JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Faculty of Education & Methodology

Department of Education & Methodology

SYLLABUS

INTEGRATED BACHELOR OF SCIENCE-BACHELOR OF EDUCATION
B.SC.-B.ED. ZBC

SESSION – 2022-23

DURATION – 4 YEARS/8 SEMESTER

SYLLABUS FOR:
1-4 YEARS

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PROGRAM DETAIL

Name of Program	-	B.Sc.B.Ed.(ZBC)Integrated
Program Code	-	B.Sc. B.Ed.(ZBC)
Mode of Program	-	Yearly /Semester
Duration of Program	-	4 yrs/ 8 Semester
Total Credits of Program	-	490
Curriculum Type and Medium Choice	-	Hindi/English

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

SYLLABUS DETAIL
I SEMESTER

S. No.	Credit	Name of Course
1	9	English Language
2	9	Hindi Language
3	9	Holistic Education
4	12	Diversity of Microbes
5	12	Animal Diversity- I
6	12	Inorganic Chemistry
Total	**63**	

II SEMESTER

S. No.	Credit	Name of Course
1	9	English Language
2	9	Hindi Language
3	6	Environmental Studies
4	5	Theatre Arts Heritage & Craft Traditions
5	6	Understanding Education & its Perspectives
6	10	Diversity of Cryptogams
7	10	Animal Diversity II
8	10	Physical chemistry
Total	**65**	

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

III SEMESTER

S. No.	Credit	Name of Course
1	9	English Language
2	9	Hindi Language
3	4	Psychology Of Learner & Learning
4	5	ICT In Education I
5	14	Gymnosperms & Reproductive Biology Of Gymnosperms
6	12	Animal Cell Biology And Genetics
7	12	Organic Chemistry
Total	**65**	

IV SEMESTER

S. No.	Credit	Name of Course
1	9	English Language
2	9	Hindi Language
3	9	Assessment Learning
4	14	Anatomy, Ecology & Evolution
5	12	Animal Physiology & Endocrinology
6	12	Inorganic Chemistry
7	9	Internship Methodology (2 Week)
Total	**74**	

V SEMESTER

S. No.	Credit	Name of Course
1	9	Teaching Approaches and Strategies
2	9	Pedagogy of Physical Science
3	9	Pedagogy of Biological Science
4	14	Botanical Nomenclature, Angiosperm Taxonomy and Utilization of Plants
5	12	Animal Ecology and Ethology
6	12	Physical Chemistry
Total	**65**	

VI SEMESTER

S. No.	Credit	Name of Course
1	4	Peace Oriented Value Education
2	10	Pedagogy Of Physical Science
3	10	Pedagogy of Biological Science
4	12	Plant Physiology
5	12	Developmental Biology & Applied Zoology
6	12	Organic chemistry
7	9	Internship 2 weeks
Total	**69**	

VII SEMESTER

S. No.	Credit	Name of Course
1	6	Secondary Education In India: Status, Issues And Concerns
2	6	Inclusive Education , Guidance And Counseling In School
3	30	Internship Methodology (14+2 Week)
Total	**42**	

VIII SEMESTER

S. No.	Credit	Name of Course
1	5	Indian Constitution & Human Rights
2	6	Curriculum and School
3	12	Genetics, Biochemistry & Biotechnology
4	12	Molecular genetics, biotechnology , instrumentation & evolution
5	12	Advanced Chemistry
Total	**47**	

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

B.Sc. B.Ed. (ZBC)
I-Semester

Nature of Course	Name of Course	C	T	P	D	P.S.
English	English	9	7	0	1	1
Hindi Language	Hindi	9	7	0	1	1
Holistic Education	Holistic Education	9	6	2	0	1
Botany	Diversity of Microbes	12	8	2	1	1
Zoology	Animal Diversity- I	12	8	2	1	1
Chemistry	Atomic structure and Bonding	12	8	2	1	1
Total Credits		**63**	**44**	**8**	**5**	**6**

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical and per course**
- **D&T represents Demonstration/Tutorial in the lecture hall**
- **P.S. represents Practice Session**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

B.Sc. B.Ed. II Semester

II SEMESTER						
Nature of Course	**Name of subjects**	**C**	**T**	**P**	**D**	**P.S.**
Language	English	9	7	0	1	1
	Hindi Language	9	7	0	1	1
Education	Environmental Studies	6	4	2	0	0
	Theatre Arts Heritage & Craft Traditions	5	3	2	0	0
	Understanding Education & its Perspectives	6	5	0	1	0
Core Botany	Diversity of Cryptogams	10	8	2	0	0
Zoology	Animal Diversity II	10	8	2	0	0
Chemistry	State of Matter & Nuclear Chemistry	10	8	2	0	0
University Compulsory Cousrse	Extra-Curricular Activities	1	-	1	-	-
	Community Development Activities	1	-	1	-	-
	FUNDAMENTAL OF COMPUTERS	1*	0.5	0	0.5	0
University Optional Course	Professional activities	-	-	-	-	-
Total Credits		**65**	**50**	**10**	**3**	**2**

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical and per course**
- **D&T represents Demonstration/Tutorial in the lecture hall**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

B.Sc. B.Ed. III Semester

Nature of Course	Name of subjects	C	T	P	D	P.S.
Language	English	9	9	0	0	0
	Hindi	9	9	0	0	0
Education	Psychology of Learner & Learning	4	2	2	0	0
	ICT in Education I	5	3	2	0	0
Botany	Gymnosperms & Reproductive Biology of Gymnosperms	14	9	2	1	1
Zoology	Animal Diversity & Comparative Anatomy of Vertebrtaes	12	8	2	1	1
Chemistry	Organic chemistry	12	8	2	1	1
University Compulsory Course	Extra-Curricular Activities	1*	-	1*	-	-
	Community Development Activities	1*	-	1*	-	-
University Mission course	**Women's Rights and Law**	1*	0	0	0	-
University Optional Course	Professional activities	-	-	-	-	-
Total Credits		**65**	**48**	**10**	**3**	**3**

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical and per course**
- **D & T represents Demonstration/Tutorial in the lecture hall**
- **P.S. represents Practice Session**

B.Sc. B.Ed (ZBC) IV Semester

Nature of Course	Name of subjects	C	T	P	D	P.S.
Language	English	9	9	0	0	0
	Hindi Language	9	9	0	0	0
Education	Assessment Learning	9	9	0	0	0
Botany	Anatomy, Ecology & Evolution	14	9	2	1	1
Zoology	Animal Physiology & Endocrinology	12	8	2	1	1
Chemistry	THERMODYNAMICS, EQUILIBRIUM AND SOLUTIONS	12	8	2	1	1
Education	**Internship Methodology (2 Week)**	9	0	0	0	0
University Compulsory Course	Extra-Curricular Activities	1	-	1	-	-
	Community Development Activities	1	-	1	-	-
University Optional Course	Professional activities	-	-	-	-	-
Total Credits		**65+9**	**52**	**8**	**3**	**3**

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical per course**
- **D & T represents Demonstration/Tutorial in the lecture hall**
- **P.S. represents Practice Session**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

B.Sc. B. Ed (ZBC) V Semester

Nature of Course	Name of subjects	C	T	P	D	P.S.
Education	Teaching Approaches and Strategies	**9**	9	0	0	0
	Pedagogy of Physical Science	**9**	9	0	0	0
	Pedagogy of Biological Science	**9**	9	0	0	0
Botany	Botanical Nomenclature, Angiosperm Taxonomy and Utilization of Plants	**14**	10	2	1	1
Zoology	Animal Ecology and Ethology	**12**	8	2	1	1
Chemistry	Transition Elements, Coordination Compounds and Chemical Kinetics	**12**	8	2	1	1
University Compulsory Course	Extra-Curricular Activities	1	-	1	-	-
	Community Development Activities	1	-	1	-	-
	Help aid	1 *	1	0	0	0
University Optional Course	Professional activities	-	-	-	-	-
Total Credits		**65**	**53**	**6**	**3**	**3**

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical per course**
- **D & T represents Demonstration/Tutorial in the lecture hall**
- **P.S. represents Practice Session**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

B.Sc. B. Ed (ZBC)
VI Semester

Nature of Course	Name of subjects	C	T	D	P	P.S.
Education	Pedagogy of Physical Science	10	10	0	0	0
	Pedagogy of Biological Science	10	10	0	0	0
Botany	Plant Physiology	12	8	2	1	1
Zoology	Developmental Biology & Applied Zoology	12	8	2	1	1
Chemistry	Organic chemistry	12	8	2	1	1
	Internship Methodology (2 Week)	9	0	0	0	0
University Compulsory Cousrse	Extra-Curricular Activities	1	-		1	-
	Community Development Activities	1	-		1	-
University Optional Course		-	-	-	-	-
Total Credits		**56+9**	**44**	**6**	**3**	**3**

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical per course**
- **D & T represents Demonstration/Tutorial in the lecture hall**
- **P.S. represents Practice Session**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

B.Sc. B. Ed (ZBC)
VII Semester

Nature of Course	Name of subjects	C	T	D	P	P.S.
Education	Secondary Education In India: Status, Issues And Concerns	6	6	0	0	0
	Inclusive Education , Guidance And Counselling In School	6	6	0	0	0
Education	**Internship Methodology (14 Week)**	30	30	0	0	0
University Compulsory Course	Extra-Curricular Activities	1	-		1	-
	Community Development Activities	1	-		1	-
University Optional Course	Professional activities	-	-	-	-	-
Total Credits		42	42	0	0	0

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical per course**
- **D & T represents Demonstration/Tutorial in the lecture hall**
- **P.S. represents Practice Session**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

B.Sc. B. Ed (ZBC)

VIII Semester

Nature of Course	Name of subjects	C	T	D	P	P.S.
Education	Indian Constitution & Human Rights	5	5	0	0	0
	Curriculum and School	6	6	0	0	0
Botany	Genetics, Biochemistry & Biotechnology	12	8	1	2	1
Zoology	Molecular Biology, Immunology & Evolution	12	8	1	2	1
Chemistry	Electrochemistry, Photochemistry, Spectroscopy And Macromolecules	12	8	1	2	1
University Compulsory Cousrse	Extra-Curricular Activities	1	-		1	-
	Community Development Activities	1	-		1	-
University Optional Course	Professional activities	-	-	-	-	-
Total Credits		**47**	**35**	**3**	**6**	**3**

Note:

- **C represents number of credit per course**
- **T represents number of theory credit per course**
- **P represents number of practical per course**
- **D & T represents Demonstration/Tutorial in the lecture hall**
- **P.S. represents Practice Session**

I SEMESTER

ENGLISH LANGUAGE

Credits-9(9+0+0+0)

Objectives:- The curriculum seeks to introduce a wide range of English. Students are also exposed in Connection with Modern English to broader level in depth.

To enhance the language ability of pupils through academic and practical usage of language in and out of the classroom.

Unit I: Descriptive Grammar **(Credit-3)**

Tenses:

a) Simple Present: Habitual action, General truths, Future time, Verbs of state, Verbs of perception, Verbs of sensation, Narration, Use of simple present for demonstration and commentaries, Present perfect, present perfect continuous, Present continuous also indicative of future action.

b) Simple past: Past time reference, Present time reference, Future time reference, Past continuous, Past perfect, past, perfect continuous

Unit II: Skills in Communication **(Credit-2)**

Negotiating a point of view – learning to talk persuasively so as to get across one's perspective. Debating on an issue – agreeing / disagreeing.

Unit III: Study and Reference Skills **(Credit-2)**

Note making; Note- taking; Summary writing.

Comprehension Skills

Extracts from literary, scientific and educational journals.

Unit IV: Skills of Communication **(Credit-2)**

Advanced Writing Skills, writing advertisement copy; Writing a project proposal and Writing Resume, sending an application.

Listening effectively; Talking about one self (likes, dislikes, interests, beliefs, personality traits, ambitions); Expressing an opinion about personal belief on a current issue. (Ability to speak fluently for 3-4 minutes. Focus would be on organized, logical, sequential presentation of thought through spontaneous speech).

Sessional Work:

Politeness competitions- students with partners take turns in using a given number of utterances for negotiation / requests/complaints/small talk. Students introduce themselves though using symbols/ metaphors.

Students collect newspaper/magazine cuttings on topical and/ or cultural issues of interest- write and share their opinion with peers.

References:

- Block, C.C. (1997). Teaching the Language Arts, 2nd Ed. Allyn and Bacon
- Mckay. et al. (1995). The Communication Skills Book, 2nd Ed. New Harbinger Publications.
- Hornby,A.S.(2001).Oxford Advanced Learner's Dictionary, OUP
- Thomsan,A.J. & Martinet.(2002).A Practical English Grammar.OUP

Outcomes:

1. Students will demonstrate proficiency in the use of written English, including proper spelling, grammar, and punctuation.
2. Students will develop the ability to read works of literary, rhetorical, and cultural criticism.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

HINDI LANGUAGE

Credits-9(9+0+0+0)

Objectives:

1. To enable the students to acquire basic skills in functional language.
2. To develop independent reading skills and reading for appreciating literary works.
3. To internalize grammar rules so as to facilitate fluency in speech and writing.
4. To develop functional and creative skills in language.
5. To develop values of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region.

Unit I : History of Language and Literature-1 **(Credit-3)**

Hindi Bhasha aur Sahitya ka Itihas [Aarmbha se Lekar 1857 Tak]

Unit II: Short Story-1 [Pre-Independence Literature **(Credit-2)**

Swatantratapurva Hindi Kahani Ka Vikas

1. Chandradhar Sharma Guleri- Usne Kaha Tha
2. Jayshankar Prasad- Puraskar
3. Premchand- Panch Parmeshwar
4. Jainendra- Ek Raat

Unit III: Short Story-2 [Post-Independence Literature] **(Credit-2)**

Swatantrayottar Hindi Kahani Ka Vikas

1. Mohan Rakesh- Uski Roti
2. Kamleshwar- Dilli Mein ek Maut
3. Phanishwar Nath Renu- Teesari Kasam
4. Bhism Sahani- Cheef ki Dawat

Unit IV : Communication skills **(Credit-2)**

Group Discussion [Samooh Charcha]
Introduction – Definition – Characteristics – Types of Discussion –Round table, Symposium, Lecture forum etc. – Relevance of Group Discussion – Exercises.

Suggested Activities:

In the internal class during the different activities the performance of the student will be assessed by the teacher. Test, assignments and small projects works may be given .

References:

1. Hindi Sahitya Ka Itihas: Ramchandra Shukla Rajkamal Prakashan,Delhi
2. Hindi Sahitya Ka Itihas: Dr Nagendra, Mayoor Paperbacks, Delhi
3. Hindi Sahitya Ki Bhoomika: Hajari Prasad Divedi Rajkamal Prakashan,Delhi
4. Hindi Sahitya Ka Adikaal: Hajari Prasad Divedi Rajkamal Prakashan,Delhi
5. Hindi Sahitya Ka Udbhav Aur Vikas:Hajari Prasad Divedi Rajkamal Prakashan,Delhi
6. Hindi Sahitya Ka Ateet: Viswanath Prasad Mishra, Rajkamal Prakashan,Delhi
7. Bhakti Aandolan Aur Bhaktikavya: Shivkumar Mishra,Lokbharti Prakashan, Delhi
8. Bhakti Aandolan aur Surdaska Kavya: Maneger Panday, Vani Prakashan, Delhi
9. Bhakti Ke Aayam: Dr P Jayraaman, Vani Prakashan, Delhi
10. Bhartiya Bhakti Sahitya: Dr Rajmal Bora, Vani Prakashan, Delhi
11. Bhaktikavya ka Samajdarshan: Dr Premshankar, Vani Prakashan, Delhi
12. Hindi Sahitya Ka Sanchhipt Itihas: Nanddulare Bajpayee, Swaraj Prakashan, Delhi
13. Hindi Sahitya ka Sanchhipt Itivritt: Shivkumar Mishra, Vani Prakashan, Delhi
14. Hindi Kahani- Antarang Pahchan: Dr Ramdars Mishra, Vani Prakashan, Delhi
15. Hindi Kahani-Sanrachana aur Samvedana: Dr Rachna Saah, Vani Prakashan, Delhi
16. Galp Ka Yatharth-Kathaloochan ke Aayam: Suvas Kumar, Vani Prakashan, Delhi
17. Hindi Ka Gadyaparva: Namvar Singh, Rajkamal Prakashan,Delhi
18. Sahitya ki Pahchan: Namvar Singh, Rajkamal Prakashan,Delhi
19. Katha Vivechan aur Gadyashilp: Ramvilas Sharma, Vani Prakashan, Delhi
20. Kahani Anubhav aur Abhivyakti: Rajendra Yadav, Vani Prakashan, Delhi

Outcomes: The students will-

1. acquire basic skills in functional language.
2. develop independent reading skills and reading for appreciating literary works.
3. internalize grammar rules so as to facilitate fluency in speech and writing.
4. develop functional and creative skills in language.
5. develop values of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

HOLISTIC EDUCATION

Credits-9(5+1.5+2+0.5)

Objectives:-

1. To develop the understanding the concept of health.
2. Understand the roll of health education and its importance in education.
3. To provide a broad spectrum of avenues for maximum potential.
4. To prepares for life long learning.
5. To understand basic and practical health programmes.

UNIT I: Health Education (Credit-2)

Meaning and definition of health- Dimensions of health- physical, mental, social and emotional and their inter relatedness Factors that promote and affect health- Biological, environmental and sociocultural Concept of Health Education- School Health Programmes- Promoting Health, Instruction, Healthful School Living and Health Services Programmes.

PRACTICALS(Credit-0.5+1+0.25)(D-0.5)(P-1)(PS-0.25)

(1) Practice of Skills and rules of different games- Basketball, Football, Volleyball, Handball, Kho Kho, Shuttle Badminton, Cricket, Table Tennis, Throwball, Tenni Koit-(Any two activities) **.**
(2) Practice of Skills and rules of different Athletic Track and Field Events- Sprints and middle distance runs: 100 mtrs, 200 Mtrs. 400 Mtrs, 800 mtrs and 1500 mtrs
Field Events: Shotput, Discus throw, Broad jump and High jump (Any one event from track events and one from Field Events) **.**

Unit2: Physical Education (Credit-1)

Modern concept of Physical education,- Definition, Aims, Objectives and Educational Dimensions of Physical Education- develop and appreciate the values of physical education programme and develop leadership qualities and all-round personality

Unit3: Physical fitness (Credit-1)

Physical Fitness- Components of Physical Fitness, Training methods for developing Physical fitness.Physical education programme at high schools- selection of activities in games and athletics based on physiological, psychological and sociological characteristics of students.

PRACTICALS(Credit-0.5+0.5+0.25)(D-0.5)(P-0.5)(PS-0.25)

1)Marking of playfields/ track. Organising Intramural competitions, Officiating matches, Drawing fixtures for different type of tournaments, and maintaining of records.
2) Health Appraisal of School Students.

Unit4: Yoga Education **(Credit-1)**

Basics in Yoga- Meaning, importance , different stages of yoga, principles of yoga- do's and dont's during practice of yogic exercises, yogasanas and pranayamas and its effect on different systems of the body and benefits of meditation to reduce stress.

PRACTICALS(Credit-0.5+0.5)(D-0.5)(P-0.5)

1) Practice of Yogic Exercises and Yogasanas- Mudras, Suryanamasakara and a minimum of 25 simple asanas**.**
2) Practice of Pranayama- and techniques of doing Meditation and Relaxation. (g) Simulated teaching of Yogasanas**.**

Sessional Work:

(a) Preparation of Health Appraisal Report of School students
(b) Learning to teach any five yogasanas
(c) Officiating Games and Athletic events during practice of games and intramural competitions
(d) Performing the skills taught in different games
(e) Organisation of competitions at class level and participating in Trekking to learn organizing skills and leadership qualities.

Suggested Readings:

1. B.K S Iyengar (1976) Light on Yoga, New York, Schocken Books.
2. B.D. Bhatt and S.R. Sharma (1993) Teaching of Physical and Health Education, Delhi, Kanishka Publishing House.
3. Edward F. Voltmer and Arthur A. Esslinger (1964). The Organisation and Administration of Physical Education, Bombay, The Times of India Press.

Outcomes:- After the transaction of the course student teacher-

1. Develop and understanding the concept of health.
2. Understand the roll of health education and its importance in education.
3. Get a broad spectrum of avenues for maximum potential.
4. Prepares for life long learning.
5. Understand basic and practical health programmes.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

DIVERSITY OF MICROBES

Credits-12(8+1+2+1)

Objectives:

- To familiarize the students the habitats ,classification, structure and life cycle of bacteria.
- To get a basic idea about the , viroid, virusoid and prions and economic impact on plants.
- To introduce the students about the aspects of Mycoplasma and Algae
- To understand the role of microbes
- To get the knowledge on various Fungus and Lichens

Unit I - Virus, prion and bacteria (Credit-2)

a) Brief account of history, discovery, characteristics of viruses, viroid, virusoid and prions and economic impact on plants.
b Bacteria –structure, nutrition, reproduction and economic importance, Gram's staining; Role of bacteria in human welfare ; Environment – decomposition and bioremediation; Agriculture – biofertilizers (Rhizobium) biopesticides (B.thuringiensis);
Brief account of bacterial diseases of plants (Citrus Canker)

Unit II - Mycoplasma and Algae (Credit-2)

A general account of Mycoplasma (e.g. sandal spike disease) and Ricketsiae.
Algae- Cyanobacteria:i) General account, occurrence, structure, reproduction and economic importance – nutritive value, biofertilizers (N2 fixation, role of heterocyst), algal blooms as biological indicators. ii) Study of Spirullina, Nostoc and Oscillatoria.
General account of occurrence, structure, thallus organization, Pigment constitution, reproduction, economic importance and classification (classification of Fritsch).
b) Study of the structure, reproduction and life-cycle of the following
Chlorophyceae : Oedogonium,
Xanthophyceae : Vaucharia
Phaeophyceae : Sargassum
Rhodhophyceae : Polysiphonia

Unit III - Fungus and Lichens (Credit-2)

General characters, thallus organization, reproduction, economic importance and classification (Alexopoulos and Mims), Study of structure, reproduction, life-cycle and phytopathology and/or economic importance of the following :
Myxomycetes - Stemonites
Phycomycetes – Albugo
Ascomycetes – Yeast, Penicillium

Unit IV –Fungus and Lichens **(Credit-2)**

(a)Study of structure, reproduction, life-cycle, phytopathology and economic importance of the following : Basidiomycetes – Puccinia, Agaricus., Deuteromycetes Cercospora, Colletotrichum
(b)Lichens – General characters, distribution, types, structure, reproduction, economic and ecological importance.

Suggested Readings:

1. Gangulee, Hirendra Chandra . College Botany.
2. Joanne M. Willey. Microbiology
3. Singh,V . A Textbook of Botany
4. Alexopoulos.C.J. Introductory Mycology

PRACTICALS **(Credit-2)**

1. Gram staining of bacteria.
2. Preparation of bacterial media and culture of bacteria.
3. Study of genera included in theory under Cyanobacteria, algae and fungi by making temporary micropreparations and using permanent slides.
4. Study of crustose, foliose and fruticose lichens.
5. Observation of disease symptoms in hosts infected by virus, mycoplasma and bacteria.

Outcomes: The student teachers

- Get familiarize with the habitats, classification, structure and life cycle of bacteria.
- Get a basic idea about the , viroid, virusoid and prions and economic impact on plants.
- Get introduce about the aspects of Mycoplasma and Algae
- Understand the role of microbes
- get the knowledge on various Fungus and Lichens.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

ANIMAL DIVERSITY–I

Credits-12(8+1+2+1)

Objectives: To enable students to understand invertebrates, the organizational hierarchies and complexities, the evolutionary trends in external morphology and internal structure; identification and classification with examples, to enable them to understand various modes of adaptations in animals.

Unit I: Protozoa and Porifera **(Credit-2)**

a) Protozoa: General characters and classification of Phylum Protozoa up to classeswithexamples (1); Type study: Entamoeba histolytica – External morphology, lifecycleand pathogenicity (2); Nutrition in Protozoa – Holozoic, holophytic, saprozoic and parasitic nutrition; Sexual Reproduction– conjugation (amphimixis), syngamy and autogamy

b) Porifera: General characters affinities and classification of Phylum Porifera up to Classes with examples ; Type study: Sycon – External morphology and cellularorganization ; Canal system and Reproduction in sponges, life cycle with reference to Amphiblastula and Parenchymula larvae.

Unit II: Cnidaria and Platyhelminthes **(Credit-2)**

a) Cnidaria: General characters and classification of Phylum Cnidaria up to classes with examples (1); Type study: Obelia – External morphology, metagenesis and life cycle; Polymorphism in Cnidaria ;

b) Platyhelminthes: General characters and classification of PhylumPlatyhelminthes up to classes with examples ; Type study: Fasciola hepatica – External morphology, digestive system, excretory system and reproductive system.

Unit III: Annelida & Arthropoda **(Credit-2)**

a) Annelida: General characters of Phylum Annelida.; Type study: Hirudineria granulosa – Habit, Habitat, structure,digestive system, reproductive system and life-history.

b) Arthropoda: General characters of Phylum Arthropoda. Habit, Habitat, structure, digestive system, reproductive system and life-history. Type study Palaemon Externalmorphology, digestive system, excretory system, reproductive system and life.

