass' concept: Mass society, mass audience, mass communication and its process Media and society theory: the mass society, Marxism and political economy, functionalism (*including* power and inequality, social integration and identity, social change and development, space and time) Mass communication theory: Dominant vs. alternative paradigm for theory and research Normative Media Theories: Authoritarian theory, Libertarian theory, Social Responsibility theory, Soviet media theory, Development media theory and Democratic-participant media theory	15	3	0
II	DIRECT EFFECTS Lasswell's Propaganda, Walter Lippmann's Public Opinion, Herman and Chomsky's Propaganda Theory; Bullet theory and S-R model; Berlo's SMCR model; Schramm's Field of Experience model; Osgood & Schramm's circular model; Lasswell formula; Shannon and Weaver's Mathematical Model.	15	3	0
III	LIMITED EFFECTS Lazarsfeld's Two-step flow theory and personal Influence;	15	3	0

	Attitude Change: Attitude: definition, structure & role; major findings of Hovland's attitude-change (persuasion) research; Selective Exposure, Selective Attention, Selective Perception; Klapper's Reinforcement (Phenomenistic) Theory; Krugman's Theory of Low Involvement; Festinger's Cognitive Dissonance Theory; Catharsis and media.			
IV	FUNCTIONALISM AND ACTIVE AUDIENCE Television Violence Theories; Social Cognition from Mass Media; Transmission versus Ritual Perspectives Active-Audience Theories: Media Functions vs. Media Uses, Uses-and-Gratifications Approach, Uses-and-Gratifications Research and Effects Development of Reception Studies: Hall's Encoding/Decoding Communication Decoding and Sensemaking; Agenda-Setting; Neuman's Spiral of Silence; Second Level Agenda Setting	15	3	0
V	SEMIOTICS, IDEOLOGY AND MEANING-MAKING Semiotics: Saussure's signifier, signified and signification; Sign: meaning and categories; Codes: meaning and categories; Signification (denotation, connotation, myth, symbols, metaphor, metonymy) Ideology: Its meaning and definitions; interaction of ideology, signs and meaning	15	3	0

Essential Reading:

- Andal, N. (2005). *Communication Theories and Models.* Bangalore: Himalaya Publishing House.
- Baran, S. J., and Davis, D. K. (2012). *Mass Communication Theory: Foundations, Ferment, and Future* (6th Ed). Wadsworth, Cengage Learning
- Fiske. J. (2011). *Introduction to Communication Studies: Studies in Culture and Communication* (3rd Ed). Oxon: Routledge.
- McQuail, D. (2010). *McQuail's Mass Communication Theory* (6th Ed). London, Thousand Oaks, New Delhi, Singapore: Sage Publications.
- Rosengren, E. K. (2000). *Communication: An Introduction.* London: Sage Publications.

Additional Reading:

- Aggarwal, V. B. and Gupta, V. S. (2002). *Handbook of Journalism & Mass Communication.* New Delhi: Concept Publication Company.
- Kumar, K. J. (2007). *Mass Communication in India* (4th Ed). Mumbai: Jaico Publishing House.
- Narula, U. (2006). *Handbook of Communication: Models, Perspectives and Strategies. New Delhi:* Atlantic Publications.
- West, R., and Turner, L. H. (2010). *Introducing Communication Theory: Analysis and Application* (4th Ed). McGraw Hill

Modern Journalism

Course Code	MJMC22102							
Course Title	Modern Journalism							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		1		1		6	
Contact hours	60		15		30		105	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	This course builds the basic foundation of a budding journalist, helping her understand basics arts of journalism: reporting and editing in the changing media landscape. Through a journey into various facets of and approaches to news, it prepares the learner to be a responsible journalist and for an entry level positions in any news organisation.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	0	0	80	40%	100	40%

* Practical examination to be conducted internally.

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Components:

Unit	Topic	Contact Hours		
		L	T	P
I	JOURNALISM IN THE AGE OF ICT Journalism: Concept, Roles and responsibilities in democracy; Freedom of speech and expression (Article 19[1] [a] and Article 19[2]) Concepts of Public Sphere and Public Interest Journalism as creative non-fiction: Joseph Pulitzer's New Journalism, Literary Journalism, Narrative Journalism, Immersive Journalism and Lifestyle Journalism. News: meaning, definition, news values; Elements (attribution, accuracy, verification, balance, fairness, brevity); dateline, credit line, byline, The news process: from the event to the reader (how news is carried from event to reader with emphasis on ICTs);	12	3	6
II	TRADITIONAL AND MODERN NEWS PRODUCTION Organizing a news story, 5W's and 1H, Inverted pyramid Lead: importance, types of lead; Body copy Changes in news worthiness, news selection, and news construction for internet- and mobile-based outlets. Use of archives, sources of news; use of online sources, search engines, big data and social media for news Use of multimedia content in news; use of infographics Critical concerns: Trial by media, Sting Operation (use and misuse)	12	3	6

	Paid news, fake news, Post-truth, "Leaks"; Yellow Journalism, Penny Press, Tabloid Journalism; Speed vs. accuracy in the digital world; Market-driven journalism			
III	NEWS GATHERING ROLES Reporter: role, functions and qualities General assignment reporting/working on a beat; news agency reporting; reporting for online news service and blogs Covering Speeches, meetings and press conferences Covering of beats: crime, courts, city reporting, local reporting, local bodies, hospitals, health, education, sports. Interviewing: doing the research, setting up the interview, conducting the interview, different ways of using the interview in a news story Overlapping roles and changing styles and subjects in the ICT age	12	3	6
IV	NEWS PROCESSING Newsroom, organizational setup of a newspaper; Editorial department; Role of Chief-sub, sub/copy-editor, editor and news editor, chief of bureau, city chiefs, and correspondents; Photo-editor and photographers Introduction to editing: Principles of editing, importance of style sheet; Headlines: functions and types, typography, language and style Pictures: Importance of pictures, selection of news pictures, editing photographs, photo captions. Editorial and Op. Ed. page: structure, purpose, edits, middles, letters to the editor, special articles, opinion pieces News processing for online news services and blogs; overlapping roles	12	3	6
V	CREATIVE NON-FICTION Features: Types of features and human interest stories Creative strategies for idea generation: Generating alternatives, challenging assumptions, the reversal method, analogy technique, choice of entry point and attention area, snowballing, random stimulation Structuring the feature: Theme statement, scratch outline, inverted pyramid approach, nut graph, five-box approach, linear, circular and frame narratives Week-end pullouts, supplements, backgrounders; Columns	12	3	6

Essential Reading:

- Baskette and Scissors. *The Art of Editing.* Allyn and Bacon.
- Bender, J. R., Davenport, L. D., Drager, M.W., and Fedler, F. (2016). *Reporting for the Media* (11th Ed). Oxford University Press
- De Bono, E. (1990). *Lateral Thinking: A Textbook of Creativity*. London: Penguin Books
- De Bono, E. (2007). *How to Have Creative Ideas.* Random House
- Flemming, C., and Hemmingway, E. (2006). *An Introduction to Journalism.* Vistaar Publications.
- Hodgson, F.W. *Modern Newspaper Practice: A Primer on the Press.* Focal Press.
- Itule, B. D., and Anderson, D. (2000). *News Writing and Reporting for Today's Media.* NY: McGraw Hill.
- Keeble, R. (2006). The Newspaper's Handbook. Routledge
- Ludwig, M. D. (2005). *Modern News Editing. New York:* Wiley-Blackwell.
- Rodmann, G. (2007). *Mass Media in a Changing World*. Mcgraw Hill Publication.

- Stein, M.L., Paterno, S. and Burnett, R. C. (2006). *News writer's Handbook: An Introduction to Journalism*. Blackwell Publishing.
- Kramer, M. & Call, W. (2007). *Telling True Stories: A Non-fiction Writers Guide*. NY: Plume-Penguin

Additional Reading:

- Chaturvedi, S. N. *Dynamics of Journalism and Art of Editing*. Cyber Tech Publications.
- Fedler, F. (1989). *Reporting for the Print Media* (4th Ed). NY: Harcout, Bruce Jovanovich Inc.MacDougall and Daniel, C. (1973). *Principles of Editorial Writing.* W.C. Brown Co.
- Evans, H. (1974). *Editing and Design* (Five Volumes). London: William Heinamann.
    - Book one: *New Man's English*
    - Book Two: *Handling Newspaper Text*
    - Book Three: *News Headlines*
    - Book Four: *Picture Editing*
    - Book Five: *Newspaper Design*
- Mencher, M. (2003). *News Reporting and Writing.* NY: McGraw Hill.
- Meera, R. (2009). *Feature Writing.* New Delhi: PHI Learning Pvt. Ltd.
- Roorbach, B. (1998). *Writing life stories.* Cincinnati, OH: Story Press.
- Sims, N. (2008). *True Stories: A Century of Literary Journalism*. Northwestern University Press

Harrington, W. (Ed.) (1997). *Intimate Journalism: The Art and Craft of Reporting Everyday Life. New York:* Sage Publications.

Social Media and Mobile Journalism

Course Code	MJMC22103							
Course Title	Social Media and Mobile Journalism							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		1		1		6	
Contact hours	60		15		30		105	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	This course introduces the learner to varied multimedia technologies, concepts and production basics using these technologies initiating the learner into seamlessly producing multimedia content for most media platforms, especially the Internet. The course also prepares budding journalists to use mobile devices and social media as professional journalists in three main ways: newsgathering, distributing content, and engaging with the audience. They will learn the fundamental skills that news operations require in the modern world.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Components:

Unit	Topic	Contact Hours		
		L	T	P
I	THINKING AUDIENCE News Consumption on mobile and social media Impact on: Journalists, Newsgathering, Distribution of news, Audience engagement, Class hashtag, Staying informed Social media editorial strategies, Keep them coming back for more; The power of social media providers; Different platforms, different approaches; Mobile and social media strategy analysis; Social media branding and journalism Social media presence: Search, analyze and act, Assume everything is public, Building a social media brand, Separate personal and professional accounts, Online spaces, Creating standout social media profiles, Consistency, Social media post, Become the go-to journalist, Social media audit, Build your presence; Beyond the "final" story: Continuing the conversation, Measuring the success of mobile and social media activity, Use social media and web analytics in newsrooms	12	3	6
II	MULTIMEDIA MEDIA PRODUCTION-I	12	3	6

	Digital Hardware: Working Remotely, Equipment and Accessories, Production Apps, Shooting and Editing Video, Recording and Editing Sound, Still Photography Digital cameras (Consumer, Prosumer, SLR, Mirrorless camera); CCD and CMOS sensors; APS-C, Four-thirds, One-inch and Full Frame sensor sizes; Audio capture and mixing devices Mobile and smart devices for content creation and sharing; wearable technologies; Mobile device production and post production accessories and tools; Live-casting using mobile devices Offline and cloud storage and sharing, FTP, Networking, Wireless connections, Internet connectivity and bandwidth			
III	MULTIMEDIA MEDIA PRODUCTION-II Word processing: Understanding newspaper stylesheets Photography basics: Composition and Editing Video basics: Basic camera shots, movements, composition, perspective; language of vision mixing (transitions) Lighting: Hard and soft light, cool and warm light, interior and exterior light, natural and artificial sources Audio basics: Diegetic and non-diegetic sound; mono, stereo and surround sound; Characteristics of sound (pitch, duration, loudness, timbre, texture, attach, decay, rhythm and spatial location); Graphics: Types of typefaces and fonts	12	3	6
IV	FROM THE FIELD: THE MOBILE JOURNALIST Digital-First Mindset: Mobile and social first, Planning Your Story: The digital-first story pitch, different types of stories, different approaches Mobile-First Workflow: A digital juggling act, Workflow in Action, Website Tutorials, Mobile-first discussion, Teaching moment, MOJO groove, Live covering, Scavenger hunt Social media optimization; Writing for social media and mobile devices	12	3	6
V	SOCIAL MEDIA ENGAGEMENT AND AUDIENCE ANALYTICS Online Measures: Concepts: Click baits, Page views vs. Unique Page Views, Hits, Cost of Ignoring, SEO, Conversion rate, Audience engagement Sterne's Social media measures: Buzz, popularity, fans/followers/friends, mainstream media mentions, virality, second-degree reach, downloads/uploads, likes/favorites, comments/ratings, bookmarks, subscriptions, page views, sentiment, engagement rate Google Analytics, Google Adsense, Facebook Insights, Twitter Analytics Pitfalls of analytics, Analytics tools, Report, Share, Experiment, Measure, Adjust			

Essential Reading:

- Bull, A. (2015). *Multimedia Journalism: A Practical Guide*. Routledge
- Kindem, G., and Musburger, R. B. (2009). *Introduction to Media Production: The Path to Digital Media Production* (4th Ed). Focal Press
- Li, Z., and Drew, M. S. (2004). Fundamentals of Multimedia. NJ: Pearson Education International
- Orlebar, J. (2002). *Digital Television Production: A Handbook.* London and NY: Arnold
- Villamil-Casanova, J., and Molina, L. (1997). *Multimedia Production, Planning and Delivery.* Prentice Hall
- Gunter, B. (2000). *Media Research Methods: Measuring Audiences, Reactions and Impact.* London, Thousand Oaks, New Delhi: Sage Publications

- Kohli-Khandekar, V. (2013). *The Indian Media Business* (4th Ed). LA, London, New Delhi, Singapore, Washinton DC: Sage.
- Kothari, G. (1995). *Newspaper Management in India.* New Delhi: DK Publishers.
- Lipschultz, J. H. (2018). *Social Media Communication: Concepts, Practices, Data and Law* (2nd Ed). NY and London: Routledge
- McPhail, T. L. (2006). *Global Communication: Theories, Stakeholders, and Trends* (2nd Ed). MA, Oxford, Victoria: Blackwell Publishing
- McQuail, D. (2010). *McQuail's Mass Communication Theory* (6th Ed). London, Thousand Oaks, New Delhi, Singapore: Sage Publications.
- Sterne, J. (2010). *Social Media Metrics: How to Measure and Optimize Your Marketing Investment.* New Jersey: John Wiley and Sons.
- Ranganathan, M., and Rodrigues, U. M. (2010). *Indian Media in a Globalised World.* New Delhi: Sage

Additional Reading:

- Kaur, R., and Mazzarella, W. (Eds.) (2009). *Censorship in South Asia: Cultural Regulation from Sedition to Seduction.* Indiana University Press
- Sindhwani, T.N. (1975). *Newspaper Economics and Management.* New Delhi: Ankur Publishing House
- Thayer, F. (1954). *Newspaper Business Management.* New York: Prentice Hall

Convergence Media

Course Code	MJMC22104							
Course Title	Convergence Media							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		1		1		6	
Contact hours	60		15		30		105	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	The course prepares the student for holistic understanding of new media technologies. While introducing the student to the potential and pitfalls of this technology, the course prepares them to engage with the technology meaningfully and efficiently.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Components:

Unit	Topic	Contact Hours		
		L	T	P
I	EVOLUTION OF ICTS Phase 1: From cave paintings and fire signals to telegraph Phase 2: Telegraph to broadcasting Phase 3: Digital ICTs, Social and Mobile Media, Artificial Intelligence Concepts: Digital natives and Millennials, Net Etiquette, Cyber Culture, Theoretical Concerns: Technology determinism, ICT proliferation and digital divide; Digital (Human) Rights	12	3	6
II	EXPANDING LEXICON Tools: SEO, Analytics, Cross-platform promotion, click baits, crowd funding, crowd sourcing, geotagging, angel investors and start-ups, 3-D printing, Wearable technologies Concepts: Web 2.0, Cloud computing, Ubiquitous Computing and Internet of Things, Cleverbots and Natural Language Processing, Metaverse, Web 3.0 – The Semantic Web Theoretical Concerns: Singularitarianism, Techno-progressivism, Technological utopianism, Posthumanism and Transhumanism	12	3	6
III	CONSTRUCTING REALITY Virtual Everything: Virtual world, Virtual Avatars, Virtual Reality (Virtual, Immersive, Extended, Mixed and Augmented Reality and Augmented virtuality); Reality–virtuality continuum; Simulated Reality, Hyper Reality,	12	3	6

	Video games: Transreality gaming; Location-based games (pervasive games, mixed reality games and augmented reality games); Cross media games (simulation games, LARP and alternate reality games); Concepts of First-person (gaming) Theoretical Concerns: Gamification; Media violence theories and video game violence: Catharsis, Reinforcement, Cultivation			
IV	THEORETICAL ISSUES Media selection: Media richness, Media naturalness, Social presence; Hyperpersonal Model Social Information Processing (SIP) Theory Social Identity Model of Deindividuation Effects Impression Management Model; Many avatars and many selves Information Society and Critique Castell's Network Societies; Mitchell's Urban Media Interface; Digital Archiving and Permanent Memory	12	3	6
V	CRITICAL ISSUES Issues: Breach of privacy; Direct and indirect surveillance with special emphasis on Big Data; Cyber Security Content Culture: Information Overload vs. Filter bubble and Echo chambers; Big Data, Data Mining and Reality Mining Internet cultures: Activism, Slackativism, Hackactivism; homogenization, hybridization, mobilization, pluralism, fragmentation, polarity; Internet Addiction; Truth-by-consensus, Truthiness, Wikiality, Post-truth Concerns: Cypherpunk movement; The Social Construction of Reality; Neo-Luddism and Technophobia, The Internet Paradox	12	3	6

Essential Reading:

- Castells, M. (2000). *The Rise of the Network Society.* Wiley-Blackwell.
- Eugenia, S. (2011). Understanding New Media. Sage
- Gane, N., and Beer, D. (2008). *New Media: The Key Concepts.* Oxford and New York: Berg
- Green, L. (2010). *The Internet: An Introduction to New Media.* Oxford and New York: Berg
- Lister, M., Dovey, J., Giddings, S., Grant, I. And Kelly, K. (2009).New Media: A Critical Introduction (2nd Ed). London and New York: Routledge.
- Manovich, L. (2001). What is New Media? In *The Language of New Media.* Cambridge: MIT Press. pp. 19-48.
- VanDijk, J. (2012). *The Network Society* (3rd ED). London: Sage.