Unit IV: Mollusca & Echinodermata **(Credit-2)**

a) Mollusca: Outline classification of Mollusca up to order

- Habit and habitat, structure, nutrition, respiration, blood vascular system, excretion and reproduction of Pila
- Torsion in Gastropoda

a) Echinodermata: Outline classification of Echinodermata up to order

- Habit and habitat, structure, nutrition, respiration, blood vascular system, excretion and reproduction of Asterias
- Larval forms of Echinoderms.

Suggested Readings:

1. Modem Textbook of Zoology Invertebrates by R.L. Kotpal –(Rastogi Publication , Meerut 10th Revised Edition)
2. Invertebrate Zoology series (Protozoa of Echinnodermata) by R.L. Kotpal - – (Rastogi Publication , Meerut)
3. Invertebrate Zoology by E.L. Jordan and P.S. Verma – S. Chand & Co., Delhi
4. Invertebrate Zoology by J.K. Dhami and P.S. Dhami – S. Chand & Co., Delhi
5. A textbook of Invertebrate Zoology by S.N. Prasad – (KitabMahal, Allahabad)
6. Life of Invertebrate Zoology by Russel and Hunter – (Macmillan)
7. Invertebrate Zoology by R.D. Barnes :- (W.B. Saunders, Philadelphia)
8. A manual of Zoology Vol. I by EkambernathaAyyar (Vishwnathan,Madras)
9. The invertebrate series of L.H. Hyman – (McGraw Hill)
10. A student's textbook of Zoology by Adma Sedgwick VoI .I, II & III (Central Book Depot, Allahabad)
11. A textbook of Zoology VoI. I by Parkar and Haswell – (Macmillan)
12. Lower non chordate, Dr VS Pawar, Hindi Edition, College book centre, Chaura Rasta, Jaipur
13. Higher non Chordate, Dr VS Pawar, Hindi Edition, College book centre , Chaura Rasta, Jaipur
14. Animal taxonomy and evolution, Dr VS Pawar, Hindi Edition, College book centre, Chaura Rasta, Jaipur

PRACTICALS(Credit-2)

1. Study of microscopes: Simple and compound, handling of microscopes, use of Micro-image projection system.
2. Preparation of culture media of Paramoecium.
3. i) Study of permanent slides of Protozoa:
a) Amoeba b) Entamoeba c) Euglena d) Paramoecium e) Paramoecium conjugation
f) Foramenifera g) Plasmodium
4. Studies on effect of various stimuli on the behaviour of Paramoecium.
5. Preparation of permanent and stained slides:
a) Obelia colony b) Sponge spicules c) Sponge gemmules
6. Study of specimens and permanent slides of Porifera:
a) Sycon b) Spongilla c) Finger sponge (Haliclona) d) Euplectella e) Sponge spicules of various types f) Spongin fibres g) Sponge gemmule h) T.S. and L.S. of Sycon.
7. Study of specimens and permanent slides of Cnidaria:
a) Hydra b) Obelia colony c) Obelia medusa d) Tubularia e)Pennaria f) Metridium
g) T.S. of Metridium h) Aurelia
i) Ephyra larva.
8. Study of specimens of Cnidaria:
a) Physalia b) Porpita c) Valella d) Tubipora e) Gorgonia.
9. Study of specimens of Helminthes:
a) Dugesia b) Fasciola c) Taenia solium d) Ascaris e) Enterobius f) Ancylostoma g) Trichinella.
10. Annelida: i) Dissection of Pheretima (Study of dissected specimens)
a) Digestive system b) Nervous system
12. Study of specimens and permanent slides of Annelida:
a) Hirudinaria b) Aphrodite c) T.S. of Pheretima d) Parapodium of Nereis.
13. Arthropoda:Palaemon, Eupagurus, Scolopendra, Apis, Peripatus.
14.Mollusca: Chiton, Pila, Aplysia, Helix, Dentalium, Mytilus, Pinctada, Unio, Sepia, Loligo Octopus:
15.Echinodermata:Antedon, Holothuria, Cucumaria, Astropecten, Asterias, Echinus
(Note: During the study of specimens and permanent slides, emphasis may be given for morphological, anatomical, adaptive, biological and economic importance)

Outcomes: To enable students to understand invertebrates, the organizational hierarchies and complexities, the evolutionary trends in external morphology and internal structure; identification and classification with examples, to enable them to understand various modes of adaptations in animals.

Inorganic Chemistry

Credits-12(8+1+2+1)

Objectives:

- To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.
- To acquire basic knowledge to students teachers about atomic structure, periodic properties, Chemical Bonding and Ionic solids, Understanding the chemistry of s-and p-block elements, the fundamentals of the chemistry of the main group elements, and important real world applications of many of these species and Acids and Bases and solvent system.
- Students will be able to describe the fundamentals of acid/base chemistry, including pH calculations, buffer behaviours.

Unit I: Atomic Structure and Periodic trends (Credit-2)

Atomic Structure:

Idea of de-Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrödinger wave equation, significance of Ψ and Ψ^2, quantum numbers, radial and angular wave functions and probability distribution curves, shapes of s, p, d and f orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule, effective nuclear charge.

Periodic Properties

Atomic and Ionic radii, Ionization energy, electron affinity and electronegativity-methods of determination or evaluation, trends in periodic table and applications in predicting and expecting the chemical behaviour.

Unit II: Chemical Bonding and Ionic solids (Credit-2)

Structure and Bonding: Covalent Bond -Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions, valence shell electron pair repulsion (VSEPR) theory with special reference to NH_3, H_3O^+, SF_4, ClF_3, ICl_2^- and H_2O, MO theory, homonuclear and heteronuclear (CO and NO) diatomic molecules, multicenter bonding in electron deficient molecules such as Boranes, bond strength and bond energy, percentage ionic character from dipole moment and electro-negativity difference.

Ionic solids – Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule, Metallic bond-free electron, valence bond and band theories.

Weak Interactions- Hydrogen bonding, Van der Waals' forces.

Unit III: Chemistry of sand p block elements (Credit-2)

s-Block Elements: Comparative study, diagonal relationship, salient features of hydrides, solvation and complexation tendencies including their function in bio-systems, an introduction to alkyls and aryls.

p-Block Elements: Comparative study (including diagonal relationship) of groups 13-17 elements, compounds like hydrides, oxides, oxy acids and halides of group 13-16, hydrides of boron-diborane and higher boranes, borazine, borohydrides, fullerenes, carbides, fluorocarbons, silicates (structural principle), tetrasulphur tetra nitride, basic properties of halogens, interhalogens and polyhalides.

Chemistry of Noble Gases: Chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.

Unit IV: Acids and Bases and solvent system **(Credit-2)**

Theories of Acids and Bases: Arrhenius, Bronsted-Lowry, Lux-Flood, solvent system and Lewis concept of acids and bases. Solvent system of acids and bases with special reference to liquid Ammonia, liquid BrF_3

Concept of Hard and Soft Acids and Bases (HSAB): Classification of acids and bases as hard and soft, Pearson's HSAB concept, acid-base strength and hardness and softness, Symbiosis, theoretical basis of hardness and softness, electro negativity.

Solvent Systems: Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2.

Suggested Readings:

1. Lee, J.D. Concise Inorganic Chemistry, ELBS.
2. Douglas, B.E. and Mc Daniel, D.H., Concepts & Models of Inorganic Chemistry
3. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications.
4. Shriver and Atkins Inorganic Chemistry, W. H. Freeman and Company
5. James Huheey, Inorganic chemistry: Principles of Structure and Reactivity, Pearson Education India
6. B.N. Figgis, J.E Huheey, P.W. Atkins Inorganic Chemistry, Pearson Education
7. Duward Shriver, Inorganic Chemistry, W. H. Freeman
8. Gary Wulfsberg, Inorganic Chemistry, University Science Books
9. A. R. West, Solid State Chemistry and its Applications, Wiley

PRACTICALS **(Credit-2)**

1. **Inorganic Chemistry:**

   Semi micro analysis: Detection of the presence of three cations and three anions (including interfering) in a given mixture qualitatively.

2. **Quantitative Analysis: Volumetric Analysis**
   - **a.** Determination of acetic acid in commercial vinegar using NaOH.
   - **b.** Determination of alkali content – antacid tablet using HCl.
   - **c.** Estimation of calcium content in chalk as calcium oxalate by permanganometry.
   - **d.** Estimation of ferrous and ferric by dichromate method.
   - **e.** Estimation of copper using thiosulphate.

Outcomes: After completion of this course students will be-

1. Able to know the concepts of atomic structure and the use of the periodic table in predicting an element's physical and chemical properties .
2. Perform quantitative calculations based on the relationship between wavelength, energy, and the speed of light.
3. Able to know types of bonds , formation of bonds ,hybridization and molecular orbtal theory ad chemistry of borazene ,diborane .

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

II Semester

ENGLISH

Credit-9(9+0+0+0)

Objectives:- Students will develop proficiency in English which equips them to:

- Understand the demands of audience, subject, situation and purpose and the use of language for effective communication.
- Analyse language in context to gain an understanding of grammar, vocabulary, spelling, punctuation and speech.

Unit I: Descriptive Grammar **(Credit-3)**

Function of Auxiliaries; Modals; Question form
Clauses: Noun Clause; Reported Speech and Change of Voice.

Unit II: Development of Language Competence **(Credit-2)**

To be based on the use of multiple texts which address issues of multiculturalism, gender, racism and texts which relate with current issues and contemporary trends. Short stories, comic strips, cartoons and animations (both print and non-print media) to be used. Speeches of famous persons, diaries, travelogues can also be used.

Unit III: Writing for Functional Purposes & Creative Skills in Writing **(Credit-2)**

Letter-writing (Professional / Personal),Writing dialogues, poems and essays

Unit IV: Basic Phonetics **(Credit-2)**

Sounds of English language, intonation and transcription using IPA.

References:

1. Chan. et al. (1997) Professional Writing Skills, San Anselma, CA
2. Fiderer, A. (1994) Teaching Writing: A Workshop Approach. Scholastic.
3. Block, C.C. (1997). Teaching the Language Arts, 2nd Ed. Allyn and Bacon
4. Mckay. et al. (1995). The Communication Skills Book, 2 nd Ed. New Harbinger Publications.
5. Merrriam, E. (1964). It Doesn't Always Have to Rhyme. Atheneum.
6. Hyland, Ken (2004) Second Language Writing. University of Michigan Press.
7. Graves,D (1992). Explore Poetry: The reading /writing teacher's companion. Heinemann
8. Stone Douglas (1999). Difficult conversations: How to discuss what Matters Most, New York.:Penguin Books.
9. Gabor Don (2001). How to start a Conversation and Make Friends, New York: Fireside.

Outcomes: After completion of this course students will -

- Examine authentic literary and non-literary texts and develop insight and appreciation.
- Gain an understanding of study and reference skills.
- Plan, draft, edit and present a piece of writing.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

HINDI LANGUAGE

Credit-9(9+0+0+0)

Objectives:

- To enable the students to acquire basic skills in functional language.
- To develop independent reading skills and reading for appreciating literary works.
- To internalise grammar rules so as to facilitate fluency in speech and writing .

Unit I: History of Language and Literature-2 **(Credit-3)**

Aadhunik Hindi Sahitya ka Itihas [1857 Se Lekar Ab Tak]

Unit II : Modern Poetry-1 [Pre-Independence Literature] **(Credit-2)**

Swatantratapurva Hindi Kavita Ka Vikas

1. Maithilisaran Gupt- Nar Ho Na Nirash Karo Man ko
2. Jayshankar Prasad- Himadri Tung Sring Se Prabudh Sudhha Bharti
3. Suryakant Tripathi Nirala- Joohi ki Kali
4. Sumitranandan Pant- Drut Jharo Jagat Ke Jirn Patra
5. Mahadevi Verma-MaiNeer Bhari Dhukh Ki Badli.

Unit III : Modern Poetry-2 [Post-Independence Literature] **(Credit-2)**

Swatantrayottar Hindi Kavita Ka Vikas

1. Gajanan Madhav Muktibodh- Bhool Galti,
2. Kedarnath Agrawal- Chandra Gahna Se Lautati Ber
3. Raghveer Sahay- Aapki Hansi
4. Nagarjun- Aakal Aur Uske Bad
5. Kedarnath Singh- Aakal Me Saras

Unit IV : Communication skills Conversation [Varta]: **(Credit-2)**

Characteristics – Definition – Styles of conversation – Higher order skills-Telephonic conversation, Role Play, – Models, etc. – Exercises.

References:

1. Hindi Sahitya Ka Itihas: Ramchandra Sukla, Vani Prakashan, Delhi
2. Hindi Sahitya ka Aadikal: Hajari Prasad Divedi, Vani Prakashan, Delhi
3. Hindi Sahitya Ka Itihas: Dr Nagendra , Mayoor Paperbacks, Delhi
4. Hindi Sahitya Ka Sanchhipt Itihas: Nanddulare Bajpayee, Swaraj Prakashan, Delhi
5. Hindi Sahitya Ka Dusara Itihas: Bacchan Singh, Vani Prakashan, Delhi
6. Aadhunik Hindi Sahitya ka Itihas: Bacchan Singh, Lokbharti Prakashan, Delhi
7. Hindi Sahitya ka Sanchhipt Itivritt: Shivkumar Mishra, Vani Prakashan, Delhi
8. Hindi Sahitya ka Sanchhipt Itihas:Viswanath Tirpathi, Orient Longman, Delhi
9. Sawtantrayotar Hindi Sahitya Ka Itihas: Dr Laxmisagar Vasney, Delhi
10. Hindi Sahitya Aur Samvedana Ka Vikas: Ramswaroop Chaturvedi, Lokbharti Prakashan
11. Bhasha, Yugbodh aur Kavita: Dr Ramvilas Sharma, Vani Prakashan, Delhi
12. Kavita ka Vartmaan: Dr P Ravi, Vani Prakashan, Delhi
13. Hindi Kvaya ka Itihas: Ramswaroop Chaturvedi, Lokbharti Prakashan, Delhi
14. Kavita ki Zameen aur Zameen ki Kavita: Namvar Singh, Rajkamal Prakashan, Delhi
15. Nayee Kavita aur Astitvawad: Ramvilas Sharma, Rajkamal Prakashan,Delhi
16. Chhayavad: Namvar Singh, Rajkamal Prakashan, Delhi
17. Kavita ke Naye Pratiman: Namvar Singh Raajkamal Prakashan, Delhi
18. Hindi Kavita ka Atit aur Vartmaan: Maneger Panday, Vani Prakashan, Delhi
19. Hindi Kavita Ki Tisari Dhara: Mukesh Manas, Swaraj Prakashan, Delhi
20. Effective Communication Skills, by Omkar N Kour
21. Prayojanmoolak Hindi- Madhav Sontakke, Rajkamal Prakashan Samooh, Delhi
22. Prayojanmoolak Hindi ki Nayee Bhoomika- Kailash Nath Panday, Rajkamal Prakashan Samooh, Delhi
23. http://www.hindisamay.com

Suggested Activities:

In the internal class during the different activities the performance of the student will be assessed by the teacher. Test, assignments and small projects works may be given .

Outcomes: After completion of this course students will –

- develop functional and creative skills in language.
- develop values of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

ENVIRONMENTAL STUDIES

Credit-6(4+1+1+0)

Objectives:

- To familiarize the students to develop a comprehensive understanding of various facets of life forms, ecological processes .
- To get a basic idea about the Critical thinking Capability to identify relevant environmental issues, analyse the various underlying causes, evaluate the practices.
- Moral and ethical awareness/reasoning Develop empathy for various life forms and appreciate the various ecological linkages within the web of life.
- To make students realize the importance and their role in the protection and maintenance of a healthy environment for sustainable development.

Unit I: Environment : Natural Resources, Biodiversity and their Conservation

Environment: Studies, concept, Scope and Importance.
Natural Resources - Renewable and Non-renewable (Forest, water, mineral, food, energy and land resources).
Associated problems and strategies for Conservation and Sustainable Development.
Ecosystem – concept, components, Ecosystems –Concept, structure and function; Pond ecosystem, Forest ecosystem; Food chains, Food webs; Concept of ecological succession energy flow, types of ecosystem.
Biodiversity – Genetic, species and ecosystem diversity; status of Biodiversity – global, national and local; Utilitarian values and ethics of biodiversity; Hotspots of biodiversity and associated threats of habitat destruction; endangered and endemic species of India;
Conservation of biodiversity - In-situ and Ex-situ; Endangered and endemic species – Concept; Afforestation – Social forestry, Agroforestry, Green belt.

PRACTICALS

a. Visit to document environmental assets - river / forest / grassland/ hill/national parks.
b. Visit to a local polluted site : Urban / Rural / Industrial / Agricultural.
c. Study of common plants, insects, birds.

Unit II: Environmental Concerns

Disaster management– Definition and types (Natural and Man-made); Self-protection during disasters (Fire, Floods, Earthquakes, landslides)
Environment Protection Act; Biodiversity Act (2002); National Environmental Policy, 2006 – Provisions and importance; Environmental Impact Assessment – Concept; Swachh Bharat Mission– Objectives; International agreements – Montreal and Kyoto protocols

PRACTICALS

a. Study of simple ecosystems – pond, river, hill slopes, etc.
b. Project on environmental pollution in the nearby sites Preparation of exhibits on environmental themes and organize an exhibition.
c. Conduct a survey of environmental problems of the community

Unit III: Natural resources and management

a. From unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, watershed management, resettlement and rehabilitation of people; its problems and concerns.
b. Environmental ethics : Issues and possible solutions,
c. Climate change, global warming, acid rain, ozone layer depletion, Wasteland reclamation. and Solid waste management.
d. Population growth, variation among nations; Population explosion – Family Welfare Programme; HIV/ AIDS; Environment and human health
e. Impact of plastic on human and animal health

Unit IV: Environmental Pollution

Environmental pollution- Air, water, soil, marine, noise and thermal pollution, nuclear hazards; solid waste management and conservation, preventive measures of pollution.
Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation; Public awareness).

Suggested Readings:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –380 013, India, Email:mapin@icenet.net (R)
3. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
4. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.

Outcomes:

The student will be able to

- Gain in-depth knowledge on natural processes that sustain life.
- Predict the consequences of human actions on the web of life, global economy and quality of human life.
- Develop critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.
- Acquire values and attitudes towards understanding complex environmental - economic social challenges, and participating actively in solving current environmental problems and preventing the future ones.
- Adopt sustainability as a practice in life, society and industry.
- Understand the importance and dimension of a healthy environment, become environmentally conscious, skilled and responsible in all their actions with a concern for sustainable development.
- Apply the knowledge on ecological and environmental significance of microbes for the benefit of the society.

THEATRE, ART AND HERITAGE CRAFT TRADITIONS

Credit-5(3+1.25+0.75+0)

Objectives:

-To understand the critical role of the crafts community and its integral relationship to the Indian society.

- To enable students to understand the relationship between economics, culture and aesthetics

- To introduce Indian culture through the crafts, so that school students appreciate the variety of skills and expressions of the Indian artist

- To provide students a creative aesthetic experience of the unique visual and Material culture of India and develop values of conservation, protection of the Environment, resources and heritage of the country

- To enable students to understand the relationship between tradition and contemporary trends, form and function, creator and consumer.

Unit I: Unit: I: Concept & forms of Theatre & Arts (Credit-1)

Eastern and Western, Natyashasthra, Doctrine of Rasa, Tragedy, Catharsis, Folk and Classical art forms. Drama, Stage Plays. Skits, Mime, Street Plays

Introduction to the History of Word Art, Forms of Art: music, dance, theater and visual arts

- appreciate different art forms
- integration of art forms in classroom process
- analyze text books for integration of different art forms.

Unit II: Expression through art forms (Credit-1)

Expressing ideas about different aspects of life

- Expressing various emotions
- Enhancing communication and presentation skills, developing imagination, creativity and aesthetic sensibility among the student teachers
- Utilizing different art expressions in teaching learning situation

Unit III: Cultural heritage of India (Credit-1)

Exposure to the cultural heritage of Locality, state/region, Nation Reflection and incorporation of the rich cultural heritage during the celebrations of festivals, functions and special days document processes of an art or craft form from the pedagogical point of view; such as weaving or printing of textiles, making of musical instruments, folk performances in the community Acquaintance with the life and work of artists and their contribution to teaching and learning.

Suggested Readings

Position Paper- National Focus Group on Arts, Music, Dance and Theater NCERT, 2006, New Delhi

Position Paper- National Focus Group on Heritage Crafts, NCERT, New Delhi, 2006 NCF 2005

NROER- National Repository of Open Educational Resource, Department of School Education &Literacy, MHRD.

PRACTICALS (Credit-0.25+0.25)(D-0.25)(P-0.25)

a. Expression, Body Language, Modulation and Creativity

b. Act for any situation

c. Preparation of script

d. Organization of Competitions at class level and exhibition in the Institute

Outcomes: After studying the subject student would be able to understand about the origin of art forms in world. They would be capable to analyse the various forms of arts and its relevance in education and social phenomenon.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

UNDERSTANDING EDUCATION AND ITS PERSPECTIVES

Credit-6(6+0+0+0)

Objectives:-

After completed the course the student-teacher will be able to:-

- To develop basic understanding and concept of education.
- Learn about the education and its implementation.
- Explain in detail the role of education in social and cultural change.
- Understand the roll of education and instrument of social change
- To develop the Socio-cultural influences on the aims and organization of education;

Unit I: Basic Concepts of Education (Credit-1.5)

Concept, meaning, aims and functions of education; Education and its related concepts – Training, Instruction and Teaching; Education as a discipline and its interdisciplinary nature; Education as value development.

Unit II: Educational Thoughts and Practices (Credit-1.5)

Relevance of educational thoughts of Indian and Western Educationists to the present education system.
a) Indian: Gandhiji, Rabindranath Tagore, Aurobindo, Jiddu Krishramurthy,Swami Vivekananda.
b) Western: Plato, Rousseau, John Dewey, Montessori and Paulo Frieri.

Unit III: Education and Socio-Cultural Context (Credit-1.5)

Education as an instrument of social change; Influence of education on society, family and their practices; Socio-cultural influences on the aims and organization of education; Emerging trends in societies and their repercussions on education: Globalization and Internationalization of education

Unit IV: Issues and Concerns in Education (Credit-1.5)

Equalization of education opportunities; Constitutional problems for ensuring and equality Nature and forms of inequality including dominant and minor groups, gender in equalities in schools; public – private; Rural urban – tribal; Democracy, Secularism, National and Emotional Integration; Inclusive Education.

Sessional Work:

Readings on educational thinkers and presentation on the contribution of one of the thinkers (group work followed by discussion)Reading on education in Ancient India – Vedic, Buddhism and Jainism

Suggested Readings:

1. Pathak, Avijit (2002) social Implications of Schooling, Delhi Rainbow Publishers.
2. Krishnamurthi J Education and the Significance of life, KFI Publications.
3. Anand, C L and et al (1993) Teacher and Education in the Emerging Indian Society, NCERT, New Delhi.
4. Mahatma Gandhis Philosophy of Education and its Relevance/Agarwal, Ruchi
5. Govt. of India, MHRD (1986, Revised 1992) National Policy of Education, New Delhi.

Outcomes:

Education serves several functions for society. These include (a) socialization, (b) social integration, (c) social placement, and (d) social and cultural innovation.Education promotes social inequality through the use of tracking and standardized testing and the impact of its "hidden curriculum." Schools differ widely in their funding and learning conditions, and this type of inequality leads to learning disparities that reinforce social inequality.This perspective focuses on social interaction in the classroom, on the playground, and in other school venues. Specific research finds that social interaction in schools affects the development of gender roles and that teachers' expectations of pupils' intellectual abilities affect how much pupils learn. Certain educational problems have their basis in social interaction and expectations.Schools ideally perform many important functions in modern society. These include socialization, social integration, social placement, and social and cultural innovation.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

DIVERSITY OF CRYPTOGAMS

Credit-10(8+0+2+0)

Objectives:

- To familiarize the students the classification and Economic importance of Bryophytes
- To get a basic idea about the Structure, reproduction, and evolutionary significance.
- To introduce the students about the aspects of Geological time scale and Fossils.
- To understand the Geological time scale and Fossils.

Unit I(Bryophyta) (Credit-2)

a) General characters, distribution, origin of the land habit in plants, structure, reproduction, alternation of generation, classification and Economic importance of Bryophytes.
b) Structure, reproduction, and evolutionary significance of following genera:
Hepaticopsida – Riccia, Marchantia
Anthocerotopsida – Anthoceros
Bryopsida – Funaria

Unit II (Geological time scale and Fossils) (Credit-2)

a) General account of geological time scale, types of fossils, fossilization process, radioactive carbon dating, and importance of fossils.
b) Study of Rhynia, Lepidodendron, Lepidostrobus.

Unit III (Pteridophyta -I) (Credit-2)

a) General characters, distribution, reproduction, life cycle and classification.
b) Study of morphology, anatomy and reproduction in
Psilopsida : Psilotum
Lycopsida : Lycopodium, Selaginella
Sphenopsida : Equisetem

Unit IV(Pteridophyta -II) (Credit-2)

a) Study of morphology, anatomy and reproduction in Pteropsida : Marsilea
b) Evolution of steles in Pteridophytes
c) Origin and significance of heterospory and seed habit.