Additional Reading:

- Baym, N. K. (2010). *Personal Connections in the Digital Age.* Chapter 3.
- Bogost, I. (2007). *Persuasive Games: The Expressive Power of Videogames.* MIT Press.
- Goldsmith, J., and Wu, T. (2006). *Who Controls the Internet? Illusions of Borderless World.* OUP
- Hassan, R., and Thomas, J. (2006). *The New Media Theory Reader.* Open University Press.
- Jenkins, H. (2006). *Convergence Culture: Where Old and New Media Collide.* NYU Press.
- Lister Dovey, Giddings, Grant and Kelly, "New media and new technologies" (2003).
- Miller, V. (2011). *Understanding Digital Culture.* Sage Publications.
- Rosen, J. "The People Formerly Known as the Audience" What video games have to teach us about language and literacy. New York: Palgrave Macmillan.
- Veltman, K. H. (2006). Understanding New Media: Augmented Knowledge and Culture. University of Calgary Press

Advertising and Online Promotion

Course Code	MJMC22201							
Course Title	Advertising and Online Promotion							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		1		1		6	
Contact hours	60		15		30		105	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	Building upon the existing understanding and skills of mass communication and non-fiction creativity, this course incorporates advertising communication concepts and skills. The learner shall be able to navigate the traditional, online and mobile advertising industry environments with equal ease.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	BASIC CONCEPTS Advertising: Definitions, functions and classification; Objectives: Perspectives on consumer behaviour; AIDA formula; Integrated marketing communication: concepts of marketing, marketing mix, branding, brand image and positioning; advertising in marketing mix; Marketing strategy, promotional strategy, advertising strategy (creative and media mix) Campaign: Concept, Campaign planning and strategy	12	2	4
II	ADVERTISING CREATIVES Copy: Ad copy concept & types of copy format; copy elements; copy structure; Homework concept; USP and appeals; writing effective copy. Visualization: concept and process; Display ad design and layout; Stages of layout for print: miniature, rough, revised rough, and comprehensive Creative execution styles used by advertisers; Tactical issues involved in the creation of print and radio, and TV commercials; Evaluation and approval of creative work by agencies	10	2	8
III	STRATEGY AND RESEARCH Media Strategy: Advertising media characteristics; media planning and its process; developing and implementing media strategies	12	4	6

	Ad Agencies: Role and types; selecting, compensating, and evaluating advertising agencies; use of integrated services Advertising Research: Pre-testing (copy testing) and post-testing (tracking studies); Research tools MRUC and IRS; BARC and TRPs, CPM; Readability Research (Flesch and Gunning Score); Online-offline measures; People's meters; Recall vs. recognition; Diaries; Physiological measures			
IV	ONLINE ADVERTISING Basics: Advantages; Online platforms (digital and rich media, search, email, mobile); Types – Display (leader board, skyscraper, banner, rectangles), Static/Dynamic ads, Email ad, Button ads, Interstitial ads, Native Ads (In-feed, Search ad [paid search, promote listing], recommendation widget, In-Ad with native elements, custom) Concepts: Impression, Conversion; Metrics [CTR, CPM, CPA, CPC, Time spent]; Ad server vs Ad Network; Targeting (Behavioral, contextual, demographic, geographic, remarketing, retargeting); Tracking (client-based, server-based, compound, conversion tracking, piggybacking)	14	4	6
V	MOBILE AND RICH MEDIA Mobile Ads: Advantages; Types (text, flash movies, banner, audio, video); Rich media ads: (Animation, 3D, tap-to-call, Social bookmark, swipe, CPD, Drag, Dynamic Location Overlay, Shake, Map, Twitter feed, Wipe, camera, Paint, and Gaming ads) Ad network and ad servers; Self-serve Advertising Platforms (Amazon, Facebook, Twitter, LinkedIn); Interactive Advertising Bureau (IAB)	12	3	6

Essential Reading:

- Belch, G. E., and Belch, M. A. (2003). *Advertising and Promotion* (6th Ed). McGraw Hill
- Jefkins, F. (1977). *Copywriting & its Presentation*. London: International Textbook Co.
- Jethwaney, J. (2010). *Advertising Management.* Oxford University Press
- Kanuk, L. L., and Schiffman, L. (1982). *Consumer Behaviour*. New Jersey: Prentice Hall
- Klapdor, S. (2012). *Effectiveness of Online Marketing Campaigns: An Investigation into Online Multichannel and Search Engine Advertising.* Dissertation TUM School of Management, Munich. Springer Gabler
- Lewis, H. G., and Nelson, C. (1999). *Advertising Age Handbook of Advertising.* NTC Contemporary
- Ogilvy, D. (1997). *Ogilvy On Advertising.* London: Prion books
- Parameswaran, M. G. (2001). *Brand Building Advertising.* Tata McGraw Hill
- Plummer, J., Rappaport, S., Hall, T., and Barocci, R. (2007). *The Online Advertising Playbook: Proven Strategies and Tested Tactics from The Advertising Research Foundation.* New Jersey: John Wiley & Sons
- Sengupta, S. (2005). *Brand Positioning: Strategies for Competitive Advantage* (2nd Ed). Tata McGraw-Hill Education
- Tiwari, S. (2003). *The (un) Common Sense of Advertising.* Response Books
- Tiwary, A. (2016). *Know Online Advertising.* Partridge
- Valladares, J. A. (2000). *The Craft of Copywriting*. Response Books
- Vilanilam, J. V., and Verghese, A.K (201). *Advertising Basics.* New Delhi: Sage Publications

Additional Reading:

- Dyer, G. (1982). *Advertising as Communication.* London and New York: Routledge
- Google (2009). *Marketing and Advertising using Google: Targeting Your Advertising to the Right Audience.* Google
- Jones, J. P. (2002). *The Ultimate Secrets of Advertising*. Sage Publication
- Kapoor, J. (2002). *Brand Naamkaran for Desi Khari English Marie Segments.* BPI (India) Pvt. Ltd.
- Ogilvy, D. (1969). *Confessions of an Advertising Man.* London: Longman
- Ries, A., and Ries, L. (2002). *The Fall of Advertising and the Rise of PR.* NY: Harper Collins

Broadcast Journalism and Production

Course Code	MJMC22202							
Course Title	Broadcast Journalism and Production							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		1		1		6	
Contact hours	60		15		30		105	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	This course imparts professional knowledge to a learner about the radio and TV ecosphere, along with audio-video production and post-production techniques, along with the skills of scripting, voicing and announcing. A learner emerges a competently trained audio-video producer, journalist and broadcaster.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Components:

Unit	Topic	Contact Hours		
		L	T	P
I	RADIO AND TV BASICS Radio/TV Eco-system: TV formats (PAL, NTSC, SECAM, DTV); Radio types (AM/FM/Internet); Distribution (Bounded, Over-the-air, Internet); Broadcasting vs. narrowcasting; Public Service, Free-to-air, Subscription, on-demand, online-streaming; Program genres, programming and scheduling TV Production stages: Script and Project Development; Budgets, and Finance; Team building; Legalities, Permissions and Rights, Pitching and Selling the Project; Preproduction; (Talent and Crew; Script Breakdowns; Scheduling); Production (Key personnel; On-set or location shoot; indoor vs. outdoor shoot); Post-production (Editing steps)	12	3	0
II	BROADCAST SCRIPTING Language use: Style (direct style, active voice, short sentences); Avoiding colloquialism, journalese, officialese, jargon, clichés, stereotyping, redundant words, adjectives and value judgment, ambiguity, tongue twisters; Numbers and names; following the style sheet TV scripting: Script Breakdowns, Production Book, Look and Feel of Project, Storyboarding and Floor Plans, Shot List; writing to the visuals Writing for radio: radio news, radio feature, talk TV news story: Elements; Packaging and scripting, Intro, structure	12	3	8

	Broadcast Interview: Types of interviews (planned/unplanned; studio/door stepper/field/; purpose; news/feature; issue-specific/talk/personality; one-to-one/ panel discussion; expert/vox-pop) Pre-interview: Research, guests and topics, dress and make-up Interview skills: Building rapport, starting and concluding, open-ended questions, follow-up, interjections, focus, subject transition, keeping control, neutral view, mood, pace			
III	AUDIO PRODUCTION AND SOUND DESIGN Basic concepts: Sound-Pressure Level, Reverb, Audio Perspective, Masking, Sound Envelope, input levels, mic techniques, background noises; Audio components (Dialogue, Background or ambience, Sound effects, Added audio, Noise); Functions of sound in relation to picture Acoustics: Spatial hearing; Direct/early/reverberant sound and Echo; Acoustics-program material matching; Indoor acoustics (Noise, Sound Isolation, Dimensions and Shape, Room Acoustics – absorption and reflection, diffraction, diffusion, variable acoustics) Sound Recording: Microphones types (dynamic/ribbon/condenser; Pick-up patterns; Special purpose mic); Accessories (shields, pop filters, and preamps); Digital recording media	12	3	6
IV	AUDIO-VIDEO EDITING Video editing: Online/offline; linear/non-linear editing; pace and rhythm; manipulating time; graphics, animation and plug-ins Audio editing set-up: Computer, DAW, Software and plug-ins, Mic modeler, sound mixing boards, analog-digital converters, audio monitors Sound editing and mixing: Gain staging and Volume, Compression, EQ, Reverb, Crossfade; Script analysis and spotting Sound Effects: Functions; Types (Prerecorded SFX libraries; Live – Studio produced, vocally produced, Foley, Production SFX, Field collection, Electronically generated); SFX Manipulation (playing speed, playing backward, looping, mixing) Sound Design: Concept; Influence on meaning;	12	3	8
V	BROADCAST ANNOUNCING AND VOICE ACTING TV and radio announcer: Roles, responsibilities and qualities; Dealing with mic-fright and camera panic Vocal development: Diaphragmatic and thoracic breathing; breathing posture; sound articulation; pronunciation; Common vocal problems; maintaining a healthy voice Announcing: Delivery style, Performance elements (volume, pitch, rate, tone, emphasis, inflection, pauses, flow, mood), Copy marking, Word usage, Language changes, Audience rapport, Avoiding inept style, Ad-lib In-studio communication: Hand signals, cue cards, prompters, IFB Announcing Styles: News (Radio, TV, Web TV); Weather, Sports, Music, Walk-through Voice Acting: Voice Quality, Message, Audience, Word Values, Character; Recording VOs: Compression, Backtiming and Deadpotting, Voice artist skills; Narration: Direct, Indirect, and Contrapuntal	12	3	8

Essential Reading:

- Alten, S. R. (2011). *Audio in Media* (9th Ed). Wadsworth, Cengage Learning
- Crisell, A. (1986). *Understanding Radio* (2nd Ed). London and New York: Routledge
- Kellison, C. (2006). *Producing for TV and Video: A Real-World Approach.* Oxford: Focal Press

- MacLoughlin, S. (1998). *Writing for Radio: How to Create Successful Radio Plays, Features and Short Stories.* Oxford: How To Books, Ltd.
- Stephenson, A. R., Reese, D. E., and Beadle, M. E. (2009). *Broadcast Announcing Worktext: A Media Performance Guide* (3rd Ed). Oxford: Focal Press
- Thompson, R. (2005). *Writing for Broadcast Journalists.* London and New York: Routledge

Communication Research

Course Code	MJMC22301							
Course Title	Communication Research							
Course Credits	Lecture		Tutorial		Practice		Total	
	5		1		0		6	
Contact hours	75		15		00		90	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	This course is designed to make the learner conversant with the principles of scientific inquiry along with equipping the learner with the necessary tools for finding answers to the research problems.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Components:

Unit	Topic	Contact Hours		
		L	T	P
I	SCIENTIFIC METHOD IN RESEARCH Research: Meaning, Objectives, Motivation, Significance The Methods of Knowing: tenacity, intuition, authority, and science Types of Research: Descriptive vs. Analytical, Applied vs. Fundamental, Conceptual vs. Empirical, Cross-sectional vs. Longitudinal, Field vs. Laboratory, Exploratory vs. Formalized Research Methods versus Methodology Scientific Method in Research: Characteristics and importance, Research Process: Research procedure, Criteria of Good Research; Selecting and defining the research Problem; Report writing	15	3	0
II	ELEMENTS OF RESEARCH Concepts and constructs; Independent and dependent variables; Discreet and continuous variables Nature of Measurement, levels of measurement, measurement scales, specialized rating scales Reliability and Validity Sampling: Population and sample, Sampling procedures, Sample size Types of research error Research questions and Hypotheses Research Approaches: Quantitative vs. Qualitative Research Designs: Exploratory, Descriptive and Experimental Types of Experimental Designs: Pre-test post-test classical experimental design, Pre-experimental design, Quasi-experimental design	15	3	0

	Sources of data: texts, observations and/or interviews, self-reports, other-reports			
III	DATA COLLECTION AND ANALYSIS Primary Data Collection Methods: Observation method, Interview method, Questionnaires/ schedules Other methods: Audits, Consumer Panels, Mechanical Devices, Projective Techniques, Depth interviews; Content Analysis; Secondary Data; Case Study method Data Analysis: Descriptive vs. Inferential Statistics Data Processing – Coding, Classification and Tabulation; Univariate analysis – Sample Distribution, Summary statistics (Measures of Central Tendency; Measures of dispersion; Measures of skewness) Bi-variate analysis – Correlation, Simple regression, One-way ANOVA Normal curve, Data Transformation	15	3	0
IV	HYPOTHESIS TESTING Basic concepts: Meaning and purpose of hypothesis; Null vs. Alternate Hypothesis; Degrees of freedom, Importance of significance, Errors in hypothesis testing; Research question vs. Hypothesis Tests of Hypotheses: Parametric vs. Non-parametric Tests Non-parametric Tests: Chi-Square Test for Goodness of Fit, Chi-Square Test a test of independence, Contingency Table Analysis Parametric Tests: t-test, Analysis of Variance, Two-Way ANOVA, Measures of association, Simple Linear Regression	15	3	0
V	INTERPRETATION AND REPORT WRITING Interpretation: Meaning and purpose; Technique and Precautions in Interpretation Significance of Report Writing Different Steps in Writing Report Layout of the Research Report Types of Reports; Oral Presentation Writing a Research Report: Mechanics and Precautions	15	3	0

Essential Reading:

- Wimmer, R.D. and Dominick, J. R. (2011). *Mass Media Research: An Introduction* (9th Ed.) Wadsworth, Cengage Learning
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques.* New Delhi: New Age
- Rebecca B. Rubin, R. B., Rubin, A. M., Haridakis, P. M., and Piele, L. J. (2010). *Communication Research: Strategies and Sources* (7th Ed.). Wadsworth, Cengage Learning
- Croucher, S. M. and Cronn-Mills, D. (2015). *Understanding Communication Research Methods: A Theoretical and Practical Approach.* New York, Oxon: Routledge
- Mukherjee, S. P., Sinha, B. K., and Chattopadhyay, A. K. (2018). Statistical Methods in Social Science Research. Singapore: Springer. https://doi.org/10.1007/978-981-13-2146-7
- Berger, A. A. (2012). Media Analysis Techniques (4th Ed.). New Delhi: Sage
- American Psychological Association (2020). *Manual of the American Psychological Association, 7th Ed.*

Public Relations and Public Opinion in Digital Age

Course Code	MJMC22302							
Course Title	Public Relations and Public Opinion in Digital Age							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		1		1		6	
Contact hours	60		15		30		105	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	This course seeks to impart an understanding about the process and philosophies of PR in the off-line and online-world, along with that of the public opinion formation and its management. A leaner will emerge with not only how to wield its power but also how the powerful effects of PR take place.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	PUBLIC RELATIONS BASICS Basic concept; Role and function of PR; PR as a management tool; PR in the marketing mix Public Relations Process; Internal vs. external publics; Tools of PR; Types of PR outfits; Staff and line functions; Ethics of PR Stakeholders PR: Media Relations, Internal Communications, Corporate Community Involvement, Financial Public Relations, Public Sector PR Strategic PR: Corporate Communication, Corporate Identity, Public Affairs and Issues Management, CSR, Crisis Communication, Event Management, Image Management Creative Thinking; Big Idea, In-box and Out-of-the-box thinking; lateral thinking; Creative process: Osborn's 7 stages, Stein's 3 stages, Green's five-I model	10	2	6
II	PR THEORY AND RESEARCH PR Approaches: Systems theory; Situational theory; Rhetoric Theories in PR; PR as relationship management; PR as social exchange Public Relations Research: Environmental monitoring (or scanning); PR audits; Communication Audits; Social Audits; PR Evaluation (Orientation – Media, Publics, Organisation, Persuasion, Relationship; Time of intervention – Formative, Summative, Goal-free)	12	2	8

III	ONLINE PR Online-mix: Internet constituents and services, Creating online-mix; Paid, owned and earned media Influencers as Publics: Visitors, bloggers, social media communities, support groups, social media influencers, social media elites, magic middle, media snackers, Youtubers, Instagrammers, Tweeps, social media experts and gurus Online Tools: Blogger relations, social media releases (SMRs), video news release (VNR), keywords and SEO, social marketing, thought leadership, participation, livestreams, brand aggregation, conversational marketing, social media trackers and aggregators, virality, cost of ignoring, leaderboards, managing negative comments (crises trendcast, proactive and reactive approaches), community managers and customer service; Platforms (blogs, video social networks, micromedia, really simple syndication (RSS), wikis, podcasts, mashups, content aggregation services) Engagement: Listening (referring links, finding conversations, measure subscribers, blogger influence, tracking); Participating (conversations as markets, building relationships and customer relationship management (CRM), online reviews and customer support) Styles of engagement: Humanized Communication (listen, learn, respect, value proposition to benefit markets, humanize and personalize the story, read and watch people); Socialized Communication (participate, engage, socialize, avoid clutter, build relationships); Understand Communities (participate [as a person, not pr], use popular tools, avoid pitching, monitor vibe and how people share, dynamics and the rules of engagement); Adapt Message (short takes, identify people and personalize, don't pitch, stand out, be compelling, multiple approaches)	14	4	16
IV	PUBLIC OPINION AND PROPAGANDA Public opinion: Concept and process (3-D process); Components (affective responses, cognitive responses, experiences of past behavior, behavioral intentions); Approaches to public opinion Propaganda: Lippmann's propaganda theory, Lasswell's model, Bernay's Public Opinion Crystallization; Chomsky and Herman Propaganda Model Media Effects: Lazarsfeld's Two-step flow theory, Agenda Setting, Framing and Priming, Knowledge-Gap Hypothesis, Spiral of Silence Public Opinion in democracy: Habermas' Public Sphere	12	4	0
V	PUBLIC OPINION AND ATTITUDE Learning and Persuasion: Hovland's Yale Model of Persuasion; Bandura's Social Learning Theory; Elaboration Likelihood Model; Symbolic Interactionism; McGuire's Inoculation Theory Consistency Theory: Cognitive Dissonance Theory Functional approach: Katz's four functions of attitude (instrumental/ utilitarian, ego defensive, value expressive, knowledge); Kelman's functional analysis (compliance, identification, internalization)	12	3	0

Essential Reading:

- Crespi, I. (1997). *The Public Opinion Process: How People Speak.* New Jersey and London: Lawrence Erlbaum Associates
- Donsbach, W., and Traugott, M. W. (2008). *The Sage Handbook of Public Opinion Research.* Los Angeles, London, New Delhi and Singapore: Sage Publications

- Green, A. (2010). *Creativity in Public Relations* (4th Ed). London and Philadelphia: KoganPage.
- Gregory, A. (2010). *Planning and Managing Public Relations Campaigns* (3rd Ed). London, Philadelphia and New Delhi: KoganPage.
- McQuail, D. (2010). *McQuail's Mass Communication Theory* (6th Ed). London, Thousand Oaks, New Delhi, Singapore: Sage Publications.
- Moss, D., and DeSanto, B. (2002). *Public Relations Cases: International perspectives.* London and New York: Routledge
- Parsons, P. J. (2008). *Ethics in Public Relations: A Guide to Best Practice* (2nd Ed). London and Philadelphia: KoganPage
- Phillip, D., and Young, P. (2009). *Online Public Relations: A Practical Guide to Developing an Online Strategy in the World of Social Media* (2nd Ed). London and Philadelphia: KoganPage.
- Solis, B., and Breakenridge, D. (2009). *Putting the Public Back in Public Relations: How Social Media Is Reinventing the Aging Business of PR.* New Jersey: Pearson Education
- Tench, R. and Yeomans, L. (2006). *Exploring Public Relations.* Harlow: Pearson Education
- Theaker, A. (2001). *The Public Relations Handbook* (2nd Ed). ondon and New York: Routledge
- Waddington, S. (Ed.). (2012). *Share This: The Social Media Handbook for PR Professionals.* John Wiley & Sons Ltd

Additional Readingss:

- Bernays, E. L. (1928). *Manipulating Public Opinion: The Why and How.* American Journal of Sociology, 3(6), pp. 958-971
- Bernays, E. L. (1961). *Crystallizing Public Opinion.* New York: Liveright Publishing Corporation
- Coombs, W. T., and Holladay, S. J. (2014). *It's Not Just PR: Public Relations in Society* (2nd Ed). John Wiley & Sons
- Ginneken, J. v. (2003). *Collective Behavior and Public Opinion: Rapid Shifts in Opinion and Communication.* New Jersey and London: Lawrence Erlbaum Associates
- Heath, R. (2005) (Ed.). *Encyclopedia of Public Relations (Vol. I and II).* London, Thousand Oaks and New Delhi: Sage Publications
- Lippmann, W. (1998). *Public Opinion* (With a new Introduction by Michael Curtis). New Brunswick and London: Transaction Publishers
- Monoley, K. (2006). *Rethinking Public Relations: PR Propaganda and Democracy* (2nd Ed). London and New York: Routledge
- Singleton, A. (2014). *The PR Masterclass: How to Develop a Public Relations Strategy that Works!.* Wiley

Media Ethics, Laws and Development

Course Code	MJMC22401							
Course Title	Media Ethics, Laws and Development							
Course Credits	Lecture		Tutorial		Practice		Total	
	5		1		0		6	
Contact hours	75		15		00		90	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	This course aims to inspire ethical journalistic conduct and knowledge of the legal framework and ethical conduct guiding the practice of journalism across media platforms. The course makes the budding journalist conversant with popular critical issues along with the rich history of the development of Indian media and journalism. The course also makes the budding journalist conversant with the current national and international industry ecosphere.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	0	0	80	40%	100	40%

*No practical examination will be conducted. The practice work will be evaluated as part of CCA.

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	ETHICS Concepts of Public Sphere and Public Interest Values: Human values and Indian ethos Regulatory framework: Press Council of India, NBA's News Broadcasting Standards Authority, IBF's BCCC, Central Board of Film Certification Press Council's Norms for Journalistic Conduct; NBA guidelines Intellectual Property: Intellectual Property Rights and its types, Creative Commons License, Copyright [amendment] Act, 2012; Content regime: Proprietary, Open source, freeware, shareware, fair use	15	3	0
II	THE LAWS Contempt: Contempt of Court, 1971; Law of Parliamentary Privileges (Article 105 [3] and 194 [3]); Parliamentary Proceedings (Protection of Publication) Act, 1977 (Article 361-A); Industry regulation: Press and Registration of Books Act, 1867; Cable TV Networks Regulation Act, 1995; Information Technology [amendment] Act, 2008 (portions relevant to media); Censorship: Official Secrets Act, 1923; Cinematograph Act, 1952; Young Persons (Harmful Publication) Act (1956); Law of Defamation (Section 499-502 of IPC); Law of Obscenity (Section 292-294 of IPC)	15	3	0

III	DEVELOPMENT OF INDIAN MEDIA-I Pioneers of Indian journalism and restrictions up to 1835; Press after 1857 revolt; Emergence of the Nationalist press; Indian press between the first and second world war; Post-independence: 1st and 2nd Press Commissions Press during Emergency	15	3	0
IV	DEVELOPMENT OF INDIAN MEDIA-II Development of radio in India Development of television in India Post-liberalization developments in print, satellites and cable television, private FM radio, FDI Internet Organisations: International Telecommunications Union, Internet Corporation for Assigned Names and Numbers, UN Internet Governance Forum, INTELSAT, COMSAT, TRAI	15	3	0
V	INDUSTRY ECOSPHERE Media ownership: Communist media, Development elites and the media, State-licensed media, Public service broadcasting, State-subsidized media, Privately-owned media, Community media; Other ownership patterns; New Media ownership Prasar Bharti Corporation, Press Institute of India, Editor's Guild of India, News Broadcaster's Association, Indian Broadcasting Foundation, PIB, DAVP, ABC News agencies: PTI, UNI, IANS, Univarta, Hindustan Samachar, ANI The Big Six: National Amusements, Walt Disney, AT&T, Comcast, News Corp, Sony Internet Giants: Alphabet Inc., Microsoft, Meta, Apple, Amazon, Twitter Ownership issues: Media pluralism, media integrity, net neutrality	15	3	0

Essential Reading:

- Barns, M. (1940). *Indian Press.* London: Allen & Unwin.
- Basu, D. (1982). The *Law of the Press in India.* New Delhi: Prentice-Hall
- Chatterji, P. C. (1987). *Broadcasting in India.* New Delhi: Sage
- Eliott, D. (Ed.) (1986). *Responsible Journalism.* Beverly Hills: Sage Publications.
- Iyer, V. (Ed.) (2000). *Mass Media Laws and Regulations in India* (2nd Ed). Indian Research Press
- Karkhanis, S. (1981). *Indian Politics and Role of the Press.* New Delhi: Vikas Publishers.
- Mankekar, D.R. (1973). *The Press versus the Govt.* New Delhi: Indian Book Co.
- Natarajan, J. (1955). *History of Indian Journalism*. Publications Division, Ministry of I&B, GoI.
- Raghvan, V. (2007). *Communication Law in India.* Lexis Nexis Butterworths
- Ranganathan, M., and Rodrigues, U. M. (2010). *Indian Media in a Globalised World.* Sage
- Rao, S. (2009). *Globalization of Indian Journalism*, 'Journalism Studies'. Routledge
- Sharma, K. C., and Sharma, J. N. (2008). *Journalism in India: History Growth Development.* Oscar
- Thakurta, P. G. (2009). *Media Ethics.* Oxford University Press
- Kohli-Khandekar, V. (2013). *The Indian Media Business* (4th Ed). LA, London, New Delhi, Singapore, Washinton DC: Sage.
- Kothari, G. (1995). *Newspaper Management in India.* New Delhi: DK Publishers.
- Ranganathan, M., and Rodrigues, U. M. (2010). *Indian Media in a Globalised World.* New Delhi: Sage

Additional Reading:

- Crawford, N. A. (1969). *The Ethics of Journalism*. Connecticut: Greenwood Press.
- Lichtenberg, J. M. (Ed.) (1990). *Democracy and Mass Media*. Cambridge Univ. Press.
- Mazumdar, A. (1993). *Indian Press and Freedom Struggle*. Calcutta: Orient-Longman.
- Shamra, K. C. (2007). *Journalism in India: A story, Growth, Development*. New Delhi: Indiana.

Visual Communication and Design

Course Code	MJMC22402							
Course Title	Visual Communication and Design							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		1		1		6	
Contact hours	60		15		30		105	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	This course is aimed at achieving three goals. First, to build a theoretical appreciation of the visual; second, to familiarize with the graphic design concepts and tool; and lastly, to train the student in applying the conceptual understanding and the tools in the art of graphic designing.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	5 x 12 = 60 marks
Total Marks (A+B)		80 marks

Course Components:

Unit	Topic	Contact Hours		
		L	T	P
I	VISUAL COMMUNICATION THEORIES – I Meaning of Visual Communication **Visual Cognitive Theory:** Understanding Cognition as Intuitive and Rational; Visual Cognition Models (Jaynes' Bicameral Mind and the Evolution of Reason; Bogen and Sperry left-right brain specialization theory; Parallel/Dualistic Organizational Models; Gardner's Multiple Intelligences; Visual Cognition, the Unconscious Mind, and Behaviour); Omniphasism: Balancing Visual Knowing and Cognitive Theory	12	3	0
II	VISUAL COMMUNICATION THEORIES – II **Visual Literacy Theory:** Meaning of Visual Literacy; Visual Literacy Skills (Thinking in Pictures, From Scene to Shot Sequence, Editing and Spatial Intelligence, Analogical Thinking, Visual Analogy); Critical Viewing (Interpreting visual lies; Understanding the power of image – Analogy to Everyday Experience, Manipulation of Point of View, Implicit Argumentation, Associational Juxtaposition)	12	3	0
III	GRAPHIC DESIGN BASICS **Graphic design:** Meaning and scope, Art or craft; **Graphic Design History:** From the beginning to the turn of the century, Modernism, Abstract Movements, Figurative Movements, Postmodernism; Computer Graphics: Digital Focus, New Technologies, Interactivity, The Future	12	3	0

	Perception: Seeing and Believing (Simplicity, Interpretations); Figure/Ground (Categories – Stable Figure/Ground, Reversible Figure/Ground, Ambiguous Figure/Ground; Letterforms); Shape (Shape versus Volume, Grouping Shapes, Shape versus Subject, Form of Shapes, Letterform Shapes)			
IV	GRAPHIC DESIGN PROCESS, TYPOGRAPHY AND COLOUR **Graphic Design Process:** Research, Creative Brief, Concept Development, Selling the idea, Execution, Process record Elements of Design (Point, Line, Shape, Colour, Volume, Movement, Space, Texture, Value, Typography); Principles of Design (Alignment, Balance, Contrast, Emphasis, Gestalt, Harmony, Movement, Proportion, Proximity, Repetition, Rhythm, Unity, White Space) **Typography:** Design of Characters; Typefaces; Size of Type; Stylistics Variation of Type; Typeface Personalities; Selection of Typefaces; Common Typefaces; Selecting Typefaces for paper & ink; screen, visual displays, computer print outs **Colour in Design:** Designing with Colour (The Colour Wheel, Properties of Colour, Colour Schemes); Colour in Printing (Tint Screens, Spot Colour or Process Colour?, Process Colour Separations, Cutting Costs, Halftones, Duotones, and Tritones)	12	3	15
V	LAYOUT AND DESIGN **Layout:** Paper size; Page composition (Page size, Text face, classic model for page design, Margins, Grid systems, Oppositions); Text layout (Justified or unjustified text, Line length, interline distance, Space, Headings, Paragraphs, Tables, Captions, Quotations, Lists, Miscellaneous); Layout of text and pictures (Different layouts, Balance in design, the picture area index); Photography in a Layout (Cropping, Resizing, Selecting, Multi-panel Design) **Production:** Preparing for Press (The Process, Quality Issues, Digital Prepress – The RIP, Fonts, Scanning, LPI and DPI, File Links, File Formats, Compression)	12	3	15