Suggested Readings:

1. Singh,V. A Textbook of Botany, Rastogi Publications, Meerut.
2. Vashishta B.R. Botany for degree students Bryophyte
3. Vashishta, P.C Botany for degree students pteridophyta
4. VashistaB.R.and Sinha A.K. Botany for Dergree students-Fungi.

PRACTICALS (Credit-2)

1. Study of the morphology, anatomy and reproductive structures of genera included in Byophytes.
2. Study of the morphology, anatomy and reproductive structures of genera included in Pteridophyta.

Outcomes: The students will be able to:

- familiarize the students the classification and Economic importance of Bryophytes
- get a basic idea about the Structure, reproduction, and evolutionary significance.
- Know about the aspects of Geological time scale and Fossils.
- understand the Geological time scale and Fossils.

ANIMAL DIVERSITY–II

Credit-10(8+0+2+0)

Objectives:

To enable students to understand in respect of vertebrates – their organizational hierarchies and complexities, the evolutionary trends in external morphology and comparative studies of internal structures; identification and classification with examples; to enable them to understand various modes of adaptations in animals.

Unit I: Hemichordata, Chordata & Cephalochordata (Credit-2)

Habit and habitat, reproduction (excluding development) and affinities to following types:-

a) Hemichordate: Banlanoglossus
b) Urocohordata:Herdmania, ascidian tadpole larva and its metamorphosis.
c) Cephalochordata: Amphioxus

Comparative anatomy of vertebrates from an evolutionary point of view of the following:-

(ii) Heart and aortic arches.
(iii) Kidney and associated urinogenital ducts

Unit II: Agnatha & Pisces (Credit-2)

Habit, habitat, of the following types:
a)Agnatha: Petromyzon (affinities with other vertebrate groups), affinities of Cyclostomates.
b) Pisces: Scoliodon (Digestive system, respiratory system, blood vascular system, urinogenital system, nervous system (central and peripheral) including sense organ)
c) Scales and fins of fishes.

Unit III: Amphiboia & Reptilia (Credit-2)

Habit, habitat, structure (morphology, digestive system, respiratory system, blood vascular system, nervous system and urinogenital system of the following types:-

a) Amphibia : Hoplobatrachus tigerinus
b) Reptilia: Sara hardwickii
c) Venomous and non-venomous snakes, poison apparatus and biting mechanism. First aid of snake bite.

Parental care in Amphibia

Unit IV: Aves & Mammals (Credit-2)

Habit, habitat, structure, morophology, digestive system, respiratory system, blood vascular system, nervous system and urinogenital system of the following types:-

a) Aves: Columba
b) Mammalia: Rabbit.
c) Origin of birds, migration & flight adaptation of birds.

Suggested Readings:

1. Modern Textbook of Zoology: Vertebrate by R.L. Kotpal – Rastogi Publication, Merrut, 3rd Edition,2008
2. A Textbook of Zoology Vol. II by Parkar and Hasswel – (MacMillan)
3. A Textbook of Zoology Vol. II by R.D. Vidyarthi – (S. Chand & Co. Delhi)
4. Life of Vertebrates by J. Z. Young – (Oxford University Press)
5. The Vertebrates by A.S. Romer – (vakils, Ferrer& Simons, Bombay)
6. Elements of Chordate Anatomy by Weichert – (McGraw Hill)
7. The Birds by R.L. Kotpal (4th Edition) – Rastogi Publications, 2008
8. Bird Migration by D.R. Griffin – (Doubleday, Garden city, USA)
9. The Book of Indian birds by salim Ali.
10. Fish and Fisheries by K. Pandey and J.P. Shukla (2nd Edition) (Rastogi Publication, 2008)
11. Indian Fishes by Qureshi – (Brij Brothers., Bhopal)
12. Comparative anatomy of the vertebrates by George C Kent- 3rd Saint Louis: The C.V. Mosby Co 1973
13. Animal taxonomy and evolution, Dr VS Pawar, Hindi Edition, College book centre, Chaura Rasta Jaipur.

PRACTICALS(Credit-2)

1. Study of Museum specimen with respect to levels and patterns of organization, biosystematics, biodiversity, adaptations, development stages, population dynamics, ecological implications etc.

a) **Hemichordata**: Balanoglossus.
b) **Urochordata**: Herdmania, Pyrosoma.
c) **Cephalochordata**: Amphioxus.
d) **Cyclostomata**:Petromyzon, Myxine.
e) **Pisces**: Scoliodon, Sphyrna, Torpedo, Pristis, Trygon, Lepidosteus, Clarias, Ophiocephalus, Anabas, Exocoetus, Hippocampus, Tetradon, Protopterus.
f) **Amphibia:** Icthyophis, Necturus, Proteus, Ambystoma, Axolotl larva, Triturus. Amphiuma, Alytes, Bufo.
g) **Reptilia:** Testudo, Trionyx, Sphenodon,Hemidactylus, Draco, Calotes, Chamaeleon, Varanus, Heloderma, Typhlops, Eryx, Hydrophis, Viper, Bungarus, Naja, Alligator; Identification of Venomous and Non-venomous Snakes.
h) **Aves:** Pavo, Columba, Psitacula, Passer, Corvus, Archaeopteryx.
i) **Mammals:** Ornithorhynchus, Echidna, Macropus, Loris, Manis, Rattus.

2. **Study of Permanent Slides:**

a) **Balanoglossus**: T.S. of proboscis, collar region and trunk
b) **Amphioxus**: T.S. or oral hood, pharynx.
c) **Mammals**: T.S. of skin, stomach, duodenum, ileum, liver, Pancreas, spleen, lungs, kidney, Testis, Ovary.

3. **Osteology:**

a) Study of skull bone of Frog, Varanus, Bird and Rabbit.
b) Study of vertebral of Frog. Varanus, Bird and Rabbit.
c) Study of girdles, forelimb and hind limb bones of Frog, Varanus, Bird and Rabbit.

4. Dissections and / or its demonstration through Charts / Models / Video / CD / digital alternatives etc and / or preparation of working models of the different system of the following animals.

a) **Scoliodon**: Afferent branchial systems, efferent branchial system, cranial nerves and internal ear.

Outcomes: The students will be able to understand in respect of vertebrates – their organizational hierarchies and complexities, the evolutionary trends in external morphology and comparative studies of internal structures; identification and classification with examples; understand various modes of adaptations in animals.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PHYSICAL CHEMISTRY

Credit-10(7+0.5+2+0.5)
Objectives:

- To acquire basic knowledge to students teachers about Mathematical concepts and learn the basic concepts of nuclear radioactivity and Nuclear reactions.
- To enhance the understanding of students in concepts related to Liquid, Colloidal states & Structure of Ionic solids, Behaviour of Gases, concepts in thermodynamics, different thermodynamic quantities such as heat and work and how are they measured, related or transformed.

Unit I: Mathematical concepts and Nuclear Chemistry (Credit-1.5)

- **Mathematical Concepts**: Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of functions like k_x, e^x,x^n, sin x, log x; maxima and minima, partial differentiation and reciprocity relations, Integration of some useful/relevant functions; permutations and combinations, Factorials, Probability.
- **Nuclear Chemistry:** Radioactive decay – decay law, disintegration constant, half-life and average life, alpha and beta disintegration reactions, group displacement law, nuclear reactions fission, fusion, artificial radioactivity, applications of radioactivity, nuclear power, carbon dating, biological effects of various types of radiations, nuclear chemistry for peace, Nuclear chemistry in Medicine and diagnostic techniques.

Unit II : Liquid, Colloidal states & Structure of Ionic solids (Credit-1.5)

- **Liquid State:** Intermolecular forces, structure of liquids (a qualitative description).Structural differences between solids, liquids and gases, Liquid crystals: Difference between liquid crystal, solid and liquid, Classification, structure of nematic and cholestric phases, Thermography and seven segment cells.
- **Colloidal States:** Definition of colloids, classification of colloids, Solids in liquids (sols): properties – kinetic, optical and electrical; stability of colloids, protective action, Hardy-Schulze law, gold number. Liquids in liquids (emulsions): types of emulsions, preparation, Emulsifier, Liquids in solids (gels): classification, preparation and properties, inhibition, general application of colloids, colloidal electrolytes.
- **Structure of Ionic solids**: Definition of space lattice, unit cell; Laws of crystallography – (i) Law of constancy of interfacial angles, (ii) Law of rationality of indices (iii) Law of symmetry, Symmetry elements in crystals. X-ray diffraction by crystals, Derivation of Bragg's equation, Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method).

Unit III : Behaviour of Gases (Credit-2)

- **Gaseous States:** Postulates of kinetic theory of gases, deviation from ideal behaviour, Vander Waals' equation of state;
- **Critical Phenomena**: PV isotherms of real gases, continuity of states, the isotherms of van der Waals equation, relationship between critical constants and Van der Waals' constants, the law of corresponding states, reduced equation of state.
- **Molecular Velocities**: Root mean square, average and most probable velocities, Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter, Liquification of gases (based on Joule – Thomson effect).

Unit IV : Thermodynamics **(Credit-2)**

- First Law of Thermodynamics: Statement, definition of internal energy and enthalpy.Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law-Joule-Thomson coefficient and inversion temperature. Calculation of w, q, dU, &dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process, temperature dependence of enthalpy, Kirchhoff's equation.
- Second law of thermodynamics: Need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature. Concept of entropy: entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.
- Third law of thermodynamics: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A &G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G with A with P, V and T.

Suggested Readings:

1. Engel, Physical Chemistry, Pearson Publications.
2. Mary Anne White, Physical Properties of Materials, Taylor & Francis second edition.
3. D N Bajpai, Advanced Physical Chemistry, S. Chand Publishing
4. S Lewis and D Gladstone, Elements of Physical Chemistry, Macmillan.
5. Peter Atkins Julio de Paula, The elements of Physical Chemistry, Oxford University Press.

PRACTICALS(Credit-2)

1. **Colloids**
   - To prepare arsenious sulphide sol and compare the precipitating power of mono -, bi- and trivalent anions.
2. **Viscosity**
   - To determine the percentage composition of a given mixture (non interacting systems) by viscosity method.
   - To determine the percentage composition of a given binary mixture by viscosity method (acetone & ethyl methyl ketone)
3. **Surface Tension**
   - To determine the surface tension of amyl alcohol in water at different concentrations and calculate the excess of these solutions.
   - To determine the percentage composition of a given surface tension binary mixture by surface tension method (acetone &ethyl methyl ketone).

Outcomes: The students will acquire-

- basic knowledge about Mathematical concepts and learn the basic concepts of nuclear radioactivity and Nuclear reactions.
- understand the concepts related to Liquid, Colloidal states & Structure of Ionic solids, Behaviour of Gases, concepts in thermodynamics, different thermodynamic quantities such as heat and work and how are they measured, related or transformed.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

III Semester

English Language

Credit-9(9+0+0+0)

Objectives:- Students are exposed in connection with Modern English and English literature to broader level .Students will be able to exchange their thoughts on sociocultural and political theme. After completing this course, there are many career options . Such as- media, journalism, publishing, public relations, content writing, blogging, creative writing, teaching and academic research.

Unit I: Language Work **(Credit-3)**
Clauses: Noun Clause; Reported Speech and Change of Voice.

Unit II: Comprehension Skills **(Credit-2)**
Extracts from literary, scientific and educational journals.

Unit III: Advanced Writing Skills **(Credit-2)**
Writing advertisement copy; Writing a project proposal and Writing Resume, sending an application.

Unit IV: Skills of Communication (Tutorials) **(Credit-2)**
Presenting oneself at an interview, participating in group discussion.

Sessional Work :
Students read sample advertisements from magazines. Discuss in groups and then prepare their own advertisement.
Students discuss and prepare interview schedules. Mock interviews are conducted.
Editing literary pieces in groups and then re-editing what has been edited by other groups after discussion

Suggested Readings:

- The Practical Course For Developing Writing Skills In English : JK Ganggal
- A Practical Course For Developing Writing Skills In English : Jk Ganggal
- Communication skills 4th edition : Peter Simon.
- Aarts, Bas(2011). Oxford Modern English Grammar. OUP
- David K. Dunaway.(1995) Aldoux Huxley Recollected: An Oral History .
- Rowman Altamira Publication
- Warner R Anthony(1993). English Auxiliaries : Structure And History. CUP

Outcomes: The students develop the knowledge of grammar, to develop writing and comprehension skill of students

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

HINDI LANGUAGE

Credit-9(9+0+0+0)

Objectives-:

- Mahadevi Verma v Kanhyalal Sethiya ka parichy bata sakegye.
- Skills of writing ke bare me jan sakegye.
- Hindi Sahitya khand pramukh sahitykar ke bare me jan sakeyge.
- Nibandh- agarchand nahata –Rajasthan ki Saanskritk dharohar ke bare me jan sakegye.

Unit I Sahitya khand **(Credit-3)**

1-Kahani –premchand –Bade bhaishab -Vijaydandetha- sikandar OR KAUWAO
2-SANSMARAN-KANHYALAL MISHRA 'PRABHKAR'-BAYALISA KE JAWAR KI UN LEHARO MAI
3-Rekhachitra-ramvraksha benipuree-rajiya
4-Vighyan –ghunakarmule-shani sabse sunder gharha
5-Nibandh- agarchand nahata –Rajasthan ki Saanskritk dharohar
6-Vayanga—sharad joshi -jeep par sawar eliliya
7- Prayawaran-anupam mishra –Aaj bhi khere hai taalaab

Unit II: General Biography of Following Writers **(Credit-3)**
Mahadevi Verma
Kanhyalal Sethiya
Suryakant Tripathi Nirala

Unit III: Skills of writing **(Credit-3)**
Novel Writing
Short Story Writing
Dialogue Writing

Suggtested Activities:
In the internal class during the different activities the performance of the student will be assessed by the teacher. Test, assignments and small projects works may be given.

Reference:

1. A Handbook of Writing Activities, Prasaranga, University of Bangalore.
2. Technical Writing by Richard W.Smith, Barnes and Noble Inc., New York, (b) Technical Report Writing Today –Danel G.Riordan, 19-A, Ansari Road, New Delhi 110 002.
3. Vyakaran Pradeep by Ramdev. Publisher : Hindi Bhavan, 36,Tagore Town Allahabad – 211 002

Outcomes: पत्र लेखन, प्रतिवेदन लेखन आदि का ज्ञान देने हेतु । उपन्यास , नाटक एवं पुस्तक समीक्षा का ज्ञान देने हेतु ।

Information and Communication Technology in Education- I

Credit-5(3+0.5+1+0.5)

Objectives of the course:

- To Appreciate the historical development of various educational media.
- To Identify and demonstrate an understanding of the main components of the computer hardware in use.
- To Differentiate various operating system and explain main functions of the system and application software environment.
- To Use a word processor, spread sheet, drawing and presentation software to produce various teaching learning resources for educational use.
- To Use internet technologies efficiently to access remote information, communicate and collaborate with others.
- To Understand the social, economic, security and ethical issues associated with the use of ICT.

Unit I: Basics in ICT and Computer Applications(I) (Credit-1)

Information and Communication Technology: Meaning, nature and advantages Emergence of new information technology- convergence of computing and Telecommunications Computer hardware fundamentals (anatomy, input devices, output devices, storage devices, display devices), hardware troubleshooting and diagnosis Operating system-meaning and types, types of computers,

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

Hands on experience in setting up a desktop PC and working with various inputdevices, output devices, storage devices, and display devices Practice in installing various system and application softwareUsing word processor, spread sheet, and presentation software to produce variousteaching learning resources

Unit II: Basics in ICT and Computer Applications(II) (Credit-1)

Computer Network-LAN,WAN. Internet - concept and architecture ; Locatinginternet resources - navigating, searching, selecting, evaluating, saving andbookmarking Use of digital camera, camcorder, scanner, interactive white board, and multimedia projector for creating and usingmultimedia resources Computer security: hacking, virus, spy ware, misuse, abuse, antivirus,firewall, and safe practices

Unit III: Basic Computer Software Applications(I) (Credit-0.5)

Software –meaning and types (system software, application software, proprietarysoftware, open source software, shareware and freeware)Open source software: concept, philosophy, types, and advantages. Open sourceeducational softwareIntroduction to MS-Windows-navigating the desktop, control panel, file manager,explorer, and accessories

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)
Locating internet resources - navigating, searching, selecting, saving and evaluating(use standard internet evaluation criteria)Social bookmarking of internet resources using any social bookmarking tools(diigo,delicious,stumbleupon)

Unit IV: Basic Computer Software Applications(II) (Credit-0.5)
Introduction to MS Office and Open OfficeBasic microcomputer applications (word processing, spreadsheets, presentations, anddrawing) and its educational applicationsUtility tools: pdf creator, file archiving, file converter, antivirusMultimedia: meaning, types, advantages and evaluation of multimedia resources.Development and use of multimedia in education E-content: design, development, standards, learning objects and reusability, and authoring tools

PRACTICALS(Credit-0.5+0+0)
Comparative study of ICT syllabus of school education and teacher education of various organizations Evaluating multimedia CD ROMs using standard criteria and study the multimedia Developing amultimedia e-content for a topic using eXe Learning

Suggested Reading-

1. FUNDAMENTALS OF INFORMATION TECHNOLOGY - 2ND EDN 2nd Edition, Leon, Alexis
2. Evant, M: The International Encyclopedia of Educational Technology.
3. Jain Amit; Sharma Samart; & Banerji Saurab (2002). MicrosoftWord forBeginners. NISCOM, CSIR: New delhi
4. How Best To Use Internet And Email (English) 01 Edition, Jayant Neogy, Unicorn Books
5. Step by Step Microsoft Excel 2010 (English), FRYE
6. BEYOND BULLET POINTS: USING MS POWER POINT 3/E (English) 3rd Edition, ATKINSON, PHI LEARNING PVT. LTD-NEW DELHI

Outcomes:-
On completion of the course the students will be able to:

- Appreciate the historical development of various educational media.
- Identify and demonstrate an understanding of the main components of the computer hardware in use.
- Differentiate various operating system and explain main functions of the system and application software environment.
- Use a word processor, spread sheet, drawing and presentation software to produce various teaching learning resources for educational use.
- Use internet technologies efficiently to access remote information, communicate and collaborate with others.
- Model collaborative knowledge construction using various web 2.0 tools and technologies.
- Understand the social, economic, security and ethical issues associated with the use of ICT.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PSYCHOLOGY OF LEARNER & LEARNING

Credit-4(2+2+0+0)

Objective: The objective of the course is to teach how people learn in a variety of settings to identify approaches and strategies to make learning more effective.

Unit I: Nature of the Learner (Credit-0.5)

Concept of growth, development-principles, characteristics of the child &adolesent, maturation and learning;Factors contributing to development such as heredity, nutrition, childrearingpractices, siblings and peers; concept of normal development, variations in developmentClassroom as a miniature society: understanding the group dynamics in aclassroom: sociometry as a technique for understanding inter-personalrelationships in a classroom Leadership, conforming behavior, and social adjustment in classroom:concept and ways of developing them, Socialization and learning: understanding influences and factors that shape learner's identity. Learners in Context: Situating learner in the socio-political and cultural context. Social, economic and cultural differences in socialization: implications for education.

Unit II: Individual differences & Assessment of Differences between Learners (Credit-0.5)

Differences between individual learners: learning styles, multipleintelligence, self-concept, self esteem, attitude, aptitude, skills andcompetencies, interest, values, study habits, locus of control and personalityUnderstanding learners with a difference: gifted, creative and talented learners, slow learners and dyslexic learners, socially disadvantaged learners, atrisk and traumatized learners Methods of assessing individual differences: tests for measuring intelligence,aptitude and personality,observation schedules, rating scales ,self-reports

Unit III: Learning: Its Nature, Types and Strategies (Credit-0.5)

-Concept & Nature of Learning, Concept learning, skill learning, verbal learning,social learning, principle learning, problem solving Basic Assumptions and analysis of the relevance of Learning Theories –Behavioral, Social, Cognitive & Humanistic learning theories;Learning as a process of construction of knowledge - Constructivism: Introduction to the concept; Piaget's theory: what is learning, structures and processes of cognitive development, cognitive conflict, characteristics of thought in different stages, implications for teaching-learning. Vygotsky's Theory: Introduction, the general genetic law, concept of ZPD, tools and symbols in development, implications for teaching.

Unit IV: Factors affecting Learning & Management of Learning (Credit-0.5)

Concept of Motivation; types, techniques of enhancingmotivation,Health, sleep, difficulty of task, content and study habits as factor Influencing learning Influence of method of learning: part and whole learning; superficial and in-depth learning; Influence of prior learning on present learning; Strategies for transfer of learning Forgetting classroom learning – meaning and its causes; strategies for Improving retention of learning Meaning of learning to learn skills;Ways of developing self study, Co-operative Learning strategies. Collaborative Learning and role of ICT

Practical/Sessional Work: **(Credit-2)**

Each work/activity should carry equal weightage of marks.

Observe some of the variations in development among a group of studentsAnd prepare a report with emphasis on educational implications (individual activity).
Development of a profile of students of a class by using appropriate
Assessment procedures (Individual activity).
Identify differences in socio-emotional characteristics among a group of students by using rating scales & inventories available in the psychology laboratory of the Institute & prepare a report by using scoring.
Visit some special schools meant for children with disabilities and prepare a report about the approaches followed in meeting their special needs (report may be prepared by a small group of students). Analyze the type of strategies adopted by a classroom teacher in organizing learning
Identify students who have motivation problem and analyse the causes and prepare a report (small group activity).
Prepare a plan of action for any one type of learning (concept learning, skill learning, attitudinal learning)

Suggested Readings:

1. Essentials Of Educational Psychology (English) 1st Edition, S. K. Mangal, Phi Learning.
2. Aggarwal, Essentials of Educational Psychology, 9th Ed. 2003, Vikas Publishing.
3. Personality Development and Soft Skills (English) by BARUN K MITRA

Outcomes: The psychology of teaching and learning helps us understand the social, emotional and cognitive processes that constitute learning throughout the lifespan settings as diverse as government research centers, schools, community organizations.

GYMNOSPERMS AND REPRODUCTIVE BIOLOGY OF ANGIOSPERMS

Credit-14(9+2+1+0)

Objectives:

- To familiarize the students the General characters, distribution, classification, affinities and economic importance of gymnosperm
- To get a basic idea about the Reproductive Biology of Angiosperms
- To introduce the students about the aspects of Reproductive Biology of Angiosperms
- To understand the Pollination and fertilization.

Unit I- Gymnosperms (Credit-2.5)

a) General characters, distribution, classification, affinities and economic importance.
b) Study of morphology, anatomy and reproduction in Cycadopsida: Cycas, Cycadeoidea
Study of morphology, anatomy and reproduction in Coniferopsida: Pinus Gnetopsida : Gnetum

Unit II- Reproductive Biology of Angiosperms (Credit-2.5)

a) Flower – Review of structure, morphology, embryological perspective.
b) Microsporangium – Development of wall layers, tapetal types, microsporogenesis, tetrad types.
c) Male gametophyte – Development and structure; vegetative and generative cells; male gametes.
d) Megasporangium (ovule): Development, types, megasporogenesis, tetrad types.
e) Female gametophyte: Development, ultrastructure, mono, bi and tetrasporic embryo sacs.

Unit III-Pollination (Credit-2)

a) **Pollination and fertilization:** Definitions, types of pollination, pollenpistil interaction, self-incompatibility, double-fertilization.
b) **Endosperm:** Definition, types – cellular, nuclear and helobial; endosperm haustoria.
c) **Embryo:** Classification, types, development of Crucifer type.
d) **Fruit and seed:** Development, structure of monocot and dicot seeds, dispersal mechanisms, importance.
e) Brief account of apomixis and polyembryony.

Unit IV- Applications of tissue culture (Credit-2)

a) Brief history, cellular totipotency, culture media and techniques.
b) Brief account of anther/ pollen culture, endosperm, embryo and protoplast culture, Applications of tissue culture.

Suggested Readings:

1. Gangulee, S.C., Kar and Ashok Kumar, College Botany Vol.II, Central BookAgency, Calcutta.
2. Dr. Vasistha P.C. Botany for degree student Gymnosperms

3. Bhojwani S S. The Embryology of Angiosperms, Vikas Publishing House, Delhi..
4. Bhatnagar.S.P. Gymnosperms

PRACTICALS **(Credit-2)**

1. Study of morphology, anatomy and reproductive structures of genera of Gymnosperms included in theory syllabus.
2. Study of structure of anther, microsporogenesis and pollen grains using permanent slides and mounts.
3. Study of structure of ovules and embryosac development (monosporic type) using permanent slides.
4. Examination of a wide range of flowers for study of pollination.
5. In vitro germination of pollen grains.
6. Preparation of culture medium and familiarization with tissue culture procedures.
7. Mounting the endosperm of Cucumis and embryos of Crotalaria.

Outcomes:

Student will able to explain how the anatomy and morphology of representative taxonomic groups are related to functions in plant world. The students are able to identify morphology, anatomy and reproduction of the Gymnosperms and their genera like Cycas and Pinus. The students have good knowledge of anther, microsporogenesis and pollen grains, culture medium and familiarization with tissue culture procedure.

ANIMAL CELL BIOLOGY AND GENETICS

Credit-12(8+1+2+1)

Objectives:

To enable students to comprehend the modern concepts and applied aspects of Cell Biology and modern concepts of Genetics and to create awareness regarding inheritance.