Essential Reading:

- Dake, D. (2005). Aesthetics Theory. In Smith, K., Moriarty, S., Barbatsis, G., and Kenney, K. (Eds.), *Handbook of Visual Communication* (3-22). Mahwah, New Jersey, London: Lawrence Erlbaum Associates
- Foss, S. K. (2005). Theory of Visual Rhetoric. In Smith, K., Moriarty, S., Barbatsis, G., and Kenney, K. (Eds.), *Handbook of Visual Communication* (141-152). Mahwah, New Jersey, London: Lawrence Erlbaum Associates.
- Williams, R. (2005). Cognitive Theory. In Smith, K., Moriarty, S., Barbatsis, G., and Kenney, K. (Eds.), *Handbook of Visual Communication* (193-210). Mahwah, New Jersey, London: Lawrence Erlbaum Associates.
- Sandra Moriarty, S. (2005). Visual Semiotics Theory. In Smith, K., Moriarty, S., Barbatsis, G., and Kenney, K. (Eds.), *Handbook of Visual Communication* (227-242). Mahwah, New Jersey, London: Lawrence Erlbaum Associates.
- Messaris, P., and Moriarty, S. (2005). Visual Literacy Theory. In Smith, K., Moriarty, S., Barbatsis, G., and Kenney, K. (Eds.), *Handbook of Visual Communication* (479-502). Mahwah, New Jersey, London: Lawrence Erlbaum Associates.
- Arntson, A. E. (2007). *Graphic Design Basics* (5th Ed.). Thompson, Wadsworth

- Ambrose, G., and Harris, P. (2008). *The Production Manual: A Graphic Design Handbook.* AVA Publishing SA

Additional Reading:

- Machin, D. (Ed.). (2014). *Visual Communication.* Berlin and Boston: Walter de Gruyter
- Jamieson, H (2007). *Visual Communication: More Than Meets the Eye.* Bristol and Chicago: Intellect

Value-added Communication Practice-1

Course Code	MJMC22105							
Course Title	Value-added Communication Practice-1							
Course Credits	Lecture		Tutorial		Practice		Total	
	0		0		4		4	
Contact hours	0		0		120		120	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	00	20	80		00		100	
Course objective	This course aims to hone personal communication and professional skills of the learner. The learner emerges with a confidence of having applied her skills to the real world projects and starts building a portfolio for the future.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	80	40%	00	00	100	40%

Course Contents:

Unit	For Regular Students	For ICDEOL Students	Contact Hours		
			L	T	P
I	i. Group Project – 10 marks** ii. Newsense Blog and Social Media Activity – 15 marks**	i. Assignments# – 20 marks*	0	0	30
II	iii. Mock Interviews – 10 marks* iv. Group Discussion/Debate – 10 marks*	ii. Assignments# – 30 marks**	0	0	30
III	v. Hindi Typing Skills (English typing skills for students of foreign origin) – 10 marks** vi. Self-Presentation Skills – 15 marks**	iii. Current Affairs File – 25 marks**	0	0	30
IV	vii. Lab Journal (Newsense) – 15 marks** viii. Current Affairs File – 10 marks**	iv. Viva Voce – 25 marks**	0	0	30

Examination and Evaluation Scheme:

* Part of CCA. Evaluation to be done throughout the semester by the institute of studies.

** Evaluation at semester-end by external examiner along with internal faculty.

Assignments to be prescribed and evaluated by the institute of studies.

Value-added Communication Practice-2

Course Code	MJMC22203							
Course Title	Value-added Communication Practice-2							
Course Credits	Lecture		Tutorial		Practice		Total	
	0		0		6		6	
Contact hours	0		0		180		180	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	00	20	80		0		100	
Course objective	This course seeks to prepare the learner for the real world professional challenges and equip her with skills required to secure a job in the communication industry.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	80	40%	00	00	100	40%

Course Contents:

Unit	For Regular Students	For ICDEOL Students	Contact Hours		
			L	T	P
I	i. Mock Interviews – 10 marks* ii. Group Discussion/Debate – 10 marks*	i. Assignments# – 20 marks*	0	0	30
II	iii. Group Project –15 marks** iv. Newsense Blog and Social Media Activity – 15 marks**	ii. Assignments# – 30 marks**	0	0	60
III	iii. Position Paper^ – 15 marks** iv. Current Affairs File – 10 marks**	iii. Position Paper^ – 15 marks** iv. Current Affairs File – 10 marks**	0	0	60
IV	vii. Resume writing – 15 marks** viii. Personal Interview Skills – 10 marks**	v. Resume writing – 15 marks** vi. Personal Interview Skills – 10 marks**	0	0	30

Examination and Evaluation Scheme:

* Part of CCA. Evaluation to be done throughout the semester by the institute of studies.

** Evaluation at semester-end by external examiner along with internal faculty.

^ To be assigned by the faculty advisor in the institute of studies.

Assignments to be prescribed and evaluated by the institute of studies.

^ To be assigned by the faculty advisor in the institute of studies.

Value-added Communication Practice-3

Course Code	MJMC22303							
Course Title	Value-added Communication Practice-3							
Course Credits	Lecture		Tutorial		Practice		Total	
	0		2		4		6	
Contact hours	0		30		120		150	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	80		00		100	
Course objective	This course brings hands-on skills and exposure to co-curricular aspects having deep impact on a young professional's life such as skill development; Innovation, start-ups, entrepreneurship; Soft skills; Intellectual property rights; Cyber security; Gender sensitization; Disaster management and preparedness; Human rights and Indian ethos; Community service and engagement; and Critical appraisal skills for health reporting.							
Pass marks	IA*		Practical*		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	80	40%	00	00	100	40%

Course Contents:

Unit	For Regular Students	For ICDEOL Students	Contact Hours		
			L	T	P
I	i. Gender Sensitisation Workshop – 10 marks* ii. Human Values and Indian Ethos Sensitization Workshop – 10 marks*	i. Assignments – 20 marks#	0	10	30
II	iii. Intellectual Property Rights Workshop – 10 marks* iv. Disaster Management and Preparedness Workshop (with special emphasis on role of journalists) – 10 marks* v. Innovations, startups and entrepreneurship Workshop – 10 marks*	ii. Assignments – 30 marks#	0	10	30
III	vi. Cyber Security Workshop – 10 marks* vii. Conflict and crisis reporting workshop – 10 marks* viii. Critical Appraisal Skills for Health Journalism Workshop (UNICEF Module) – 10 marks*	iii. Current Affairs File – 10 marks# iv. Minor Project˜ – 20 marks#	0	10	30
IV	ix. Community Service and Engagement – 10 marks** x. Newsense Blog – 10 marks**	ix. Viva Voce – 20 marks**	0	0	30

Examination and Evaluation Scheme:

* Evaluation to be done throughout the semester by the workshop coordinators.

To be prescribed and evaluated by the institute of studies.

˜Minor Project has to be a unique individual creative endeavour focusing on single topic/theme in any the following fields: print journalism, broadcast journalism, online content, advertising, public

relations, content writing/editing, photography, graphic designing, audio-video production, and development communication. A candidate shall submit and present the project report at the time of the viva voce conducted by the institute of studies. Topic and scope of the project shall be finalized in consultation with faculty advisor.

** Evaluation at semester-end by external examiner along with internal faculty.

Comprehensive Viva Voce

Course Code	MJMC22403							
Course Title	Comprehensive Viva Voce							
Course Credits	Lecture		Tutorial		Practice		Total	
	0		0		4		4	
Contact hours	0		0		0		0	
Examination Scheme	Internal Assessment		Practical Examination*		End-semester Examination		Total Marks	
	Attendance	CCA						
	00	00	100		00		100	
Course objective	This course aims to hone communication and professional skills of the learner. The learner emerges with a confidence of having applied her skills to the real world projects and starts building a portfolio for the future.							
Pass marks	IA		Practical*		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	00	40%	100	40%	00	00	100	40%

Course Contents:
Students will make a portfolio and a presentation to showcase their work throughout all four semesters of the programme.

Examination and Evaluation Scheme:
* Evaluation will be done at the end of the semester by an external examiner from the industry with support from internal examiner(s). The evaluation will be based on the candidate's portfolio, presentation and viva voce covering the course contents of all four semesters.

Industry Internship

Course Code	MJMC22304							
Course Title	Industry Internship							
Course Credits[@]	Lecture		Tutorial		Practice		Total	
	0		0		4		4	
Contact hours	0		0		180		180	
Examination Scheme	Internal Assessment[#]		Practical Examination*		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	80		0		100	
Course objective	This course seeks to prepare the learner for the real world professional challenges and equip her with skills required to secure a job in the communication industry.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	80	40%	00	00	100	40%

[@] This is a non-CGPA mandatory course. The credits of this course will not be counted towards total credits earned by a candidate for the degree programme.

[#] One faculty member from the Department of Journalism and Mass Communication will act as the internal supervisor for a student who opts for internship. The internal supervisor will award marks based on regular feedback and attendance from the organisation.

[*] Based on seminar presentation in the Department by a student based on the work done during the internship.

Internship Components:

- For industry internship a student will join an organisation of repute working either in the area of mass communication or the communication department an organisation of repute, provided that the work undertaken during industry internship is in the following areas: journalism, public relations, advertising, development communication or visual communication. A student can also have the following work profiles: writing, copy editing, production or designing in television, radio, print publications, internet publications, etc.
- A student may complete a minimum of 180 working hours with the organisation where (s)he is placed. These 180 hours may be completed by working either part-time or full-time.

Notes:

- Finding the internship placement will be the sole responsibility of the student.
- Internship can be joined after the 3rd Semester end-semester examination.

Community and Community Media

Course Code	MJMC22106							
Course Title	Community and Community Media							
Course Credits	Lecture		Tutorial		Practice		Total	
	3		1		0		4	
Contact hours	45		15		0		60	
Examination Scheme	Internal Assessment		Practical Examination		Theory Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	In a post-globalization world, the 'community' is undergoing resurgence. This course sensitizes the student to the various ways in which community has been conceptualized. The course also introduces the student to the potential of using community media in making a difference to our world.							
Pass marks	IA		Practical		Theory Exam		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	0	0	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have four sub-sections covering all four units of the syllabus. One out of two questions from each sub-section is to be answered (700 words) for 15 marks each.	4 x 15 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	COMMUNITY AS THEORY Community: Meaning; Concepts of *Gemeinschaft* and *Gesellschaft* • Jürgen Habermas' Public Sphere • Hermeneutic Communities • Liquid Modern Communities • Postmodern Communities COMMUNITY AS PLACE • Cosmopolitanism, Worldliness and the Cultural Intermediaries • Liminality, Communitas and Anti-Structure • Locality, Place and Neighbourhood • Virtual Communities	12	4	0
II	COMMUNITY AS METHOD • Action Research • Community Profiling • Community Studies • Ethnography • Social Network Analysis	12	3	0
III	COMMUNITY AS IDENTITY/BELONGING • Community and Identity	11	4	0

	• Imagined Communities • The Symbolic Construction of Community COMMUNITY AS IDEOLOGY • Communitarianism • Imaginary Communities • Nostalgia • The 'Dark Side' of Community			
IV	COMMUNITY MEDIA Community media: meaning and origins; types and examples Community media as Alternative media Community Radio in India Community Radio Best Practices Community Media Issues: Community media and Democracy; Community media and Cultural Globalisation; Community media as Socio-Cultural Mediation; Community media and Collaboration; Community media and Community Development; Community media and Participation; Community media and Social Movements Community media and the Internet	12	4	0

Essential Reading:

- Blackshaw, T. (2010). *Key Concepts in Community Studies.* New Delhi: Sage Publications
- Howley, K. (2005). *Community Media: People, Places, and Communication Technologies.* Cambridge : Cambridge University Press
- Buckley, S. (Ed.). (). *Community Media: A Good Practice Handbook.* UNESCO
- Coyer, K., Dowmunt, T., and Fountain, A. (2007). *The Alternative Media Handbook.* London and New York: Routledge
- Bailey, O., Cammaerts, B., and Carpentier, N. (2008). *Understanding Alternative Media.* New York: Open University Press

Additional Reading:

- Cohen, A. P. (1985). *The Symbolic Construction of Community*. London: Tavistock
- Heller, A. (1999). *A Theory of Modernity*. Oxford: Blackwell
- Hobsbawm, E. (1995). *Age of Extremes: The Short Twentieth Century 1914–1991*. London: Abacus
- Anderson, B. (1991). *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (2nd ed.). London: Verso
- Bauman, Z. (2000). *Liquid Modernity*. Cambridge: Polity Press
- Bell, C. and Newby, H. (1971). *Community Studies: An Introduction to the Sociology of the Local Community*. London: George Allen and Unwin
- Tönnies, F. (1955, 1887). *Gemeinschaft und Gesellschaft* (trans. *Community and Society*). London: Routledge

Development Communication

Course Code	MJMC22204							
Course Title	Development Communication							
Course Credits	Lecture		Tutorial		Practice		Total	
	3		1		0		4	
Contact hours	45		15		0		60	
Examination Scheme	Internal Assessment		Practical Examination		Theory Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	This course aims to sensitize the learner about the various development regimes and the development apparatus, including development communication, that supports (and fails) the development initiatives. The learner shall emerge a wiser and a more efficient practitioner of communication for development.							
Pass marks	IA		Practical		Theory Exam		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	0	0	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have four sub-sections covering all four units of the syllabus. One out of two questions from each sub-section is to be answered (700 words) for 15 marks each.	4 x 15 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	DEVELOPMENT BASICS Meaning of development Classical and neo-liberal development theories Structuralism, neo-Marxism and socialism Grassroots development; Social and cultural dimensions of development Environment and development theory; Post-Development Globalization and development: problems and solutions Dependency paradigm, World Systems Theory	12	3	0
II	DEVELOPMENT INSTITUTIONS Developmental and rural extension agencies; governmental, semi-government, non-governmental organizations; Panchayati Raj Institutions (mandate and structure); Development planning at national, state, regional, district, block and village levels. Major development initiatives Himachal Pradesh and Indian Govt. United Nations and its bodies; Other major national and international NGOs and organisations and their programmes Human Rights; Right to Education, Right to work; Right to services	11	3	0
III	DEVELOPMENT COMMUNICATION Meaning and need for development communication Magic Multipliers: (Lerner, Scramm, Rogers); Development Support Communication; Diffusion of Innovations; Two-step Flow; Extension as	12	3	0

	development; Population IEC and Health Communication; Social Marketing and Behaviour Change Communication; Information and Communication Technologies for Development (ICT4D) Participatory Development Communication (Dialogical approach and Self-management, access and participation) Agenda Setting; Communication for Development (C4D)			
IV	Media and Development Role of media in National Development Historical perspective on media for development: Print, Radio, TV, Video, Traditional and Folk Media, Community Media; Development Journalism; Critical appraisal of development journalism in India New technologies for development (special emphasis on India); National Knowledge Network Designing messages for development: Strategy, framing, writing/ scripting, producing, disseminating development messages for urban, semi urban and rural audiences.	10	6	0

Essential Reading:

- Belmont, C. A. (2001). *Technology Communication Behaviour.* New Delhi: Wordsworth
- Dharmarajan, S. (2007). *NGOs as Prime Movers.* New Delhi: Kanishka Publications
- Madhusudan, K. (2006). *Traditional Media and Development Communication.* New Delhi: Kanishka Publishers
- Mehta, S.R. (Ed.) (1992). *Communication in Social Development.* Jaipur: Rawat Publications
- Melkote, S., and Steeves, H. L. (2001). *Communication for Development in the Third World: Theory and Practice for Empowerment* (2nd Ed). New Delhi: Sage Publications.
- Nair, K. S., and White, S. A. (1993). *Perspectives on Development Communication.* New Delhi: Sage Publication
- Ninan, S. (2007). *Headlines from the Heartland: Reinventing the Hindi Public Sphere.* LA: Sage Publications
- Parmar, S. (1975). *Traditional Folk Media in India.* New Delhi: Gekha Books
- Rogers, E. M. (2000). *Communication and Development: Critical Perspective.* New Delhi: Sage Publications
- Schramm, W. (1964). *Mass Media and National Development.* Stanford Univ. Press
- Schramm, W., and Lerner, D. (1967). *Communication and Change in the Developing Countries.* Honululu: East West Center Press
- Servaes, J. (Ed.) (2002). *Approaches to Development Communication.* Paris: UNESCO
- Willis, K. (2005). Theories and Practices of Development. London and NY: Routledge

Additional Reading:

- Bebbington, A.J. and Bebbington, D.H. (2001). Development Alternatives: Practice, Dilemmas and Theory. *Area,* 33 (1): 7-1 7
- E.M. Rogers (1995). Diffusion of Innovations (4th Ed). New York: Free Press
- Escobar, A (1995). Encountering Development: The Making And Unmaking Of The Third World: 12–14
- Hunt, D. (1989). Economic Theories of Development: An Analysis of the Competing Paradigms. NT: Harvesters Whitsheaf
- Joshi, P.C. (2002). Communication and National Development. Anamika Publishers

- Kiely, R. (1999). The Last Refuge of the Noble Savage? A Critical Assessment of Post-Development Theory. *The European Journal of Development Research*, 11 (1): 30-55
- Lerner, D. (1958). The Passing of Traditional Society. Glencoe: Free Press
- Nustad, K.G. (2001). Development: The Devil We Know? *Third World Quarterly*, 22 (4): 479-489
- Pieterse, J.N. (1996). The Development of Development Theory: Towards Critical Globalism. *International Political Economy*, 3 (4): 541-564
- Pieterse, J.N. (1998). My Paradigm or Yours? Alternative Development, Post-Development, Reflexive Development. *Development and Change*, 29 (2): 343-373
- Pieterse, J.N. (2000). After post-development. *Third World Quarterly*, 21 (2): 175-191
- Thakur, B. S., and Agarwal, B. C. (1989). Media Utilization for Development of Women and Children. New Delhi: Concept Publishers

Media and Cultural Studies

Course Code	MJMC22305							
Course Title	Media and Cultural Studies							
Course Credits	Lecture		Tutorial		Practice		Total	
	3		1		0		4	
Contact hours	45		15		0		60	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	The media is a powerful actor in social conditioning. It mirrors, transplants and perpetuates social norms and values. This course is designed to equip a student appreciate the politics of mass media culture industry by sensitizing her towards the dynamics of this power and its impact on cultures in the globalised world.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have four sub-sections covering all four units of the syllabus. One out of two questions from each sub-section is to be answered (700 words) for 15 marks each.	4 x 15 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	CULTURE AND IDENTITY Culture: Meaning and definition, characteristics; Classification: Macro and Micro, and Material and Non-Material Culture; Concepts of Mass Culture, Pop Culture, Subculture, Counterculture Raymond William's Culture as *'a whole way of life'* Stuart Hall: Culturalism vs. Structuralism	12	4	0
II	CULTURE, IDENTITY AND MEANING-MAKING Identity: Self-concept, personal vs. social identity Constituents of identity; Identity change; Identity Negotiation Theory Symbolic Interactionism; Social Constructionism; The Media Literacy Movement	11	4	0
III	GLOBALISATION AND GLOBAL CULTURE Gloablisation: concept, meaning, driving forces; Global trade in media culture, global media culture, capitalism and the rise of consumer culture Global media structure: Multinational media ownership and control, Varieties of global mass media International news flow: Imbalance in the news flow, MacBride Commission report, NWICO Stuart Hall's Cultural Hegemony vs. Cultural Resistance and Struggle	11	3	0

IV	INTER-CULTURAL COMMUNICATION Hofstede's Cultural Dimensions Theory Communication Accommodation Theory Inter-culture Networks Theory Cultural change: Four-fold model of acculturation; Concepts of cultural maintenance, cultural hybridization, multiculturalism, cultural pluralism, intercultural competence Cultural Convergence Theory	11	4	0

Essential Reading:

- Baran, S. J., and Davis, D. K. (2012). *Mass Communication Theory: Foundations, Ferment, and Future* (6th Ed). Wadsworth, Cengage Learning
- Barker, C. (2002). *Making Sense of Cultural Studies: Central Problems and Critical Debates.* London, Thousand Oaks, New Delhi: Sage Publications.
- Fiske. J. (2011). *Introduction to Communication Studies: Studies in Culture and Communication* (3rd Ed). Oxon: Routledge.
- Golding. P. and Harris, P. (Eds.) (1999). *Beyond Cultural Imperialism: Globalization, Communication and the New International Order.* London, Thousand Oaks, New Delhi: Sage Publications.
- Gudykunst, W. B. and Mody, B. (Eds.) (2002). *Handbook of International and Intercultural Communication* (2nd Ed). London, Thousand Oaks, New Delhi: Sage Publications.
- Hall, S. (2016). *Cultural Studies 1983: A Theoretical History.* Durham and London: Duke University Press.
- McQuail, D. (2010). *McQuail's Mass Communication Theory* (6th Ed). London, Thousand Oaks, New Delhi, Singapore: Sage Publications.

Additional Readings:

- Gurevitch, M., Bennett, T., Curran, J. and Woollacott, J. (Eds.) (1982). *Culture, Society and the Media.* London and New York: Routledge.
- Ryan, M. (2010). *Cultural Studies: A Practical Introduction.* Wiley-Blackwell

Dissertation

<table>
<tr><td>Course Code</td><td colspan="8">MJMC22404</td></tr>
<tr><td>Course Title</td><td colspan="8">Dissertation</td></tr>
<tr><td rowspan="2">Course Credits</td><td colspan="2">Lecture</td><td>Tutorial</td><td colspan="2">Practice</td><td colspan="3">Total</td></tr>
<tr><td colspan="2">0</td><td>1</td><td colspan="2">3</td><td colspan="3">4</td></tr>
<tr><td>Contact hours</td><td colspan="2">0</td><td>15</td><td colspan="2">90</td><td colspan="3">105</td></tr>
<tr><td rowspan="3">Examination Scheme</td><td colspan="2">Internal Assessment</td><td rowspan="2">Practical Examination*</td><td rowspan="2">End-Semester Examination</td><td colspan="3" rowspan="2">Total Marks</td></tr>
<tr><td>Attendance</td><td>CCA</td></tr>
<tr><td>5</td><td>15</td><td>80</td><td>0</td><td colspan="3">100</td></tr>
<tr><td>Course objective</td><td colspan="8">This course seeks to introduce a learner to the rigours for practical aspects of research in the field of communication. It lays the ground work for preparing a student to take up and complete research projects in a professional manner either in the industry or academics.</td></tr>
<tr><td rowspan="3">Pass marks</td><td colspan="2">IA</td><td colspan="2">Practical</td><td colspan="2">ESE</td><td colspan="2">Total</td></tr>
<tr><td>Max</td><td>Pass</td><td>Max</td><td>Pass</td><td>Max</td><td>Pass</td><td>Max</td><td>Pass</td></tr>
<tr><td>20</td><td>40%</td><td>80</td><td>40%</td><td>00</td><td>00</td><td>100</td><td>40%</td></tr>
</table>

* By external examiner based on seminar presentation by the student and viva-voce examination.

Course Components:

- A student opting for dissertation will have to submit a research-based dissertation at the end of the semester. The topic for the research study, its scope and objectives and methodology will be finalized in consultation with the faculty advisor allotted at the beginning of the semester. The topic for research will be finalised only after the approval of the synopsis by the Departmental Research Committee.
- The topic and research study may either be in Hindi or English, not bi-lingual.
- The work submitted as dissertation by any candidate should be the original work of the candidate, free of plagiarism and completed under the direct supervision of the faculty advisor.
- A dissertation may be submitted only after the due approval and signatures of the faculty advisor.

Major Project

Course Code	MJMC22405							
Course Title	Major Project							
Course Credits	Lecture		Tutorial		Practice		Total	
	0		0		4		4	
Contact hours	0		0		120		120	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	80		0		100	
Course objective	This course seeks to prepare the learner for the real world professional challenges and equip her with skills required to secure a job in the communication industry.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	80	40%	00	00	100	40%

Course Components:

- Students will conduct an inquiry using a variety of methods (e.g. case study, observation and analysis, planning, etc.) to undertake a task or study a subject and write a report in line with the objectives of the project.
- The project work will address a real life problem and the procedures and practices used in industry.
- Students may will plan, implement, or evaluate projects that have real-world applications beyond the classroom.
- The projects may be of any of the following type: case study, service learning projects, work-based projects, task-oriented projects, or problem-solving projects. All projects should have the following features: A definite beginning, middle, and end; directly observable information; real-world problems; First-hand investigation; tangible outcomes that can be shared with the stakeholders; evidence of reflective thinking by the student
- Based on the above, a student will prepare and submit a Major Project Report (up to ten thousand words) which will be assessed by external experts.
- Viva-voce by an external expert will be an integral part of the evaluation process.
- The area/topic of the project will be selected in consultation with the faculty of the institution of studies at the beginning of the semester.
- Practical examination will be conducted by external examiner (with help from internal faculty) based on Project Report and viva-voce examination as per the following criteria:

Sr.	**Performance criteria**	**Marks**
1.	Selection and planning of project assignment	10
2.	Analysis and evaluation of the problem	10
3.	Providing solution of the problems	10
4.	Report writing	30
5.	Viva voce	20
Total		80

Basics of Convergence Media

Course Code	MJMC22205							
Course Title	Basics of Convergence Media							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		0		0		4	
Contact hours	60		00		00		60	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	00		80		100	
Course objective	The course prepares the student for holistic understanding of new media technologies. While introducing the student to the potential and pitfalls of this technology, the course prepares them to engage with the technology meaningfully and efficiently.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	40%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have four sub-sections covering all four units of the syllabus. One out of two questions from each sub-section is to be answered (700 words) for 15 marks each.	4 x 15 = 60 marks
Total Marks (A+B)		80 marks

Course Components:

Unit	Topic	Contact Hours		
		L	T	P
I	EVOLUTION OF ICTS Phase 1: From cave paintings and fire signals to telegraph Phase 2: Telegraph to broadcasting Phase 3: Digital ICTs, Social and Mobile Media, Artificial Intelligence Concepts: Digital natives and Millennials, Net Etiquette, Cyber Culture, Theoretical Concerns: Technology determinism, ICT proliferation and digital divide; Digital (Human) Rights	15	0	0
II	EXPANDING LEXICON Tools: SEO, Analytics, Cross-platform promotion, click baits, crowd funding, crowd sourcing, geotagging, angel investors and start-ups, 3-D printing, Wearable technologies Concepts: Web 2.0, Cloud computing, Ubiquitous Computing and Internet of Things, Cleverbots and Natural Language Processing, Metaverse, Web 3.0 – The Semantic Web Theoretical Concerns: Singularitarianism, Techno-progressivism, Technological utopianism, Posthumanism and Transhumanism	15	0	0
III	CONSTRUCTING REALITY Virtual Everything: Virtual world, Virtual Avatars, Virtual Reality (Virtual, Immersive, Extended, Mixed and Augmented Reality and Augmented virtuality); Reality–virtuality continuum; Simulated Reality, Hyper Reality,	15	0	0

	Video games: Transreality gaming; Location-based games (pervasive games, mixed reality games and augmented reality games); Cross media games (simulation games, LARP and alternate reality games); Concepts of First-person (gaming) Theoretical Concerns: Gamification; Media violence theories and video game violence: Catharsis, Reinforcement, Cultivation			
IV	CRITICAL ISSUES Issues: Breach of privacy; Direct and indirect surveillance with special emphasis on Big Data; Cyber Security Content Culture: Information Overload vs. Filter bubble and Echo chambers; Big Data, Data Mining and Reality Mining Internet cultures: Activism, Slackativism, Hackactivism; homogenization, hybridization, mobilization, pluralism, fragmentation, polarity; Internet Addiction; Truth-by-consensus, Truthiness, Wikiality, Post-truth Concerns: Cypherpunk movement; The Social Construction of Reality; Neo-Luddism and Technophobia, The Internet Paradox	15	0	0

Essential Reading:

- Castells, M. (2000). *The Rise of the Network Society.* Wiley-Blackwell.
- Eugenia, S. (2011). Understanding New Media. Sage
- Gane, N., and Beer, D. (2008). *New Media: The Key Concepts.* Oxford and New York: Berg
- Green, L. (2010). *The Internet: An Introduction to New Media.* Oxford and New York: Berg
- Lister, M., Dovey, J., Giddings, S., Grant, I. And Kelly, K. (2009).New Media: A Critical Introduction (2nd Ed). London and New York: Routledge.
- Manovich, L. (2001). What is New Media? In *The Language of New Media.* Cambridge: MIT Press. pp. 19-48.
- VanDijk, J. (2012). *The Network Society* (3rd ED). London: Sage.

Additional Reading:

- Baym, N. K. (2010). *Personal Connections in the Digital Age.* Chapter 3.
- Bogost, I. (2007). *Persuasive Games: The Expressive Power of Videogames.* MIT Press.
- Goldsmith, J., and Wu, T. (2006). *Who Controls the Internet? Illusions of Borderless World.* Oxford University Press US.
- Hassan, R., and Thomas, J. (2006). *The New Media Theory Reader.* Berkshire and New York: Open University Press.
- Jenkins, H. (2006). *Convergence Culture: Where Old and New Media Collide.* New York: NYU Press.
- Lister Dovey, Giddings, Grant and Kelly, "New media and new technologies" (2003).
- Miller, V. (2011). *Understanding Digital Culture.* Sage Publications.
- Rosen, J. "The People Formerly Known as the Audience" What video games have to teach us about language and literacy. New York: Palgrave Macmillan.

Ethico-legal Issues in Media

Course Code	MJMC22406							
Course Title	Ethico-legal Issues in Media							
Course Credits	Lecture		Tutorial		Practice		Total	
	4		0		0		4	
Contact hours	60		00		00		60	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	This course aims to inspire ethical journalistic conduct and knowledge of the legal framework and ethical conduct guiding the practice of journalism across media platforms. The course makes the budding journalist conversant with popular critical issues along with the rich history of the development of Indian media and journalism. The course also makes the budding journalist conversant with the current national and international industry ecosphere.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	0	0	80	40%	100	50%

*No practical examination will be conducted. The practice work will be evaluated as part of CCA.

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	10 x 2 = 20 marks
Part B	This section shall have four sub-sections covering all four units of the syllabus. One out of two questions from each sub-section is to be answered (700 words) for 15 marks each.	4 x 15 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	ETHICS Concepts of Public Sphere and Public Interest Values: Human values and Indian ethos Regulatory framework: Press Council of India, NBA's News Broadcasting Standards Authority, IBF's BCCC, Central Board of Film Certification Press Council's Norms for Journalistic Conduct; NBA guidelines	15	0	0
II	INTELLECTUAL PROPERTY Intellectual Property Rights and its types, Creative Commons License Copyright [amendment] Act, 2012; Content regime: Proprietary, Open source, freeware, shareware, fair use	15	0	0
III	THE LAWS Contempt: Contempt of Court, 1971; Law of Parliamentary Privileges (Article 105 [3] and 194 [3]); Parliamentary Proceedings (Protection of Publication) Act, 1977 (Article 361-A) Rights: Right to Privacy, Right to be forgotten	15	0	0
IV	INDUSTRY REGULATION	15	0	0

	Press and Registration of Books Act, 1867; Cable TV Networks Regulation Act, 1995; Information Technology [amendment] Act, 2008 (portions relevant to media) Censorship: Official Secrets Act, 1923; Cinematograph Act, 1952; Young Persons (Harmful Publication) Act (1956); Law of Defamation (Section 499-502 of IPC); Law of Obscenity (Section 292-294 of IPC)			

Essential Reading:

- Basu, D. (1982). The *Law of the Press in India.* New Delhi: Prentice-Hall
- Chatterji, P. C. (1987). *Broadcasting in India.* New Delhi: Sage
- Eliott, D. (Ed.) (1986). *Responsible Journalism.* Beverly Hills: Sage Publications.
- Iyer, V. (Ed.) (2000). *Mass Media Laws and Regulations in India* (2nd Ed). Indian Research Press
- Raghvan, V. (2007). *Communication Law in India.* Lexis Nexis Butterworths
- Thakurta, P. G. (2009). *Media Ethics.* Oxford University Press
- Kohli-Khandekar, V. (2013). *The Indian Media Business* (4th Ed). LA, London, New Delhi, Singapore, Washinton DC: Sage.