Unit I: Cell **(Credit-2)**

Introduction to cell: Discovery, characteristics of prokaryotic (bacterial) and eukaryotic cells (plant and animal cells), cell theory, viruses and viroids.

Cell membrane: Ultra structure, chemical composition, models, unit membrane concept, fluidity, glycocalyx and functions of cell membrane. Transport across cell membrane: Passive transport (osmosis, diffusion), facilitated (mediated) diffusion; active transport (primary and secondary) and endocytosis and exocytosis.

Mitochondria: Ultra structure, chemical composition, functions, origin, electron transport chain and generation of ATP molecules.

Unit II: Cell Organelle **(Credit-2)**

Ultrastructure, types, chemical composition and functions of

(i) ER and Golgi-complex
(ii) Lysosome, Ribosome,
(iii) Centriole,
(iv) Cilia and flagella

Nucleus: occurrence, number, shape, size and structure (nuclear envelopes, nuclear matrix and nucleolus)

Chromosomes: Introduction, structure (chromatids, primary and secondary constrictions, nucleolar organizer and telomeres) types; Chemical composition and functions. Chromosomal organizations: Nucleosome concept, Euchromatin, heterochromatin

Unit III: Cell Cycle and Division **(Credit-2)**

a) Cell reproduction: Cell cycle and significances of mitosis and meiosis. Regulation of Cell cycle.
b) Mendelian principles of inheritance- monohybrid and di-hybrid cross, back cross and test cross.
c) Deviation of Mendelism – incomplete dominance, co-dominance with examples.
d) Gene interactions: Epistasis, complementary, supplementary, duplicate genes with cumulative effects and collaborator genes.
e) Multiple alleles: Characters, examples pseudoalleles, inheritance of A, B , AB, O and Rh blood groups (antibody reactions)

Unit IV: Genetics (Credit-2)

a) Chromosomal mutations-
   i. Variation in chromosome number (aneuploidy and euploidy)
   ii. Structural changes in chromosomes (deletion, duplication, inversion and translocation).
b) Sex–determination: Genetic (sex chromosome, genic balance and haplo-diploidy mechanisms), hormonal and environmental control of sex determinations with examples.
c) Sex-linked inheritance: white eye colour in Drosophila, colour blindness and hemophilia in man.
d) Linkage: Definition, difference between linkage and independent assortment, chromosomal theory of linkage, kinds, linkage groups and significances.
e) Crossing over- Definition, mechanism, theories, kinds, frequency, factors affecting crossing over and significances.

Suggested Readings:

1. Molecular Biology of the Cell, Alberts et al, 5thed Garland Science 2008.
2. Molecular Cell Biology, H Lodish MP Scott et al 7th Ed, McMillan Pub 2013.
3. Biochemistry, Molecular Biology and Genetics 5th ED, Lippincott Willaims and Wilkinson, 2013.
4. Cell Biology Gerald Karp, 7thed, Wiley Pub 2014
5. Cell and Development Biology by Sastry, Singh &Tomar- (Rastogi Publications . 2008)
6. Essentials of Molecular Biology ,2nded, David Freifileder, Panima Publishing N Delhi 1996
7. Biochemistry and Molecular Biology , K Wilson & J Walker, 7th Cambridge 2010.
8. Cell and Molecular Biology by P.K Gupta – (RastogiPublications 2008)
9. Cell Biology by C.B Power –(Himalaya publishing House, Bombay)
10. Cell Biology by de Robertis et. al-(W.B Saunders , Philadelphia)
11. A textbook of Cytology by R.C Dalela& S.R. Verma – (Jaiprashnath& Co. Meerut)
12. Cell Biology by J.D. Burke – (Scientific Book Agency , Calcutta)
13. Cell Biology : A molecular approach by R.D Dyson- Allyn& Bacon, Boston)
14. Cell Biology by R.M. Dowben – (Harper & Row, New York)
15. Cell function by L. L Langley – (Affiliated East West Press, New Delhi)
16. Cytology by C.D. Darlington
17. Cell and Molecular Biology by de Robertis EDP & de Robertis EMI Jr. (1996) . Holt WB Saunders Internationl
18. Genetics- P.S. Verma& V.K. Agarwal , S. Chand&Co.Delhi
19. Principles of Genetics Gardner , Ed 7th Wiley Eastern Pvt Ltd 2013
20. Genetic – Winchester , Oxford IBH Publications
21. Genetic – Stickberger, Macmillian Publications.
22. Immunology , Kuby 7thed, Owen Punt Stenford McMillan, 2013

Outcomes: After studying this course the stubents will be able to :
Comprehend the modern concepts and applied aspects of Cell Biology and modern concepts of Genetics and to create awareness regarding inheritance.

PRACTICALS(Credit-2)

- Microscope : Simple and compound microscope, working mechanism and maintenance
- Study of bacterial and enkaroytic cell.
- Slides of sub cellular components (Cell organelles)
- Erythrocyte plasma membrane permeability.
- Study of Karyotype and Idiogram of man.
- Study of Barr Bodies in human buccal epithelial cells.
- Identification of blood groups (ABO) and Rh factor in man.
- Drosophila culture and life cycle.
- Sexual Dimorphism in Drosophila, Identification of wild or mutant varieties.
- Study of salivary gland chromosomes of Drosophila
- Problems on pedigree analysis.
- Meiotic studies of testes of cockroach.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

ORGANIC CHEMISTRY

Credit-12(8+1+2+1)

Objectives:

- To acquire basic knowledge to students teachers about the concept of hybridization and geometry of atoms and the three-dimensional structure of organic molecules, Stereochemistry and Reaction Mechanism, General aspects of Organic Reactions; an understanding of nucleophiles, electrophiles, electronegativity and resonance.
- To acquire basic knowledge to students teachers about understanding of Cyclo alkanes, Cyclo Alkenes and Alkadienes, how to use their understanding of organic mechanisms to predict the outcome of reactions, the fundamentals of electronic structure and bonding in aromatic systems, reactivity patterns of aromatic molecules, chemical properties of Alkyl and Aryl Halides and general periodicity patterns of (organic/inorganic) molecules and the ability to design synthetic approaches to such species.

Unit I: Stereochemistry of Organic Compounds (Credit-2)

Review of Concept of Isomerism and Types of isomerism with examples.

Optical Isomerism: Structural changes responsible for properties: elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity,properties of enantiomers, chiral and achiral molecules with two stereogenic centres,diastereomers, threo and erythro diastereomers, meso compounds, resolution ofenantiomers, inversion, retention andracemization and asymmetric synthesis.Relative and absolute configuration, sequence rules, D & L and R & S systems ofnomenclature.

Geometric isomerism: Determination of configuration of geometric isomers. Cis –trans and E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds.

Conformational isomerism:

Difference between configuration andconformation.Conformational analysis of ethane and n-butane; conformations of cyclohexane,axial andequatorial bonds, conformation of mono alkyl substituted cyclohexanederivatives. Review of Newman projection and Sawhorse formulae, Fischer andflying wedge formulae.

Unit II: Chemistry of Cyclo alkanes, Cyclo Alkenes and Alkadienes (Credit-2)

- **Cycloalkanes**: Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropane ring, banana bonds, Stereochemistry of cyclo alkanes.
- **Cycloalkenes**: Methods of formation, conformation and chemical reactions of cycloalkenes.
- **Alkadienes:** Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes, Structure of allenes and butadiene, methods of formation, polymerization, chemical reaction – 1, 2 and 1, 4 additions, Diels-Alder reaction.

Unit III: Aromatic Hydrocarbons **(Credit-2)**

A. **Arenes and Aromaticity:** Nomenclature of benzene derivatives, the aryl group, Aromatic nucleus and side chain, Structure of benzene; molecular formula and Kekule structure, stability and carbon-carbon bond lengths of benzene, resonance structure, MO picture. **Aromaticity**: The Huckle rule, aromatic ions.
B. **Aromatic Electrophilic Substitution**: General pattern of the mechanism, role of σ- and π- complexes, Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts' reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio, Side chain reactions of benzene derivatives, Birch reduction; Methods of formation and chemical reactions of alkylbenzenesalkynylbenzenes and biphenyl, naphthalene and Anthracene.

Unit IV: Alkyl and Aryl Halides **(Credit-2)**

Nomenclature and classification of alkyl halides, methods of formation, chemical reactions, Mechanisms of nucleophilic substitution reactions of alkyl halides, SN^2 and SN^1 reactions with energy profile diagrams, Polyhalogencompounds: Chloroform, carbon tetrachloride.

Methods of formation of aryl halides, nuclear and side chain reactions, addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions,relative reactivities of alkyl halides vsallyl, vinyl and aryl halides, synthesis and uses of DDT and BHC.

Suggested Readings:

1. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Eliel, E. L. &Wilen, S. H. Stereochemistry of Organic Compounds; Wiley: London, 1994.
5. Jerry March, Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, Sixth Edition
6. Peter Sykes, A Guidebook to Mechanism in Organic Chemistry Paperback – 2003.
7. Harkishan Singh and V. K. Kapoor. Medicinal and Pharmaceutical Chemistry. VallabhPrakashan Publishers, Delhi. 1996.

Outcomes: After studying this course the stubents will be able to :

1- Know the fundamentals of organic chemistry
2- Know stereoisomerism
3- Aliphatic and aromatic compounds"

PRACTICALS(Credit-2)

Laboratory Techniques:

1. **Organic Chemistry: Laboratory techniques**

- **Calibration of Thermometer**

  Naphthalene (80-82°C), Acetanilide (113.5-114°C), Urea (132.5-133°C), Distilled Water (100°C)

- **Distillation**

  Simple distillation of ethanol-water mixture using water condenser
  Distillation of nitrobenzene and aniline using air condenser
- **Crystallization**

  Concept of induction of crystallization, Phthalic acid from hot water (using fluted filter paper and stem less funnel), Acetanilide from boiling water, Naphthalene from ethanol,Benzoic acid from water

- **Decolourisation and crystallization using charcoal**

  Decolourisation of brown sugar (sucrose) with animal charcoal using gravity filtration.
  Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixed with 0.3g of Congo Red using 1g decolorizing carbon) using ethanol.

- **Sublimation (simple and Vacuum)**

  Camphor, Naphthalene, Phthalic acid and Succinic acid.

- **Determination of melting point/ boiling points**

  Determination of melting point: Naphthalene, Benzoic acid, Urea, Succinic acid, Cinnamic acid, Salicylic acid, Acetanilide, m-Dinitrobenzene p-Dichlorobenzene, Aspirin.
  Determination of boiling points: Ethanol, Cyclohexane, Toluene, Aniline and Nitrobenzene.

2. **Functional Group Analysis**

a. Detection of extra elements (N, S and halogens), solubility behavior and functional groups (Alcoholic, phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in simple organic compounds.
b. Identification of an organic compound through the functional group analysis and preparation of suitable derivatives.

IV SEMESTER
ENGLISH

Credit-9(9+0+0+0)
Objectives:-The objective of teaching English has two main aspects:

1. Language aspect: Words, sentences, pronunciation, spelling and grammar.
2. Literature aspect: Words, sentences, expressing ideas, feelings and experiences.

These two objectives differ from each other as far as the class and age of students is concerned.

The Other four fold objectives are-

1. Semantic-related to understanding.
2. Phonetic- deals with the sound spelling and pronunciation.
3. Graphic- related to writing.
4. Phonetic-cum-graphic- dealing with reading

Unit I: Creative Skills in Writing **(Credit-(3)**
Writing dialogues
Writing poems
Writing essays

Unit II: Phonetics **(Credit-(2)**
Speech Organs
Syntactic, Semantic, Pragmatic

Unit III: Literature – Novel & Drama **(Credit-(2)**
E M Forster : A Passage to India
Joseph Conrad : Heart of Darkness

Unit IV: Literature – Drama **(Credit-(2)**
Girish Karnad – Tuglaq
Samuel Beckett's Waiting for Godot

Sessional Work:
Students participate in group discussion focusing on taking turns and Speaking persuasively. Students stage a play choosing one of the plays prescribed. The end can be changed to express their perspective about the theme of women and their evolution/ freedom.

Suggested Readings:
1. Second Language Acquisition : Rod Ellis
2. Stone Douglas (1999). Difficult conversations : How to discuss what Matters Most, New York.: Penguin Books.
3. Gabor Don (2001). How to start a Conversation and Make Friends, New York:
4. Introducing Second Language Acquisation : Saville Trocke M, CUP

Outcomes:
1. Students will demonstrate proficiency in the use of written English, including proper spelling, grammar, and punctuation.
2. Students will develop the ability to read works of literary, rhetorical, and cultural criticism,

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

HINDI LANGUAGE

Credit-9(9+0+0+0)

Objectives-:

- Hindi Vayakranika ka samany adhyayan v paribhasha ko samajh sakenge.
- Sabada niraman padati-upsarg,partayaya,sandhi,samasa ki pahachan kar sakenge.
- Hindi ki Parmookh Boliyan ka adhyayan kar sakenge.
- Rajbhasha or Rashtra Bhasha mein antar kar payenge.

Unit I: Grammer -1 **(Credit-(3)**

Vayakranika hindi:
1-Nibandh lekhan-sabad seema 300
2-karyalaye lekhen – shashkeeya –ardha shashkeeya patra'karyalaya ghyapan,vighyapati evam karyalaya aadesha,Adhisuchana,prasthankan
3-Sankshepan-
4-Pallawan
5-Sabada niraman padati-upsarg,partayaya,sandhi,samasa
6 Sabad sudhi and vakaya sudhai
7—Muhaware and locoktiyan
8-Paribhasika sabdawali
9-Sabad ke prakar –sanghya ,sarvanam ,visheshan,evam kirya visheshan

Unit II Grammer –II **(Credit-(3)**
Sabad Shakti
Samasa
Alankara

Unit III: Hindi ki Parmookh Boliyan **(Credit-(3)**
Rajbhasha or Rashtra Bhasha mein antar

Suggested Activities:
In the internal class during the different activities the performance of the student will be assessed by the teacher. Test, assignments and small projects works may be given.

References:

1. A Handbook of Writing Activities, Prasaranga, University of Bangalore.
2. Hindi Bhasa Vighyan by Dr. Bholanath Tiwari

Outcomes:
1. Students will demonstrate proficiency in the use of written English, including proper spelling, grammar, and punctuation.
2. Students will develop the ability to read works of literary, rhetorical, and cultural criticism,

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

ASSESSMENT OF LEARNING

Credit-9(9+0+0+0)

Objectives:- The course will enable the student teachers to –

1.Understand the process of evaluation

2.develop the skill in preparing, administering and interpreting the achievement test.

3.understand and use different techniques and tools of evaluation for learning

4.comprehend the process of assessment for learning

5.develop skills necessary to compute basic statistical measures to assess the learning.

Unit I: Introduction to Assessment & Evaluation (Credit-3)

(a) Concept of test, measurement, examination, appraisal, evaluation and their inter relationships.
(b) Purpose and objectives of assessment- for placement, providing feedbacks, grading promotion, certification, diagnostic of learning difficulties.
(c) Forms of assessment: -
(i) (Formative, Summative, prognostic; diagnostic; Norm referenced; Criterion referenced based on purpose)
(ii) (Teacher made; Standardized based on nature & scope)
(iii) (Oral, written, performance based on mode of response)
(iv) (Internal, External, self, peer, & teacher based on context)
(v) Based on nature of information gathered (Quantitative, Qualitative)
(d) Importance of assessment & evaluation for Quality Education – as a tool in Pedagogic decision making on as writing instructional objectives, selection of content, teaching learning resources, methodology, strategies & assessment procedures followed.
(e) Authentic assessment; school based assessment

Unit II: Assessment of Learning (Credit-2)

(a) Concept of Cognitive, Affective, Psychomotor domain of learning
(b) Revised taxonomy of objectives (2001) and its implications for assessment and stating the objectives.
(c) Constructing table of specifications & writing different forms of questions –(VSA, SA, ET & objective type, situation based)
(d) Construction of achievement tests- steps, procedure and uses
(e) Construction of diagnostic test – Steps, uses & limitation

Unit III: Assessment for Learning (Credit-2)

(a) Need for CCE its importance and problems faced by teachers
(b) Meaning & Construction of process-oriented tools – observation schedule; check-list; rating scale; anecdotal record;
(c) Assessment of group processes – Nature of group dynamics; Socio-metric techniques; steps for formation of groups, criteria for assessing tasks; Criteria's for assessment of social skills in collaborative or cooperative learning situations.
(d) Quality assurance in tools – Reliability (Test-retest; equivalent forms, split- half) & Validity (Face, content, construct) – Procedure to establish them; Item – analysis.
(e) Portfolio assessment – meaning, scope & uses; developing & assessing portfolio; development of Rubrics.

Unit IV: Construction Interpretation and Reporting of student's performance

(Credit-2)

(a) Interpreting student's performance
(i) Descriptive statistics (measures of central tendency & measures of variability, percentages)
(ii) Graphical representation (Histogram, Frequency Curves) (iii) NPC – percentile.
(b) Grading – Meaning, types, and its uses
(c) Role of feedback to stake holders (Students, Parents, Teachers) and to improve teaching – learning process; Identifying the strengths & weakness of learners.
(d) Reporting student's performance – Progress reports, cumulative records, profiles and their uses, Portfolios.

Sessional Works to be carried out in Tutorial Sessions

1. Discussion on existing assessment practices in schools and submitting the report.
2. Constructing a table of specification on a specific topic (subject specific)
3. Constructing a unit test using table of specifications and administering it to target group and interpreting the result.
4. Construction of any one of the process oriented tools and administering it to group of students & interpreting it.
5. Analysis of question papers (teacher made)

Suggested Readings:

1. Linn; Measurement and Assessment in Teaching 9th Edition by Pearson
2. Ved Prakash, et.al. (2000): Grading in schools, NCERT, Published at the publication Division by the secretary, NCERT, Sri Aurobindo Marg, New Delhi
3. Sinclair , Sheila Anne (Editor) , Barry : Assessment as Learning : Using Classroom Assessment to Maximize Student Learning , Corwin Publishers
4. Dix; The Essential Guide to Classroom Assessment: Practical Skills for Teachers, Pearson India.
5. Thorndike Robert M. , Thorndike-Christ Tracy ;Measurement And Evaluation In Psychology And Education (English) 8th Edition, Prentice-Hall

Outcomes:

1.Students will be able to understand the concept of measurement, evaluation and assessment and know the process of evaluation

2.They can able to learn about the concept of CCE, rating and grade.

ANATOMY, ECOLOGY AND EVOLUTION

Credit-14(10+1+2+1)

Objectives:

- To familiarize the students the Meristems characteristics, classification, theories of meristemetic activity, organization of shoot-apex
- To get a basic idea about the Ecological Factors , Ecosystem, Community, Plant succession
- To understand the Morphology, Biodiversity and Environmental pollution.

Unit I: Meristem **(Credit-2.5)**

a) **Meristems** – characteristics, classification, theories of meristemetic activity, organization of shoot-apex.

b) **Epidermis:** Structure and functions, stomatal types, trichomes.

c) **Simple tissues:** Definition, types – parenchyma, collenchyma, sclerenchyma- structure, functions.

d) **Vascular tissues:** Structure of xylem and phloem, functions, primary and secondary vascular tissues, types of wood.

e) Review of anatomy of stem, root and leaf of dicot and monocot.

f) Secondary growth in root and stem. Brief account of anomalous secondary growth – Bougainvillea, Dracaena.

Unit II: Ecology **(Credit-2.5)**

a) **Ecological Factors** : Brief account of Edaphic, climatic, physiographic and biotic factors and their ecological importance.

b) **Ecosystem** : Structure, abiotic and biotic components, bio-energetic approach, food chain, food web, ecological pyramids, bio-geo-chemical cycles of carbon, nitrogen and phosphorus.

c) **Community ecology** : Community characteristics, frequency, density, cover, life forms.

d) **Plant succession** : General features, events in succession, brief account of xerarch succession.

Unit III : Morphology, Anatomy and Physiology **(Credit-2.5)**

a) Morphological, anatomical and physiological adaptations of plants to environment – hydrophytes, xerophytes, halophytes.
b) Biodiversity : General account, types and characteristics, biodiversity conservation efforts,WCU, Red databook, brief account of Intellectual
Property Rights (IPR) and patent laws.
c) Environmental pollution – a brief account of causes, effects and remedies
of air, water, soil, radioactive and noise pollution.

Unit IV : Concept of evolution **(Credit-2.5)**

a) Brief account of origin of life and concept of evolution. Evolutionary
b) theories– Lamarckism, Darwinism, germ plasm and mutation theories, Neo Darwinism, isolation, mutation, speciation, genetic drifts.
b) Vegetation types of India and Karnataka.

Suggested Readings:
1. De Debapriya. Environment and Ecology. S Chand

2. P.D Sharma . Ecology and Utilization of Plants
3. Gangulee S.C. & Kar.1980, College Botany Vol.I, Central Book Agency, Calcutta
4. Pandey, B.P. Plant Anatomy

Outcomes:
1. Students have the knowledge of anatomy and functioning of monocots and dicots plants.
2. They familiarilize morphology,genetic recombination, ecological adaptation characteristics and vegetative propagation.ecological adaptation and different theories of evolution and concept of ecology ecosystem,biodiversity and vegetative propagation of India.

PRACTICALS **(Credit-2)**

1. Study of a common dicot and monocot stem, root and leaf to understand the body plan, tissue systems and modular type of growth.
2. Study of L.S. of shoot tip to understand cyto-histological zonation.
3. Study of epidermal tissue system, stomata and trichome types.
4. Study of density, diversity, frequency of herbaceous species by quadrat method and to compare the frequency distribution with Raunkair's Standard Frequency Diagram.
5. To estimate Importance Value Index on the basis of relative frequency, relative density and relative biomass.
6. To determine moisture content and water holding capacity of soils.
7. To estimate transparency, pH and temperature of different water bodies.
8. To estimate salinity of different water samples.
9. Study of ecological anatomy of hydrophytes, xerophytes, halophytes, epiphytes and parasites.
10. Field study of diversity in leaf shape, size, thickness and surface properties.

ANIMAL PHYSIOLOGY AND ENDOCRINOLOGY

Credit-12(8+1+2+1)

Objectives:

To enable students to comprehend the modern concepts of physiological aspects on various organs and systems of animals and human being to comprehend chemical nature, biological molecules and physiological roles.

Unit I: Digestion and Respiration (Credit-2)

- Physiology of digestion: Chemical nature of food stuff (including micronutrients), various types of digestive enzymes and their digestive action in the alimentary canal, role of GI hormones in digestion, mechanism of absorption of digested food.
- Physiology of respiration: Mechanism and control of breathing, exchange of gases transport of respiratory gases (oxygen and carbon dioxide)

Unit II: Circulation and Excretion (Credit-2)

- Physiology of blood circulation
- Composition and function of blood.
- Blood groups (ABO and Rh)
- Blood coagulation – factors, mechanism, theories and anticoagulants.
- Origin, conduction and regulation of heart beat in mammals.
- Cardiac cycle, ECG

b) Excretion: Physiology of Excretion: Nitrogenous wastes, anatomy of mammalian kidney, structure of nephron, mechanism of urea and urine formation (including hormonal regulation)osmoregulation

Unit III: Neuro-muscular co-ordination (Credit-2)

a) Nervous Co-ordination – Synapse-structure, types, properties and signal transmission through synapses.
b) Muscle contraction – Types of muscles, Contractile and regulatory proteins, Mechanism of muscle contraction, Neuromuscular junction and relaxation, sliding filament theory, chemical changes during muscle contraction .
c) Physiology of Reproduction: hormonal control of male and female reproduction, implantation, parturition and lactation in mammals, Female Reproductive cycle

Unit IV: Endocrinology and Hormonal Control of Reproduction (Credit-2)

Hormones: Classification, properties of hormones.
Mechanism of hormone action (peptide and sterioid hormones)
Endocrine glands:Pituitary gland: Location, anatomy and functions of hormones with hypothalamic regulation
Thyroid gland: Location, anatomy, synthesis and function of T3 & T4
Adrenal gland, Islets of Langerhans, Testes and Ovaries

Suggested Readings:

1. Molecular Developmental Biology 2/e PB by T. Subramoniam Narosa Publishing House Pvt. Ltd. - New Delhi

2. Endocrinology and Reproductive Biology by K.V. Sastry – (Rastogi Publications, 2008).

3. Animal Physiology: Mechanisms & Adaptations, 2/e PB (English) 2nd Edition by R Eckert CBS PUBLISHERS & DISTRIBUTORS-NEW DELHI

4**. Human Physiology (English) International 2 Revised Ed Edition** By Arthur J. Vander James Sherman Dorothy Luciano McGraw-Hill Professional**.**

Outcomes:

"Student will be familiar about the normal functioning of a particular organ system & how cells, tissues, and organisms function. They understand how to cope with stresses imposed upon our bodies by different environments. Student will be familiar about the physiological studies of normal biological function provide the basis for understanding the abnormal function seen in animal and human disease. Students will be familiar and develop a substantial set of skills, including working in a laboratory, experiment planning, research, and data interpretation" "Student will be familiar about the knowledge of hormone synthesis, secretion, and action of all the endocrine glands while gaining an appreciation for the complex endocrine systems. They also learn about how the endocrine system is involved in societal health problems such as diabetes, obesity, and reproductive failure.