Additional Reading:

- Crawford, N. A. (1969). *The Ethics of Journalism*. Connecticut: Greenwood Press.
- Lichtenberg, J. M. (Ed.) (1990). *Democracy and Mass Media*. Cambridge Univ. Press.

Annexure B

Himachal Pradesh University, Shimla – 171005

Department of Journalism and Mass Communication

Course Work for

Doctor of Philosophy in Journalism and Mass Communication

w.e.f. Academic Session 2022-23

Approved in PG-BoS held on 17.11.2022

(Ajay Kumar)	(Ajai Srivastava)	(Vikas Dogra)
(Shashi Kant)	(Jyoti Kamal)	(Kanwaljit Singh)

)

Norms for Ph.D. in Journalism and Mass Communication

1. Ph.D. is a full time regular course of study pursued by regular attendance in classes and seminars. A candidate seeking admission to the Ph. D. course must have at least 55% marks (50% in case of SC/ST) in the subject concerned at Master's level.
2. Applicants for the Ph.D. programme who hold either UGC NET(JRF)/Rajiv Gandhi Fellowship/Maulana Azad Fellowship/Awardees of Teacher Fellowship/ along with students sponsored by ICCR or any other Department of Govt. of India shall be exempt from the written entrance test. Such candidates will have to appear for interview and discussion on the research proposal as specified at 4(iii) below.
3. For the remaining seats, applicants shall have to appear for an entrance process of 100 marks, comprising written entrance test (70 marks) and interview/discussion on research proposal (30 marks).
4. Entrance process shall be conducted as follows:
    i. The written component of the entrance test shall carry 70 percent of the total 100 marks. The entrance will be of two-hour duration to be conducted in the form of Multiple Choice Questions; each question carrying one mark. The Entrance Test for Ph.D. shall have 50 percent as qualifying marks (45 percent in case of SC/ST candidates).
    ii. The syllabus for entrance test shall be 50 percent research methodology and 50 percent shall be subject specific.
    iii. The interview and discussion on the research proposal of the candidate with the Department Research Committee shall constitute 30 percent of the total 100 marks. The interview and discussion on the research proposal shall have 50 percent as qualifying marks (45 percent in case of SC/ST candidates).
    iv. Candidates appearing in entrance process shall be awarded aadditional weightage as follows:

Sr. No.	Category	Weightage
1	UGC-NET qualified	20 Marks
2	SLET qualified	15 Marks
3.	M.Phil from HPU	10 Marks

5. Other rules and regulations of the Himachal Pradesh University for admission and completion of Ph.D. degree shall apply.

Ph.D. (Journalism and Mass Communication) Course-work

Note: Minimum number of the credit requirement for the Ph.D. programme will be 14 credits. The coursework shall be treated as a prerequisite for Ph.D. preparation. The course-work for Ph.D. in Journalism and Mass Communication shall comprise of three courses. The scheme of examination and the detailed syllabi for the three courses will be as follows:

List of Courses

Discipline Specific Core Courses

Course Code				Course name	Marks Distribution			
LE	**SUB**	**SEM**	**NO.**		**IA**	**PR**	**ESE**	**TOT**
Semester - I								
PHD	JMC	1	01	Communication Research Methods	20	0	80	100
PHD	JMC	1	02	Communication Thought and Research Trends	20	0	80	100
PHD	JMC	1	03	Research and Publication Ethics	10	0	40	50

ESE	End-semester Examination
IA	Internal Assessment
JMC	Journalism and Mass Communication
L	Lecture
LE	Level
M	Master of Arts
PR	Practical Exam
SEM	Semester
SUB	Subject
T	Tutorial
TOT	Total marks
YR	Year of introduction

Communication Research Methods

Course Code	PHDJMC101							
Course Title	Communication Research Methods							
Contact hours	60		30		0		90	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	15	0		80		100	
Course objective	This course aims bring inculcate the thorough understanding of research methodologies, tools and processes to enable a budding researcher carry on research projects with confidence. The students will learn approaches to communication research, quantitative research concepts, qualitative research concepts, and report writing and presentation.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	50%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	2 x 10 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	12 x 5 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	RESEARCH METHODS AND DESIGNS Research: meaning, types and objectives; Scientific research: need, process and challenges; Research problem: Defining and selecting a research problem; Research design: meaning, need and importance; Census and sample surveys; Comparison of quantitative and qualitative research approaches.	12	6	0
II	APPROACHES TO COMMUNICATION RESEARCH Message- or Artifact-Oriented Research: Archival/Documentary Research (library/documentary research, historical research, legal/policy research, secondary data analysis, meta-analysis); Textual Research (Critical/Cultural Approaches, Textual Analysis, Conversation/Interaction Analysis, Content Analysis). People- or Behaviour-Oriented Research: Survey Research (Data Collection and Interviews, Questionnaires, Polls and Ratings, Intensive Interviews, Focus Groups); Observational Research (Ethnography, Participant Observation, Unobtrusive Observation, Network Analysis, Verbal and Nonverbal Coding, Pre-experimental Designs, Experimental Designs, Laboratory and Non-laboratory Research).	12	6	0
III	QUANTITATIVE RESEACH CONCEPTS The Data: Meaning and types of data, issues of reliability and validity; methods of collecting primary and secondary data.	12	6	0

	The Sample: Population and sample, Sampling error, Sample size, Sample designs: Probability and Non-probability sampling designs; Problems of sampling in social research. Hypothesis: Development and structure; Methods of hypothesis formulation; Hypothesis Testing. Data classification and presentation of data: Frequency distribution and graphic representation; Experimentation: Experiments in the social sciences: Laboratory experiments and field experiments, Experiments and quasi-experiments; advantages and limitations of experimentation. Causality: The concept of cause, empirical corroboration of the causal relationship.			
IV	QUALITATIVE RESEARCH CONCEPTS Qualitative Techniques: Participant Observation, Observation vs. participant observation; Fields of application and recent developments in participant observation; Overt and covert observation: access and informants; What to observe; Recording observations; Analysis of empirical material; Observation in microsociology; Limitations. Qualitative Interview: Collecting data by asking questions; Quantitative and qualitative interviewing; Types of interview; Conducting interviews; Analysis of empirical material; Use of Documents: Reading social traces; Personal documents; Institutional documents.	12	6	0
V	REPORT WRITING AND PRESENTATION What is a scientific paper? How to: prepare the title; list the authors and addresses; prepare the abstract; write the introduction; write the materials and methods section; write the results; write the discussion; cite the references; state the acknowledgments Thesis: Thesis writing in English as a second language; Writing a research proposal; The overall shape of theses and dissertations; Writing the Introduction; Writing the background chapters; Writing the Methodology chapter; Writing the Results chapter; Writing Discussions and Conclusions; Writing the Abstract and Acknowledgements.	12	6	0

Essential Reading:

- Rubin, R.B., Rubin, A.M., Haridakis, P.M. and J.P., Linda (2010). *Communication research: Strategies and sources* (7th edn.), Boston: Wadsworth Cengage Learning.
- Wimmer, R.A. and Dominick, J.R. (2011). *Mass media research: An introduction* (9th edn.), Boston: Wadsworth Cengage Learning.
- Corbetta, P. [Bernard Patrick (*Trans.*)] (2003). *Social research: Theory, methods and techniques,* London, Thousand Oaks and New Delhi: Sage Publications.
- Kothari, C.R. (2004). *Research methodology: Methods and techniques,* New Delhi: New Age International (P) Limited, Publishers.
- Day, R.A. (1998). *How to write and publish a scientific paper*, Arizona: The Oryx Press.
- Paltridge, B. and Starfield, S. (2007). *Thesis and dissertation writing in a second language: A handbook for supervisors,* London and New York: Routledge.

Communication Thought and Research Trends

Course Code	PHDJMC102							
Course Title	Communication Thought and Research Trends							
Contact hours	60		30		00		90	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	25	0		80		100	
Course objective	This course will apprise a student with the latest research thought and research trends in communication studies, thus enabling them to be up-to-date with their research own proposals in future. The course will introduce a student to theoretical background of communication research, along with the latest audience research methodologies, media output research, media exposure and response research and media response research.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	20	40%	00	00	80	40%	100	50%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Ten short answer (50 words) questions covering the entire syllabus for two marks each. All questions are compulsory.	2 x 10 = 20 marks
Part B	This section shall have five sub-sections covering the five units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 12 marks each.	12 x 5 = 60 marks
Total Marks (A+B)		80 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	THEORETICAL BACKGROUND OF COMMUNICATION RESEARCH Humanities Research Traditions: Researching the Text (rhetoric, hermeneutics, phenomenology, semiotics); Disciplines in Humanistic Research: Art history, literary criticism, linguistics, film studies. Social Science Research Traditions: Positivism, interpretive social science, critical social science. Interdisciplinary developments in communication research: Post modernism, feminism, cognitivism, cultural studies approach.	12	6	0
II	AUDIENCE RESEARCH METHODOLOGIES Quantitative Audience Research: Surveys (*distinguished along* the purpose of the survey, the form of administration and the time span of the research), Experiments (*along with* type of experimental design), Quasi-experimental research Qualitative Audience Research: Focus group, observational research (completely unstructured field studies, completely structured observation, semi-structured study, unstructured laboratory study)	12	6	0
III	MEDIA OUTPUT RESEARCH Content Analysis: Describing trends in media portrayals, testing hypotheses about the policies or aims of media producers, comparing media content with the real world, assessing the representation of particular groups in society, and drawing inferences about media effects; Experimental Research on media output: Typography and makeup	12	6	0

	research, readability research, television narrative analysis, analysis of television formats, linguistic codes within children's programmes, coders' perception and audiences' perception; Limits to quantitative content analysis; Qualitative Content Analysis: Structuralist-semiotic analysis, discourse analysis, rhetorical analysis, narrative analysis and interpretative analysis.			
IV	MEDIA EXPOSURE AND RESPONSE RESEARCH Key audience measures and data capture techniques (questionnaires, diaries, electronic recording devices, experience sampling, observation and in-depth interviews); Print Media Research (readership research, and circulation research); Electronic Media Usage (ratings research, and audience measurement); Qualitative approaches to audiences. Media Response Research: Affective Response: industry-driven affective research (off-line and on-line measures); Academic research (viewers' reaction, and viewers as editors).	12	6	0
V	MEDIA RESPONSE RESEARCH Cognitive Response: Off-line measures of attention and comprehension (survey interview measures, attention measurement in an experimental framework, focus group measures), Online measures (observational research, laboratory research for behavioural measures, physiological measures, and information-processing tasks) Cognitive Impact: Agenda-setting research, cultivation of beliefs and opinions, factual learning from the media.	12	6	0

Essential Reading:

- Gunter, B. (2000). *Media research methods: Measuring audiences, reactions and impact*, London, Thousand Oaks, New Delhi: Sage.
- Jensen, K.B. (Eds.) (2002). *A handbook of media and communication research: Qualitative and quantitative methodologies,* London and New York: Routledge.
- Frey, L.R. and Cissna, K.N. (Eds.) (2009). *Routledge handbook of applied communication research,* London and New York: Routledge.
- Paxson, P. (2010). *Mass Communications and Media Studies: An Introduction,* London and New York: *Continuum.*
- Wimmer, R.D. and Dominick, J.R. (2011). *Mass media research: An introduction,* Boston: Wadsworth.

Research and Publication Ethics

Course Code	PHDJMC103							
Course Title	Research and Publication Ethics							
Contact hours	15		00		15		30	
Examination Scheme	Internal Assessment		Practical Examination		End-semester Examination		Total Marks	
	Attendance	CCA						
	5	5	00		40		50	
Course objective	This course aims to steer a student towards understanding the importance of ethics in best practices in research and research publications.							
Pass marks	IA		Practical		ESE		Total	
	Max	Pass	Max	Pass	Max	Pass	Max	Pass
	10	40%	00	00	40	40%	50	50%

Instructions for Paper Setters:

Maximum time: 3 hours.

Part A	Five short answer (50 words) questions covering first three units of the syllabus for two marks each. All questions are compulsory.	2 x 5 = 10 marks
Part B	Three sub-sections covering first three units of the syllabus. One out of two questions from each sub-section is to be answered (500 words) for 10 marks each.	10 x 3 = 30 marks
Total Marks (A+B)		40 marks

Course Contents:

Unit	Topic	Contact Hours		
		L	T	P
I	PHILOSOPHY AND ETHICS Introduction to philosophy: definition, nature and scope, concept, branches Ethics: definition, moral philosophy, nature of moral judgements and reactions	3	0	0
II	SCIENTIFIC CONDUCT Ethics with respect to science and research Intellectual honesty and research integrity Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP) Redundant publications: duplicate and overlapping publications, salami slicing Selective reporting and misrepresentation of data	5	0	0
III	PUBLICATION ETHICS Publication ethics: definition, introduction and importance Best practices/standards setting initiatives and guidelines: COPE, WAME, etc. Conflicts of interest Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types Violation of publication ethics, authorship and contributor-ship Identification of publication misconduct, complaints and appeals Predatory publishers and journals	7	0	0
IV	OPEN ACCESS PUBLISHING *(Practice only)* Open access publications and initiatives	0	0	4

	SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies Software tool to identify predatory publications developed by SPPU Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.			
V	PUBLICATION MISCONDUCT *(Practice only)* A. Group Discussions: Subject specific ethical issues, FFP, authorship Conflicts of interest Complaints and appeals: examples and fraud from India and abroad B. Software tools: Use of plagiarism software like Turnitin, Urkund and other open source software tools	0	0	4
VI	DATABASES AND RESEARCH METRICS *(Practice only)* A. Databases: Indexing databases Citation databases: Web of Science, Scopus, etc. B. Research Metrics: Impact Factor of journal as per Journal Citation Report, SNIP, SIR, IPP, Cite Score Metrics: h-index, g index, i10 index, altmetrics	0	0	7

Essential Reading:

- Bird, A. (2006). *Philosophy of Science*. Routledge.
- MacIntyre, Alasdair (1967). A Short History of Ethics. London
- P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). *On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition*. National Academies Press.
- Resnik, D.B. (2011). What is ethics in research & why is it important. *National Institute of Environmental Health Sciences*, 1-10. Retrieved from https://www.niehs.njh.gov/research/resourses/bioethics/whatis/index.cfm
- Beall, J. (2012). Predatory Publishers are corrupting open access. Nature, 489(7415), 179-179. https://doi.org/10.1038/489179a
- Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019). https://www.insaindia.rcs.in/pdf/Ethics_Book.pdf

2.3.1

Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences

INDEX

Sr. No	Documents	Page No
1	Certificate and other proofs	2-3



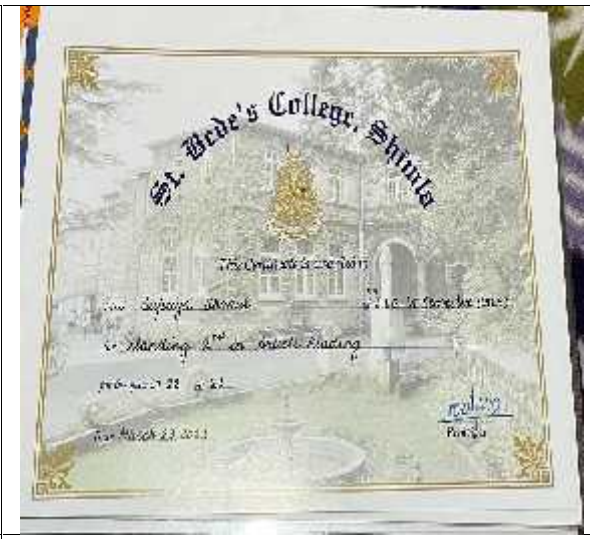
HIMACHAL PRADESH UNIVERSITY INSTITUTE OF LEGAL STUDIES
NAAC (A+) and BCI Approved

Certificate Of Participation

This Certificate is awarded to Aayush Pandit of 5th Semester (Roll No. 2018) for participating in the Webinar on National Anti-Drug Day on Awareness Initiatives for Youth Law

Dr Shalini Verma
NSS Programme Officer

Prof Sanjay Sindhu
Director IPHLS



St. Bede's College, Shimla

This Certificate is awarded to

for Standing 2nd in Quiz Reading

Principal



पहली नजर

वेबीनार द्वारा राष्ट्रीय युवा संसद महोत्सव का जिला स्तरीय आयोजन

आकाशवाणी शिमला ने जी-20 पर कराई प्रतियोगिता

अमर उजाला ब्यूरो



निकिता धीमान



रीतिका चंबियाल

शिमला। आकाशवाणी शिमला ने जी-20 को लेकर राजीव गांधी महाविद्यालय कोटशेरा में अंतर महाविद्यालय भाषण प्रतियोगिता का आयोजन किया। इसमें शहर के छह शिक्षण संस्थानों के विद्यार्थियों ने भाग लिया।

भाषण प्रतियोगिता में राजकीय महाविद्यालय संजौली की निकिता धीमान ने प्रथम स्थान हासिल किया। इसके अलावा इंस्टीट्यूट ऑफ लीगल स्टडीज की रीतिका चंबियाल ने दूसरा और सेंट बीड्स कॉलेज की नीतिका ठाकुर ने तीसरा स्थान प्राप्त किया। राजकीय कन्या महाविद्यालय की पारूल झरांगटा और राजकीय महाविद्यालय संजौली की आस्था शर्मा को सांत्वना पुरस्कार देकर सम्मानित किया गया। आयोजन में दूरदर्शन के कलस्टर हेड एवं उपमहानिदेशक गुरविंद्र सिंह, कोटशेरा कॉलेज की प्राचार्य डॉ. अनुपमा गर्ग और उपप्रधानाचार्य शिखा जोशी, कार्यक्रम प्रमुख आकाशवाणी शिमला अनिवल वर्मा तथा उपनिदेशक अनिल कुमार मौजूद रहे।



नीतिका ठाकुर

सूचना एवं जनसंपर्क विभाग की अतिरिक्त निदेशक आरती गुप्ता, वरिष्ठ रंग कर्मी ज्याहर कौल, दूरदर्शन के कार्यक्रम प्रमुख अमरेंद्र कुमार निर्णायक मंडल में शामिल रहे।



हिमाचल प्रदेश विश्वविद्यालय

पूर्व विद्यार्थी मिलन समारोह-2022

Certificate of Appreciation

This Certificate is awarded to Prof. /Dr. /Ms. /Mr. Ritika Chambyal

of University Institute of Legal Studies.

Shimla in recognition of his/her contribution in organizing the **Mega Alumni Meet** 2022 of Himachal Pradesh University held on 21st August, 2022 at HPU, Summer Hill, Shimla.



Himachal Pradesh University Institute of Legal Studies, Shimla

ENVISION 2K22

LEGAL CUM CULTURAL FEST

5TH -11TH NOVEMBER 2022

CERTIFICATE OF MERIT CUM PARTICIPATION

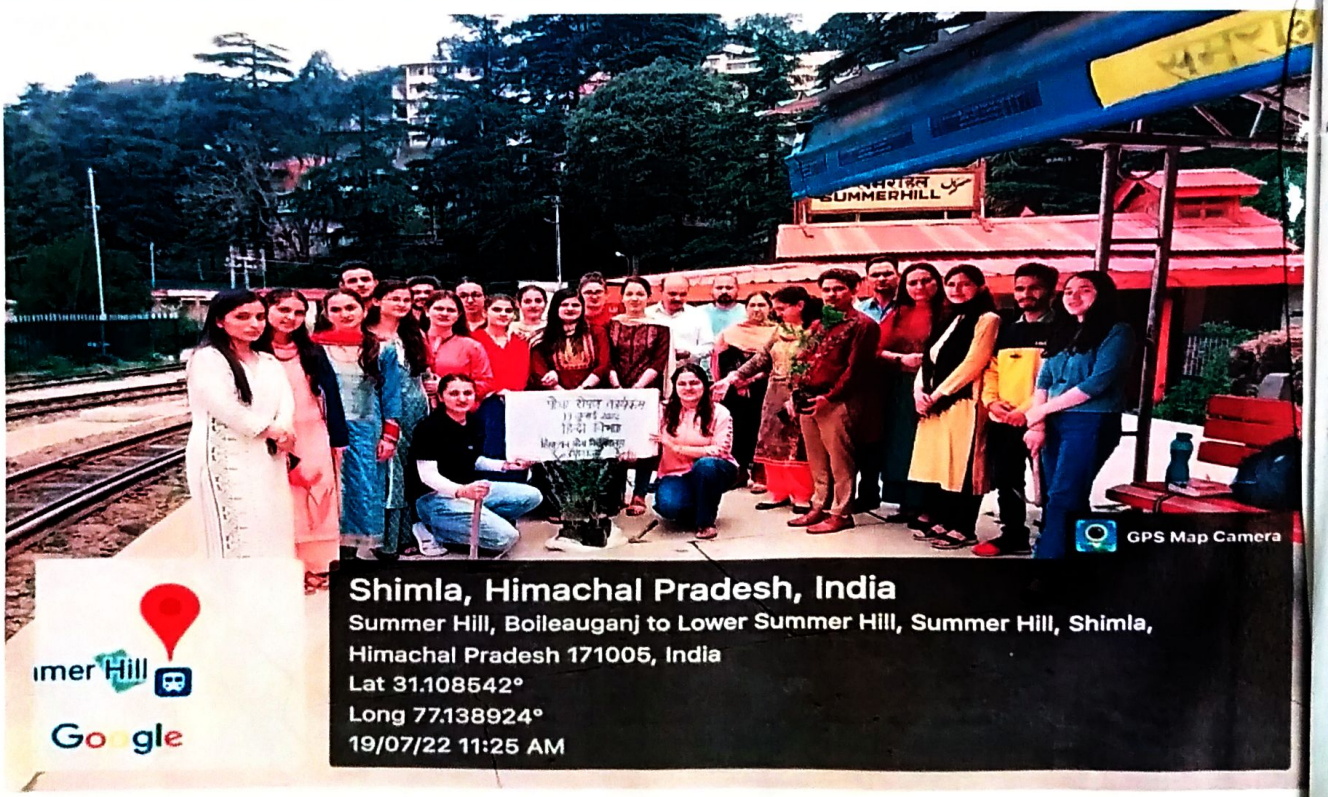
This is to certify that Ms. Mr. Ritika Chambyal **Student of** ULLS, Shimla **has participated in the** Parliamentary Debate **of has been awarded** 1st **position in the ENVISION 2K22 organized at the Himachal Pradesh University Auditorium, Summerhill, Shimla-05**

Prof.(Dr.) Shiv Kumar Dogra
Director,HPUILS

पौधारोपण अभियान

दिनांक – 19-07-2022





आज़ादी के अमृत महोत्सव एवं विश्वविद्यालय के 53वें स्थापना दिवस के उपलक्ष्य में हिमाचल प्रदेश विश्वविद्यालय के हिंदी विभा
दिनांक 19 जुलाई, 2022 को समरहिल रेलवे स्टेशन पर पौधारोपण करते हुए विभाग के प्राध्यापक, स्टेशन अधीक्षक संजय गेरा, वि
एवं शोधार्थी|





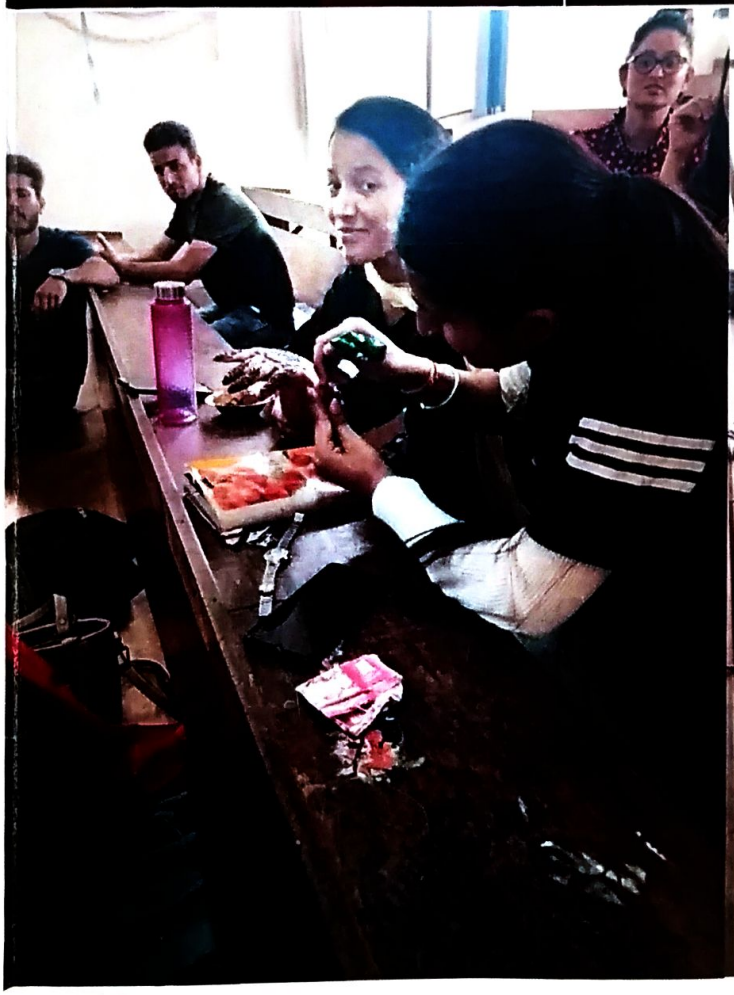


आज़ादी के अमृत महोत्सव एवं विश्वविद्यालय के 53वें स्थापना दिवस के उपलक्ष्य में हिमाचल प्रदेश विश्वविद्यालय के हिंदी विभाग द्वारा दिनांक 19 जुलाई, 2022 को समरहिल रेलवे स्टेशन पर पौधारोपण करते हुए विभाग के प्राध्यापक, स्टेशन अधीक्षक संजय गेरा, विद्यार्थी एवं शोधार्थी।

मेंहदी प्रतियोगिता
19 जुलाई 2022





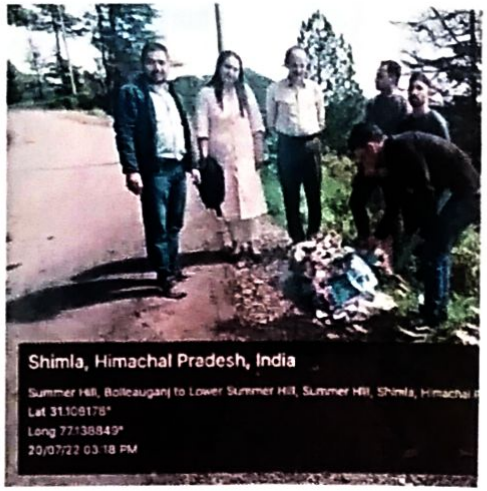


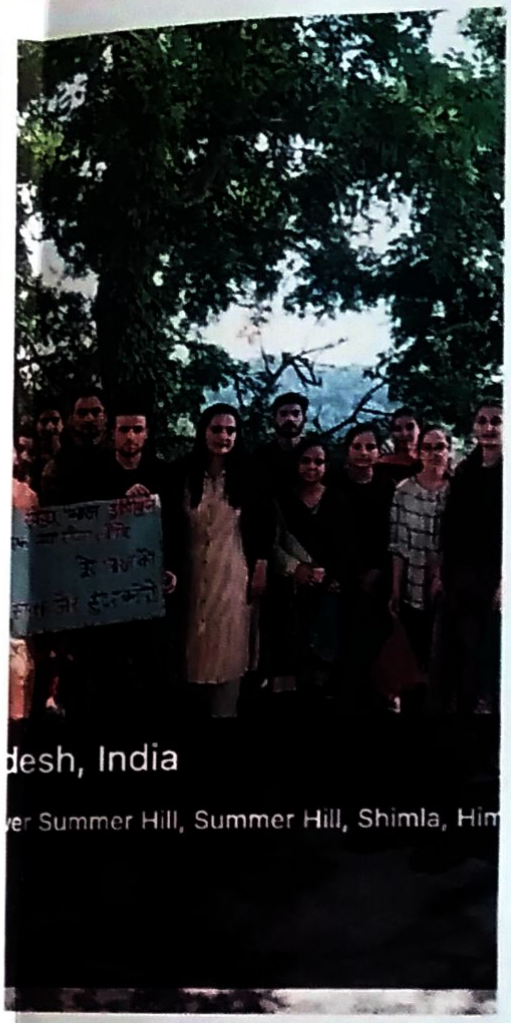


आज़ादी के अमृत महोत्सव एवं विश्वविद्यालय के 53वें स्थापना दिवस के उपलक्ष्य में हिमाचल प्रदेश विश्वविद्यालय, शिमला के हिदी विभाग द्वारा दिनांक 19 जुलाई, 2022 को आयोजित मेंहदी प्रतियोगिता में हिस्सा लेते विद्यार्थी एवं शोधार्थी|

हिन्दी विभाग द्वारा
20 जुलाई, 2022
को आयोजित
स्वच्छताअभियान
कार्यक्रम के
छायाचित्र—

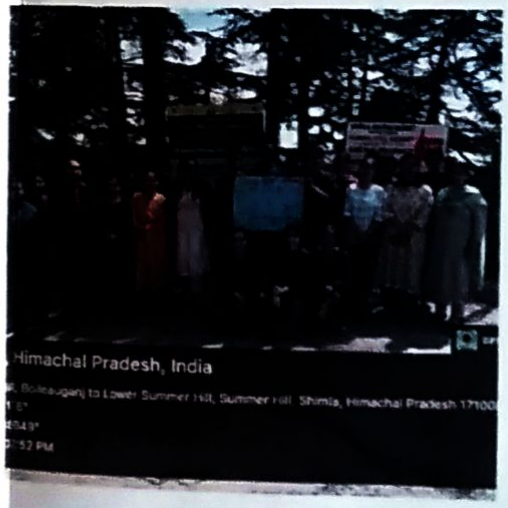










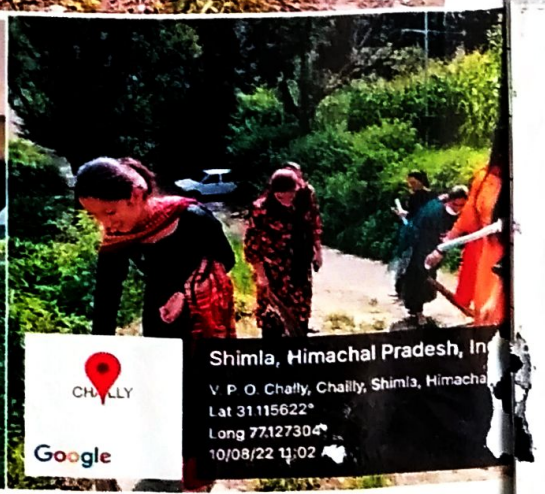


सामुदायिक भागी
कार्यक्रम









हिंदी विभाग के द्वारा सामुदायिक भागीदारी कार्यक्रम के अंतर्गत चायली पंचायत के चैली गाँव में दिनाँक 10 अगस्त, 2
अभियान में भाग लेते हिंदी विभाग के प्राध्यापक, शोधार्थी, वि[illegible] चैली गाँव के उपप्रधान और ग्रामीण महिलाएं