PRACTICALS(Credit-2)

1. Effect of temperature and pH on the salivary amylase enzyme activity.
2. Preparation of Blood smears of frog / lizard/ bird / mammals.
3. Identification of blood groups (ABO) and Rh factor in man.
4. Estimation of Hemoglobin by Sahils method.
5. Enumeration of RBC in blood samples.
6. Enumeration of WBC in blood samples.
7. Preparation of Haemin Crystals.
8. Effect of different concentrations of NaCl on RBC.
9. Measurement of blood pressure, Heart beat and Pulse rate.
10. Study of bleeding time, Coagulation time of blood.
11. Dissect and demonstrate the endocrine glands in rat and man (Chart or model).
12. Study of Histological slides of the following endocrine gland of mammal testis, ovary, thyroid, adrenal, pitutary, Islets of Langerhans.

Inorganic Chemistry

Credit-12(8+1+3+0)

Objectives:

- To gain an understanding of the chemistry of transition and inner transition metals, coordination compounds, organometallic compounds, metal carbonyls of Transition Elements, Coordination chemistry and magnetic behaviour of complexes, Chemistry of Lanthanide and Actinides, concepts of Oxidation and Reduction and Principles involved in the extraction of the elements.

Unit I:
Transition Elements **(Credit-2)**

General group trends with special reference to electronic configuration, variable valency, magnetic and catalytic properties, colour and spectral behaviour, ability to form complexes, stability of various oxidation states and e.m.f. comparative studies of Chemistry of the first, second and third transition series.

Inorganic Reaction Mechanism

Thermodynamic and Kinetic stability. Introduction to inorganic reaction mechanisms. Substitution reactions in square planar Complexes, Trans-effect, theories of trans effect. Determination of binary formation constant by pHmetry and spectrophotometry

Unit II:
Chemistry of Lanthanide and Actinides **(Credit-2)**

Chemistry of Lanthanide: Occurrence and separation, electronic structure, oxidation states and ionic radii and lanthanide contraction, spectral and magnetic properties, complex formation and applications.
Chemistry of Actinides: Electronic configuration, oxidation states, actinide contraction, complex formation, spectral and magnetic properties, applications. Chemistry of separation of Np, Pu and Am from Uranium, similarities between the later actinides and later lanthanides.

Unit III:
Coordination Compounds **(Credit-2)**

Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes. Limitations of valance bond theory, an elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.
Oxidation and Reduction
Use of redox potential data- analysis of redox cycle, redox stability in water-Frost, Latimer and Pourbaix diagrams. Principles involved in the extraction of the elements.

Unit IV:
Organometalic Compounds, Metal Carbonyls &Nitrosyls (Credit-2)

A. Organometallic compounds

Definition, nomenclature and classification of organometallic compounds, preparation, properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn and Ti, a brief account of metal-ethylene complexes and homogenous hydrogenation.

B. Carbonyls and Nitrosyls

a) **Metallic Carbonyls**: Metallic carbonyls General methods of Preparation, general properties, structure and nature of Metal carbonyls, bonding in carbonyls, Effective atomic number (EAN) rules as applied to metallic carbonyls. 18-electron rules applied to metallic carbonyls. Preparation, properties and structure of nickel tetracarbonyl, iron penta carbonyls, chromium hexa carbonyls, dimanganesedeca carbonyl, dicobaltocta carbonyl.

b) **Metallic Nitrosyls:** Some metallic Nitrosyls: Metal nitrosyl carbonyls, metal nitrosyl halides, sodium nitroprusside (Preparation properties, structures and uses) structure and nature of M-N bonding in nitorsyl. Effective atomic number (EAN) rules as applied to metallic nitrosyls.

Suggested Readings:

1. R. C. Mehrotra and A. Singh Organometallic Chemistry :A Unified Approach, Wiley
2. A. G. Sharpe: Inorganic Chemistry, Pearson
3. Bell and Lott: Modern approach to Inorganic chemistry, Van Nostrand
4. Emelns and Anderson Principles of Inorganic Chemistry
5. G. L. Miessler and D. A. Tarr: Inorganic Chemistry, Prentice Hall
6. Cotton and Wilkinson, Advanced Inorganic Chemistry, 6th Edition, Wiley
7. Lee, J.D. Concise Inorganic Chemistry, ELBS.
8. Douglas, B.E. and Mc Daniel, D.H., Concepts & Models of Inorganic Chemistry
9. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications
10. Shriver and Atkins Inorganic Chemistry, W. H. Freeman and Company
11. James Huheey, Inorganic chemistry: Principles of Structure and Reactivity, Pearson Education India
12. Shriver and Atkins' Inorganic Chemistry, Oxford Press
13. Green wood, Chemistry of The Elements, Elsevier

Practicals: (Credit-2)
Synthesis and analysis

a. Preparation of sodium trioxalatoferrate (III), Na_3 [Fe $(C_2O_4)_3$] and determination of its composition by permanganometry.
b. Preparation of copper tetraammine complex. $[Cu(NH_3)_4]SO_4$.
c. Preparation of Ni-DMG complex, $[Ni(DMG)_2]$.
d. Preparation of cis- and trans – bisoxalatodiaqua chromate (III) ion.

Gravimetric Analysis

a. Cu as Copper thiocyanate.
b. Ni as Nickel dimethylgloxime

pH metry

a. To determine normality of xN HCl by pH metry.
b. To determine normality and dissociation constant of weak acid (xN CH_3COOH) by pH metry.
c. To determine normality and dissociation constant of dibasic acid (xN oxalic acid/malonic acid/maleic acid) using 0.1N NaOH solution
8. A comparative study on methods of finding pH using universal indicator, pH paper strips (both wide and narrow range), pH meter.
9. Determination of solubility product constant (Ksp) of a sparingly soluble salt.
10. Determination of dissociation constant of phenol phthalin/methyl orange by colorimeter.
11. Determination of molecular weight of a given liquid by steam distillation.
12. Determination of percentage composition of NaCl by critical solution temperature method (phenol-water system).
13. Determination of distribution coefficient of benzoic acid between water and toulene or acetic acid between water and 1-butanol.
14. Determination of transition temperature of a given salt hydrate.
15. Determination of molecular weight of the given substance by Rast's method.

Outcomes:

- The student gain an understanding of the chemistry of transition and inner transition metals, coordination compounds, organometallic compounds, metal carbonyls of Transition Elements, Coordination chemistry and magnetic behaviour of complexes, Chemistry of Lanthanide and Actinides, concepts of Oxidation and Reduction and Principles involved in the extraction of the elements.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

V SEMESTER

TEACHING APPROACHES AND STRATEGIES

Credit-9(9+0+0+0)

Objectives:
Teaching Strategies and. Approaches for Pupils with Special. Educational Needs A Scoping. Study.Every teacher develops a particular way of going about the complex task of teaching.the method of teaching in very important, but explaining the most successful results depend on many factors. Perceptions of the Extent of Use of the Selected Teaching Strategies.

Unit I: Understanding Teacher and Teaching (Credit-3)

Teaching as a planned activity – elements of planning.
Assumptions underlying teaching and their influence on the planning for teaching.
Proficiency in Teaching: Meaning and place of awareness, skills, competencies and commitment.
Assumptions underlying effectiveness in teaching – Behaviouristic, Humanistic and Constructivist perspectives.
An analysis of teacher functions, skills and competencies in the three phases: Preactive phase – visualizing, decision-making on outcomes, preparing and organization; interactive phase – facilitating and managing learning; post-active phase – assessment of learning outcomes, reflecting on pre-active, interactive and post-active processes Characteristics associated with effective teachers.
Impact of one's own socialization processes, awareness of one's own shifting
identities as 'student', 'adult' and 'student teacher' and their influence on 'becoming a teacher'.
Teacher's professional identity – what does it entail?

Unit II: Planning for Teaching (Credit-2)

An analysis of teacher's roles and functions in the pre-active phase – visualizing, decision-making on outcomes, preparing and organisation.
Visualizing: The learner and learning readiness characteristics, the subject matter content and their inter-linkages, the learning resources, approaches/strategies. Decision-making on outcomes: Establishing general instructional goals, specification of objectives and standards for learning, allocation of instructional time for various activities/ tasks – instructional time as a variable in learning.
Decision-making on instructional approaches and strategies: Expository or Inquiry, Individualized or Small Group or Whole Class – skills required for learner engagement in the context of the strategy decided.
Preparing for instruction: Identifying and selecting available learning resources or developing required learning resource.
Preparation of a Plan: Unit Plan and Lesson Plan.

Unit III: Skills and Strategies of Teaching **(Credit-2)**

An analysis of teacher's roles and functions in the interactive phase – facilitating and managing learning.
Introducing a lesson – need and various possibilities.
Motivating the learners and sustaining their attention – importance of stimulus variation and reinforcement as skills.
Questioning, Illustration and explanation as teacher competencies influencing student-learning in the classroom;
Strategy of Teaching – a) Expository Strategy as approach to teaching for understanding: Presentation – discussion – demonstration, the Advance Organiser
Model; b) Inquiry Strategy as approach to teaching thinking skills and construction of knowledge : Concept attainment / Concept formation, Inductive thinking, Problem based learning/ Project Based Learning.

Unit IV: Approaches to Organizing Learning **(Credit-2)**
Approaches to Individualised Instruction: Computer Managed Instruction,
Programmed Instruction and Learning Activity Packages, Approaches to Small
Group and Whole group Instruction: Cooperative and Collaborative approaches to learning, Brain storming, Role Play and Dramatization, Group Discussion, Simulation and Games, Debate, Quiz and seminar.

Sessional Work:

- Comparative study of syllabi of various subjects to identify content categories.
- Writing instructional objectives of a lesson under domains and levels.
- Practice on the skills of introducing, questioning, stimulus variation, illustrating and organizing learning activity.
- Design learning episodes / activities and organize them in the classroom.

Suggested Readings:

1. R. C. Mishra; Classroom Management (English) 01 Edition.APH Publisher.
2. Patricia & Devis; Cognition and Learning. Sil International, Global Publishing.
3. Dewey, J. (1916). Democracy and Education. New York : The MacMillan Company.
4. Lindfors, J. (1984). How children learn or how teachers teach? A Profound confusion: Language Arts, 61 (6), 600-606.
5. Smith, K. (1993). Becoming the "guide" on the side: Educational Leadership, 51(2), 35-37.
6. Savery, J. and Duffy, Thomas M. (1995). Problem based learning: An instructional model and its constructivist framework. Educational Technology, 35, 31-38.

Outcomes:
Teaching approach is one of the most important processes to have teaching success and.Providing an opportunity for students to apply what they learn in the classroom to real-life experiences has proven to be an effective way of both disseminating and integrating knowledge. Discussion. Active Learning. Cooperative Learning. Integrating Technology. Distance Learning.The interaction between teacher and learners is the most important feature of the classroom.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PEDAGOGY OF PHYSICAL SCIENCE

Credit-9(9+0+0+0)

Objectives:-

- To Gain insight about the nature of science and its curriculum.
- To Comprehend the approaches and strategies of learning science at secondary level.
- To Apply pedagogic aspects in teaching-learning of science effectively by adopting appropriate teaching strategy.
- To Discuss a topic in science; construct test items to measure objectives belonging to various cognitive levels.
- To Use teaching aids effectively in teaching science.
- To Gain the knowledge and comprehend the principles of curriculum and analyse the organization of science content at secondary level.
- To Select and use the relevant methods, strategies and approaches in science class and laboratory.
- To Develop skills in organizing, using and maintaining the available resources in teaching science.
- To Transfer the fundamental experimental skills to the pupils and organize different activities related with science processes/skills to the pupils.

Unit I: The Nature of Science and its Curriculum (Credit-3)

Nature of Science: History, Philosophy and nature of science, its role and importance in daily life, Science as interdisciplinary area of learning, development of science and technology, their interdependence and impact on society, development of scientific attitude and values through science education.

Curriculum Development: need and salient features of curriculum,strategy and principles of curriculum construction, trends in science curriculum, development of science curriculum in India, basic criteria of validity of a science curriculum in the light of NCF – 2005, curriculum for the secondary level. Objectives of teachingscience at Upper Primary level and Secondary level.Analysis of syllabus and textbooks of science at Upper Primary and Secondary level.

Unit II : Approaches and Strategies of Learning Science (Credit-2)

Lesson Planning: Instructional objectives, identification of teaching points, organising the content, designing learning experiences, Pedagogical shift from science as fixed body of knowledge to process of constructing knowledge.

Scientific Method: Observation, enquiry, hypothesis, experimentation, data collection, generalization.

Unit and Lesson Planning: Using constructivist approach, taking examples from specific contents of science such as electric circuit, magnetic effects of current, physical and chemical changes, animal and plant kingdom.

Strategies of Learning: Inquiry approach, experimentation, problem solving, concept mapping, collaborating learning and experiential learning in science, facilitating learners for self-study in science.

Learning Resources and strengthening Science

Learning Resources: Identification and use of learning resources in science from immediate environment such as natural pH indicators, common salts, fruits, lenses and mirrors, inter-conversion of one form of energy to other, exploring alternative sources of energy, audio-visual materials; multimedia–selection and designing; use of ICT in learning science.

Instructional resources: Multimedia, computer, charts, models, improvised apparatus and their role and functions.
Strengthening of Learning Science: Organisation of practicals in laboratory, use of science kits, investigatory project, field trips, science clubs, science fairs, use of worksheets.

Unit III : Planning and Pedagogic Aspects in Teaching - Learning of Science (Credit-2)
Lesson Planning and learning concepts of science such as Newton's laws of motion, universal law of gravitation, heat as energy, temperature, transfer of heat, reflection, refraction and total internal reflection of light.
Mole concept and Avogadro's number, structure of atom, periodicity of elements, acid, base & salt and pH scale, carbon and its compounds.
Nutrition in amoeba and. hopper, digestive and respiratory system in animals, control and coordination in animals, reproduction in animals.
Photosynthesis, factors affecting the process of photosynthesis, respiration in plants, transportation in plants, asexual and sexual reproduction, pollination, fertilization and partheno-genesis in plants. Heredity and variations, structure of chromosome, RNA & DNA.
Unit IV : Exploring Learning of Science (Credit-2)
Exploring learning of science concepts such as electric circuits, series and parallel combination of circuits, electric current, measurement of current and potential difference, ohm's law, resistance, factors effecting resistance, electrical energy, elementary ideas about A.C. and D.C. motors, characteristics of metals, metallurgical operations-dressing of the ore, calcinations, roasting, smelting and refining, concept of electrode potential and electrochemical series, reactivity of metals and non-metals, extraction of metals like iron, copper and aluminium.
Evaluation in Science
Modes of evaluation: oral, observation and written, objective and essay type questions, Types of objective test items: short answer type, multiple choice type, fill-in-blank type, true-false, matching type, construction of test items: achievement test, diagnostic test and their construction, Preparation of blue print: taking examples of concepts of science mentioned in unit III and IV, continuous and comprehensive evaluation for overall development of child.
Tools and Techniques of Assessment: learning indicators, performance-based assessment, learners' records of observations, field diary, oral presentation of learner's work, portfolio, assessment of project work, assessment of learning based on content mentioned in unit III and IV.
Modes of Learning Engagement:
Constructivist Approach: Activity based learning experimentation, Interactive learning, Group work, demonstration method, Peer learning, Project work, Assignments followed by presentation, Discussion, Inquiry approach, Concept mapping etc.
Practicum:
Activities based on Science syllabus of Classes IX and X:

- Preparation of teaching aids: charts, models, Preparation of one working model.
- Preparation of a model lesson plan followed by seminar/ presentation before the whole group.
- Preparation of kit for teaching learning of a topic along with write up (name of unit, name of the theme/topic, material used, procedure, learning outcomes).
- Preparation of blue print and construction of an achievement test, its administration on one section of a class and analysis of results.

Practicals:

- Study of laws of reflection and refraction.
- Verification of Ohm's law.
- Demonstration of Magnetic effect of current.
- Determination of given resistance and specific resistance of a material using wheat stone bridge and post office box.
- Preparation of crystals of copper sulphate.
- Study of exothermic and endothermic, combination and decomposition reactions.
- Preparations of gases (H_2, O_2& CO_2) and study of their properties.
- Study nature of soft and hard water from a given water sample and its removal.
- Preparation of blood film/blood group testing.
- Study of diffusion and osmosis.
- Study of evolution of CO_2 and heat in respiration.
- Study of evolution of O_2 in photosynthesis.
- Check adulteration in food items.
- Demonstration of interaction between a magnet and current.
- Examine bacteria from curds and milk under microscope.

Suggested Readings:

1. Lewis, J. 1972 Teaching of School Physics, Penguin Book, UNESCO.
2. Anderson, Hans O and Koutnik, Paul G, 1972.Towards More effective science Instruction in secondary education.The MacMillan Co., New York and Courier MacMillan, London,.
3. Das, RC. 1984 Curriculum and Evaluation.National Council of Educational Research and Training, New Delhi,.
4. Driver, R.The pupil as scientist, Open University Press, Buckingham, 1983.
5. Saxena A.B. 1988. Vigyan Shikshan Ka AyonjanHar Prasad Bhargava & Sons, Agra,
6. Science for Class IX and X, NCERT Publication.
7. National Curriculum Framework 2005, NCERT Publication.2006
8. NCERT (2005) National Curriculum Framework. New Delhi. NCERT
9. Science Teachers and Educators 1985. UNESCO Bangkok
10. NCERT: Teacher Education Curriculum Framework 1978NCERT, New Delhi.
11. Teaching Life Sciences, J.K. Sood, Kohli Publication.
12. Science Teaching In Schools by Du RC (1985) Sterling Publication.
13. Science for Class IX and X, NCERT Publication New Delhi
14. R.C.Sharma Modern Science Teaching, Dhanpat Rai& Sons, Delhi.
15. Teaching Technology for College Teachers, Sterling Publishers. New Delhi
16. Food and Nutrition by E.P.G Arya Book Depot. New Delhi.

Outcomes:- On completion of the course, the student teacher will be able to:

- Gain insight about the nature of science and its curriculum.
- Comprehend the approaches and strategies of learning science at secondary level.
- Apply pedagogic aspects in teaching-learning of science effectively by adopting appropriate teaching strategy.
- Discuss a topic in science; construct test items to measure objectives belonging to various cognitive levels.
- Use teaching aids effectively in teaching science.
- Gain the knowledge and comprehend the principles of curriculum and analyse the organization of science content at secondary level.
- Select and use the relevant methods, strategies and approaches in science class and laboratory.
- Develop skills in organizing, using and maintaining the available resources in teaching science.
- Transfer the fundamental experimental skills to the pupils and organize different activities related with science processes/skills to the pupils.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PEDAGOGY OF BIOLOGICAL SCIENCE

Credit-9(9+0+0+0)
Objectives:-

- To Develop insight on the meaning, nature, and effective use of different activities/experiments/demonstrations/ laboratory experiences for determining aims and strategies of teaching-learning of biological science.
- To Prepare and use of lesson plans and unit plans required for instructional purposes.
- To Integrate with other school subjects and to identify and relate everyday experiences with learning of biological science.
- To Explore the curricular processes and skills in science at secondary level and laboratory in teaching– learning.
- To Formulate meaningful inquiry episodes, problem-solving situations, investigatory and discovery learning projects based on upper primary, stages during teaching-learning of biological science

Unit I: **Aims, Objectives, its Nature and Scope** **(Credit-2.5)**

Developing scientific attitude and scientific temper : Nurture the natural curiosity, aesthetic senses and creativity in biology,
Acquire the skills to understand morphology, taxonomy, genetics, cell biology, development biology etc.
Understanding biology in relation to society and human welfare,
Imbibe the values of honesty, integrity, cooperation, concern for life and preservation of environment;
Solving problems of everyday life;
Know the facts and principles of biology and its applications consistent with the stages of cognitive development of learners;
Specific objective of different content areas in biology.
Science as a domain of enquiry, dynamic body of knowledge and as a process of constructing knowledge;
Biological Science for environment and health, History of biological science, its nature and knowledge of biological science independent of human application;
Origin of life and evolution, biodiversity, observations and experiments in biological sciences;
Biological sciences and society.

Unit II : : Exploring Biology **(Credit-2.5)**

Motivating learner to bring his/her previous knowledge in science/biology gained through classroom/environment/parents and peer group;
Cultivating in teacher-learner the habit of listening to child;
Generating discussion, involving learners in teaching-learning process;
Encouraging learners to raise questions,
Appreciating dialogue amongst peer groups,
Encouraging learners to collect materials from local resources and to develop/fabricate suitable activities in biological science (individual or group work);
Understanding the role of learners in negotiating and mediating learning in biology.

Unit III: : School Science Curriculum (Biological Science) (Credit-2)

Trends in Science curriculum; Consideration in developing learner- centred curriculum in biology

Concept of curriculum, historical background of Biology curriculum and its studies. Biological sciences curriculum study project.

Principles of curriculum construction, curriculum development process, techniques of structuring and restructuring of curriculum, trends in curriculum development in Biology, analysis of existing Biology syllabi and study of recent trends/innovations in biological sciences.

Pedagogical analysis of – different types of natural resources; food resources and enriched food habits; diversity in plants and animals; hierarchical organization of life.

Unit IV: Approaches and Strategies of Learning Biological Science (Credit-2)

Pedagogical shift from science as fixed body of knowledge to process of constructing knowledge, scientific method - observation, enquiry, hypothesis, experimentation, data collection, generalization (teacher- educator will illustrate taking examples from different stage-specific content areas keeping in mind the variation, e.g. structure and function, interaction between living and non-living, biodiversity etc.).

Communication in biological sciences;

Problem solving, investigatory approach, concept mapping, collaborative learning, and experiential learning in biological science (teacher-learner will design learning experiences using each of these approaches);

Facilitating learners for self- study

Lesson plan format for learning objectives, preparation and use of teaching aids, time management, recapitulation and evaluation strategies for learners and presentation of lesson plan in biological sciences in class-room transaction.

Modes of Learning Engagement:

Constructivist approach, Activity based learning experimentation, Interactive learning, Group work, Peer learning, Project work, Assignments followed by presentation, Discussion, Inquiry approach, Concept mapping etc.

Language across the Curriculum Activities: As an integral part of teaching-learning process, relevant activities should be carried out to enhance and promote language skills (LSRW) and proficiency based on the rationale of Language Across Curriculum. The activities in this regard are language centered and, therefore, the focus of learning and teaching activities should be on language skills not necessarily on the content. The activities in this regard may be designed/improvised according to the context. Some of the exemplar activities may include:

- Presentation (Oral and Written) based on themes from the content area
- Debate on themes from the content area
- Panel discussion/Seminar/ discussion etc.
- Group discussion/group work
- Question-answer sessions
- Role play/dramatization
- Extempore speech/Elocution
- Organization of reading/reflection activities beyond the textbooks

Practicum:

Activities based on Science syllabus at secondary level.

- Preparation of teaching aids: charts, models, Preparation of one working model.
- Preparation of a model lesson plan followed by seminar/ presentation before the whole group.
- Preparation of kit for teaching learning of a topic along with write up (name of unit, name of the theme/topic, material used, procedure, learning outcomes)
- Construction of an achievement test, its administration on one section of a class and analysis of results.
- Tools and Technique in Biological Science
- Perform experiments to detect presents of carbohydrates, lipids and proteins in food by qualitative test
- Different types of Microscopes and their principle
- Experiments on Diffusion and osmosis
- Evolution of CO_2 and heat in respiration
- Evolution of O_2 in photosynthesis
- Observation of stages of mitosis and meiosis/animal tissues.

Suggested Readings:

1. NCERT. (2005) National Curriculum Framework. New Delhi. NCERT.
2. NCERT. (2005) Position Paper of NFG on Teaching of Science. New Delhi. NCERT.
3. NCERT. (2005) Position Paper of NFG on Habitat and Learning. New Delhi. NCERT.
4. Vaidya, N. (2004) Science Teaching for 21st Century, Deep & Deep Publications.(1999). Dat Poly, Encyclopedia of Teaching Science.New Delhi. Sarup & Sons.
5. Sutton, CR and Hayson J.H. (1974). The Art of the Science Teacher. McGraw Hill Book Company Ltd.
6. Their, DH. (1973) Teaching Elementary School Science.A Laboratory Approach, Sterling Publication Pvt. Ltd.
7. Science Teacher. (Peer reviewed journal for science teachers).
8. Journal of Research in Science Teaching. (Wiley-Blackwell).
9. Ameeta, P. (2008) Methods of Teaching Biological Science.Neelkamal Publications Pvt. Ltd. Educational Publishers.
10. Sharma, R.C. (1987) Modern Science Teaching. New Delhi. Dhanpatarai& Sons.

Web Sites

1. http:/www.tc.columbia.edu/mst/science.ed/courses.asp.
2. http:/www.edu.uwo.ca

Outcomes:- On completion of the course, the student teachers will be able to:

- Develop insight on the meaning, nature, and effective use of different activities/experiments/demonstrations/ laboratory experiences for determining aims and strategies of teaching-learning of biological science;
- Prepare and use of lesson plans and unit plans required for instructional purposes;
- Integration with other school subjects and to identify and relate everyday experiences with learning of biological science;
- Explore the curricular processes and skills in science at secondary level and laboratory in teaching– learning;
- Formulate meaningful inquiry episodes, problem-solving situations, investigatory and discovery learning projects based on upper primary, stages during teaching-learning of biological science

BOTANICAL NOMENCLATURE, ANGIOSPERM TAXONOMY AND UTILIZATION OF PLANTS

Credit-14(10+1+2+1)

Objectives:

- To familiarize the students about the Botanical Nomenclature
- To get a basic idea about the salient vegetative and floral characteristics and economically important angiosperm.
- To introduce the students about the aspects of utilization of plants.