कार्य क्रम



हिंदी विभाग के द्वारा सामुदायिक भागीदारी कार्यक्रम के अंतर्गत चायली पंचायत के चैली गाँव में दिनाँक 0 अगस्त, 2022 को स्वच्छता अभियान में भाग लेते हिंदी विभाग के प्राध्यापक, शोधार्थी, विद्यार्थी तथा चैली गाँव के उपधान और ग्रामीण महिलाएं|



स्वच्छता का पाठ

शिमला। एचपीयू के हिंदी विभाग द्वारा बुधवार को सामुदायिक भागीदारी गतिविधि के तहत चैली गांव में स्वच्छता अभियान कार्यक्रम का आयोजन किया गया। सर्वप्रथम चैली गांव के उपप्रधान मोहन ठाकुर ने चायली पंचायत के चैली गांव में हिंदी विभाग के प्राध्यापक, विद्यार्थियों तथा शोधार्थियों का स्वागत किया। उन्होंने हिंदी विभाग के विद्यार्थियों को सफाई करने के लिए गांव के क्षेत्र से अवगत कराया।



SEMINAR ON 18TH ANNUAL WORLD COPD (CHRONIC OBSTRUCTIVE PULMONARY DISEASE) DAY 20 NOVEMBER,2019)

E-Resources

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=0YyNXHI8GPO8SUQIuYNtTA==

2.https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=0YyNXHI8GPO8SUQIuYNtTA==

3. https://swayam.gov.in/explorer

4. https://www.swayamprabha.gov.in/

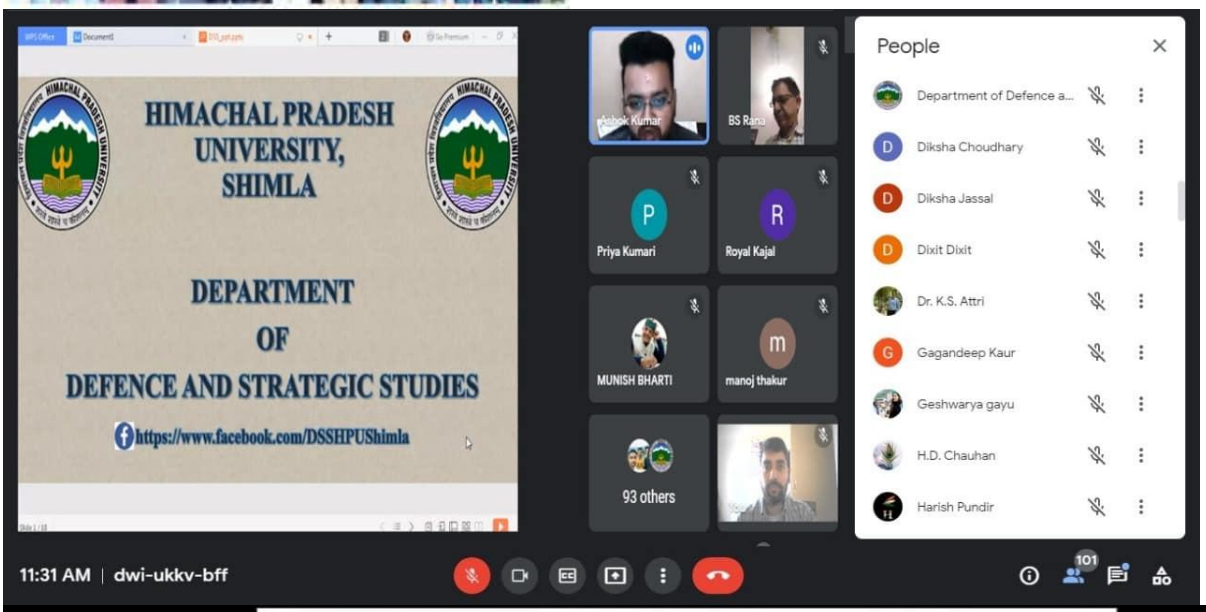

Department of Defence and Strategic Studies
Pradesh University Shimla




Himachal Pradesh University Shimla
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ON
Career Opportunities for Defence Aspirants
BY
Sqn. Leader Anupam Arora, 44 Squadron, Chandigarh







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Defence Studies, HPU Shimla with NSS open unit, Chandigarh organises Webinar on Kargil Vijay Diwas

Yadavindra S Rana | July 26, 2021 05:01 PM



CHANDIGARH: Department of Defence and Strategic Studies, Himachal Pradesh University (HPU), Shimla in collaboration with NSS Open Unit, Chandigarh commemorated Kargil Vijay Diwas in a virtual mode. The occasion was graced by Prof. Bikram Rana (Former OSD-Education), Prof. Harish K. Thakur (Chairman, Defence Studies, HPU, Shimla), Col. Ravi Raina (Serving Officer, Indian Army) and Dr. Chandan Awasthi (Deputy Director, IDC India). In a keynote address, Prof. Rana highlighted the importance of 22-years of Vijay Diwas by enlightening the sacrifices of Indian armed forces during the whole operation.

Being from Himachal, he shared the inspiring story of 25year old Capt. Vikram Batra (Yeh Dil mange more) and Maj. Saurab Kalia with a reference how their invaluable sacrifices going to motivate the generations for decades and coming centuries. He further shared his personal association and experience of Capt. Batra being associated to NSS/NCC in early 1990's.

Another panelist, Col. Ravi Raina being connected to on ground situation with Indian Army stressed to promote the strategic culture among common citizen for better understand of ongoing proxy wars. Narrating the ongoing geopolitical turbulence in South Asia, Col. Raina highlighted the growing demand and need of hour for Defence and Strategic Studies subject in India among all College and Universities as a compulsory subject. He further shared, how unknowingly the present generation is least aware about the ongoing drug trafficking and people are getting into trap of money laundering with shell companies.

Taking forward the session, Dr. Chandan Awasthi with research expertise highlighted the career prospects for students and growing demand of Defence analysts in think tanks and research institutions. He further added that IDC India from next year going to introduce PhD. Programme in Defence and Strategic Studies. Webinar was followed by Q&A session.

Prof. Harish Thakur congratulated the organisers and faculty members for this fruitful association in raising the awareness of national importance for community. In the end panelists thanked NSS Programme Officer, Er. Binesh Bhatia and NSS Open Unit for hosting this webinar of prime importance with a hope to continue the good work alive in National interest.


Submission Guidelines
Certificate/Publication
Chief Patron
Patron
Convener
Organising Secretaries
Important Dates
Registration Fee


COMMEMORATING KARGIL VIJAY DIWAS
Date: 26th July, 2022 | Time: 11am | Platform: Google MEET
Organised By: Dept. of Defence & Strategic Studies, HPU Shimla and NSS Open Unit, UT Chandigarh


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Himachal Pradesh University, Shimla
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TWO DAY ICSSR SPONSORED NATIONAL SEMINAR
on
INDIA'S NATIONAL SECURITY : MILITARY CHALLENGES, MANAGEMENT & RESPONSE




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NATIONAL SEMINAR
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"India and South Asia: Understanding the Border as a Hindrance"
March 27, 2023
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VENUE: Conference Hall, Chanakya Bhawan, HP University Business School, HPU




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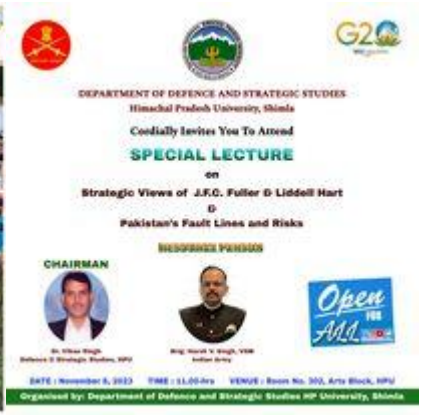

INDUCTION SESSION 2022-23
New Education Policy and Elective Subject
DEFENCE & STRATEGIC STUDIES
Department of Defence and Strategic Studies
HP University, Shimla


#G20 University Connect


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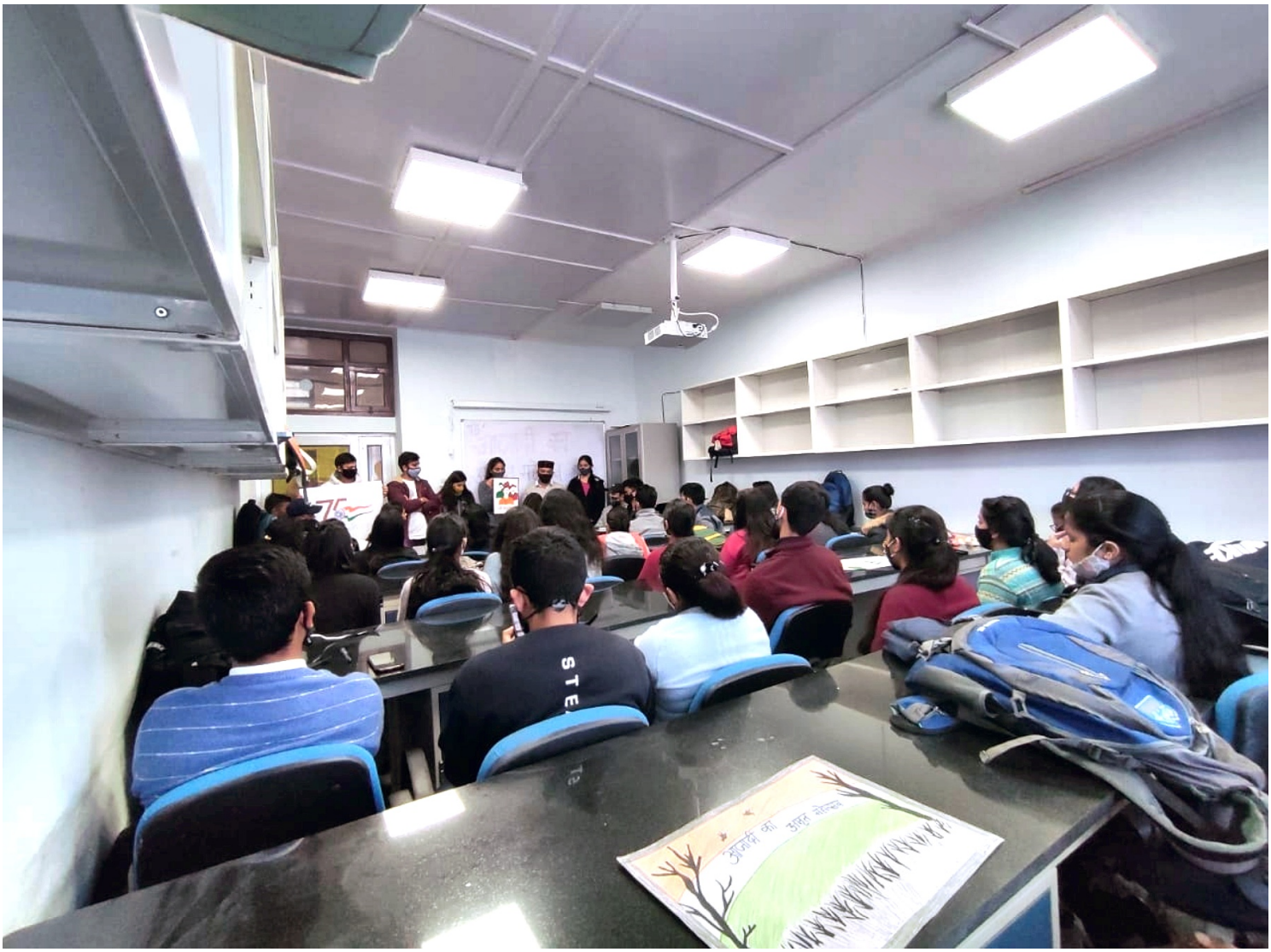

DEPARTMENT OF DEFENCE AND STRATEGIC STUDIES
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LECTURE SERIES
Subject: Chinese Strategic Culture and Chinese Thinking on Managing Borders Crises
DIRECTOR
RESOURCE PERSON
CHAIRMAN
Maj. Gen. Amarjit Singh
Maj. Gen. (Dr.) Mandeep Singh
Dr. Vikas Singh
Date : November 22, 2023
Time : 11am onwards
Platform : Google MEET
Organized by: Gyan Chakra Think Tank, Chandimandir with DSS, HPU & Stakeholders




ENVIRONMENT LABORATORY
AND
CONSULTANCY DIVISION


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अंतर्राष्ट्रीय पर्वत दिवस - 2021
थीम : सतत पर्वत पर्यटन
दिनांक : 11 दिसम्बर, 2021
स्थान : पश्चिमी हिमालयन टेम्परेट आर्बोरेटम, पीटर हिल, शिमला
हिमालयन वन अनुसन्धान संस्थान




MANAGE WASTE
RESPONSIBLY


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RESPONSIBLY

Student centric methods such as experiential learning and participative learning and problem-solving methodologies are used for enhancing their learning experiences. To meet the individual needs of the students various creative and innovative teaching methods are required for the effective curriculum transaction. There is no size fit all solution for a teacher to impart effective learning strategies. Amalgam of many instructional procedures is a must for effective curriculum transaction between teacher and the taught.

Student centric methods, such as experiential learning, participative learning and problem-solving methodologies are used for enhancing learning experiences

Teaching-learning methods adopted by the faculty members include Lecture Method, Interactive Method, Project-based Learning, Computer-assisted Learning, Experiential Learning, etc. The Teaching-learning activities are made effective through illustration and special lectures. Lessons are taught through PowerPoint presentations to make learning interesting besides oral presenting methods. Lecture method: This conventional method is commonly adopted by all teachers. This method facilitates the teacher to interpret, explain and revise the content of a text-only for better understanding of the subject by the learners. Interactive method: The faculty members make learning interactive with students by motivating student participation in group discussion, role-play, subject quiz, news analysis, discussion, and questions and answers on current affairs

Departments provide an effective platform for students to develop the latest skills, knowledge, attitude, values to shape their behaviour in the correct manner. The department conducts innovative programs which stimulate the creative ability of students and provide them a platform to nurture their problem-solving skills and ensure participative learning. The department Implements student-centric methods of enhancing the lifelong learning skills of students. Faculty members make efforts in making the learning activity more interactive by adopting student-centric methods.

1. Experiential Learning: Department conducts add-on programs to support students in their experiential learning. The department communicates the following experiential learning practices to improve creativity and cognitive levels of the students –
   • Laboratory Sessions are conducted with content beyond syllabus experiments.
   • Project development on latest technologies by students where they platform their working model in the technical fest.
   • Industrial Visits to engage them in experiential learning while visiting the organization.

2. Participatory Learning: In this type of learning, students participate in different activities such as seminars, group discussions, wallpapers, projects, and skill-based add-on courses. Students are encouraged to participate in activities where they can use their specialized technical or management skills.

• Annual cultural program – This is organized every year for the students of the department to give an opening to their creativity.
• Regular Quizzes- Quizzes are organized for student participation at intra or inter-department levels.
• Seminar Presentation – Students develop technical skills while presenting papers in seminars.

3. Problem-solving methods: Department encourages students to acquire and develop problemsolving skills. For this, the department organizes expert lectures on different topics, participate in different technical tests and other competitions.
•Regular assignments based on problems
• Mini Project development
• Regular Quizzes
• Case studies discussion
• Class presentations
• Debates within the department event.

In addition to the traditional teaching-learning methods, the institute is providing innovative student-centric methods such as Hackathons, Workshops, Seminars, Virtual Lab, Simulation, Roleplay, Review web literature, Video, Demonstration, Activity-based learning, Flipped Classroom, Guest lecture, Professional practice school, GD/ debate, Peer learning groups, MOOCs, Google Classroom, Project-based learning, Real-time case studies, Worksheets, PPT, Mind map, Journal Review, Proto-type model, Crosswords, Research projects, Language games, Viva, Poster presentation, Public Speaking to encourage Participative, Problem-solving and Experiential learning.