Unit I : BOTANICAL NOMENCLATURE (Credit-2.5)

a) ICBN, principles and aims; type concept, concept of genus and specific epithet, Principle of priority, units of classification., identification keys.
b) Brief account of regional, national and international herbaria, significance of herbaria and botanical gardens of India and their importance.
c) Brief history, development of taxonomic thought, outlines of artificial, natural and phylogenetic systems of classification.
d) Salient features and outline classification of Bentham and Hooker

Unit II : - ANGIOSPERM TAXONOMY-I (Credit-2.5)

Study of the diagnostic features, salient vegetative and floral characteristics and economically important plants of following families:
i) Magnoliaceae ii) Capparidacea iii) Malvaceae iv) Fabaceae v) Rutaceae vi) Apiaceae vii) Euphorbiaceae viii) Amarantacea

Unit III : - ANGIOSPERM TAXONOMY –II (Credit-2.5)

Study of the diagnostic features, salient vegetative and floral characteristics and economically important plants of following families

ix)	Apocyanaceae	x)	Asclepiadacea
xi)	Acanthaceae	xii)	Solanaceae
xiii)	Lamiaceae	xiv)	Liliaceae
xv)	Poaceae	xvi)	Arecaceae

Unit IV: UTILIZATION OF PLANTS(Credit-2.5)

Brief account (botanical name, family, extraction/ processing where necessary) and uses of the following :
a) Cereals and Pulses : Rice, wheat, maize, millets, pigeon, pea, Bengal gram, green gram, black gram.
b) Fibres : Cotton, jute, linen, coir.
c) Vegetable oils : Groundnut, coconut, sunflower, safflower, castor.
e) Timber and bamboos : Rosewood, teakwood, honne, canes and bamboos.
f) Beverages : General account, coffee, tea, cocoa.
g) Spices and condiments : General account, cardamom, clove, pepper, ginger, cinnamon, saffron, turmeric, mustard.
h) Rubber : General account, Hevea, Ficus.
i) Medicinal plants : Brief account of ethnobotany, uses of Cinchona, Rauwolfia, Phyllanthes, Catharanthus, Ocimum, Tylophora and other locally available medicinal plants.

Suggested Readings:

1. Singh V. Taxonomy of Angiosperms, Rastogi Publications, Meerut
2. Jones, A.B. and A.Luchsinger, 1979, Plant Systematics, McGrow Hill Book Co., New York
3. Singh G . Plant Systematics.
4. Pandey, B.P. Economic botany

PRACTICALS **(Credit-2)**

1. Study of selected technical terms and their definitions (used in the description of plant).
2. Detailed study of at least one plant specimen per family as given in theory syllabus.
3. Field study (3-5 days) to a near by forest, for collection, identification and submission of 5 herbarium sheets;
4. To recognize the botanical name, family, part used and products of economic importance as per theory syllabus;
5. Preparation and submission of an illustrated inventory of 5 medicinal plants used in indigenous systems of medicine and allopathy.

Outcomes:- The students will be able to-

- familiarize about the Botanical Nomenclature
- get a basic idea about the salient vegetative and floral characteristics and economically important angiosperm.
- introduce the students about the aspects of utilization of plants.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

ANIMAL ECOLOGY AND ETHOLOGY

Credit-12(8+1+2+1)

Objectives:-

1.After completion of this subject students should learn the concept of ecosystem.
2.This subject Demonstrate an understanding of ecological relationships between organisms and their environment.

Unit I: Environment and Ecosystem (Credit-2)

Environment: - Atmosphere, lithosphere and hydrosphere as habitats and ecological factors.
Abiotic factors: Light and Temperature as ecological factors, limiting factors, Liebig's law of minimum and Shelford Law of tolerance
Ecosystem: Dynamics of Ecosystem, Ecological Pyramids, Energy flow, Food chain and Food web, Productivity.
Biochemical cycle: water, nitrogen and suphur cycles recycling of organic nutrients.
Population: Definition and attributes–density, natality, vital index, age distribution, growth patterns, migration, dispersal, dispersions, carrying capacity.
Biotic Community: Definition, Structure, Ecotone, edge effects, habitat and different types of niche, Ecological succession, Infra and Interspecific interaction. All types of animal association.
Elementary statistics: Central tendency and Correlation Coefficient.

Unit II: Pollution and its effect (Credit-2)

Pollution Types and Causes
Air pollution: sources, acid rain, photochemical smog, prevention and control
Water pollution, sources, prevention and control, eutrophication.
Noise pollution: sources, prevention and control.
Soil pollution: sources, prevention and control
Thermal pollution.
Green house effect and global warming
Depletion of ozone layer.
Natural Disaster: Earthquake, Tsunami
Natural Resources and conservation – Non Renewable and Renewable
Bioaccumulation and Biomagnifications.

Unit III: Economic Importance and Wild life (Credit-2)

Economic Importance of Invertebrates (Apiculture, Aquaculture, Sericulture).
Insects as pests and their management
Economic Importance of vertebrates (Fish culture and Poultry culture.)
Wild life of India, causes of depletion of wild life, modes of wild life conservation, Red data book. Environmental legislations (Wildlife Protection Act, Environment act. Biodiversity act).
Wild life scenario in and around central foot hills of the Aravalli and the Thar desert.

Unit IV: Ethology **(Credit-2)**

Introduction and history of Ethology.
Behaviour: Innate (tropism, Texas, reference instincts) and Acquired (learning and reasoning)
Motion: Classification of directional movements:- kinesis, tropism & taxes
Communication: Definition ,types of signal (touch, sound, Chemical, and visual),
Societies: characteristics and advantage with reference to honey bee, and monkey

Suggested Readings:

1. Environmental Biology, M Calver, Cambridge Pub 2009.
2. Fundamentals of Ecology of E.P. Odum – W.B. Saunders, Philadelphia)
3. Fundamentals of Ecology of Gene P Odum &Gray W Barrett 5th ed., Cengage Learning 2011
4. Environmental studies by S.V.S Rana – Rastogi Publication, 2008
5. Animal Ecology by S.P. Singh 6th Revised Edition – Rastogi Publications,2008
6. Basic Ecology by E.P. Odum (Holt, Rinehart & Winston , New York)
7. Ecology by S.K. Charles(Prentice Hall of India, New Delhi)
8. Ecology : Principle and Applications by Chapman E (1988) – Cambridge University Press
9. Modern concept of ecology by Kumar HD (1986) Vikas Publication House.
10. Ecology and Environment by Sharma PD (1991) Rastogi Publication
11. Environmental Biology by Trievedi PR &Gurudeep Raj (1992)
12. Animal Ecology and Biostatistics. KC Soni Hindi Edition college book centre, Chaura Rasta, Jaipur
13. Mammalian Endrocrinology and Animal Behavior, VS Pawar, Hindi Edition, College book centre, Chaura Rasta

Outcomes:-

1.After completion of this subject students learn the concept of ecosystem.
2.This subject Demonstrate an understanding of ecological relationships between organisms and their environment.

PRACTICALS(Credit-2)

1. Simulation of an ecosystem in the laboratory.
2. Determination of oxygen content of water sample by Winkler's method.
3. Determination of chloride content of water sample.
4. Determination of dissolved CO_2 content of water.
5. Determination of Alkalinity in the pond water.
6. Determination of total solid content of water.
7. Determination of pH of soil sample.
8. Determination of water content in a given simple of soil.
9. Demonstration of Phototactic responses by Tribolium / House fly / Drosophila.
10. Demonstration of Geotactic responses by Earthworm.
11. Exercise on mean, median, mode and test of significance- Correlation Coefficient.

The students will undertake a study cum collection tour to study, collect, identify and preserve marine and terrestrial animals

Physical Chemistry

Credit-12(8+1+2+1)

Objectives:-

To learn the basic principles of phase equilibrium, Electrochemistry and phase equilibrium, chemical equilibrium and its relationship with thermodynamic quantities, basic concepts of electrochemistry and its applications, chemical bonding from the valence bond model and molecular orbital theory, the limitations of classical mechanics at molecular length scales, the differences between classical and quantum mechanics, the connection of quantum mechanical operators to observables, probabilities, amplitudes, averages, expectation values, and observables. The connection between common approximation methods and standard chemical frameworks (Born-Oppenheimer approximation, molecular orbitals).

Unit I: Electrochemistry (Credit-2)

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution. Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law its uses and limitations. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method.Applications of conductivity measurements; determination of degree of dissociation, determination of solubility product of a sparingly soluble salt, conductometric titrations.

Types of reversible electrodes-gas-metal ion, metal-insoluble salt anion and redox electrodes. Electrode reactions, Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode-reference electrodes-standard electrode potential, sign conventions, Electrolytic and Galvanic cells-reversible and irreversible cells, conventional representation of electrochemical cells.EMF of a cell and its measurements. Computation of cell EMF. Calculation of thermodynamic quantities of cell reactions (ΔG, ΔH, and K), polarization, over potential and hydrogen overvoltage. application of concentration cells, solubility product and activity coefficient, potentiometric titrations. Definition of pH and pK_a determination of pH using hydrogen, Hydrolysis of salts. Corrosion-types, theories and methods of combating it.

Unit II: Chemical Equilibrium (Credit-2)

Chemical Equilibrium: Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Le Chatelier's principle. Reaction isotherm and reaction isochore – Clapeyron equation and Clausius – Clapeyron equation, applications.

Phase Equilibrium: statement and meaning of the terms – phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system-water, CO_2 and S systems.Phase equilibria of two component system – solid – liquid equilibria, simple eutectic-Bi-Cd, Pb-Ag systems, desilverisation of lead.Solid solutions – compound formation with congruent melting point (Mg-Zn) and incongruent melting point, (NaCl-H_2O), ($FeCl_3$-H_2O) system. Freezing mixtures, acetone-dry ice.Liquid-liquid mixtures- Ideal liquid mixtures, Raoult's and Henry's law. Non-ideal system-azeotropes- HCl-H_2O and ethanol – water systems.Partially miscible liquids – Phenol-water, trimethylamine-water, nicotine-water systems.Lower and upper consolute temperature. Effect of impurity on consolute temperature. Immiscible liquids, steam distillation. Nernst distribution law-thermodynamic derivation, applications.

Unit III: Chemical Kinetics **(Credit-2)**

Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light catalyst, concentration dependence of rates, mathematical characteristics of simple chemical reactions – zero order, first order, second order, pseudo order, half-life and mean life, Determination of the order of reaction – differential method, method of integration, method of half-life period and isolation method. Experimental methods of chemical kinetics: conductometric, potentiometric, optical methods, polarimetry and spectrophotometer. Theories of chemical kinetics: effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis), Expression for the rate constant based on equilibrium constant and thermodynamic aspects. Characteristics of catalyzed reactions, classification of catalysis homogeneous and heterogeneous catalysis, enzyme catalysis, miscellaneous examples.

Unit IV: Elementary Quantum Mechanics **(Credit-2)**

De Broglie hypothesis, the Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one dimensional box.Schrodinger wave equation for H-atom, separation into three equations (without derivation), quantum numbers and their importance, hydrogen like wave functions, radial wave functions, angular wave functions.

Suggested Readings:

1. S Lewis and D Gladstone, Elements of Physical Chemistry, Macmillan.
2. Moudgil, H. K. Textbook of physical chemistry second edition, PHI
3. B S Bahl, G D Tuli&ArunBahl, Guide to Essentials of Physical Chemistry S. Chand Publishing.
4. Alberty&BawendiSilbey, Physical Chemistry 4th Economy Edition, Wiley.
5. Christopher M. A. Brett, Ana Maria Oliveira Brett, Electrochemistry: Principles, Methods, and Applications, Oxford science publications
6. Keith J. Laidler, Chemical Kinetics, 3rd Edition, Prentice Hall
7. Michael J. Pilling and Paul W. Seakins, Reaction Kinetics 2nd Edition, Oxford Science Publications.
8. Puri, Sharma &Pathania,Principles of Physical Chemistry.
9. Ira N Levine, Physical Chemistry 6 edition McGraw-Hill Higher Education.
10. A K Chandra, Introductory Quantum Chemistry, Tata McGraw-Hill Education.
11. Ira N Levine 7 edition Quantum Chemistry Pearson.

Outcomes:-

The students learn the basic principles of phase equilibrium, Electrochemistry and phase equilibrium, chemical equilibrium and its relationship with thermodynamic quantities, basic concepts of electrochemistry and its applications, chemical bonding from the valence bond model and molecular orbital theory, the limitations of classical mechanics at molecular length scales, the differences between classical and quantum mechanics, the connection of quantum mechanical operators to observables, probabilities, amplitudes, averages, expectation values, and observables. The connection between common approximation methods and standard chemical frameworks (Born-Oppenheimer approximation, molecular orbitals).

PRACTICALS **(Credit-2)**

Chemical Kinetics

1. Electrochemistry

a. pH metric: Acid-Base Titration.
b. To determine the strength of the given acid conductometrically using standard alkali solution.
c. To determine the solubility and solubility product of a sparingly solubility product of a sparingly soluble electrolyte conductometrically.
d. To determine the ionization constant of a weak acid conductometrically.
e. To titrate potentiometrically the given ferrous ammonium sulphate solution using $KMnO_4$/ $K_2Cr_2O_7$ as titrant and calculate the redox potential of Fe^{2+}/Fe^{3+}system on the hydrogen scale.

2. Chemical Kinetics

a. To study the saponification of ethyl acetate kinetically.
b. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
c. To study the effect of acid strength on the hydrolysis of an ester.
d. To compare the strength of HCI and H_2SO_4 by studying the kinetics of hydrolysis of ethyl acetate.
e. To study kinetically the reaction rate of decomposition of iodide by H_2O_2

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

VI SEMESTER
PEACE ORIENTED VALUE EDUCATION

Credit-4(4+0+0+0)

Objectives:

- To Understand the importance of peace education.
- To Analyse the factors responsible for disturbing peace.
- To Appreciate the role of peace in life.
- To Develop insight of understanding of concept of Indian values according to time, space and situation.
- To Scientifically analyse values in Indian culture and tradition.
- To Develop positive attitude about Indian human values
- To Understand the Indian values according to Shradhhaand logic.
- To Understand the co-ordination withIndian values and life style.
- To Analyse the ethical, artistic and pleasant values.
- To Analyse absolute evalues in globalization and universlization.
- To Develop the teaching learning method for adoptation and assimilation in life value.
- To Explain fundamental aims and values that provide the intellectual basis of contemporary education policy and practice.
- To Engage with issues in a manner that makes them sensitive to promote certain educational values while marginalizing others.
- To Explore the meaning of Ethics and values.
- To Understand the process of value education.

Unit I: Importance of Peace **(Credit-1)**

Aims, objectives and importance of Peace Education.
Barriers- Psychological, Cultural, Political
Factors responsible for disturbing Peace: Unemployment, terrorism, Exploitation, Suppression of individuality, complexes.
Characteristics of good textbook, evaluation of textbook, analysis of text book from peace education perspective.

Unit II: Nature and sources of values, Classification of values **(Credit-1)**

Meaning, concept need and importance of values and ethics.
Personal and Social values
Intrinsic and extrinsic values on the basis of personal interest and social good.
Social, moral, spiritual and democratic values on the basis of expectation of society and one's self inspiration.
Identification of Analysis of emerging issues involving value conflicts
Design and development of instructional material for nurturing values.

UNIT III: Values in religious scriptures **(Credit-1)**

Bhagwad gita-Nishkam Karma, Swadharma, Laksagrah and Stithpragya.
Bible – Concept of truth, compassion, forgiveness
Dhamnipada- Astangmarg, Aryastyaand Madhyamarg
Gurugranth Sahib- Concept of Kirath, Sungat, Pangat & Jivanmukti
Quran–Concept of spiritual and moral values (adah, raham & theory of justice) & social responsibilities.

UNIT IV: Methods and Evaluation of Value Education (Credit-1)

Traditional Methods: Story Telling, Ramleela, Tamasha, street play and folk songs.
Practical Methods: Survey, role play, value clarification, Intellectual discussions.
Causes of value crisis: material, social, economic, religious evils and their peaceful solution.
Role of school- Every teacheras teacher of values, School curriculum as value laden.
Moral Dilemma (Dharmsankat) and one's duty to wards self and society.

Practicum/Field Work (Any two of the following):

- Preparation of a report on school programmes for promotion of peace.
- Observation of classroom situation and identification of factors promoting peace.
- Analyse morning assembly programme of a schoolfrom the point of view of value education.
- Analysis of a text book of a school subject from the point of view of values hidden.
- Preactice of role- play in two situations and preparation of report.
- Report on value conflict resolution in a situation.

Suggested Readings:

1. AcharyaMahaprija : TowardsInnerHarmony, NewDelhi,B. Jain Publishers, 1999
2. Dutt,N.K.andRuhelaS.P.:HumanValuesandEducation,SterlingPublishersPvt.Ltd., NewDelhi,
3. Gandhi K.L.: Value Education, GyanPublishingHouse, NewDelhi, 1993
4. Gupta,NathuLal:ValueEducation:TheoryandPractice:JaikrishanAgarwal,MahatmaGandhi Road,Ajmer – 2000
5. I.A.Lolla:ValueCertification:AnadvancedHandbookfortrainersandTeachers,Calif, UniversityAssociatePress, KrischanBoum, Howard 1977
6. PremKripal: Value in Education, NCERT, NewDelhi 1981
7. Rajput, J.S. (2001).Values in Education, NewDelhi, SterlingPublishers, 2005
8. RokeachM.: The Nature ofHumanValues, The FreePress , NewYork 1973
9. SharmaR.S.: The Monk who sold his Ferrari, Mumbai, JaicoPublishingHouse, 2003
10. Swami RagunathAnand: Eternal ValuesforaChangingSociety, BVB Bombay1971.
11. Gupta, K. M. (1989). Moral Development of School Children Gurgaon: Academic Press.
12. Krishnamurthy, J. (2000). Education and the Significance of Life. Pune: KFI.
13. Dhokalia, R. P. (2001). External Human Values and World Religious. New Delhi: NCERT.
14. Sheshadri, C., Khadere, M. A., &Adhya, G. L. (ed.) (1992). Education in Value. New Delhi: NCERT, London, Allen and Unwin.
15. Singh, R. N. (ed.) (2003). Analytical study of Sikh Philosophy, Commonwealth Publishers: New Delhi- 02.
16. Khan Masood Alia (ed.) (2006). Islamic Thought and its Philosophy. Commonwealth Publishers: New Delhi- 02.
17. Khan, IntakhabAlam (2007). Peace, Philosophy and Islam, Academic Excellence.Delhi-31.

Outcomes: After completion of the course, student-teachers will be able to:-

- Understand the importance of peace education.
- Analyse the factors responsible for disturbing peace.
- Appreciate the role of peace in life.
- Develop insight of understanding of concept of Indian values according to time, space and situation.
- Scientifically analyse values in Indian culture and tradition.
- Develop positive attitude about Indian human values
- Understand the Indian values according to Shradhhaand logic.
- Understand the co-ordination withIndian values and life style.
- Analyse the ethical, artistic and pleasant values.
- Analyse absolute evalues in globalization and universlization.
- Develop the teaching learning method for adoptation and assimilation in life value.
- Explain fundamental aims and values that provide the intellectual basis of contemporary education policy and practice.
- Engage with issues in a manner that makes them sensitive to promote certain educational values while marginalizing others.
- Explore the meaning of Ethics and values.
- Understand the process of value education.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PEDAGOGY OF PHYSICAL SCIENCE

Credit-10(10+0+0+0)

Objectives:-

- To Gain insight about the nature of science and its curriculum.
- To Comprehend the approaches and strategies of learning physical science at secondary level.
- To Apply pedagogic aspects in teaching-learning of physical science effectively by adopting appropriate teaching strategy.
- To Discuss a topic in Science, construct test items to measure objectives belonging to various cognitive levels.
- To Use teaching aids effectively in teaching science.
- To Gain insight the salient features of curriculum,strategy and principles of curriculum and science curriculum for the secondary level.
- To Comprehend the objectives of teaching science at secondary level.
- To Apply the principles of learning processes in the teaching of science.
- Teach a topic in science effectively by adopting appropriate teaching strategy.
- To Construct test items to measure objectives belonging to various cognitive levels.
- To Use effectively the teaching aids in teaching science.

Unit I : Nature of science and its Curriculum (Credit-3)

Nature of Science: History, Philosophy and nature of science, its role and importance in daily life, Science as interdisciplinary area of learning, development of science and technology, their interdependence and impact on society.

Curriculum Development: need and salient features of curriculum, strategy and principles of curriculum construction, trends in science curriculum, development of science curriculum in India, basic criteria of validity of a science curriculum in the light of NCF – 2005, curriculum for the secondary level. Objectives of teaching science at upper primary level and secondary level.Analysis of syllabus and textbooks of science at upper primary and secondary level.

Unit II : Approaches and Strategies of Learning Physical Science (Credit-3)

Lesson Planning: Pedagogical shift from science as fixed body of knowledge to process of constructing knowledge, scientific method: observation, enquiry, hypothesis, experimentation, data collection, generalization, unit and lesson planning: using constructivist approach taking examples from specific contents of science such as electric circuit, magnetic effects of current, physical and chemical changes.

Strategies of Learning: inquiry approach, experimentation, problem solving, concept mapping, collaborating learning and experiential learning in science, Facilitating learners for self-study in science.

Learning Resources: identification and use of learning resources in science from immediate environment such as natural pH indicators, common salts, fruits, lenses and mirrors, inter-conversion of one form of energy to other, exploring alternative sources of energy, improvisation of apparatus, audio-visual materials; multimedia–selection and designing; use of ICT in learning science.

Strengthening of Learning Science: organisation of practicals in laboratory, use of science kits, investigatory project, field trips, science clubs, science fairs, relationship between science and other subjects, scientific attitude, development of values through science education, concept mapping and its use, co-operative learning.

Unit III: Pedagogic Aspects in Teaching - Learning of Physical Science (Credit-2)

Pedagogic aspects in teaching-learning of science concepts such asnature of matter: classification of matter based on chemical constitution elements, compounds and mixtures, types of mixtures-homogenous and heterogeneous solution, atoms and molecules, atomic theory of matter, atomic and molecular masses, concept of mole, chemical reactions, types of chemical reactions: combination, decomposition displacement reactions, electronic concept of oxidation reduction, oxidation number of redox reactions, elementary idea of electro chemical cell and dry cell.

Planning and Pedagogic Aspects for Teaching - Learning of Physical Science

Planning and pedagogic aspects– lesson planning and learning of scienceconcepts such as Charge, electrostatic force, quantization of charge, capacitance, potential and potential difference, Ohm's law, series and parallel connections of resistances and capacitances, electric power, magnetic effect, heating effect of current, Faraday's law of induction, Lenz Law, motor and generators, oscillations and waves, periodic and non-periodic motion, sound as wave motion, longitudinal and transverse waves.

Unit IV: Exploration of learning of Physical Science (Credit-2)

Exploration of learning of scienceconcepts such asdisplacement, motion and its types, speed, velocity and acceleration, angular velocity and acceleration, force: magnitude and direction, addition and subtraction, resultant, balanced and unbalanced force, momentum, work: work done by force, dependence of work on relative orientation of force and displacement, energy (kinetic and potential) work - energy equivalence, power, conversion of K.E. into P.E. and vice-versa, law of conservation of energy and momentum, gravitation: Newton's laws of gravitation, acceleration due to gravity, factors affecting 'g'. Chemical reactions, type of chemical reactions-combination, decomposition, displacement reactions, endothermic and exothermic reactions, concept of oxidation, reduction, redox reactions, rate of reaction, factors affecting the rate like concentration, temperature, pressure and catalyst.

Evaluation in Science

Concept of CCE, modes of evaluation: oral, observation and written, objective and essay type questions, types of objective test items: short answer type, multiple choice type, fill-in-blank type, true-false, matching type, making of test items, achievement test, diagnostic test and their construction, preparation of blue print taking examples of concepts of science mentioned in unit III and IV, continuous and comprehensive evaluation for overall development of child.

Tools and Techniques of Assessment: development of learning indicators, Performance-based assessment, learners' records of observations, field diary, oral presentation of learners work, portfolio, assessment of project work, construction of test items and administration of tests, exploring content and assessments of learning based on content mentioned in unit III and IV.

Modes of Learning Engagement:

Constructivist approach: Activity based learning experimentation, Interactive learning, Group work, Peer learning, Project work, Assignments followed by presentation, Discussion, Inquiry approach, Concept mapping etc.

Practicum:

Activities based on Science syllabus of classes IX and X

- Preparation of one working model.
- Preparation of a model lesson plan followed by seminar /presentation before the whole group.
- Preparation of kit for teaching learning of a topic along with write up (name of unit, name of the theme/topic, material used, procedure, learning outcomes).
- Construction of an achievement test, its administration on one section of a class and analysis of results.

Practicals:

- Preparation of designs of ideal Laboratory/Herbarium/Aquarium/terrarium.
- Measuring the rates of water absorption and loss in plants and animals.
- To design and perform experiment to demonstrate that by product of Respiration in plants and animals is heat.
- To demonstrate oxygen consumption during respiration in plants and animals.
- Perform experiments to detect the presence of carbohydrates, lipids and proteins in food by qualitative chemical tests.
- Measurement of length, mass, time, temperature, current, voltage.
- Graphic manipulation like (a) distance-time graph (b) velocity – time graph (c) voltage – current graph (d) temperature – time graph.
- Study of motion under force (design and demonstration).
- Methods of preparation of common laboratory reagents.
- Separation of substances of a given mixture like (i) NaCl, NH_4Cl and sand and (ii) Sulphur, NaCl and Iron scrap.
- Demonstration of laws of electromagnetic induction.
- Study heating effect of current.
- Qualitative chemical test for some common food stuffs.
- Preparation of Chlorine (Cl_2) and Ammonia (NH_3) and Study of their properties.
- Study nature of soft and hard water.

Suggested Readings:

1. P.K.G.Nair, 1985 Principle of Environmental Biology, UNESCO training of science teachers and educators Bangkok UNESCO.
2. NCERT: 1978 Teacher Education curriculum framework, NCERT, New Delhi
3. Science Teaching in Schools by Das. R.C.(1985), Sterling publication.
4. Modern Science teaching by Heiss, E.d. Obourn, E.S. Hoffman, C.W (1961) MacMillian Publication, New York.
5. NCERT (2006) Science for Class IX & X. New Delhi. NCERT.
6. Lewis, 1. 1972 Teaching of school physic, Penguin Book, UNESCO,.
7. Anderson, Hans 0 and Koutnik Paul G. 1912 Towards More effective science instruction in secondary education. The Macmillan Co., New York and Courier Macmillan, London,:
8. Das; 'RC. 1984 Et a. Curriculum and Evaluation National Council of Educational research And Training New Delhi,.
9. Driver, R 1983 The pupil as scientist? Open University Press, Buckingham.
10. Saxena, A.B. 1988 Vigyan Shikshan KaAyonjan Har Prasad Bhargava& Sons, Agra.
11. NCERT (2006) Science for class IX and X, New Delhi. NCERT
12. NCERT (2005) National Curriculum Framework. New Delhi. NCERT.

Outcomes: On completion of the course, the student teacher will be able to:

- Gain insight about the nature of science and its curriculum.
- Comprehend the approaches and strategies of learning physical science at secondary level.
- Apply pedagogic aspects in teaching-learning of physical science effectively by adopting appropriate teaching strategy.
- Discuss a topic in Science, construct test items to measure objectives belonging to various cognitive levels.
- Use teaching aids effectively in teaching science.
- Gain insight the salient features of curriculum,strategy and principles of curriculum and science curriculum for the secondary level.
- Comprehend the objectives of teaching science at secondary level.
- Apply the principles of learning processes in the teaching of science.
- Teach a topic in science effectively by adopting appropriate teaching strategy.
- Construct test items to measure objectives belonging to various cognitive levels.
- Use effectively the teaching aids in teaching science.

PEDAGOGY OF BIOLOGICAL SCIENCE

Credit-10(10+0+0+0)

Objectives:-

- To Identify and relate approaches of teaching-learning of biological science with social relevance;
- To Explore the process skill in science and develop competency to organise laboratory facilities and equipment in teaching– learning of biological sciences;
- To Use effectively different activities – ICT, excursion, visits, research methodology etc for teaching–learning of biological science;
- To Examine different pedagogical issues in learning biological science;
- To Construct appropriate assessment tools for evaluating learning of biological science;
- To Develop ability to use biological science concepts for life skills; and
- To Develop professional competencies for teaching, learning of biological science.
- To Appreciate that science is a dynamic and expanding body of knowledge

Unit I: Planning for Teaching-Learning of Biological Science (Credit-3)

Identification and organization of concepts for teaching-learning of biology;
Determining acceptable evidences that show learners' understanding.
Understanding Constructivist Approach
Instructional materials required for planning teaching-learning of biological science and learners' participation in developing them; Identifying and designing teaching-learning experiences;
Planning field visits, Zoo, Sea shore life, Botanical garden, etc.;
Organizing activities, laboratory experiences, making groups, planning ICT applications in learning biology.
Behavioural, physical and mental changes during Adolescence.

Unit II : Learning Resources in Biological Science (Credit-3)

Identification and use of learning resources in biological science from immediate environmental, exploring alternative sources;
Developing and designing science kit and biological science laboratory; Planning and organizing field observation; Collection of materials, etc.;
Textbooks, audio-visual materials, multimedia-selection and designing;
ICT introduction, Use of ICT in teaching and learning, ICT resources to support Biology teaching and learning;
E- learners introduction, e-learning and changing nature of classroom, challenges and drawbacks of e-learning.
Using community resources for biology learning; Pooling of learning resources in school complex/block/ district level; Handling hurdles in utilization of resources.

.

Unit III: Tools and Techniques of Assessment for Learning in Biological Science

(Credit-2)

Performance-based assessment; Developing indicators for performance assessment in biological sciences; Learners record of observations;
Field diary, herbarium;
Oral presentation of learners work in biological science, Portfolio; Assessment of project work in biology (both in the laboratory and in the field), Assessment of participation in collaborative learning;
Construction of test items (open-ended and structured) in biological science and administration of tests;
Developing assessment framework in biological science;
Assessment of experimental work in biological science- Evidences of evolution, fitness and heredity, role of environment in day to day life.
Exploring content areas in biological science not assessed in formal examination system and their evaluation through various curricular channels;
Encouraging teacher-learners to examine a variety of methods of assessments in biological science;
Continuous and comprehensive evaluation.

Unit IV: Biological Science – Lifelong Learning and Professional Development of Biology Teacher

(Credit-2)

Nurturing natural curiosity of observation and drawing conclusion; Facilitating learning progress of learners with various needs in biology;
Ensuring equal partnership of learners with special needs;
Stimulating creativity and inventiveness in biology; Organising various curricular activities, such as debate, discussion, drama, poster making on issues related to science/biology;
Organizing events on specific day, such as Earth Day, Environment Day, AIDS Day, Science Day etc.
Planning and organizing field experiences, Science club, Science exhibition; Nurturing creative talent at local level and exploring linkage with district/state/central agencies.

Professional development programmes for science/biology teachers:

- Participation in seminar, conferences, online sharing membership of professional organization; Teachers as a community of learners;
- Collaboration of school with colleges, universities and other institutions;
- Journals and other resource materials in biology education;
- Role of reflective practices in professional development of biology teachers;
- Teacher as a researcher: Learning to understand how children learn science – action research in biological science.

Modes of Learning Engagement:
Constructivist approach, Activity based learning experimentation, Interactive learning, Group work, Peer learning, Project work, Assignments followed by presentation, Discussion, Inquiry approach, Concept mapping etc.

Practicum: Activities based on Science syllabus at secondary level.

- Preparation of one working model.
- Preparation of a model lesson plan followed by seminar/presentation before the whole group.
- Preparation of a kit for teaching learning of a topic along with write-up (name of unit, theme/topic, material used, procedure, learning outcomes).
- Construction of an achievement test, its administration on one section of a class and analysis of results.
- Study of heredity and evolution.
- Preparation of Herbarium and Herbarium techniques
- Establishment of Science Laboratory
- Respiration in plants and animals
- Nutrition in plants and animals
- Excretion in plants and animals
- Movements in Plants and animals
- Techniques of formulating science project in laboratories as per curriculum
- Evidences of evolution
- Principle of working of Human eye.

Suggested Readings:

1. NCERT (2005). National Curriculum Framework. New Delhi. NCERT.
2. NCERT (2005). Position Paper of NFG on Teaching of Science. New Delhi. NCERT.
3. NCERT (2005). Position Paper of NFG on Habitat and Learning. New Delhi. NCERT.
4. N. Vaidya, Science Teaching for 21st Century (1999). New Delhi.Deep & Deep Publications.Dat Poly, (2004).Encyclopaedia of Teaching Science. New Delhi. Sarup& Sons.
5. Their, DH, (1973). Teaching Elementary School Science.A Laboratory Approach, Sterling Publication Pvt. Ltd.
6. Science Teacher. (Peer reviewed journal for science teachers).
7. Journal of Research in Science Teaching. (Wiley-Blackwell).
8. Turner Tony and Wendey Di Macro. Learning to Teach School Experience in secondary school teaching.London and New York.Routledge.
9. P. Ameeta, (2008). Methods of Teaching Biological Science. Educational Publishers edition or later ed.
10. Sharma R.C., (1987). Modern Science Teaching or later edition. New Delhi. Dhanpatarai& Sons.
11. Teaching of Science Today and Tomorrow. New Delhi Docba House.

Web Sites

- http:/www.tc.columbia.edu/mst/science.ed/courses.asp.
- http:/www.edu.uwo.ca

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

- Identify and relate approaches of teaching-learning of biological science with social relevance;
- Explore the process skill in science and develop competency to organise laboratory facilities and equipment in teaching– learning of biological sciences;
- Use effectively different activities – ICT, excursion, visits, research methodology etc for teaching–learning of biological science;
- Examine different pedagogical issues in learning biological science;
- Construct appropriate assessment tools for evaluating learning of biological science;
- Develop ability to use biological science concepts for life skills; and
- Develop professional competencies for teaching, learning of biological science.
- Appreciate that science is a dynamic and expanding body of knowledge

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PLANT PHYSIOLOGY

Credit-12(8+1+2+1)

Objectives: The student teachers study;

- To Understandthe sub-cellular physiological phenomena inplants;
- To Understand the water relations inplants;
- To Understand the functioning of plant from the physiological point ofview;
- To Understand about enzymes and their mechanism of action
- To Understand various facets of growth, differentiation and physiology of flowering in angiosperms.

Unit I : Absorption Of Water (Credit-2)

a) Importance of water to plant life, properties of water.
b) b) Review of diffusion, osmosis and imbibition – definitions, concept ofwater potential, osmotic potential, pressure potential, solute potential, roleof aquaporins.
c) **Absorption of water**: Root as an absorbing organ, mechanism andpathways of water movement from root hair to root xylem - symplast,apoplast and trans-membrane pathways.
d) **Ascent of sap**: Vertical pathway of water in plants, structuralproperties of xylem, root pressure theory, cohesion – tension hypothesis.

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Preparation of different types of solutions – molal, molar, percent and normal solutions.
2. To study the effect of temperature and organic solvents on permeability of plasma membrane.
3. Determination of osmotic potential by plasmolytic method.
4. Determination of water potential of potato tuber.

Unit II : Transpiration (Credit-2)

a) Transpiration: Definition, types, mechanism of stomatal openingand closing (role of K+ and Abscisic acid), antitranspirants, factorsand significance of transpiration, guttation.

b) Cellular Respiration: Introduction, respiratory quotient, aerobicand anaerobic respiration, structure of mitochondrion, glycolysis,synthesis of acetyl CoA, Krebs cycle, oxidative phosphorylation,electron carrier complexes, chemiosmotic hypothesis, proton pumptheory, synthesis of ATP (Paul Boyer's hypothesis), pentose phosphatepathway.

c) Photosynthesis

Introduction, brief history, ultrastructure of chloroplast,photosyntheticpigments, absorption and action spectra, photochemical (light) reaction,photophosphorylation, Z-scheme, Calvin cycle, C4 pathway, CAM pathway,photorespiration, factors and significance of photosynthesis.

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Calculation of stomatal index, frequency and area of stomatal aperture in the 2 surfaces of leaves.
2. Determination of the rate of transpiration in 2 surfaces of leaf by cobalt chloride method.
3. Demonstration of transpiration pull.

Unit III : Transport Of Organic Substances (Credit-2)

a) Transport of Organic Substances : Ultrastructure and functions ofphloem, (sieve tube), mechanism of phloem transport, source – sinkrelationship, theories and factors affecting photosynthesis.

b) Mineral Nutrition: Major and micro-nutrients, absorption of mineralsalts, mechanism and theories of mineral uptake; passive absorption –mass flow, Donnan equilibrium: active absorption – carrier concept, cytochrome pump hypothesis.Role of N, P, K, Ca, Mg, Fe, N and Zn in plant metabolism, Mineral deficiencysymptoms.

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Separation of photosynthetic pigments by paper chromatography.
2. Comparison of rate of photosynthesis under different environmental conditions.
3. Demonstration of necessity of light, CO2 and chlorophyll for photosynthesis.
4. Plotting the absorption spectrum of chlorophylls.
5. Quantitative estimation of chlorophylls by colorimetry.

Unit IV : Growth And Development (Credit-2)

a)Growth and Development: Definitions, phases of growth and development, photomorphogenesis, brief account of phytochromes – discovery,physiological role and mechanism of action.

b)Plant growth Regulators : General account, discovery, chemicalnature, physiological effects and applications of auxins, kinins, gibberellins, ethylene and abscisic acid. Brief account of plant movements.

c)Physiology of flowering :(i) Brief account of photoperiodism, short day, long day and day-neutral plants, night interruption phenomenon,florigen concept, role of phytochromes (ii)Brief account of vernalization.

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Demonstration of aerobic and anaerobic respiration.
2. Demonstration of phototropism and geotropism.
3. Study the distribution of growth in roots.
4. Observation of cyclosis in plant materials.
5. Testing the germinability of seeds using TTC

Suggested Readings:

1. Taiz,L. and E.Zeiger, 1998, Plant Physiology (2nd Ed.), Sinauer Associates Inc. USA.
2.Trivedi ,Atreya and Pathak.Plant Physiology, Biochemistry.and Biotechnology.Ramesh Book Depot
3.Srivastava, H.S., 2005, Plant Physiology, Biochemistry and Biotechnology, Rastogi Publications, Meerut.
4. Datta, Subhash Chandra.Plant Physiology

Outcomes: After completion of this course the student teachers will be able to;

- Understandthe sub-cellular physiological phenomena inplants;
- Understand the water relations inplants;
- Understand the functioning of plant from the physiological point ofview;
- Understand about enzymes and their mechanism of action
- Understand various facets of growth, differentiation and physiology of flowering in angiosperms

DEVELOPMENTAL BIOLOGY AND APPLIED ZOOLOGY

Credit-12(8+1+2+1)

Objectives:

To enable students to comprehend the modern concepts of developmental biology to understand the developmental sequences in vertebrates; to compare the developmental of organs and systems.

Unit I: Gametogenesis and Early Development (Credit-2)

Gametogenesis – Differentiation of spermatozoa and oocyte in mammals;Different types of eggs, classification based on amount and distribution of yolk (deutoplasm)

Fertilization – approach of gamete, interaction of gametes, monospermy, polyspermy; Parthenogenesis and its significance

Cleavage – Types of cleavages – holoblastic, meroblastic, radial, spiral, discoidal, superficial; planes of cleavages – meridional, vertical, equatorial, latitudinal

Genetic control: Genetic control of development and differentiation).

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1.Study of different types of eggs (Insect, Frog, Hen) Study of permanent slides of different developmental stages in Frog a) Section of egg, b) early cleavage, c) blastula, d) morula, e) Gastrula

2.Study of permanent slides of a) neural plate, b) neural fold of Frog. ii) Study of different developmental stages of Frog tadpole: a) Early tadpole, b) hind limb stage, c) hind limb and fore limb stage, d) short tailed stage, e) young Frog.

Unit II: Development of Frog and Regeneration (Credit-2)

Gastrulation – Morphogenetic movement of cells, mechanism of gastrulation and change in cell shape

Neurulation – Formation, position and fate of three germinal layers

Organizer phenomenon – Organizer concept of Spemann, chemical nature and distribution of inductors – competence, determination and differentiation ; metamorphosis of tadpole

Regeneration: Regeneration in different animals,Factors influencingregeneration .

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1.Study of permanent slides of chick embryos of a) 13 hrs, b) 19 hrs, c) 24 hrs, d) 33 hrs, e) 48 hrs of incubation ii) Study of sections of chick embryos of a) 19 hrs, b) 24 hrs, iii) 48 hrs of incubation

2.Rearing of two races of silkworm from egg to cocoon stages – conditions required, quality and quantity of food provided, precaution taken during feeding, moulting and spinning.

3.Harvesting cocoons, reeling of silk from the cocoons, study of some economic traits – fecundity, larval duration, cocoon weight, shell weight and silk weight.

Unit III: Development of Chick and Mammal (Credit-2)

a) Development of Chick: Overview of early development; formation ofprimitive streak and germinal layers; Salient features of chick embryos of 13hrs, 19 hrs, 24 hrs, 33 hrs and 48 hrs of incubation;

b) Foetal membranes – Development, structure and functions of a) amnion,b) chorion, c) yolk sac, d) allantois

c) Placenta in mammals – Structure, classification, physiology and hormonalcontrol of placenta

PRACTICALS (Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Study of common nematode pests of crops.
2. Study of common insect vectors.
3. Study of economically important

a) Fishes, b) crustaceans, c) molluscs

4.Field visit to study the common practices in rearing of honeybees and fish.

Unit IV: Applied Zoology **(Credit-2)**

a) Beneficial animals: Basic principles of practices in culturing of i)silkworms (Sericulture), ii) bees (Apiculture), iii) Aquaculture – fish, prawnand shell fish; Importance of diary

b) Harmful animals: Pests - life cycle, damages caused and control measures of common insect pests of stored food grains and crops, nematode pests of crops, insect vectors ; Control – biological control and integrated pest management (IPM) .

PRACTICALS (Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Preparation of window on hen's egg to study development of embryo.
2. Incubation of fertilized egg of chick, preparation of permanent mounting of embryo from incubated egg and identification of age of the embryo
3. Study of common insect pests of stored grains and crops.

Suggested Readings:

1. An Introduction to Embryology (English) 5th Edition by Balinsky Cengage Learning India Pvt Ltd, New Delhi
2. Human Embryology (English) 9th Edition by Inderbir Singh Macmillan
3. CHORDATE EMBRYOLOGY (English) 1st Edition (Paperback) by Verma, P S|;Tyagi, B S;Agarwal, V K|; S CHAND & COMPANY-NEW DELHI
4. Molecular Developmental Biology 2/e PB by T. Subramoniam Narosa Publishing House Pvt. Ltd. - New Delhi.
5. Economic Zoology by G.S. Shukla & V.B. Upadhyay.

Outcomes:- After completion of this course the student teachers will be able to;

comprehend the modern concepts of developmental biology to understand the developmental sequences in vertebrates; to compare the developmental of organs and systems.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

ORGANIC CHEMISTRY – II

Credit-12(8+1+2+1)

Objectives:

- Students will gain an understanding of the fundamental electronic structure and bonding in carbonyl compounds, substituent effects on pKa (in the case of carboxylic acids), the reactivity of carbonyl compounds with both hard and soft nucleophiles (carboxylic acids, aldehydes and ketones), the ability of synthetic organic chemistry to prepare specific molecular targets in a selective manner through a series of simple bond-forming processes.
- To know about important functional group transformations and bond-forming methods in organic synthesis
- To introduce students to the chemistry of carbonyl compounds including structure and reactivity, 1,2- and 1,4-addition and enols and enolates. Chemistry of Nitrogen Compounds, Synthetic transformation of aryl diazonium salts, azo coupling. Chemistry of Heterocyclic compounds.

UnitI:Chemistry of Hydroxy Compounds and ether Chemistry of hydroxy compound

Alcohols:classification and nomenclature.Monohydric alcohols-nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature. Reactions of alcohols.

Dihydric alcohols-nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$ and HlO_4] and pinacol-pinacolone rearrangement.

Trihydric alcohols- nomenclature and methods of formation, chemical reactions of glycerol.

Phenols: Nomenclature, structure and bonding. Preparation of phenols, physical properties and acidic character. Acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols-electrophilic aromatic substitution, acylation and carboxylation. Mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hooesch reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

Ethers and Epoxides: Nomenclature of ethers and methods of their formation, physical properties, Chemical reactions – cleavage and auto oxidation, Ziesel's method.Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and Organolithium reagents with epoxides.

UnitII: Chemistry of Carbonyl Compounds including Enolates (Credit-2)

Aldehydes and Ketones: Nomenclature and structure of carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1, 3-dithianes, synthesis of ketones from nitriles and from carboxylic acid. Physical properties,

Mechanism of nucleophilic additions to carbonyl group with particular emphasis on Benzoin, Aldol, Perkin and Knoevenagel condensations, Condensation with ammonia and its derivatives, Witting reaction, Mannich reaction.

Use of acetals as protecting group, Oxidation of aldehydes, Baeyer-villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen, Wolff-kishner, $LiAlH_4$ and $NaBH_4$ reductions, Halogenation of enolizable ketones.

Introduction to α, β unsaturated aldehydes and ketones.

Organic Synthesis via Enolates: Acidity of α-hydrogens. Synthesis of ethyl acetoacetate by Claisen condensation and Synthesis of diethylmalonate. Keto-enoltautomerism in ethyl acetoacetate. Synthetic applications of ethyl acetoacetate and diethylmalonate. Alkylation of 1,3-dithianes.

UnitIII: Chemistry of Nitrogen Compounds (Credit-2)

Nitroalkanes and Nitroarenes: Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes.Mechanisms of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media.Picric acid.Halonitroarenes: Reactivity.
Amines: Structure and nomenclature of amines, physical properties. Stereochemistry of amines, Separation of a mixture of primary, secondary and tertiary amines, Structural features effecting basicity of amines, Amines salts as phase-transfer catalysts, Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction, Hofmann bromamide reaction. Reactions of amines: Electrophilic aromatic substitution in aryl amines, reaction of amines with nitrous acid. Synthetic transformation of aryl diazonium salts, azo coupling.

Unit IV: Chemistry of Heterocyclic compounds (Credit-2)

Heterocyclic Chemistry: Introduction: Molecular orbital picture and aromatic characteristic of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.Mechanism of nucleophilic substitution reactions in pyridine derivatives.Comparison of basicity of pyridine, piperidine and pyrrole.

Suggested Readings:

1.Bruckner, R. Advanced organic chemistry: Reaction Mechanisms Academic Press
2.Lowry, Thomas H. Mechanism and theory in organic chemistry Addison-Wesley
3.Kalsi P S Reaction Mechanism 6th Edition
4.Singh Mukherjee, Reaction Mechanism
5.Francis A Carey Organic Chemistry fourth edition.
6.Bahl, Arun A textbook of organic chemistry S. Chand and Co. Ltd.
7.Gupta R, Kumar M, Gupta V, Heterocyclic Chemistry, Springer
8.Francis A. Carey, Richard A. Sundberg, Advanced Organic Chemistry
9.David E. Lewis Advance Organic Chemistry Oxford University Press.
10.Bernard Miler Advanced Organic Chemistry: Reactions And Mechanism Prentice Hall College.
11.David R. Klein, Organic Chemistry 4th Edition John Wiley & Sons.

PRACTICALS (Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1.Synthesis of Organic Compounds

a..Acetylating of salicylic acid, aniline, glucose and hydroquinone.
b. Benzoylation of aniline and phenol.
c. Aliphatic electrophilic substitution: Preparation of iodoform from ethanol/ acetone.
d. Aromatic electrophilic substitution:
i. Nitration: Preparation of m-dinitrobenzene and p-nitroacetanilide
ii. Halogenation: Preparation of p-bromoacetanilide and 2,4,6-tribromophenol
e. Diazotization/coupling: Preparation of methyl orange and methyl red
f. Oxidation: Preparation of benzoic acid from toluene
g.Reduction:Preparation of aniline from nitrobenzene and m-nitroaniline from m-dinitrobenzene.

Outcomes:

- Students gain an understanding of the fundamental electronic structure and bonding in carbonyl compounds, substituent effects on pKa (in the case of carboxylic acids), the reactivity of carbonyl compounds with both hard and soft nucleophiles (carboxylic acids, aldehydes and ketones), the ability of synthetic organic chemistry to prepare specific molecular targets in a selective manner through a series of simple bond-forming processes.
- Students know about important functional group transformations and bond-forming methods in organic synthesis
- Students know about the chemistry of carbonyl compounds including structure and reactivity, 1,2- and 1,4-addition and enols and enolates. Chemistry of Nitrogen Compounds, Synthetic transformation of aryl diazonium salts, azo coupling. Chemistry of Heterocyclic compounds.

INTERNSHIP PROGRAMME METHODOLOGY 1(Credit-9)

Phase 1: Pre-internship
Phase 2: Internship
Phase 3: Post-Internship and Critical Reflection of Internship Experience

VII Semester

SECONDARY EDUCATION IN INDIA: STATUS, ISSUES AND CONCERNS

Credit-6(6+0+0+0)

Objectives:-

The Curriculum aims to:

1. achieve cognitive, affective and psychomotor excellence;
2. enhance self-awareness and explore innate potential;
3. attain mastery over laid down competencies;
4. imbibe 21st century learning, literacy and life skills;
5. promote goal setting, and lifelong learning;
6. inculcate values and foster cultural.

Unit I: Concept, Nature and Purpose of Secondary Education (Credit-2)

Concept of secondary education, aims, objectives, scope and nature of secondary education, functions of secondary schools, Linkages with elementary and senior secondary stages. Problems of teacher training, Role of NCTE and Curriculum Reforms.

Unit II: Status of Secondary Education (Credit-2)

Present situation of secondary education in the country. Universalisation of secondary education – access, enrolment, retention and learning achievement of students, Structure and systems of schools, Concept of RMSA; Examination Reforms, administration and financing of secondary education.

Unit III: Quality Education at Secondary Level (Credit-1)

Concept of quality in education; quality Indicators/related to planningand organization of learning experience, learning environment (Physical and Academic), problems and challenges to quality improvement, through settingstandards of performance and monitoring, Improving internal efficiency of theschool system, teacher recruitment, their working conditions and staff morale.

Unit IV: Secondary School Teacher (Credit-1)

Issues related to professionalism – code of professional ethics for Teachers;changed role of the teacher in the new millennium – learning facilitator anddiagnostician, Issues related to teacher motivation, working condition both inurban and rural areas, job satisfaction, issues related to teacher's roleperformance and role perception, role ambiguity role over load, role stress andstrain, accountability of teachers.

Sessional Work:

Preparing status report on secondary education in a chosen block/district with reference to access, enrolment and dropout.

Prepare a report on the existing status of the teachers, method of recruitment and salary structure.

Visits to different types of secondary schools and preparation of school profiles.

Conduct interview with teachers/students/parents of different schools and prepare a report on problems of secondary education.

Visit to alternative education centers at secondary level and preparation of a report.

Survey of educational needs of disadvantaged/disabled.

Suggested Readings:

1. Chopra, R.K. (1993) Status of Teachers in India, NCERT, New Delhi.
2. Cardinal Principles of Secondary Education. a Report of the Commission on the Reorganization of Seco (English) Isha Books.
3. Govt. of India (1966) Abstract and Analysis of the Report of the Indian Education Commission, with Notes, and "The Recommendations" in Full
4. Shyamlal Arya;National Policy of Education, 1992, Modification and their POA's MHRD, Deptt. of Education. Signature Books International.
5. Neelam Ed Sood;Management of School Education in India 2012, pp. 230 (Crown Size) (English) 01 Edition. Aph Publishing Corporations.

Outcomes- After completion of this course, the student will-

- Acquire the ability to utilize technology and information for the betterment of humankind;
- Strengthen knowledge and attitude related to livelihood skills;
- Develop the ability to appreciate art and show case talents;
- Promote physical fitness, health and well-being.
- Promote arts integrated learning.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

INCLUSIVE EDUCATION , GUIDANCE AND COUNSELLING IN SCHOOL

Credit-6(6+0+0+0)

Objectives:-

- To get the knowledge of the concept, need and principles of guidance.
- To explains the role of school in organizing different guidance programmes
- To narrates the process, tools and techniques of counselling.
- To explains the qualities and role of a school counselor.

Unit I: Introduction of Inclusive Education, Educational Strategies and Management **(Credit-2)**

Concept meaning scope and challenges of inclusive education Distinction between special education, integrated education and inclusive education and their merits and demerits Creating inclusive environment Importance and need for adaptation Guidelines for adapting teaching science, social studies, mathematics and languages at the secondary level Educational measures for effective implementation of inclusive education.

Unit II Nature, needs and Evaluation of SWDN **(Credit-2)**

Definition, types and classification of SWDN Characteristics and educational needs of SWDN based on research evidence Supportive resources and services for children with SWDN in inclusive Education Teachers' role in implementing reforms in assessment and evaluation in inclusive education Type of adaptations / adjustment in assessment and evaluation strategies used for students with diverse needs Importance of CCE

UNIT-III Guidance & Counselling **(Credit-1)**

Guidance and Counselling- Meaning, Definitions, Aims, Nature, Principles and Needs. Counselling– Meaning, Definitions, Elements-Characteristics – Objectives – Need – Type and relationship between guidance and Counselling - Benefits- Limitations, History of guidance movement in India – Problems of guidance movement in India – Ways to improve guidance movement in India.

UNIT-IV Guidance Services in Schools **(Credit-1)**

Non-testing devices in guidance: Observation, Cumulative record, Anecdotal record, Case study, Autobiography, Rating Scale, Sociometry etc. Testing devices in guidance–-Meaning, Definition, Measurement, Uses of psychological tests. Guidance services at different school levels– Organisation of Guidance services in schools – Role of guidance personnel – Career and Occupational Information – sources, gathering, filing, dissemination.

Sessional work

1.Tutorial - Readings on PWD Act, RTE Act, IEDSS, SSA, RMSA and their implications for inclusive education

2.Tutorial – visit to special schools for observing the behaviours of students with VI, HI, MR, LH.

3.Chauhan, S. S. (2008). Principles and techniques of guidance. UP: Vikas Publishing House Pvt Ltd.

4.Sharma, R. N. (2008). Vocational guidance & counseling. Delhi: Surjeet Publications.

Suggested Readings:

1.Sophia Dimitriadi ;Diversity, Special Needs and Inclusion in Early Years Education (English) 1st Edition, SAGE Publications India Pvt Ltd
2.Internet Source, MHRD (2005b). 'Action Plan for Inclusive Education of Students and Youth with Disabilities',
3.Internet Source, SSA (2002). 'Basic features of SSA', Inclusive education in SSA, Retrieved from www.ssa.nic.in / inclusive_education /ssa_plan_manual
4.Neena Dash ;Inclusive Education for Children With Special Needs.

Outcomes- After going through the course the student will be able:

- To orient the student with tools and techniques of measurement and evaluation.
- To develop skills and competencies in constructing and standardizing a test.
- To enable the student to tabulate and find out some standard meaning from the raw scores by using statistical procedures
- To make the students understand how various requirements of education are measured evaluated interpreted and their results are recorded to help learners.

VIII SEMESTER

INDIAN CONSTITUTION AND HUMAN RIGHTS

Credit-6(5+0+0+0)

Objectives: On completion of this course, the student teacher will be able to

- Know the importance, preamble and salient features of Indian Constitution
- Appreciate the significance of Fundamental Rights, Duties and Directive Principles of State Policy.
- Develop an understanding of the strength of the Union Government.

Unit I: Meaning and Importance of the Constitution (Credit-3)

(a) Preamble, Salient features Constituent Assembly and the Spirit of the Indian Constitution.
(b) Fundamental Rights, Duties and Directive Principles, Fundamental Rights, Fundamental Duties, and the Directive Principles of the state policy of the Indian Constitution.
(c) Union, State and Local Self Governments Union Government: Parliament, the President and Prime Minister: State Government: Governor and the Council of Minister: Judiciary: Functions and Powers: Panchayat Raj System.

Unit II: Human Rights (Credit-2)

Origin and Development of Human Rights, Growing Advocacy and Declining Trendsof Human Rights, Rights of Scheduled Casts, Scheduled Tribes, Minorities, Childrenand Women, Human Rights Defenders, Human Rights Violation and Human Rights Organisations.

Suggested Readings:

1.Madhav Khosla;, THE INDIAN CONSTITUTION (English) Oxford University Press
2.Ghosh, Indian Government and Politics. PHI LEARNING PVT. LTD-NEW DELHI
3.Naseem Ahmad, Indian Public Aministration, Anmol Publications Pvt.Ltd.
4.Jagdish chand, Education In India After Independence : Anshah Publishing House (shipra Pub.), H4-03 Mayurdhwaj, 60 Ip. Extn. Delhi-92

Outcomes: In this paper students will be able to

- Understand the functioning of the State Government for the unity and the strength of the Democracy.
- Know the importance of local self-Government and Panchayati Raj Institutions in India.
- Know the meaning, significance, the growing advocacy of Human Rights.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

CURRICULUM AND SCHOOL

Credit-6(6+0+0+0)

Objectives:-It aims at understanding and learning-
the developmental stages of children, nature of the knowledge in general and curricular subject areas in particular, and the child's socio-political contexts.
Further the objectives also have to be specific enough to be used as guidelines for content selection and organisation.

Unit I: Concept and determinants of curriculum (Credit-2)

Meaning of Curriculum; the dynamics of hidden curriculum and its effects; Core curriculum;Spiral curriculum;Determinants of school curriculum;National goals and priorities: Trends in the curriculum of school education at national and state levels (with reference to National Curriculum frameworks); Difference between curriculum Curriculum and syllabus.

Unit II: Curriculum implementation in school (Credit-2)

Planning and converting curriculum into syllabus and learning activities. Role of teacher in operationalising curriculum (Concept mapping, Longrange planning, daily lesson Planning, creating learning situations, selecting learning experiences, choice of resources, planning Assessments. Time management, Text book as a tool for curriculum transaction, other learning resources such as 'on learning' and ICT, interactive videos, other technological resources. Planning and use of curricular materials – teachers hand book, sourcebook, work book, manuals, and Other learning materials.

Unit III: School as a system for curriculum implementation (Credit-2)

Concept of a school; its components; school climate and environment.
School as an organization- mission, vision and core values. Factors influencing school environment. School plant, Physical and academic infrastructural facilities. Planning: Types of planning-short term, annual plan; Strategic planning and goal setting;.Organization of curricular activities i.Curricular-activities: Management of classroom teaching -learning activities, Managing Examination and Evaluation in school; Reducing stress and strain of students facing public examinations and enhancing their chances for better schooling; Classroom management for different types of instructional strategies; Group dynamics and its implications, Instruction in a diverse classroom ii. Co-curricular activities: organizing various cultural and club activities and competitions, school-level, inter-school-level, district and National Level Planning School Time table.

Sessional activities

Group work to analyze the curricular concepts school visits to study the factors required for Implementing the curriculum in schools and write reflective experiences.
Review of national curriculum frame works on school education and write a report for presentation and discussion.
Analysis of teachers' handbooks, text books, workbooks, source books followed by Power point Presentations and report submission.
Interviews with class room practitioners and students who are the stakeholders to know their Perceptions about the curriculum and the text books in use.
Readings of certain curriculum reviews and articles bearing significance to the course outlined and Reflections on them.

Suggested Readings:

1. Alka Kalra (1977) Efficient School Management and Role of Principals, APH Publishing, New Delhi.
2. Buch M B Planning Education, Implementation and Development, NCERT, New Delhi. .
3. Curriculum Planning for better teaching and learning by J.G. saylor and W Alexander (Holt, Rinehart and Winston).
4. Dewey, John (1959): The child and the Curriculum, Chicago, The University of Chicago Press.
5. Eugenia Hepworth Berger (1987), Parents as partners in Education: The school and home Working together.
5. Howson, Geoffrey (1978): Developing a New Curriculum, London: Heinmann.

Outcomes- After going through the course the student will:

- Understand and construct their own knowledge
- Understand importance of Experiences in Learning
- Understand the socio-economic context and identity of the learner.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Advanced Chemistry

Credit-12(8+1+2+1)

Objectives: Students Teachers will be able to

- Understand the Spectroscopic methods that are used to study the molecules.
- Predict the appearance of a molecule's vibrational spectra as a function of symmetry and uses in detailed organic structure analysis
- Determine the vibrations for a triatomic molecule and identify whether they are infrared-active.
- Determine whether the molecular vibrations of a tri-atomic molecule are Raman active.
- Explain the difference between Stokes and anti-Stokes lines in a Raman spectrum.
- Understand Chemistry of Biomolecules.
- The knowledge about Spectral & Magnetic properties of Transition Metal complexes.
- Understand the Bioinorganic Chemistry, Geochemical effect on the distribution of metals.
- Learn chemistry of Amino Acids, Peptides, Proteins and Nucleic Acids

Unit I: Spectroscopy-I (Theoretical Principle) (Credit-2)

Introduction: electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.

Rotational Spectrum: Diatomic molecules, Energy levels of a rigid rotor (semi-classical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotor, isotope effect.

Vibrational Spectrum: Infrared spectrum: energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.

Raman Spectrum: Concept of polarisability, pure rotational and pure vibrationl Raman spectra of diatomic molecules, selection rules,σ,π- and n M.O., their energy levels and the respective transitions.

Nuclear magnetic resonance (NMR) spectroscopy: Proton magnetic resonance (^{1}H NMR) spectroscopy, nuclear shielding and deshielding, chemical shift and molecular structure, area of signals and proton counting, splitting of signals, spin-spin coupling and coupling constant, interpretation of NMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde, 1, 1, 2-tribromoethane, ethyl acetate, toluene and acetophenone.

Unit II: Electronic Spectrum & Photochemistry (Credit-2)

Electronic Spectrum: Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Frank-Condon principles.Qualitative description of σ, π- and n M.O., their energy levels and the respective transitions. **Photochemistry**

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus-Draper law, Stark-Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions – energy transfer processes (simple examples).

Unit III: Spectral & Magnetic properties of Transition Metal complexes (Credit-2)

(A) **Electronic spectra of Transition Metal Complexes:** Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series, Orgel-energy level diagram for d^1 to d^9states, discussion of the electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion.

(B) **Magnetic Properties of Transition Metal Complexes:** Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes.

Unit IV: Bioinorganic Chemistry **(Credit-2)**

Metal ions present in biological systems, classification of elements according to their action in biological system. Geochemical effect on the distribution of metals. Sodium / Potassium pump, carbonic anhydrase and carboxypeptidase. Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity, Use of chelating agents in medicine,Cisplatin as an anti-cancer drug. Iron and its application in bio-systems, Haemoglobin, Myoglobin; Storage and transfer of iron.

Amino Acids, Peptides, Proteins and Nucleic Acids: Classification, structure and stereochemistry of amino acids. Acid-base behaviour, isoelectric point and electrophoresis.Preparation and reactions of α-amino acids.

Structure and nomenclature of peptides and proteins.Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides and proteins. Primary and secondary structures of proteins.Protein denaturation/renaturation.

Nucleic acids: introduction, Constitution of nucleic acids, Ribonucleosides and ribonucleotides. The double helical structure of DNA.

Suggested Readings:

1. Sharma Y. R. elementary organic spectroscopy: principles and chemical applications paperback.
2. Mehta and Mehta, Organic chemistry, PHI
3. Donald L. Pavia Gary M. Lampman George S. Kriz James A. Vyvyan, Introduction to Spectroscopy, 5th Edition.
4. Bahl B. S.&BahlArun 5000 Solved Problems In Organic Chemistry, S. Chand Publishing.
5. Madan R. L., Chemistry for Degree Students B.Sc. 3rd Year S. Chand Publishing.
6. NafisHaider S, Fundamental of Organic Chemistry, S. Chand Publishing.
7. Pradeep. T. Nano: The Essentials; Understanding Nanoscience and Nanotechnology. Tata McGraw-Hill Education Pvt. Ltd., New Delhi.
8. Kenneth J. Klabunde and Gleb B. Sergeev Nanochemistry (Second Edition)
9. Bandyopadhyay, A. K. Nano Materials. New Age International Publishers, New Delhi
10. P.T. Anastas and J.C. Warner, Green Chemistry: Theory and Practice. Oxford University Press.
11. Lancaster M. Green Chemistry: Introductory Text. Royal Society of Chemistry (London).
12. Ryan M.A. and Tinnesand M. Introduction to Green Chemistry. American Chemical Society (Washington).
13. Cann M. C. and Connelly M. E. Real world cases in Green Chemistry, American Chemical Society (Washington).
14. Cann M. C. and Umile T. P. Real world cases in Green Chemistry (Vol 2) American Chemical Society (Washington)
15. Ahluwalia, V.K., Kidwai, M. New Trends in Green Chemistry, 2004
16. Inorganic Polymers by Stone and Graham.

Practicals

Organic Chemistry

a.Two stage preparation: *p*-nitroacetanilide from Aniline and *p*-Bromoacetanilide from Aniline.
b.Determination of Iodine value of an oil/fat.
c.Separation of two component mixture using water or $NaHCO_3$ solution & identification of the two components. Preparation of one derivative.
d.Green synthesis:

Physical Chemistry
a.Colorimetry

i. Determination of formula of complex by Job's method**.**
ii Verification of Beer – Lambert law for $KMnO_4/K_2Cr_2O_7$ and determine the concentration of the given solution of the substance.

b.Polarimetry

i.Determination of the specific rotation of a given optically active compound and determination of the concentration of given solution of an optically active substance
Solvent Extraction
i.Separation and estimation of Mg (II) and Zn (II)
Ion Exchange Method
Separation and estimation of Mg (II) and Zn (II)
Chromatography
i.To determine R_f value of individual and mixture of amino acid by thin layer chromatography (TLC).
i.Separation, Isolation and Analysis of the Different Components in a Mixture.
ii. Method of separation of green leaf pigment, mixture of inorganic, vitamins, colors of flowers etc. separation of α, β, γ carotene from carrot.
Refractometry and Polarimetry

i.To verify law of refraction of mixture (e.g of glycerol and water) using Abbe's refractrometer.
ii.To determine the specific rotation of a given optically active compound.
UV spectrophotometer
i.Record the UV spectrum of p-nitrophenol (in 1:4 ethanol:water mixture). Repeat after adding a small crystal of NaOH. Comment on the difference, if any.
ii.Record the U.V. spectrum of a given compound (acetone) in cyclohexane (a) Plot transmittance versus wavelength. (b) Plot absorbance versus wavelength.

Outcomes: At the end of the course students will be able to:

- The knowledge about Spectral & Magnetic properties of Transition Metal complexes.
- Understand the Bioinorganic Chemistry, Geochemical effect on the distribution of metals.
- Learn chemistry of Amino Acids, Peptides, Proteins and Nucleic Acids

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

MOLECULAR GENETICS, BIOTECHNOLOGY , INSTRUMENTATION & Evolution

Credit-12(8+1+2+1)

Objectives:
To enable students to comprehend the modern concepts and applied aspects of Molecular Genetics, Biotechnology and instrumentation.

Unit I: Nucleic Acids: RNA & DNA (Credit-3)

- Nucleic acids: DNA- Structure, forms, chemical composition functions and units of DNA, Genetic Code
- RNA: Genetic RNA, non–genetic RNAs (mRNA, tRNA, and rRNA) – Structure and functions.
- Replication of DNA
- Gene mutation : nature of mutation, types of mutation and causes of mutation
- DNA repair: mismatch repair, direct repair, base-excision, nucleotide-excision repair and other types of DNA repair. Genetic diseases and faulty DNA repair.

Unit II: Genetic Engineering (Credit-3)

- Gene expression: Transcription and translation of prokaryotes and eukaryotes.
- Regulation of gene expression in prokaryotes (Lac and tryptophan operon)
- Genetic engineering : Gene cloning
    i. Cloning vectors
    ii. Restriction endonucleases, staggered and blunt ended cuts, ligation and example.
    iii. Recombinant DNA technology
- Gene amplification
    i. cDNA library
    ii. Genomic library and
    iii. Polymerase chain reaction
- Applications of recombinant DNA technology – DNA finger printing, human gene therapy, ethical concerns and cloning. Human Genome Project.

Unit III Tissue Culture& Microscopy (Credit-3)

- Animal Cell, Tissue and organ culture. History of animal Cell & organ culture requirements. Characteristics of animal cell culture. Culture media (Natural & Synthetic).
- Sterilization of glassware, equipment isolation of animal tissue; sometic cell fusion, hybridoma technology.
- Elementary idea of bio informatics, genomics, proteomics
- Microscopy : Principle structure and function of simple and compound microscope
- Spectrophotometry: Principle of spectrophotometer, structure of simple & UV visible spectrophotometer. Principles of Chromatography.
- Principles of electrophoresis, separation technique of proteins and DNA.
- Principles of Centrifugation, simple, Gradient &Ultracentrifuge.
- General Principle & functions of instrument related to ECG, EEG, CT scanning and Sonography.

Unit IV: Theories of Evolution (Credit-2)
a) Origin of Life: Urey Muller's experiment – Theories on origin of life
b) Theories of Evolution – Lamarckism and Darwinism (Review) Neo-Lamarckismand Neo-Darwinism, de Vries theory of mutation and its significance in evolution;Hardy-Weinberg's Law, Genetic drift, Modern synthetic theory of evolution.

PRACTICALS(Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)
1.Study of five animals for mimicry.
2. Study of fossil models of Trilobites and fishes.

Suggested Readings:
1.Molecular Biology of the Cell, Alberts al, 5thed, Garland Science 2008
2.Molecular Biology of the Gene Watson Baker et al, 7thed, Pearson 2014.
3.Biochemistry , Molecular Biology and Genetics 5thed, Lippincott Williams and Wilkinson, 2013
4.Biochemistry D Voet & JG Voet, Wiley 2011.
5.Immunology , Kuby 7thed, Owen Punt Stenford McMillan, 2013
6.Fundamentals of Biochemistry , JL Jain , S Chand Pub 2014
7.Essentials of Molecular Biology 2ed, David Freifileder, Panima Publishing N Delhi 1996.

Practicals:

1. Isolation of genomic DNA
2. Molecular separations by chromatography, electrophoresis, precipitation etc.
3. Isolation of milk protein from the milk sample.
4. Separation of serum from blood by using centrifuge
5. Separation of plasma from blood by centrifugation.
6. Separation of biomolecules by paper and gel chromatography.
7. Preparation and use of culture media for microbes.
8. Preparation and use of culture media for animal tissues.
9. Media preparation media sterilization and inoculation.
10. Cell culture techniques- Design and functioning of tissue culture laboratory, cell proliferation measurements, culture media preparation and cell harvesting methods.
11. Isolation and staining of bacteria.
12. Determination of pH value of different water samples, blood urine and saliva.
13. Qualitative tests for carbohydrates.
14. Qualitative test for proteins.
15. Qualitative test for lipids.
16. Effects of temperature on the activity of enzyme.
17. Chart, model, Power point/multimedia presentation preparation related to evidence of evolution Human /Horse evolution, Geographical time scale etc.
18. Students are expected to visit different laboratories (RRL, CSIR, ICMR, Science centers etc).

Outcomes-
This course teaches organization and expression of plant and animal genome and plant and animal tissue culture Students learn about transgenic animal, their application in pharmaceutical industry, cloning and its importance. This course prepares the students in appreciating the its benefits and applications in biotechnological, pharmaceutical, medical and agricultural field

GENETICS, BIOCHEMISTRY & BIOTECHNOLOGY

Credit-12(8+1+2+1)

Objectives:

- To get an overview on Principles of microscopy, Chromosomes, Chromosomal alterations
- To impart knowledge about Cytoplasmic inheritance, Genetic variations, Enzymology, Proteins, Biotechnology, Carbohydrates and Lipids.
- To acquire an in depth knowledge on plant biotechnology and its application

Unit I: Microscopy **(Credit-3)**

a) **Principles of microscopy** – Light, flourescent, phase contrast, UV and electron microscope.
b) **Chromosomes** – Brief account of morphology and organization of prokaryotic and eukaryotic chromosome; Nucleosome model, concept of karyotype and idiogram (brief).
c) **Chromosomal alterations:** (i) Structural variations – Deletion, Duplication, Translocation and Inversion. (ii) Numerical Variations – Aneuploidy and euploidy.

PRACTICALS (Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Examination of electron micrographs of virus, bacteria, Cyanobacteria. And eukaryotic cells with special reference to organelles;
2. Study of various stages of mitosis and meiosis by preparing slides of suitable plant materials (onion root tips and onion flower buds).

Unit II : **(Credit-3)**

a)**Mendelism** – Review of Mendel's laws of inheritance, solving problems related to Mendel's laws.
b) Sex determination in plants – *Melandrium.*
c) **Cytoplasmic inheritance** – plastid inheritance in *Mirabilis*, cytoplasmic male sterility in maize.
d) **Genetic variations:** Mutations – spontaneous and induced, transposable genetic elements.

PRACTICALS (Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1.Working out genetic problems related to Mendelian laws of inheritance and interaction of genes.

Unit III: **(Credit-2)**

Enzymology: Discovery, nature, nomenclature and classification, mechanism of enzyme action, lock and key hypothesis, induce-fit hypothesis, regulation of enzyme action, inhibitors, prosthetic groups and coenzymes, factors affecting enzyme action.
Proteins – classification, structure – primary, secondary, tertiary and quaternary, Biosynthesis of proteins – transcription, m-RNA processing, translation. Inhibitors of protein synthesis.
Carbohydrates: Introduction, classification, chemical structures of mono, oligo and polysaccharides, synthesis and breakdown of sucrose and starch.
Lipids: Introduction, classification, chemical structures, saturated and unsaturated fatty acids,synthesis and breakdown of fatty acids, - oxidation.

PRACTICALS (Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. Separation of amino acids by paper chromatography
2. To test for the presence of carbohydrates , proteins and lipids.
3. Working out the laws of inheritance using seeds/ beads.

Unit IV- Biotechnology **(Credit-3)**

a) Tools and techniques, cloning vectors, brief account of genomics and c-DNA library, interferons, transposable elements, PCR, bio-informatics.
b) Applications of Biotechnology – functional definition and applications, brief account of DNA finger printing, Agrobacterium – mediated gene transfer, achievements in crop improvement, transgenic plants.

PRACTICALS (Credit-0.25+0.5+0.25)(D-0.25)(P-0.5)(PS-0.25)

1. To prepare Agarose gel for gel electrophoresis

Suggested Readings:

1. Gupta, P.K.1999, A Textbook of Cell and Molecular Biology, Rastogi Publications, Meerut.
2. Rastogi, S.C. Cell Biology
3. Verma P.S. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology
4. Das, Vijendra. Genetics and plant breeding
5. Trivedi & Sharma.Cell Biology,Genetics and Breeding. Ramesh Book Depot.

Outcomes-Through this course the students are exposed to importance of biological macromolecules. They acquire knowledge in the quantitative and qualitative estimation of biomolecules. They study the influence and role of structure in reactivity of biomolecules. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions.