

Study & Evaluation Scheme

of

**B.Sc.-B.Ed.**  
**(4 Years Integrated Course)**

[w.e.f Session 2020-21]



आईएफटीएम विश्वविद्यालय, मुरादाबाद, उत्तर प्रदेश

**IFTM University, Moradabad, Uttar Pradesh**

**NAAC ACCREDITED**

**IFTM University, Moradabad**

**N.H.-24, Lodhipur Rajput, Delhi Road, Moradabad, Uttar Pradesh-244102**

**E-mail Id : [info@iftmuniversity.ac.in](mailto:info@iftmuniversity.ac.in)**

**website: [www.iftmuniversity.ac.in](http://www.iftmuniversity.ac.in)**



आईएफटीएम विश्वविद्यालय, मुरादाबाद, उत्तर प्रदेश

**IFTM University, Moradabad, Uttar Pradesh**

**NAAC ACCREDITED**

## **IFTM UNIVERSITY**

**N.H.-24, Lodhipur Rajput, Delhi Road, Moradabad, Uttar Pradesh-244102**

**E-mail Id : [info@iftmuniversity.ac.in](mailto:info@iftmuniversity.ac.in)**

**website: [www.iftmuniversity.ac.in](http://www.iftmuniversity.ac.in)**

**Study & Evaluation Scheme Of**

**BSc.-BEd. (Integrated Course)**

**[w.e.f Session 2020-21]**

### **Summary**

**Programme: B.Sc.B.Ed. (4 Years Integrated Course)**

**Course Level: UG Dual Degree**

**Duration: Four years (Eight semesters) Full Time**

**Medium of Instruction: English / Hindi**

**Minimum Required Attendance: 75%**

## Programme Outcomes (POs):

After completing this programme students will be able to: -

- Use learner centered teaching methods as such and with modification in future.
- Develop an understanding of paradigm shift in conceptualizing disciplinary knowledge in school curriculum.
- Identify the challenging and overcoming gender inequalities in school, classroom, curricula, textbook, social institutions etc.
- Develop competencies among student-teachers to select and use appropriate assessment strategies for facilitating learning.
- Engage student-teachers with self, child, community and school to establish close connections between different curricular areas.
- Enable student-teachers to integrate and apply ICT in facilitating teaching-learning process and in school management.
- Systematize experiences and strengthening the professional competencies of student-teachers.
- Provide first-hand experience of all the school activities

## Evaluation of theory Papers:

Internal	External	Total
30	70	100

## Internal Evaluation of theory:

	ClassTest I	ClassTest II	ClassTest III	Assignment(s)	Others activities (including attendance)	Total
	Best two out of the three					
Full Course	10	10	10	5	5	30
Half Course	5	5	5	2.5	2.5	15

## Duration of Examination:

Internal	External	Practical
1 hr	3 hrs	3 hrs

## **Preparatory Note:**

This Ordinance pertains to the four year B.Sc.-B.Ed. (Integrated) programme of the IFTM University, Moradabad from session 2016-17. NCTE regulation -2014 the programme shall now be of four years (Integrated course) from the session 2016-17 and these revised regulations will apply to the candidates admitted for the academic year 2018-19, 2019-20 and onwards.

## **Ordinance for B.Sc.-B.Ed.**

### **1.1 Eligibility and Admission:**

- (i) Candidates who after graduation have passed Intermediate (10+2) examination in or science stream any other Equivalent examination recognized by the Board of Secondary Education with at least 50% marks may be admitted for the degree of B.Sc.-B.Ed. (Integrated) programme. Relaxation in percentage of marks shall be given to S.C. / S.T. students' as per U.P. Government/University norms. Eligibility criteria shall vary as per NCTE/UGC/UP State Government norms.
- (ii) Rules of reservation shall apply to all admissions as per U.P. Government/University norms.

### **1.2 Obligation of Admitted Candidates:**

- i. Every admitted candidate shall be required to show a competent knowledge in various theory papers and required skills to be detailed hereinafter.
- ii. Every admitted candidate shall be required to undertake field work, assignments, school observation, and internship in Teacher Education Institution etc. as given in the course.
- iii. As far attendance is concerned the rules of NCTE/University shall prevail.
- iv. A candidate, who desires to appear in examinations under these ordinances, shall have to submit his/her application after completing all said activities on a prescribed form and that up to a prescribed last date. The candidate shall have to submit application for both years.

### **1.3 The Mode of Examination:**

- (i) The mode of examination may vary between annual system and semester system as per the decision of the University. The mode of examination prevailing at present is that of semester examination.
- (ii) Students shall be allowed to appear for Back/Improvement examination in five papers only.
- (iii) A student can complete B.Sc.-B.Ed. Course in a maximum of Eight years from the date of admission in the course.

### **1.4 Course Structure of B.Sc.-B.Ed.**

The course structure of B.Sc.-B.Ed. Four year's programme is divided into two major categories as Professional Education Component, Ability Enhancement Component (AEC) and General Education Component. The structure is represented as below-

**Study and Evaluation Scheme**  
**Programme: B.Sc.-B.Ed. (4 Years Integrated)**  
**Course Structure**

<b>Semester – I</b>								
Course	Code	Subject	Title	Credit	Internal	External		Total
						Theory	Practical	
<b>PEC 1</b>	BSCBED121		Basis of Education	4	30	70	--	100
<b>PEC 2</b>	BSCBED122		Education in India: Issues and Concerns	4	30	70	--	100
<b>AEC 1</b>	BSCBED123		English Language Proficiency-I	4	30	70	--	100
<b>Group -A is Compulsory. Select any one group from B &amp; C.</b>								
<b>Group – A</b>								
<b>GEC 1</b>	BSCBED131	Chemistry	Atomic Structure and Bonding	3	30	70	--	100
	BSCBED151		Practical	1	15	--	35	50
<b>Group – B</b>								
<b>GEC 2</b>	BSCBED132	Physics	Mechanics	3	30	70	--	100
	BSCBED152		Practical	1	15	--	35	50
	BSCBED133	Mathematics	Calculus I and Matrices	4	30	70	--	100
<b>Group – C</b>								
<b>GEC 3</b>	BSCBED134	Zoology	Diversity of Animals I	3	30	70	--	100
	BSCBED153		Practical	1	15	--	35	50
	BSCBED135	Botany	Diversity of Microbes	3	30	70	--	100
	BSCBED154		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>

**PEC** = Professional Education Component (PEC)

**AEC** = Ability Enhancement Course (AEC)

**GEC** = General Education Component (GEC)

<b>Semester –II</b>								
<b>Course</b>	<b>Code</b>	<b>Subject</b>	<b>Title</b>	<b>Credit</b>	<b>Internal</b>	<b>External</b>		<b>Total</b>
						<b>Theory</b>	<b>Practical</b>	
<b>PEC 1</b>	BSCBED221		New Trends and Innovation in Education	4	30	70	--	100
<b>PEC 2</b>	BSCBED222		Value and Peace Education	4	30	70	--	100
<b>AEC 1</b>	BSCBED223		English Language Proficiency - II	4	30	70	--	100
<b>Subjects - As per semester I</b>								
<b>Group – A</b>								
<b>GEC 1</b>	BSCBED231	Chemistry	States of Matter and Nuclear Chemistry	3	30	70	--	100
	BSCBED251		Practical	1	15	--	35	50
<b>Group – B</b>								
<b>GEC 2</b>	BSCBED232	Physics	Elasticity, Waves, Heat and Thermodynamics	3	30	70	--	100
	BSCBED252		Practical	1	15	--	35	50
	BSCBED233	Mathematics	Calculus II, Analytical Geometry and Number Theory	4	30	70	--	100
<b>Group – C</b>								
<b>GEC 3</b>	BSCBED234	Zoology	Diversity of Animals II	3	30	70	--	100
	BSCBED253		Practical	1	15	--	35	50
	BSCBED235	Botany	Diversity of Cryptogams and Archegoniatae	3	30	70	--	100
	BSCBED254		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>
<b>Total First Year Marks (PCM Group)</b>								<b>1400</b>
<b>Total First Year Marks (ZBC Group)</b>								<b>1500</b>

**PEC** = Professional Education Component (PEC)

**AEC** = Ability Enhancement Course (AEC)

**GEC** = General Education Component (GEC)

<b>Semester –III</b>								
Course	Code	Subject	Title	Credit	Internal	External		Total
						Theory	Practical	
<b>PEC 1</b>	BSCBED321		Learning and Teaching	4	30	70	--	100
<b>PEC 2</b>	BSCBED322		Assessment for Learning	4	30	70	--	100
<b>PEC 3</b>	BSCBED323		Yoga Education, Self Understanding and Development	4	30	70	--	100
<b>Subjects - As per semester I</b>								
<b>Group – A</b>								
<b>GEC 1</b>	BSCBED331	Chemistry	Organic Chemistry I	3	30	70	--	100
	BSCBED351		Practical	1	15	--	35	50
<b>Group – B</b>								
<b>GEC 2</b>	BSCBED332	Physics	Electricity and Electromagnetism	3	30	70	--	100
	BSCBED352		Practical	1	15	--	35	50
	BSCBED333	Mathematics	Real Analysis	4	30	70	--	100
<b>Group – C</b>								
<b>GEC 3</b>	BSCBED334	Zoology	Diversity of Animals III and Comparative Anatomy	3	30	70	--	100
	BSCBED353		Practical	1	15	--	35	50
	BSCBED335	Botany	Gymnosperms and Reproductive Biology of Angiosperms	3	30	70	--	100
	BSCBED354		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>

**PEC** = Professional Education Component (PEC)

**AEC** = Ability Enhancement Component (AEC)

**GEC** = General Education Component (GEC)

<b>Semester –IV</b>								
Course	Code	Subject	Title	Credit	Internal	External		Total
						Theory	Practical	
<b>PEC 1</b>	BSCBED421		Contemporary India and Education	4	30	70	--	100
<b>PEC 2</b>	BSCBED422		Role of ICT in Education	4	30	70	--	100
<b>PEC 3</b>	BSCBED423		Language Across the Curriculum	4	30	70	--	100
<b>Subjects - As per semester I</b>								
<b>Group – A</b>								
<b>GEC 1</b>	BSCBED431	Chemistry	Thermodynamics, Wquilibrium and Solutions	3	30	70	--	100
	BSCBED451		Practical	1	15	--	35	50
<b>Group – B</b>								
<b>GEC 2</b>	BSCBED432	Physics	Optics	3	30	70	--	100
	BSCBED452		Practical	1	15	--	35	50
	BSCBED433	Mathematics	Differential Equations	4	30	70	--	100
<b>Group – C</b>								
<b>GEC 3</b>	BSCBED434	Zoology	Ecology, Biogeography & Wildlife	3	30	70	--	100
	BSCBED453		Practical	1	15	--	35	50
	BSCBED435	Botany	Plant Anatomy and Ecology	3	30	70	--	100
	BSCBED454		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>
<b>Total Second Year Marks (PCM Group)</b>								<b>1400</b>
<b>Total Second Year Marks (ZBC Group)</b>								<b>1500</b>

**PEC** = Professional Education Component (PEC)

**GEC** = General Education Component (GEC)



<b>Semester –V</b>								
Course	Code	Subject	Title	Credit	Internal	External		Total
						Theory	Practical	
<b>PEC 1</b>	BSCBED521		Gender School and Society	4	30	70	--	100
<b>Select any two Pedagogy (School Subjects) on the basis of GEC</b>								
<b>PEC 2</b>	BSCBED522		Pedagogy of Physical Science 1	2	15	35	--	50
<b>PEC 3</b>	BSCBED523		Pedagogy of Mathematics-I	2	15	35	--	50
	BSCBED524		Pedagogy of Biological Science-I	2	15	35	--	50
<b>PEC 4</b>	BSCBED555		<b>Practicum:</b> School Attachment Programme-I	4	100	--	--	100
	UDM*		Disaster Management	3	30	70	--	100
<b>Subjects - As per semester I</b>								
<b>Group – A</b>								
<b>GEC 1</b>	BSCBED531	Chemistry	Transition Elements, Coordination Compounds and Chemical Kinetics	3	30	70	--	100
	BSCBED551		Practical	1	15	--	35	50
<b>Group – B</b>								
<b>GEC 2</b>	BSCBED532	Physics	Atomic and Molecular Physics	3	30	70	--	100
	BSCBED552		Practical	1	15	--	35	50
	BSCBED533	Mathematics	Multivariate Calculus and Vector Calculus	4	30	70	--	100
<b>Group – C</b>								
<b>GEC 3</b>	BSCBED534	Zoology	Development Biology, Applied Zoology & Ethology	3	30	70	--	100
	BSCBED553		Practical	1	15	--	35	50
	BSCBED535	Botany	Botanical Nomenclature, Angiosperm Taxonomy and Utilization of Plants	3	30	70	--	100
	BSCBED554		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>

**PEC** = Professional Education Component (PEC)

**GEC** = General Education Component (GEC)

\* Disaster Management is non-credit paper. Clearing the paper is mandatory for the students. But marks will not be count with total course marks.

<b>Semester –VI</b>								
Course	Code	Subject	Title	Credit	Internal	External		Total
						Theory	Practical	
PEC1	BSCBED621		Creattng an Inclusive School	4	30	70	--	100
<b>Select any two Pedagogy (As per Semester V)</b>								
PEC2	BSCBED622		Pedagogy of Physical Science-II	2	15	35	--	50
PEC3	BSCBED623		Pedagogy of Mathematics-II	2	15	35	--	50
	BSCBED624		Pedagogyof Biological Science-II	2	15	35	--	50
PEC4	BSCBED655		<b>Practicum:</b> School Attachment Programme-II	4	100	--	--	100
	ES*		Environmental Studies	3	30	70	--	100
<b>Subjects - As per semester I</b>								
<b>Group – A</b>								
GEC1	BSCBED631	Chemistry	Organic Chemistry II	3	30	70	--	100
	BSCBED651		Practical	1	15	--	35	50
<b>Group – B</b>								
GEC2	BSCBED632	Physics	Classical and Quantum Mechanics	3	30	70	--	100
	BSCBED652		Practical	1	15	--	35	50
	BSCBED633	Mathematics	Groups and Rings	4	30	70	--	100
<b>Group – C</b>								
GEC3	BSCBED634	Zoology	Animal Physiology, Endocrinolgy & Immunology	3	30	70	--	100
	BSCBED653		Practical	1	15	--	35	50
	BSCBED635	Botany	Plant Physiology and Metabolism	3	30	70	--	100
	BSCBED654		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>
<b>Total Third Year Marks (PCM Group)</b>								<b>1400</b>
<b>Total Third Year Marks (ZBC Group)</b>								<b>1500</b>

PEC = Professional Education Component (PEC)

GEC = General Education Component (GEC)

\* Environmetal Studies is non-credit paper. Clearing the paper is mandatory for the students. But marks will not be count with total course marks.

<b>Semester –VII</b>								
Course	Code	Subject	Title	Credit	Internal	External		Total
						Theory	Practical	
<b>PEC1</b>	BSCBED721		Health and Physical Education	4	30	70	--	100
<b>Select Any Two School Subjects on the Basis of General Education Component (GEC)</b>								
<b>PEC2</b>	BSCBED755		Internship in School Subject: Physical Science	4	--	--	100	100
<b>PEC3</b>	BSCBED756		Internship in School Subject: Mathematics	4	--	--	100	100
	BSCBED757		Internship in School Subject: Biological Science	4	--	--	100	100
<b>Subjects - As per semester I</b>								
<b>Group – A</b>								
<b>GEC1</b>	BSCBED731	Chemistry	Electrochemistry and Photochemistry	3	30	70	--	100
	BSCBED751		Practical	1	15	--	35	50
<b>Group – B</b>								
<b>GEC2</b>	BSCBED732	Physics	Nuclear and Particle Physics	3	30	70	--	100
	BSCBED752		Practical	1	15	--	35	50
	BSCBED733	Mathematics	Linear Algebra	4	30	70	--	100
<b>Group – C</b>								
<b>GEC3</b>	BSCBED734	Zoology	Cell Biology, Genetics and Evolution	3	30	70	--	100
	BSCBED753		Practical	1	15	--	35	50
	BSCBED735	Botany	Cell Biology and Genetics	3	30	70	--	100
	BSCBED754		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>

**PEC** = Professional Education Component (PEC)

**GEC** = General Education Component (GEC)

<b>Semester –VIII</b>								
Course	Code	Subject	Title	Credit	Internal	External		Total
						Theory	Practical	
<b>PEC1</b>	BSCBED821		Educational Administration and Management	4	30	70	--	100
<b>PEC2</b>	BSCBED822		Guidance and Counselling in Schools	4	30	70	--	100
<b>PEC3</b>	BSCBED855		<b>Practicum:</b> Reading & Reflection on Text	4	100	--	--	100
<b>Subjects - As per semester I</b>								
<b>Group – A</b>								
<b>GEC1</b>	BSCBED831	Chemistry	Spectroscopy, Natural Products and Heterocyclics	3	30	70	--	100
	BSCBED851		Practical	1	15	--	35	50
<b>Group – B</b>								
<b>GEC2</b>	BSCBED832	Physics	Solid State Physics	3	30	70	--	100
	BSCBED852		Practical	1	15	--	35	50
	BSCBED833	Mathematics	Complex Analysis and Numerical Analysis	4	30	70	--	100
<b>Group – C</b>								
<b>GEC3</b>	BSCBED834	Zoology	Biochemistry, Molecular Biology and Biotechnology	3	30	70	--	100
	BSCBED853		Practical	1	15	--	35	50
	BSCBED835	Botany	Molecular Biology, Biochemistry and Biotechnology	3	30	70	--	100
	BSCBED854		Practical	1	15	--	35	50
Total Marks (PCM Group)								400
Total Marks (ZBC Group)								450
<b>Total Semester Marks (PCM Group)</b>								<b>700</b>
<b>Total Semester Marks (ZBC Group)</b>								<b>750</b>
<b>Total Fourth Year Marks (PCM Group)</b>								<b>1400</b>
<b>Total Fourth Year Marks (ZBC Group)</b>								<b>1500</b>

**PEC** = Professional Education Component (PEC)

**GEC** = General Education Component (GEC)

**Note:**

- The students whose attendance were 75 % (theory) and 90% (Practicum) and above and failed to take examination in that year will be given chance in the next year only once. However, this should not affect the intake of fresh students in respective courses on the basis of seats available for that particular year.
- The external marks in each theory paper will be based upon the marks obtained in the semester examinations conducted by the University. The internal marks in each theory paper will be awarded to the student based upon his/ her performance in the internal tests, assignments, paper presentations and other co-curricular activities.

**Practical/Internship:**

There shall be field work of 16 weeks in the seventh semester out of which school internship shall be of 15 weeks. Out of these 15 weeks, 01 week shall be devoted to the observation of subject teaching in the school. Next 06 weeks shall be devoted for teaching of subject lesson with daily lesson plan. 25 lessons each shall be taught for both Upper Primary and Secondary levels and supervised by teacher of the department. During next 6 weeks students shall carry out the duties of concerned subject teacher as per the school time table. Last 02 week shall be devoted to post teaching activities. They will be engaged in school functioning in all its aspects in consultation with the School-mentor, like

- Participating in various ‘out-of-class room’ activities in school.
- Organizing events e.g., cultural activities, debates, games, quiz, essay-competition, drama, etc.
- Preparation of School calendar, time-table, assessment schedule, evaluation tools etc.
- Preparing a suggested comprehensive plan of action for some aspect of school improvement.
- It is important that the student-teachers will consolidate and reflect on their teaching experience during the school-internship.
- Student-teachers will maintain a Journal (A Diary) in which he/she records his/her experiences and observations, etc. daily.
- Student-teachers will maintain a Portfolio of all the activities like-details of daily-teaching., topic, date, class, objectives of teaching, resources used, assessment tools, homework given, etc.
- Student-teachers will work on an Action Research based Project on any Educational problem of School, which will be selected in consultation with the concerned faculty supervisor.

**1.5 Conduct of Examinations:**

- (i) The examination for four year BSc.BEd.shall be held semester wise.
- (ii) A candidate shall be eligible to appear in the examination who has pursued the prescribed course of studies in the department and has completed all the activities related to field engagement as prescribed for each semester.
- (iii) The examination at the end of the course shall be held both in theory and practical/Field engagement. A candidate shall be required to pass theory and practical/field work examinations separately.
- (iv) The minimum pass marks in each theory subjects (including sessional marks) is 35%.
- (v) The minimum pass marks in practical examination/ comprehensive viva/ project is 50%.

- (vi) The minimum 45 % marks in the aggregate of particular academic year inclusive of both semester of that academic year.
- (vii) Classification of results (Theory as well as Practical/Field engagement) –60% and above - First Division, 45% and above but below 60% - Second Division (A candidate shall be promoted to second year only when he/she has passed the first year examinations) similarly to second year, third year and fourth year.
- (viii) In each Semester, the candidate can appear in back/improvement exam in maximum two papers only.
- (ix) A student of B.Sc.-B.Ed.Course, who has completed all the desired activities/internal tests/attendance etc. throughout the semester but could not appear in the examination or appeared in the examination but failed in more than one papers, may be allowed to appear in the examination of next semester as an ex-student. The internal marks received in previous semester shall be carried over.
- (x) In case of any obscurity, the general provision of the university shall prevail.
- (xi) Mark sheet and Degrees shall be awarded as Integrated B.Sc.-B.Ed.

**FIRST YEAR**  
**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. (Integrated Programme)**  
**SEMESTER- I**

**BSCBED121: BASIS OF EDUCATION**

**Course Objective:**

Objective of this course is to know the nature and purpose of Education, To maintain an interaction between values and beliefs and to know the Forms of Knowledge and its Organisation in Schools.

**Course Content:**

**Unit -1: - Education - Nature and Purpose**

Meaning and Nature of Education: Processes and Modes of Education: Is education an activity/process? How education in schools is linked with outside school experiences?, Why education in the form of schooling, needs to be provided to all children?, Purpose of Education: Whether education is organized for: Individual development or social transformation; Providing knowledge or information; How worthwhile is education? Who decides it? For whom? Who is an educated person?

**Unit -2: - Knowledge and Knowing**

Knowledge- meaning, what is knowledge? What is knowing? Can doing, thinking and feeling be discerned separately in knowing? Differentiate between information, knowledge, belief and truth, Knowing Process: What are different ways of knowing?, How knowledge can be constructed? What is involved in construction of knowledge? What are the relative roles of knower and the known in knowledge transmission and construction?, Facets of Knowledge: What are different facets of knowledge and their relationship such as Local and universal?, Concrete and abstract?, Theoretical and practical? Contextual and textual? School and out of school?

**Unit -3: - Forms of Knowledge and its Organisation in Schools**

Can we categorize knowledge? On what basis? What forms of knowledge are included in school education?, On what basis are knowledge categories selected in school education?, Who selects, legitimizes, and organizes categories of knowledge in schools? In what form? How does school knowledge get reflected in the form of curriculum, syllabus and text books?

**Unit4: - Autonomy of Teacher and Learner**

Autonomy of teacher, what is autonomy? Is autonomy and freedom the same? What is Teacher's autonomy?, What is freedom of a teacher? Freedom in what sense? Why?, Do autonomy and accountability go together?, What are the hindering factors that affect teacher's autonomy?, Autonomy of learner, What is autonomy of learner?, What are the restraints on learners in schools?, Can learners be free from curriculum, textbooks, instruction, and discipline?, Does learning take place if the learner is free from all constraints of the school?, To what extent individual autonomy and collective responsibility go together for teacher and learner?

**Course Outcomes:**

Students completing this course will be able to: Develop physical, mental, spiritual and social aspects of personality, develop social skills and providing the students with access to knowledge.

### References: -

1. Agrawal, A. (1995). *Dismantling the Divide Between Indigenous and Scientific Knowledge: Development and Change*, 26:413-39
2. Ant Weiler, C. (1998). *Low Knowledge and Local Knowing: An Anthropological Analysis of Contested "Cultural Products" in the Context of Development*. *Anthropos*, 93:46-94.
3. Butchvarov, P. (1970), *The Concept of Knowledge*, Evanston, Illinois: North Western University Press.
4. Chomsky, N (1986). *Knowledge of Language*, Prager, New York.
5. Datta, D.M. (1972). *Six ways of Knowing*. Calcutta University Press, Calcutta.
6. Dewey John. 'My Pedagogic Creed', in D.J. Flinders and S.J. Thorton (eds.) *The Curriculum Studies Reader*, Routledge: New York, 1997.
7. Dewey, John (1956). *The Child and the Curriculum and School and Society*, University of Chicago Press, Chicago, Illinois, U.S.A.
8. Dewey, John( 1997 ) *Experience and Education*, Touchstone, New York
9. Keddie, N. (1971) : *Classroom Knowledge*, in. M.F.D Young.
10. Krishna Murthy, J. (1947) *On Education*, Orient Longman, New Delhi.
11. Kumar Krishna (1996). *Learning From Conflict*, Orient Longman, New Delhi.
12. Margaret, K.T. *The open Classroom*, Orient Longman: New Delhi, 1999.
13. P.H. Phenix, (1964). *Realms of Meaning*. MacGraw-Hill, New York.
14. Peters, R.S. *The Concept of Education*, Routledge, UK, 1967.
15. Prema Clarke (2001). *Teaching & Learning: The Culture of pedagogy*, Sage Publication, New Delhi.
16. Steven H. Cahn (1970). *The Philosophical Foundation of Education*, Harper & Row Publishers, New York.
17. Sykes, Marjorie. *The Story of Nai Taleem*, Nai Taleem Samiti: Wardha, 1988
18. Thapan. M. (1991). *Life at School: An Ethnographic Study*. Oxford University Press, Delhi

### Website sources:

- [www.learningclassesonline.com](http://www.learningclassesonline.com)
- <http://www.ignouhelp.in/ignou-bed-study-material-in-hindi>
- <https://www.ncertbooks.guru/b-ed-books>
- <https://onlinecourses.swayam2.ac.in>
- <https://www.classcentral.com/course/swayam-contemporary-india-and-education-13960>

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. (Integrated Programme)**  
**SEMESTER- I**

**BSCBED122: EDUCATION IN INDIA: ISSUES AND CONCERNS**

**Course Objective:**

Objective of this course is to give due recognition and importance to the social organization, traditions, customs and value systems of the various communities.

**Course Content:**

**Unit -1: - Normative Vision of Indian Education**

Normative orientation of Indian Education: A historical enquiry, Constitutional provisions on education that reflect national ideals: Democracy, Equality, Liberty, Secularism, and Social Justice, India as an evolving Nation State: Vision, Nature and Salient Features- Democratic and Secular polity, federal structure: Implications for Educational system, Aims and purposes of education drawn from the normative vision.

**Unit -2: - Vision of Education: Four Indian Thinkers**

An overview of salient features of the 'philosophy and practice' of education advocated by these thinkers, Rabindranath Tagore: Liberationist pedagogy, M.K.Gandhi: Basic education OR Education for self sufficiency, Madan Mohan Malviya: Education for individual and social transformation, Gijju Bhai Badheka: Education for Children.

**Unit -3: - Contemporary Indian Schooling: concerns and issues**

Universalization of School Education- Right to Education and Universal access:i. Issues of - a) Universal enrollment b) Universal retention c) Universal success:ii. Issues of quality and equity- Rastriya Madhymik Shikshya Abhiyan (The above to be discussed with specific reference to physical, economic, social and cultural access particularly to girl child and weaker sections as well as differently abled children).

**Unit -4: - Contemporary Indian Schooling: concerns and issues**

Equality of Educational Opportunity: Meaning of Equality and Constitutional Provisions- Prevailing nature and forms of Inequality including Dominant and Minor groups and the related issues- Inequality in Schooling: Public- private schools, Rural-urban schools, single teachers' schools and many other forms of inequalities in school systems; and the processes leading to disparities- Differential quality in Schooling: variations in school quality, Idea of 'common school' system, Education for National Development: Education Commission (1964-66), Emerging trends in the interface between:- Political process and education, - Economic developments and education, - Socio-Cultural changes and education.

**Course outcomes:**

Students completing this course will be able to:

1. Increase reliance on social mobilization to promote basic education.
2. Emphasise on pre-primary education.
3. Introduce of minimum level of learning in school.

4. Adopte a child centered, activity based approach.

### References: -

1. Agrawal, J.C. & Agrawal S.P. (1992). Role of UNESCO in Educational, Vikas Publishing House, Delhi.
2. Anand, C.L. et.al. (1983). Teacher and Education in Emerging in Indian Society, NCERT, New Delhi.
3. Mani, R.S. (1964). Educational Ideas and Ideals of Gandhi and Tagore, New Book Society, New Delhi.
4. Manoj Das (1999). Sri Aurobindo on Education, National Council for Teacher Education, New Delhi.
5. Naik, J.P. & Syed, N., (1974). A Student's History of Education in India, MacMillan, New Delhi.
6. Radha Kumud Mookerji. Ancient Indian Education (Brahmanical and Buddhist), Cosmo Publications, New Delhi- 1999.
7. Sykes, Marjorie (1988): The Story of Nai Talim, Naitalim Samiti: Wardha.
8. Dr. Vada Mitra. Education in Ancient India, Arya book Depot, New Delhi – 1967
9. Ministry of Education. 'Education Commission "Kothari Commission"'. 1964-1966. Education and NationalDevelopment. Ministry of Education, Government of India 1966.
10. *Learning without Burden*, Report of the National Advisory Committee. Education Act. Ministry of HRD, Department of Education, October, 2004.
11. MKV vkj0 ,0 "ke% Hkj rh; f'k{kk dh l el kef; d l eL; k, \$ vkj0 yky cpl fMi k\$ ¼ w kZ i d k'ku¼ ej BA
12. MKWjeu fcgljh yky% Hkj rh; f'k{kk dh l el kef; d l eL; k, \$ vkj0 yky cpl fMi k\$ ¼ w kZ i d k'ku¼ ej BA

### Website Sources:

- [www.learningclassesonline.com](http://www.learningclassesonline.com)
- <http://www.ignouhelp.in/ignou-bed-study-material-in-hindi>
- <https://www.ncertbooks.guru/b-ed-books>
- <https://onlinecourses.swayam2.ac.in>
- <https://www.classcentral.com/course/swayam-contemporary-india-and-education-13960>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. (Integrated Programme)**  
**SEMESTER- I**

**BSCBED123 –ENGLISH LANGUAGE PROFICIENCY- I**

**Course Objectives:**

The paper has been designed to give the students a firsthand knowledge of grammar to make use in four skills i.e. writing, speaking, reading & listening and use of the English language through the study of literature. The students would be given the knowledge of writing paragraph, gist or abstract and to comprehend the unseen passage and writing letters and application of different kinds.

**Course Content:**

**Unit-1: -**

**Reading and Listening Skills**

- (A) Reading Comprehension
- (B) Listening Comprehension
- (C) Comprehension of an unseen passage

**Unit-2:**

**Constituents of Written Communication-I:**

- (A) Words and Phrases, Word Formation, Vocabulary Building, Synonyms, Antonyms and Homophones
- (B) The Sentence and its kinds
- (C) Direct and Indirect Narration.
- (D) Active and Passive Voice.
- (E) Punctuation and capitalization

**Unit -3: -**

**Writing Skills:**

- (A) Development of Paragraph, Paragraph Writing: Describing an event, object, process.
- (B) Importance, Principles, Formats and Structure of Letter Writing
- (C) Letter Writing: Business/Official/ Social.

**Spoken Skills:**

- (A) Presentation Strategies and Speech Mechanism
- (B) Dimensions of Speech
- (C) The Mechanism and Organs of Speech

**Unit -4: -**

**Value Based Literary Texts Reading:**

**(A) Poetry:**

- John Keats - When I have fears that I may cease to be.
- Wilfred Owen - Futility.
- W.B Yeats - Lake Isle of Innisfree.

**(B) Short Stories:**

- R. N. Tagore - Hungry Stones.
- Ruskin Bond - The Tunnel.
- Leo Tolstoy - How much land does a man need.

**(C) Speech:**

**(A) Prose:**

Ian Watt - The Social Function of Literature

A. J. Bahm – The Mother of Sciences

S. Radhakrishnan - Democracy

**Course Outcomes:**

Students completing this course will be able to:

- Understand and recall of what read and listen is including facts and main idea.
- Apply the comprehensive set of skills and knowledge for life success.
- Communicate effectively.
- Make use of grammar in own writing English.
- Develop the intellectual flexibility, creativity, and cultural literacy.

**Suggested Reading: -**

1. Deo, S. S.; English prose Selection- Dr.
2. Peter, Roach; English Phonetics
3. Subhramanium, Bala; Phonetics and Spoken English

**Website Sources:**

- [www.wikipedia.com](http://www.wikipedia.com)
- [www.englishgrammar.org](http://www.englishgrammar.org)
- [www.grammarly.com](http://www.grammarly.com)
- [www.gradesaver.com](http://www.gradesaver.com)
- [www.litcharts.com](http://www.litcharts.com)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- I**

**BSCBED131: ATOMIC STRUCTURE AND BONDING**

**Course Objective:**

The primary objectives of the course are:

- To help students gain understanding of chemical bonding.
- To understand the chemical reactions.
- To understand Nanoscopic structure of chemicals.
- To understand Electronic or quantum mechanics.

**Course Content**

**Unit I: Atomic Structure**

Black-body radiation- Planck's radiation law, photoelectric effect, (Compton effect) and Bohr's Model of hydrogen atom and its limitations. State de Broglie hypothesis and Heisenberg uncertainty principle.

Schrodinger wave equation and its importance, physical interpretation of the wave function, significance of  $\psi$  and  $\psi^2$ , postulates of Radial functions wave. Quantum numbers and their importance, atomic orbitals and shapes of s, p, d orbitals, Multi-electron atoms, Aufbau and Pauli exclusion principles and Hund's multiplicity rule- Electronic configurations of the elements (s, p, d blocks), effective nuclear charge. (Explanation for the stability of completely filled and half filled shells with examples). Screening effect: Slaters' rule, (Energy level diagram for multi atoms).

**Unit II: Periodic Properties and s -and p-Block Elements**

**Atomic radii, Covalent radii, ionic radii and Vander Waal's radii**- definition with explanation with examples in a group and period Explanation of observed trends.

**Ionization energy:** Definition, the factors influencing ionization energy, variation in a group and period. Effect of the size and electronic configuration on successive ionization energies.

**Electron affinity:** Definition, variation in a group and in a period (observed trends in the values to be accounted for).

**Electronegativity:** Definition, variation in a group and in a period (observed trends in the values to be accounted for), calculation of electronegativity by Pauling and Mulliken methods.

**s- and p-block elements:** Comparative study of s-Block Elements, diagonal relationships, Anomalous properties of Lithium and Beryllium.

To appreciate the wide variety in Physical and Chemical characteristics of p-Block elements and their compounds. Comparative study (including diagonal relationships) of groups 13-17 elements, compounds like hydrides, oxyacids and groups 13-16.

**Unit III: Chemical Bonding - I**

Ionic Solids – Ionic structures, radius ratio effect and coordination number, polarizing power and polarisability of ions, Fajan's rule. Weak interactions- Hydrogen 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 to  $\text{NH}_3$ ,  $\text{H}_3\text{O}^+$ ,  $\text{SF}_4$ ,  $\text{ClF}_3$ ,  $\text{ICl}_2$ , and  $\text{H}_2\text{O}$ .

#### **Unit IV: Molecular Orbital theory and Xenon compounds**

Approaches to understand the properties and stabilities of molecules as viewed by different theories of bonding. Molecular orbital theory, basic ideas – criteria for forming M.O. from A.O., construction of M.O's by LCAO – Method

Discussion about homonuclear ( $\text{He}_2$ ,  $\text{N}_2$ ,  $\text{O}_2$ ,  $\text{F}_2$ ,  $\text{C}_2$ ) and heteronuclear ( $\text{CO}$  and  $\text{NO}$ ) diatomic molecules, bond Order and bond energy, percentage ionic character from dipole moment and electronegativity difference, comparison of M.O. and V.B. Models. Chemistry of xenon: structure and bonding in xenon compounds.

#### **Course Outcomes:**

- At the end of the course students will be able to calculate the heat released and absorbed during chemical reactions, predict the equilibrium constant of chemical and phase transfer .
- They will also be able to relate the molecular properties (e.g. electro negativity), and draw the molecular structures of simple inorganic molecules.
- Through this , students will be able to rationalize the structure of atoms and their relative positions in the Periodic table, structures of molecules, and the chemical properties of molecules.
- This course will equip students with the necessary knowledge to understand chemistry at the most fundamental level of wave function for any chemical system.

#### **References:**

1. University Chemistry: Bruce Mahan.
2. Concise Inorganic Chemistry: J D Lee, fifth Edition, Wiley Publishers.
3. An Introduction to Inorganic chemistry Mackay and Mackay.
4. Advanced Inorganic Chemistry SatyaPrakash, G.D.Tuli, S. K. Basu, R. D. Madan.
5. S.Chand & Company Pvt. Ltd. Principles of Physical Chemistry Puri, Sharma, Pathania, 47th Edition, Vishal Publishing Co.
6. Text book of Inorganic Chemistry P.L. Soni Sultan Chand & sons.

#### **Website Sources:**

- [freebookcentre.net](http://freebookcentre.net)
- <https://pubs.acs.org/journal/inocaj>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**BSc.BEd. Integrated Programme**  
**SEMESTER- I**

**BSCBED151: Practical (Chemistry)**

**Course Objective:**

The primary objectives of the course are:

- To emphasize the relevance of fundamentals and applications of chemistry in day today life.
- To take into account appropriate combinations of old and new emerging concepts for the potential uses.
- To address the principles of general chemistry and specific topics relevant to various disciplines.
- To bring adaptability to new developments in Chemistry and to acquire the skills required to become a perfect teacher.
- To bring potential applications of chemistry and practical utility in order to become good teacher.

**Course Content:**

1. Calibration and handling of balances, pipette, burette, and standard flask. Basic principles underlying the preparation of solutions, knowledge of primary and standard substances, Indicators used in titrations, their working principles range and their uses. Concept of Molarity, Normality, Molality, Equivalent weight and related calculations.
2. Stoichiometry of neutralization reactions of Sulphuric, Hydrochloric and Nitric acid using sodium hydroxide solution.
3. Preparation of standard Sodium Carbonate solution, Standardisation of Hydrochloric acid and estimation of Sodium hydroxide present in the given solution.
4. Estimation of carbonate and hydroxide present in a mixture.
5. Estimation of Carbonate and Bicarbonate in a given mixture by double indicator method.
6. Estimation of ammonium chloride in a given solution by back titration.
7. Estimation of oxalic acid present in the given solution using sodium hydroxide solution and pure crystals of potassium hydrogen phthalate.
8. Estimation of Ferrous ammonium sulphate present in the given solution using potassium permanganate solution and pure crystals of oxalic acid.
9. Estimation of iron(II) using Potassium dichromate with internal and external indicators.
10. Estimation of ferrous and ferric ions in a given mixture using potassium dichromate solution.
11. Standardisation of Sodium thiosulphate using potassium dichromate and estimation of copper by Iodometry.
12. Estimation of Copper in the given Copper salt by Iodimetry.
13. Estimation of total hardness of water using EDTA solution and pure crystals of Zinc sulphate.

**Course Outcome:**

- Students are able to estimate the impurities present in water.
- Ability to prepare advanced polymer materials.

- Ability to know the strength of an acid present in secondary batteries.
- Ability to find the  $\text{Fe}^{+2}$ ,  $\text{Ca}^{+2}$  &  $\text{Cl}^-$  present in unknown substances using titrimetric and instrumental methods.

### References:

1. A Text Book of Quantitative Inorganic Analysis, A I Vogel.
2. Systematic Experiments in Chemistry ArunSethi New Age International (p) Ltd. Cochin.

### Website Sources:

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- I**

**BSCBED132: MECHANICS**

**Course Objective:**

The course aim is to impart knowledge in depth about laws of motion and their application to various dynamical situations, motion of inertial frames and concept of Galilean transformations.

**Course Content:**

**Unit I:**

Vector and scalar products. Scalar triple product and Vector triple product. Differentiation of a vector with respect to scalars (such as time). Gradient, Divergence, Curl definitions, physical meaning, and operations, Laplacian, Line, Surface, and Volume integrals. Gauss', Stokes, and Greens theorem.

**Unit II:**

Newton's Laws of motion. Frames of reference, inertial and non inertial, pseudo forces, Galilean transformations; Galilean invariance, Dynamics of a system of particles. Centre of Mass.

Principle of conservation of momentum for a system of particle, Work and Kinetic Energy Theorem. Conservative and non-conservative forces. Conservation of energy. Momentum of variable-mass system: motion of rocket.

**Unit III:**

Gravitation: Newton's Law of Gravitation. Central force and motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). two-body central force problem and reduction to the equivalent one body problem, inverse square law potential and different forms of orbit, Kepler's laws of planetary motion.

**Unit-4**

Simple Harmonic Motion (Basic idea), Differential equation of SHM and its solutions (simple pendulum, compound pendulum, loaded spring), Kinetic and Potential Energy, Total Energy and their time averages. Linearity and Superposition Principle. (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats), Lissajous figures with equal an unequal frequency and their uses. Damped vibrations. Forced vibrations.

**Course Outcomes:**

Students completing this course will be able to:

- Understand laws of motion and their application to various dynamical situations
- Apply Gradient, Divergence and Curl.
- Explain conservation laws and to apply them to basic problems.
- Understand two body central force problem, reduced mass.
- Define Kepler's law and to apply Kepler's law to describe the motion of planets and satellite in circular orbit through the study of law of Gravitation.
- Understand differential equation of SHM and its solutions.
- Describe Lissajous figures and their uses.

**References:**

1. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, 6<sup>th</sup> Edition, John Wiley and Sons Inc.
2. Harris Benson, University Physics, Revised Edition, John Wiley and Sons, Inc.
3. FW Sears, MW Zemansky and HD Young, University Physics, 1986. Addison-Wesley.
4. K. R. Symon, Mechanics, Addison Wesley, 1971.
5. Basudeb Bhattacharya, Engineering Mechanics, 2nd edn., 2015, Oxford University Press
6. Ronald Lane Reese, University Physics, 2003, Thomson Brooks/Cole.
7. Y. R. G. Takwale and P. S. Puranik, Introduction to classical mechanics, Tata McGraw Hill.
8. Charles Kittel et. al., Mechanics Berkeley Physics course, 2007, Tata McGraw-Hill.
9. H C Verma, Concepts of Physics, Bharati Bhawan; Revised Reprint 2015 edition

**Website Sources:**

- <https://en.wikipedia.org>
- <https://courses.lumenlearning.com>
- <https://physics.info>
- <https://www.toppr.com>
- <https://digitalcommons.unl.edu>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**BSc.BEd. Integrated Programme**  
**SEMESTER- I**

**BSCBED152: PRACTICAL – I (PHYSICS)**

**Course Objective:**

The main objective of this course is to impart the knowledge to the students about the experiments so that students will get a better understanding of the concepts studied by them in the theory course and correlate with experimental observations.

**Course Content:**

**List of Experiments**

1. To determine the surface tension of a liquid by Jaeger's method.
2. To determine the viscosity of liquid by Poiseuille's method.
3. To determine the value of Stefan's constant.
4. To determine the moment of inertia of flywheel about its axis of rotation.
5. To determine the value of g with help of compound pendulum.
6. To determine the modulus of rigidity of a given material in form of a wire by statistical method.
7. To determine the time period of simple pendulum.
8. To determine the surface tension of the given liquid by capillary rise method.
9. To determine the Elastic Constants of a Wire by Searle's method.
10. Calculate the moment of inertia of an irregular body using a torsion pendulum.

**Course outcomes:**

Students completing this course will be able to:

- Measure value of Stefan's constant.
- Calculate moment of inertia
- Determine surface tension
- Evaluate the elastic constant

**References:**

1. Practical Physics by S. L. Gupta
2. Practical Physics by Navneet Gupta
3. Practical Physics by S. K. Gupta

**Website Sources:**

- <https://nvlpubs.nist.gov>
- <https://dkpandey.weebly.com>
- <http://vlab.amrita.edu>
- <https://www.niser.ac.in>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**BSc.BEd. Integrated Programme**  
**SEMESTER- I**

**BSCBED133: CACULUS-I AND MATRICES**

**Course Objectives:**

The main aims of this course are to gain proficiency in differential calculus, and introduce the basic tools of matrices and complex numbers which are used to solve application problems in a variety of settings ranging from chemistry and physics to business and economics. Differential calculus develops the concepts of limit, continuity and derivative, and is fundamental for many fields of mathematics.

**Course Content:**

**Unit I: Differential calculus:**

Limits revisited, Continuous functions, Discontinuous functions and types. Differentiation, Linear approximation theorem, higher derivatives, Leibnitz's theorem. Monotone functions, Maxima and Minima, Concavity, Differentiability theorems, Rolle's theorem, Mean Value theorems, Taylor's theorem, Maclaurin's theorem, Taylor's and Maclaurin's infinite series, Indeterminate forms.

**Unit II: Integral Calculus:**

The integral of a function, Techniques of integration, Integration of Rational Functions, Rationalizable Integrals. Definite Integral, Properties, Definite integral as the limit of a sum, the fundamental theorem of Calculus, Reduction formulae, Area, Volume and Length.

**Unit III: Matrices – I**

Elementary Matrices and transformation, Symmetric and Skew Symmetric, Hermitian and Skew Hermitian matrices and their standard properties, Determinants, Adjoint of a square matrix, Singular and non-singular matrices, Rank of a matrix, Elementary row / column operations, Invariance of rank under elementary operations, Inverse of a non-singular matrix by elementary operations.

**Unit IV: Matrices - II**

System of m-linear equations in n-unknowns, Matrices associated with linear equations, Trivial and non-trivial solutions, Criterion for existence of non-trivial solution of homogeneous and non-homogeneous systems. Characteristic equation of a square matrix, Eigen values and Eigen vectors, Finding them for a real symmetric matrix, Diagonalization of a real symmetric matrix, Cayley – Hamilton theorem (without proof) .

**Course Outcomes:**

This course will enable the students to:

- Define and use fundamental concepts of calculus including limits, continuity and differentiability.
- Solve systems of linear equations and find Eigen values and corresponding eigenvectors for a square matrix, and check for its diagonalizability.
- Perform operations with various forms of complex numbers to solve equations.

## References:

- Advanced Calculus, Frank Ayres, Schaum's outline TMH Publishing Co.
- Algebra by Natarajan, Manicavachagon Pillay and Ganapathy, Viswanathan, S., Printers & Publishers Pvt Ltd
- Calculus and Analytical Geometry by Thomas – Finney, Narosa Publishing House.
- Calculus by Anton, Addison-Wiley.
- Calculus by Lipman Bers, Vols. 1 and 2, IBH.
- Differential Calculus by Gorakh Prasad, Pothishala Ltd.
- First Course in Calculus, Serge Lang, Addison-Wiley.
- Higher Algebra by Bamard and Child, MacMillan India Ltd.
- Integral Calculus by Shanthinarayan, S.Chand and Co.Ltd.
- Matrices by Frank Ayres, Schaum's outline TMH Publishing Co.
- Textbook of Matrix Algebra by Suddhendu Biswas, PHI Learning.

## Website Sources:

- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- I**

**BSCBED134: DIVERSITY OF ANIMALS-I**

**Course Objective:**

The course would provide an insight to the learner about the existence of different life forms on the Earth, and appreciate the diversity of animal life. It will help the student to understand the features of Kingdom Animalia and systematic organization of the animals based on their structural and functional affinities.

**Course Content:**

**Unit I: ANIMAL CLASSIFICATION AND PROTOZOA**

- a) **Principles of classification:** Binomial nomenclature and outline classification of animal kingdom; Body organization in animals (different grades of organization, coelom)
- b) **Protozoa:** General characters and classification of Phylum, Protozoa up to classes with examples; Reproduction in Protozoa: Asexual – fission, budding, sporulation; Sexual – conjugation; Type study of *Entamoeba*

**Unit II: PORIFERA**

- a) **Porifera:** General characters and classification of Phylum, Porifera up to classes with examples; Type study: *Sycon* – External morphology and cellular organization; Canal system – Ascon, sycon and leucon types;
- b) **Acnidaria (Ctenophora):** General characters and classification of Phylum, Acnidaria up to classes with examples; Affinities of Acnidaria.

**Unit III: CNIDARIA, ACNIDARIA AND PLATYHELMINTHES**

- a) **Cnidaria:** General characters and classification of Phylum, Cnidaria up to classes with examples; Type study: *Obelia* – External morphology; life cycle (with reference to metagenesis); (1); Polymorphism in Cnidaria; Corals and coral reefs, their types, formation, theories and importance.
- b) **Platyhelminthes:** General characters and classification of Phylum, Platyhelminthes up to classes with examples; Type study: *Taenia solium* – External morphology, proglottid, excretion, reproduction, life cycle and pathogenicity.

**UNIT IV: NEMATHELMINTHES AND ANNELIDA**

- a) **Nemathelminthes:** General characters and classification of Phylum, Nemathelminthes up to classes with examples; External morphology, life-cycle and pathogenicity of *Wucheraria bancrofti*; Parasitic adaptations in Helminthes.
- b) **Annelida:** General characters and classification of Phylum, Annelida up to classes with examples; Type study: *Hirudinaria*– External morphology, locomotion, digestive system, reproductive system, life-history; Trochopore larva.

## Course Outcomes:

Upon completion of the course, students will be able to:

- Learn about the importance of systematics, taxonomy and structural organization of animals.
- Appreciate the diversity of non-chordates living in varied habit and habitats.
- Understand evolutionary history and relationships of different non-chordates through functional and structural affinities.

## References:

1. Modern Textbook of Zoology Invertebrates by R.L. Kotpal – (Rastogi Publications, Meerut, 10th Revised Edition).
2. Invertebrate Zoology series (Protozoa to Echinodermata) by R.L. Kotpal – (Rastogi Publications, Meerut).
3. Invertebrate Zoology by E.L. Jordon and P.S. Verma – S. Chand & Co., Delhi).
4. Invertebrate Zoology by J.K. Dhama and P.S. Dhama – S. Chand & Co., Delhi).
5. A Textbook of Invertebrate Zoology by S.N. Prasad – (Kitab Mahal, Allahabad).
6. Life of Invertebrates by Russel and Hunter – (Macmillan).
7. Invertebrate Zoology by R.D. Barnes – (W.B. Saunders, Philadelphia).
8. A manual of Zoology, Vol.1 by Ekambernatha Ayyar (Vishwanathan, Madras).
9. The invertebrate series of L.H. Hyman – (McGraw Hill).
10. A student's textbook of Zoology by Adam Sedgwick Vol. I, II & III – (Central Book Depot, Allahabad).
11. A Text book of Zoology vol.1 by Parkar and Haswell – (Macmillan).

## Website Resources:

- Online Tools and Web Resources: · Swayam (MHRD) Portal · Animal Diversity
- (<https://swayam.gov.in/courses/5686-animal-diversity>) · Advances in Animal Diversity,
- Systematics and Evolution (<https://swayam.gov.in/courses/5300-zoology>)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- I**

**BSCBED153: PRACTICAL – I (ZOOLOGY)**

**Course Objective:**

Information and concepts about morphology, anatomy and physiology of non-chordates will be imparted through classroom lectures to inculcate a conceptual base among the students about the subject and through observations in nature through real animals/preserved specimens/models.

**Course Content:**

1. Study of microscopes: Simple and compound, handling of microscopes, use of Micro-image projection system.
2. Study of permanent slides of Protozoa:  
a) *Euglena* b) *Plasmodium* c) *Opalina* d) *Entamoeba* e) *Foramenifera* f) *Paramoecium*  
g) *Paramoecium* conjugation
3. Preparation of permanent and stained slides:  
a) Sponge spicules b) Sponge gemmules
4. Study of specimens and permanent slides of Poriferans:  
a) *Sycon*, b) *Spongilla*, c) *Euplectella*, d) *Euspongia*
5. Study of specimens and permanent slides of Cnidaria (Hydrozoa and Scyphozoa):  
a) *Obelia* medusa, b) *Obelia* colony c) *Physalia*, d) *Aurelia* e) *Porpita*
6. Study of specimens of Cnidaria (Anthozoa):  
a) *Madrepora*, b) *Meandrina*, c) *Gorgonia* d) T. S. of *Metridium*
7. Study of specimens of Platyhelminthes:  
a) *Dugesia*, b) *Fasciola*, c) *Taenia solium*,
8. Study of specimens of Nematodes:  
a) *Wuchereria*, b) *Enterobius*, c) *Ancylostoma*, d) *Ascaris*
14. Study of specimens and permanent slides of Annelida:  
a) *Nereis*, b) *Heteronereis*, c) *Aphrodite*, d) *Hirudinaria* e) T.S. of *Pheretima*, f) T.S. of *Nereis*, g) T.S. of *Hirudinaria*, h) Parapodium of *Nereis*
15. Study of *Pheretima*:  
a) Digestive system and b) Nervous system
16. Study of *Hirudinaria*:  
a) Digestive system and b) reproductive system

**Course Outcomes:**

Upon completion of the course, students will be able to:

- Study of animals which will improve their observation skills, data collection skills, critical thinking and analytical skills of students.



- Furthermore, museology will give them a comprehensive idea of structural features of non-chordates and the basis of classification.

### **References:**

1. Practical Zoology Invertebrate by S.S. Lal.

### **Online Resources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- I**

**BSCBED135: DIVERSITY OF MICROBES**

**Course Objective:**

The objective of this course is to expose the students to bacterial structure, types, mode of nutrition in bacteria, reproduction, economic importance of cyanobacteria and bacteria. This course will also enhance the knowledge of the students about viruses, viroids, Fungi and their economic importance.

**Course Content:**

**Unit-I**

- a. Brief account of characteristics of viruses, viroid, virusoid and prions, Structure, and characterized features of Bacteriophages.

A brief account of diseases caused by 1. Virus – yellow mosaic of bean and HIV, 2. Prions – BSE, Kuru disease; d) Role of viruses in human welfare – a brief account. Brief account of bacterial diseases of plants (Citrus Canker)

- b. Brief account of morphology and flagellation ultrastructure, modes of nutrition, reproduction and economic importance of bacteria.

- c. Role of bacteria in human welfare ; Environment – decomposition and. bioremediation; Agriculture – biofertilizers (*Rhizobium*) biopesticides (*B. thuringiensis*); Pharmaceuticals – antibiotics and probiotics; industrial – organic acids.

- d. A general account of Mycoplasma (e.g. sandal spike disease) and Rickettsiae.

- e. *Cyanobacteria*:

- i) General account, occurrence, structure and economic importance – biofertilizers (N<sub>2</sub> fixation, role of heterocyst), algal blooms as biological indicators. ii) Study of *Spirulina*, *Nostoc* and *Oscillatoria*.

**Unit II:**

General account of occurrence, structure, thallus organization, reproduction, economic importance and classification (classification of Fritsch).

- b) Study of the structure, reproduction and life-cycle of the following:

Chlorophyceae: *Oedogonium*, *Chara*

Phaeophyceae: *Sargassum*

Rhodhophyceae: *Polysiphonia*

Bacillariophyceae: General account, structure and reproduction of pennate diatom, economic importance.

**Unit III:**

General characters, thallus organization, reproduction, economic importance and classification (Alexopoulos and Mims).

- a) Study of structure, reproduction, life-cycle and phytopathology and/or economic importance of the following :

Myxomycetes –*Stemonites*

Phycomycetes –*Albugo*

**Unit IV:**

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

**Course Outcomes:**

**Students completing this course will able to:**

- Understand the diversity of micro-organisms such as viruses, bacteria, fungi, lichens and algae; their classification, structure and growth.
- Increase the understanding the economic values of bacteria, fungi, mycorrhizae, lichens and develop theoretical & technical skills about them.

**References:**

1. Alexopoulos.C.J. Introductory Mycology.
2. Chopra, A Class book of Fungi, S.Nagin & Co., Jullandar.
3. Dubey H.D. A Text book of Fungi, Bacteria and Viruses.
4. Kumar, H.D., A Textbook of Algae.
5. Pandey, B.P., A Text book of Algae, Sultan Chand & Co., New Delhi.
6. Sharma, O.P., 1992, Text book of Thallophytes, TMH Publishing House, New Delhi.
7. Sharma, P.D. 2005, The Fungi, Rastogi Publications, Meerut.
8. Singh, V., P.C.Pande & D.K.Jain, 2007, Diversity of Microbes and Cryptogams, Rastogi Publications, Meerut.
9. Singh. V., P.C.Pande & D.K.Jain, 2006. A Text book of Botany, Rastogi Publications, Meerut.
10. Smith, G.M.,1971, Cryptogamic Botany Vol.I, Algae & Fungi, TMH Publishing Co., New Delhi.

**Website Sources:**

- [www.kopykitab.com](http://www.kopykitab.com)
- [www.pdfdrive.com/botany-books.html](http://www.pdfdrive.com/botany-books.html)
- [www.digitalbookindex.org](http://www.digitalbookindex.org)
- [cqej.altopianoblu.it](http://cqej.altopianoblu.it) > botany-notes-pdf
- [www.kalyanipublication.co.in](http://www.kalyanipublication.co.in)
- [www1.biologie.uni-hamburg.de](http://www1.biologie.uni-hamburg.de)
- [www.topfreebooks.org](http://www.topfreebooks.org) >
- [www.pdf.com](http://www.pdf.com)
- [en.wikipedia.org](http://en.wikipedia.org)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www.freebookcentre.net](http://www.freebookcentre.net)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- I**

**BSCBED154: PRACTICAL (BOTANY)**

**Course Objective:**

The main goal of this course is to share the knowledge to the students about the experiments. The students will get a better understanding of the concept studied by them in theory course and correlate with experimental observations.

**Course Content:**

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.

**Course Outcomes:**

Completing this course, students will be able to:

- Culture the different bacterial strains and isolate them from environmental conditions.
- Have the knowledge of Gram staining technique.
- Gain knowledge on fixation, dehydration, hand sectioning, microtome sectioning.
- Observe and identify the algae and fungi, lichens.
- Observe the disease symptoms in hosts infected by virus, mycoplasma and bacteria.

**Suggested Readings:**

1. A text Book of Practical Botany 1 by Bendre and Kumar.
2. Botany Practical Vol. I by B.P. Pandey.
3. Practical Botany II by O.P. Sharma.

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

- **Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED221: NEW TRENDS AND INNOVATION IN EDUCATION**

**Course Objective:**

Objective of this course is to familiarize students with classification of innovations, discuss the hurdles to innovation and offer ways to increase the scale and rate of innovation based transformation in the education system.

**Course Content:**

**Unit-1:**

Innovation – concept and Need of innovation in view of technological and social change. Obstacles in innovation, Role of education in bringing innovations. Role of UNICEF in introducing innovations in Indian School Education.

**Unit-2:**

Integrated Child Development Scheme (ICDS)-Early childhood care and education (ECCE). State supported innovations; Sarva Shiksha Abhiyan, Lok Jumbish, Eklavya, Mahila Samakhya. National Level– Brief Account of right to education, National Literacy Mission & Adult Education, Life Skill Education- Hard & Soft Skills.

**Unit-3:**

Changing face of school and University in the age of information, communication and technology. Education through interactive radio, television, computer and internet, Tele & Video conferencing, EDUSAT. Role of e-learning in education; e-content, e-magazines and e-journals.

**Unit-4:**

Distance Education – concept, need, benefits and limitations, 'Distance Education' and 'Open education', Open School, Open University, Virtual University. Idea of nurturing rural talent; The Navodaya Vidyalaya Sangathan. Changing School in the era of liberalization, privatization and globalization.

**Course Outcomes:**

After completing this course Students will be able to:

- Produce the needed high quality learning outcomes across the system.
- Focus of Educational innovation should be on teaching and learning theory and practice.
- Apply needs a solid theoretical foundation based on purposeful, systematic, research and a sound pedagogy.

**Reference:**

1. Chauhan S.S. (1994): Innovations in teaching hearing process, Vikas Publishing House P. Ltd, New Delhi.
2. Sharma, A.R.: Educational Technology, Vinod Pustak Mandir, Arra.
3. Laxmi S. (1989): Innovations in Education, Sterling Publishers Pvt. Ltd., Delhi
4. Mohanti, J. (1982): Indian Education the Emerging Societies, Sterling Publishers, New Delhi
5. fl ga] Hkkbz ; kxbUnzt hr% f' k{kk ea uokpkj , oa uohu i dfrR ; k; A
6. ^vk; 7] ekgu yky( 1/2014 1/2 \*\*' k{kd iz kkl u , oa icu/ku\*\* I w kz iz dk'ku 1/kj0 yky cpl fMi k3 ejBA
7. Websites of MHRD, IGNOU, NIOS, Navodaya Vidyalaya Sangathan.

**Website Sources:**

- [www.home.sandivk/news/innovation.com](http://www.home.sandivk/news/innovation.com)
- [www.lamasatech.com](http://www.lamasatech.com)
- [www.teachthought.com](http://www.teachthought.com)
- [www.wikipedia.com](http://www.wikipedia.com)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED222: VALUE AND PEACE EDUCATION**

**Course Objective:**

Objective of the course is to familiarize students and to achieve the long term values and behaviour that are identified as being more real for the good of ourselves and other. Right are part of the foundation of freedom justice and peace in the world.

**Course Content:**

**Unit I: Concept, Meaning and Nature of Value**

Concept and meaning of value and Peace: Indian and Western perspectives on value and Peace. Reflections of great Indian thinkers on values and Peace (Gandhiji, Swami Vivekananda, Sri Aurobindo, Rabindranatha Tagore, J. Krishnamurthi) Understanding Peace in the individual, Social, National and International context Nature and characteristics of values Sources and selection of values -culture and human needs.

**Unit II: Concept, Meaning and Nature of Peace**

Historical development of Peace education in India and in the world Preamble to the Indian Constitution and values inherent in it Exposition of the five human values of Truth, Righteous Conduct, Peace, Love and Non- Violence with illustrations from life and literature. Creation of United Nations, UNESCO, UNICEF and their role in promoting value and Peace Education.

**Unit III: Concept and need for Value-based Education and Education for Peace**

Concept of value based education and Education for Peace with special reference to peace to Indian view of life; Paradigm shift from Peace education to Education for Peace. Need for and importance of value based education and Education for Peace in the present scenario. Recommendations of Sri Prakasha Committee (1959) on value education. Recommendations of Parliamentary Committee of HRD on Values Education (1996-90) headed by Shri S.B. Chauhan. National Focus Group Report on Education for Peace (2005).

**Curriculum development and Models of Value Education.**

Models of value education; Rationale building model, the consideration model, valuing process and clarification model. Aims and objectives of Value based education and Education for Peace in the curriculum. Integration of human values with all (school) academic subjects.

**Unit IV: Pedagogy of Value Education and Education for Peace**

Approaches and Techniques of teaching human values: - Direct approach: value based Story-telling, Group activities (dramatization, literary activities, games and sports, service activities) Counselling, organizing value based cocurricular activities. Indirect Approach; Incidental Approach with illustrations Integrated approach: Integration into curricular, co-curricular

activities and subjects (with illustrations of integration from Language, Mathematics, science and social science , art and aesthetics , Yoga and health education.

### **Course Outcomes:**

After completing this course Students will be able to:

- Develop a sensible person with strong character and values.
- Have ight attitude and standards to face the outside world.
- Know the real purpose of life.
- Echance the knowledge and understanding of human right.
- Develop skills for practicing human right.

### **References:**

1. Barash, P. David (2000). Approaches to Peace, Oxford University Press, New York.
2. Galtung, J. (2003). Searching for Peace – The road to TRANSCEND, Sterling Virginia.
3. Galtung, Johan (1984). The Struggle for Peace Gujarat Vidyapith, Ahmedabad.
4. Galtung, Johan (1996). Peace by Peaceful Means: Peace and Conflict, Development and Civilization. Sage Publications, New Delhi.
5. Harris Ian. M. (1998). “Peace Education” Mc Farland & Company, Inc Publisher London.
6. Howlett, Charles F., John Dewey and Peace Education, Encyclopedia of Peace Education, Teacher College, Columbia University 2008.
7. Kapani, Madhu (2000). Education in Human Values – concept and practical implications, New Delhi; Sterling Publishers.
8. National Curriculum Framework (2005) position paper, National Focus group on Education for Peace, NCERT, New Delhi.
9. NCERT National Curriculum Framework (2005). Position Paper, National focus Group on Education for Peace, NCERT, New Delhi (2006).
10. NCTE (1998). Curriculum Framework for Quality Teacher Education, NCTE, New Delhi.
11. Pandey, S. (2004). Education for Peace, Self Instructional Package for Teacher Education, NCERT, New Delhi.
12. Sri Sathya Sai International Center for Human Values (2009). Education in Human Values: Course Book for Training of Master Trainers, New Delhi.
13. The Curriculum framework for Quality Teacher Education (1998) NCTE, New Delhi.

### **Website Sources:**

- [www.tnteu.ac.in](http://www.tnteu.ac.in)
- [www.wikipedia.org](http://www.wikipedia.org)
- [www.researchgate.net](http://www.researchgate.net)

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED223: ENGLISH LANGUAGE PROFICIENCY- II**

**Course Objectives:**

The paper has been designed to educate students in both the artistry and utility of the English language through the study of literature. Students will use writing techniques constitutive of individual genres. This paper will assist students in the development of intellectual flexibility, creativity, and cultural literacy so that they may engage in life-long learning.

**Course Content:**

**Unit-1: -**

**Reading Comprehension**

Advanced comprehension (ability to comprehend English texts of a moderately advanced nature) based on the following essays:

- (A) Richard Steel- The Art of Conversation
- (B) Oliver Goldsmith- National Prejudices
- (C) William Hazlitt- Common Sense
- (D) Thomas De Quency- Literature

**Unit-2: -**

**Constituents of Written Communication-II:**

- (A) Correct Usage: Parts of Speech, Tenses & Agreement of verb with the subject.
- (B) Concord
- (C) Requisites of sentence constituents

**Unit-3: -**

**Writing Skills-**

- (A) Report Writing.
- (B) Expansion of an Idea.
- (C) Notice and Circulars.

**Spoken Skills-**

- (A) Phonetics and Syllable Structure
- (B) Word Accent, Stress, rhythm and Intonation
- (C) Group Discussion and Extempore

**Unit -4: -**

**Value Based Literary Texts Reading:**

**(A) Poetry:**

- Toru Dutt- Our Casuarina Tree
- Jayanta Mahapatra - Relationship
- Sarojini Naidu – Songs of Radha, the Milkmaid

**(B) Short Stories:**

- Guy De Maupassant – The Diamond Necklace

O' Henry – The Gift of Magi  
Mulk Raj Anand – A Pair of Mustachios

**(C) Speech:**

Martin Luther King: I Have a Dream

**(D) Prose:**

Brooker T. Washington- My struggle for an Education

J. Bronowski – Men and Nature

R. L. Stevenson – El Dorado

**Course Outcomes:**

Students completing this course will be able to:

- Identify, analyze, interpret and describe the critical ideas, values, and themes that appear in literary and cultural texts.
- Be proficient in oral communication and writing.
- Write analytically in a variety of formats including essays, notices and reports.
- Enable them to assimilate the correct patterns of the language.
- Apply the comprehensive set of skills and knowledge for life success.

**References:**

1. English Phonetics- Peter Roach.
2. Phonetics and Spoken English- Bala Subhramanium.
3. English prose Selection- Dr. S. S. Deo.

**Website Sources:**

- [www.wikipedia.com](http://www.wikipedia.com)
- [www.englishgrammar.org](http://www.englishgrammar.org)
- [www.grammarly.com](http://www.grammarly.com)
- [www.gradesaver.com](http://www.gradesaver.com)
- [www.interestingliterature.com](http://www.interestingliterature.com)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED231: STATES OF MATTER AND NUCLEAR CHEMISTRY**

**Course Objective:**

- This course deals with the production, chemistry and properties of the kinetic theory of gases and explanation of the macroscopic properties of solids in terms of structure.
- Specifically, the course introduces difference between liquid crystal, solid and liquid, and their important concepts.
- Covered also are metal bonding in clusters, the HSAB concept, chelate effect, and complex stability.
- Also about the fundamental particles of nucleus, Concept of Nuclides, isotopes, isobars and isotones.

**Course Content:**

**Unit I: Gaseous and Solid State**

Review of kinetic theory of gases and van der Waals equation. Collision number, mean free path and collision diameter. Liquefaction of gases.

Explanation of the macroscopic properties of solids in terms of structure, bonding and defects. 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 equation. Predicting crystal structure. Defects in solids, Critical Phenomena: Derive a 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.

**Unit II: Liquids and Colloids**

**Liquid crystals:** Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholesteric phases. Thermography and seven segment cell. 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 applications of colloids.

**Unit III: Acids and bases**

A discussion on changing concepts of acids and bases involving concentrations and effects of solvent medium. Arrhenius, Bronstead-Lowry and Lewis concepts of acids and bases. 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, electronegativity and hardness and softness.

## Unit IV: Nuclear Chemistry

Fundamental particles of nucleus, Concept of Nuclides, isotopes, isobars and isotones (with specific examples), nuclear forces, qualitative idea of stability of the nucleus (n/p ratio), binding energy, packing fraction, Natural and artificial radioactivity, Radioactive Disintegration series, half life, average life, nuclear reactions, artificial transmutation, nuclear fusion and fission. Nuclear fusion as a future source of energy, Nuclear reactors, Application of Radioactivity and Radio isotopes as tracers in chemistry, biology, medicine, agriculture and industry.

### Course outcomes:

Students completing this course will be able to:

- Understand the concepts related to Gaseous and Solid State.
- Analyze the acids and bases involving concentrations and effects of solvent medium.
- Evaluate the disintegration series, calculate the half life, average life, nuclear reactions, artificial transmutation, nuclear fusion and fission

### References:

1. Essentials of Physical Chemistry Arun Bahl, B.S. Bahl, G.D. Tuli, S. Chand & Company Ltd.
2. Principles of Physical Chemistry : Marron and Prutton
3. Elements of Physical Chemistry : Samuel Glasstone and Lewis
4. Physical Chemistry : P W Atkins
5. Nuclear Chemistry V.N. Darls Sultan Chand & sons.
6. Essentials of Nuclear Chemistry Arnika, Harijeevan, 4th edition, New Age International.

### Website Sources:

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiaavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED251: PRACTICAL (CHEMISTRY)**

**Course Objectives:**

The objectives of the course are:

- To emphasize the relevance of fundamentals and applications of chemistry in day today life.
- To take into account appropriate combinations of old and new emerging concepts for the potential uses.
- To address the principles of general chemistry and specific topics relevant to various disciplines.
- To bring adaptability to new developments in Chemistry and to acquire the skills required to become a perfect teacher.
- To bring potential applications of chemistry and practical utility in order to become good teacher.

**Course Content:**

- a. To arrive at a scheme of analysis of anions and cations based on solubility products and common ion effect: Systematic qualitative analysis by micro-scale methods of a mixture containing two acidic and two basic radicals from the following list(not more than one interfering radical):  
Cations: lead, copper, bismuth, cadmium, tin, antimony, iron, aluminium, zinc, cobalt, nickel, calcium, strontium, barium, magnesium, sodium potassium, ammonium. Anions: carbonate, bicarbonate, acetate, fluoride, chloride, bromide, iodide, nitrate, sulphate, borate, oxalate, phosphate.
- b. Preparation of the complexes: Tris (thiourea)copper(I)sulphate monohydrate, Mercury tetra thiocyanatocobaltate(II), simple cobalt and chromium complexes and their analysis.

**Course Outcomes:**

Students completing this course will be able to:

- To analyse the cations and anions.
- To prepare advanced complex compound of industrial applications.
- To know the strength of an acid present in secondary batteries.
- To find the  $\text{Fe}^{+2}$ ,  $\text{Ca}^{+2}$  &  $\text{Cl}^-$  and many other ions present in unknown mixture using qualitative analysis methods.

**References:**

1. A Text Book of Quantitative Inorganic Analysis, A I Vogel.
2. Systematic Experiments in Chemistry ArunSethi New Age International (p) Ltd. Cochin.

**Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED232: ELASTICITY, WAVES, HEAT, AND THERMODYNAMICS**

**Course Objective:**

The objective of this course is to impart knowledge in depth about waves, fundamental laws of thermodynamics and their applications.

**Course Content:**

**Unit I:**

Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli- Dependence of Young's modulus on temperature and its applications, Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Elastic potential Energy, Work done in stretching and work done in twisting a wire - Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion - Torsional pendulum-Determination of rigidity modulus and moment of inertia by Searle's method.

**Unit II:**

Review of Mechanical waves, types of waves, travelling waves, the superposition principle, wave speed, power and intensity in wave motion. Transverse waves on a string- travelling and standing waves on a string. Normal Modes of a string. Group velocity, Phase velocity. Plane waves. Spherical waves, interference of waves, standing waves, resonance, Doppler Effect. Analysis of complex waves. Fourier series, Application to square wave, triangular wave.

**Unit III:**

Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between CP& CV, Work Done during Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient. Reversible & irreversible processes, Second law & Entropy, Carnot's cycle & theorem..

**Unit IV:**

Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams. Third law of thermodynamics, Unattainability of absolute zero. Thermodynamic potentials. Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations& applications - Joule-Thompson Effect, Clausius-Clapeyron Equation, Expression for  $(C_P - C_V)$ ,  $C_P/C_V$ ,  $TdS$  equations.

**Course Outcomes:**

Students completing this course will be able to:

- Understand Hooke's law, elastic constants and Torsional pendulum.
- Describe Waves, various phenomena like superposition principle, interference and Doppler Effect.
- Define the basic concepts of thermodynamics, Zeroth law, first and the second law of thermodynamics and their applications.
- Understand the concept of entropy and enthalpy

- Explain Maxwell's relations and their applications.
- Derive Clausius Clapeyron equation.

### **References:**

1. David Halliday, Robert Resnick and Jay Walker, Fundamentals of Physics, 6th Edition, John Wiley and Sons, Inc.
2. Harris Benson, University Physics, Revised Edition, John Wiley and Sons Inc.
3. Zeemansky and R. Dittman, Heat and Thermodynamics, McGraw Hill, 7th edition, 1996.
4. Matveev, Thermal Physics, MIR Publications
5. D S Mathur, Elements of Properties of Matter, S.Chand (G/L) & Company Ltd., 2010.
6. Gupta and H. Ray, Heat and Thermodynamics, New central publications.
7. D. S. Mathur, Heat and Thermodynamics, Sultan Chand.
8. M. N. Saha and B. N. Srivastava, Treatise on Heat, The Indian Press.
9. Kumar and S.P. Taneja, Thermal Physics, R. Chand Publications, 2014.

### **Website Sources:**

- <https://en.wikipedia.org>
- <https://madeeasy.in>
- <https://www3.nd.edu>
- <https://physics.info>
- <http://www.csc.kth.se>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED252: PRACTICAL (PHYSICS)**

**Course Objective:**

In this course students would be able to understand basic experiments of optics such as: determination of wavelength and radius of curvature, Specific rotation and wavelength of sodium light etc. The students will get a better understanding of the concepts studied by them in the theory course and correlate with experimental observations.

**Course Content:**

**List of Experiments**

1. To determine the wavelength of sodium light by Newton's ring method.
2. To determine the radius of curvature of Plano convex lens by Newton's ring experiment.
3. To determine the specific rotation of plane of polarization for cane sugar solution with the help of polarimeter.
4. To determine the focal length of combination of two lenses separated by distance with the help of Nodal slide and to verify the formula.
5. To determine frequency of tuning fork with help of sonometer.
6. To determine the Resolving Power of a Plane Diffraction Grating.
7. To verify Fresnel's formulae for the reflection of light.
8. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of  $g$ , and (c) Modulus of Rigidity.
9. To determine the refractive index of the material of prism and its dispersive power with the help of spectrometer.
10. To determine the wavelength of Sodium light with help of Michelson Interferometer.

**Course Outcomes:**

Students completing this course will be able to:

- Calculate the wavelength of sodium light, and radius of curvature of plano convex lens.
- Determine the focal length of combination of two lens.
- Measurement of refractive index of the prism.
- Determine resolving power of plane diffraction grating.

**References:**

1. Practical Physics by S. L. Gupta.
2. Practical Physics by Navneet Gupta.



3. Practical Physics by S. K. Gupta.

**Website Sources:**

- <http://www.iiserpune.ac.in>
- <http://vlab.amrita.edu>
- <https://www.niser.ac.in>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED233: CALCULUS – II, ANALYTICAL GEOMETRY AND NUMBER THEORY**

**Course Objectives:**

The main aims of this course are to consider applications of derivatives for sketching of curves and conics and application of definite integrals for calculating volumes of solids of revolution, length of plane curves and surface areas of revolution which are helpful in understanding their applications in plenary motion, design of telescope and to many real-world problems. Number theory is one of the oldest branches of Mathematics. In this course we introduce the basic concepts of Number theory such as divisibility, congruences, congruences with prime modulus, quadratic reciprocity and some functions of Number Theory.

**Course Content:**

**Unit I: Partial Derivatives – I**

Functions of two or more variables, Limits, Continuity, Partial derivatives, Differentiable functions, linear approximation theorem. Homogeneous functions, Euler's Theorem, Chain Rule, Change of Variable, Directional Derivative, Partial Derivatives of higher order, Taylor's Theorem, Derivative of Implicit functions, Jacobians.

**Unit II: Analytical Geometry – I**

Cartesian coordinates in three dimensional spaces, Relation between Cartesian coordinates and position vector, Distance formula (Cartesian and Vector form), Direction cosines, Direction ratios, Projection on a Straight line, angle between two lines, Area of Triangle, Volume of a tetrahedron. Straight line, equations of straight lines (Cartesian form).

**Unit III: Analytical Geometry – II**

Planes, Equations of Planes (Cartesian and Vector form), Normal form, Angle between planes, Coaxial planes, Parallel and Perpendicular planes, Length of a Perpendicular from a point to a plane, Bisectors of angles between two planes, Shortest distance between two skew lines. Translation and Rotation of Cartesian axes in plane, Curves of second degree, Discriminant and Trace, Theorem on Discriminant and trace, Classification theorem on second degree equation.

**Unit IV: Theory of Numbers**

Division Algorithm – Prime and Composite Numbers – proving the existence and uniqueness of GCD and the Euclidean Algorithm – fundamental theorem of Arithmetic - the least common multiple – congruences – linear congruences – Wilson's theorem – Simultaneous congruences – Theorem of Euler – Fermat and Lagrange.

**Course Outcomes:**

This course will enable the students to:

- Sketch curves in a plane using its mathematical properties in the different coordinate systems of reference.

- Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.
- Be well-versed with conics and quadric surfaces so that they should be able to relate the shape of real-life objects with the curves/conics.
- Discuss Quadratic residues and Jacobi symbol.
- Describe power residue, multiplicative groups.
- Understand the concepts of divisibility and Primes.

### References:

1. A Course in calculus and Real Analysis-Iby Ghorpade S R and Limaye B V (2006),Springer Verlag
2. Advanced Calculus by Frank Ayres, Schaum's outline TMH Publishing Co.
3. Calculus and Analytical Geometry by Thomas and Finney, S.Chand and Co. Ltd.
4. Calculus by Anton, Wiley.
5. Calculus with Analytic Geometry by S K Stein, McGraw Hill.
6. Calculus, Vols. 1 and 2 by Lipmann Bers, IBH.
7. Differential Calculus by Gorakh prasad, Pothishala Ltd.
8. Elementary Number Theory by David M. Burton, McGraw Hill Education.
9. Elementary Number Theory with applications (2nd edition) by Thomas Koshy, Academic Press.
10. First Course in Calculus by Serge Lang, Addison-Wiley.
11. Higher Algebra by Bamard and Child, Macmillan India Ltd.
12. Integral Calculus by Shanthi Narayan, S.Chand and Co. Ltd.
13. Introduction to Calculus and Analytical Geometry by Courant and John, Narosa Publishing House.

### Website Sources:

- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED234: DIVERSITY OF ANIMALS–II**

**COURSE OBJECTIVE:**

The course will make the students aware about the characteristic morphological and anatomical features of diverse animals; economic, ecological and medical significance of various animals in human life; and will create interest among them to explore the animal diversity in nature.

**COURSE CONTENT**

**UNIT I: ARTHROPODA AND ONYCHOPHORA**

- a) **Arthropoda:** General characters and classification of Phylum Arthropoda up to classes with examples, Type study: External morphology, digestive system, circulatory system, respiratory system, excretory system, nervous system and reproductive system; Mouth parts and metamorphosis in Insects.

**UNIT II: MOLLUSCA**

- a) **Mollusca:** General characters and classification of Phylum Mollusca up to classes with examples; *Pila* – External morphology, digestive system, nervous system, respiration, circulation and reproduction.

**UNIT III: ECHINODERMATA AND CHORDATA**

- a) **Echinodermata:** General characters and classification of Phylum Echinodermata up to classes with example; Type study: *Asterias* – External morphology, digestive system, water-vascular system, haemocoelomic system and reproductive system, life-cycle and metamorphosis.
- b) **Chordata:** General characters and outline classification of Phylum Chordata up to classes with examples.
- c) **Hemichordata:** *Balanoglossus* External morphology, nutrition, respiration and reproduction.

**UNIT IV: PROTOCHORDATA AND CYCLOSTOMATA**

- a) **Amphioxus** – External morphology, Digestive system, nutrition, respiration and reproduction; Affinities and phylogenetic relationship among Hemichordata, Urochordata and Cephalochordata.
- b) **Cyclostomata** – General characters and classification of Class Cyclostomata up to orders with examples; Type study: *Petromyzon* – External morphology, digestive system, respiratory system and reproduction; Structure and metamorphosis of Ammocoetes larva;

**Course outcomes:**

Upon completion of the course, students will be able to:

- Learn about the importance of systematics, taxonomy and structural organization of animals.
- Be familiarized with the morphology and anatomy of representatives of various animal phyla.

- Comprehend the economic importance of non-chordates, their interaction with the environment and role in the ecosystem.

### **References:**

1. Invertebrate Zoology by E.L.Jordon and P.S. Verma – S. Chand & Co., Delhi).
2. Invertebrate Zoology by J.K.Dhami and P.S.Dhami – S. Chand & Co., Delhi).
3. Invertebrate Zoology series (Protozoa to Echinodermata) by R.L. Kotpal – (RastogiPublications, Meerut, 2008).
4. The Invertebrate series of L.H.Hyman – (McGraw Hill).
5. A student's textbook of Zoology by Adam Sedgwick Vol. I, II & III – (Central BookDepot, Allahabad).
6. A Textbook of Zoology vol.1 by Parkar and Haswell – (MacMillan).
7. Destructive and Useful Insects- Their habits and control by Metcalf and Flint – (TataMcGraw Hill, New Delhi).
8. Protochordates by K.S. Bhatia.
9. Modern Textbook of Zoology Invertebrates by R.L. Kotpal – (Rastogi Publications,Meerut, 10th Revised Edition, 2008).
10. Modern Textbook of Zoology: Vertebrates by R.L. Kotpal – (Rastogi Publications,Meerut, 3rd Edition, 2008).

### **Website Sources:**

- [www.digitalbookindex.org](http://www.digitalbookindex.org)
- [www1.biologie.uni-hamburg.de](http://www1.biologie.uni-hamburg.de)
- [www.topfreebooks.org](http://www.topfreebooks.org) ›
- [www.pdf.com](http://www.pdf.com)
- [en.wikipedia.org](http://en.wikipedia.org)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED253: PRACTICAL (ZOOLOGY)**

**Course Objective:**

The course would provide an insight to the learner about the existence of different life forms on the Earth, and appreciate the diversity of animal life. It will help the student to understand the features of Kingdom Animalia and systematic organization of the animals based on their structural and functional affinities.

**Course Content:**

1. Study of specimens of Arthropoda and Onychophora:  
a) *Limulus* b) *Palamnaeus* c) *Palaemon* d) *Balanus*, e) *Cancer*, f) *Scolopendra*, g) *Spirobolus* h) *Peripatus* j) *Aranea*
2. Identification and classification of any common insects belonging to five different orders (Diptera, Coleoptera, Hymenoptera, Lepidoptera and Hemiptera)
3. Study and mounting (a & b) of mouth parts:  
a) *Culex/Anopheles* b) *Periplaneta*, c) *Apis*, d) butterfly e) housefly
4. Study of Crustacean larvae:  
a) Nauplius, b) Zoea, c) Mysis, d) Megalopa
5. Study of specimens and permanent slides of Mollusca:  
a) *Chiton* b) *Pila*, c) *Dentalium* d) *Unio*, e) *Sepia*, f) *Glochidium* larva.
6. Study of specimens and permanent slides (larvae) of Echinodermata:  
a) *Astropecten/Asterias*, b) *Ophiothrix*, c) *Echinus*, d) *Holothuria*, e) *Antedon* f) *Bipinnaria* larva  
g) *Echinopluteus* larva
7. Study of specimens and permanent slides of Protochordata:  
a) *Balanoglossus*: a) Entire, b) T.S. through proboscis, c) T.S. through trunk region, d) *Herdmania*.
8. Study of *Amphioxus*:  
a) Entire, b) T.S. through pharynx, c) T.S. through intestine
9. Study of specimens of Cyclostomata:  
a) *Petromyzon* and b) *Myxine*.
10. Identification of gastropods, cephalopods and bivalves using keys for identification
11. Study of *Palaemon/Periplaneta* (Chart/assimilation):  
a) Digestive system b) Nervous system c) statocyst d) mouth parts
12. Study of *Pila* (Chart/assimilation):  
a) Radula b) Nervous system

**Course outcomes:**

Upon completion of the course, students should be able to:

- Learn about the importance of systematics, taxonomy and structural organization of animals.
- Befamiliarized with the morphology and anatomy of representatives of various animal phyla

### **Suggested Readings:**

1. Practical Zoology Invertebrate by S.S. Lal.

### **Website Resources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED235: DIVERSITY OF CRYPTOGAMS AND ARCHEGONIATAE**

**Course Objectives:**

The course aims to have the understanding of classification, diversity, vegetative growth, reproduction methods Bryophytes and Pteridophytes, their affinities, evolution of bryophytes and economic as well as ecological importance of both groups of plants and general account of palaeobotany.

**Course Content:**

**Unit I: BRYOPHYTA**

- a. General characters, distribution, structure, reproduction, alternation of generation, classification and economic importance.
- b. Study of morphology, anatomy and reproduction in Hepaticopsida: (*Italics*)
- c. Study of morphology, anatomy and reproduction in Anthocerotopsida : (*Italics*)  
Bryopsida: (*Italics*)
- d. Origin and affinities of bryophytes – brief account.

**Unit II: PALAEOBOTANY**

- 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**

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

**Unit IV:**

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

**Course Outcomes:**

On completing this course, the students will be able to:

- Understand distribution of the bryophytes and pteridophytes, their general characters and reproduction methods.
- Understand their economic and ecological significance of both plants groups
- Understand the evolution of stellar system, Origen and significance of heterospory and seed habits in pteridophytes.



- Identify and explain the some genera of bryophytes and pteridophytes.

### **References:**

1. Anroid, Introduction to Palaeobotany, McGraw Hill, London.
2. Gangulee H.C., Kar and Ashok Kumar,1982, College Botany Vol.II, Central Book Agency, Calcutta.
3. Pandey, Mishra & Trivedi, 2007, A Textbook of Botany Vol.II, Rastogi Publications, Meerut.
4. Parihar, N.S., Bryophyta.
5. Parihar, N.S., Introduction to Embryophyta Vol.II Pteridophyta.
6. Singh V., P.D.Pande & D.K.Jain 2005, Diversity and Systematics of Seed plants, Rastogi Publications, Meerut.
7. Singh, V., P.C.Pande & D.K.Jain 2006, A Textbook of Botany, Rastogi Publications, Meerut.
8. Smith. G. M., 1971, Cryptogamic Botany Vol.II, TMH Publishing House, New Delhi.
9. Vashishta, P.C.1982, Peridophyta, S.Chand & Co. Ltd., New Delhi.

### **Website Sources:**

- [ccej.altopianoblu.it](http://ccej.altopianoblu.it) > botany-notes-pdf
- [en.wikipedia.org](http://en.wikipedia.org)
- [onlineecourses.nptel.ac.in](http://onlineecourses.nptel.ac.in)
- [www.digitalbookindex.org](http://www.digitalbookindex.org)
- [www.freebookcentre.net](http://www.freebookcentre.net)
- [www.kalyanipublication.co.in](http://www.kalyanipublication.co.in)
- [www.kopykitab.com](http://www.kopykitab.com)
- [www.pdf.com](http://www.pdf.com)
- [www.pdfdrive.com/botany-books.html](http://www.pdfdrive.com/botany-books.html)
- [www.topfreebooks.org](http://www.topfreebooks.org) >
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www1.biologie.uni-hamburg.de](http://www1.biologie.uni-hamburg.de)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- II**

**BSCBED254: PRACTICAL (BOTANY)**

**Course Objectives:**

The main goal of this subject is to share the knowledge to the students about the experiments. The students will get a better understanding of the concept studied by them in theory course and correlate with experimental observations.

**COURSE CONTENT:**

1. Study of the morphology, anatomy and reproductive structures of genera included in Bryophyta and Pteridophyta.
2. Preparation and submission of 2 double-stained slides.

**Course Outcomes:**

Completing this course, students will be able to:

- Gain knowledge on fixation, dehydration, hand sectioning.
- Observe and identify the bryophytes and pteridophytes (Ferns) with the help of their morphological and anatomical features.

**References:**

1. A text Book of Practical Botany 1 by Bendre and Kumar.
2. Botany Practical Vol. I by B.P. Pandey.
3. Practical Botany II by O.P. Sharma.

**Website Sources:**

- <http://www.biologycorner.com>
- <https://oer.galileo.usg.edu>

- **Note: Latest editions of all the suggested readings must be used.**

**SECOND YEAR**  
**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED321: LEARNING AND TEACHING**

**Course Objectives:**

The purpose of this course is to expose the students to:

- Acquire knowledge and understanding about the learner and the teaching-learning process to bring effectiveness in the learning outcomes
- Gain an understanding of different theoretical perspectives on learning with a focus on cognitive views of learning as well as social constructivist theories
- Understand the individual differences in cognitive abilities among the learners and decide the teaching-learning strategies appropriate to the needs of the learners
- Appreciate the critical role of learner differences and contexts in making meanings, and draw out implications for schools and teachers
- Be acquainted with group dynamics and various roles of the teachers in teaching learning process
- Understand the nuances of professionalism and be encouraged to develop competencies to act as professionals
- Comprehend the parameters of effective teaching so as to demonstrate his/her skills at different phases of instruction

**Course Contents:**

**Unit- I: Process of Learning:**

Nature of Learning: Meaning, Definitions, Characteristics, Types of Learning: Facts, concepts, skills, generalizations, principles, rules, values, beliefs, attitudes, Factors affecting Teaching and Learning: maturation, attention, interest, fatigue, rewards and punishment.

**Unit -II: Approaches to Learning:**

Introduction to learning – concept and importance, Behavioural: trial and error, conditioning (classical and operant) and social learning, Cognitive (insightful and information processing model), Constructivism: concept, planning and development of learning experiences (Vygostky, Piaget and Bruner, etc.)

**Unit III: Nature of Learner**

Intelligence meaning nature and theories of intelligence (two factor theory and Thurston's group factor theory), Emotional intelligence, measurement of intelligence and application of intelligence tests, Personality: meaning, nature, types and trait theories of personality, assessment of personality. Learning styles: concept, types and implication for learning. Thinking, Imagination, Remembering, forgetting: meaning, concept, types and factors, influencing to learning.

## Unit -IV: Teaching as a Complex Activity:

Concept of Teaching: meaning, definition, characteristics, forms, Phases of Teaching: pre active, inter active, post active, Levels of Teaching: memory, understanding, reflective, Basic teaching skills and competencies, Strategies and techniques of teaching.

### Course Outcome:

After completing the course students will be able to -

- Understand the psychological and socio-cultural dimensions of Individual differences.
- Know and understand the individual differences based on range of cognitive abilities.
- Explain the concept of learning and factors influencing learning.
- Understand the theories of learning of Skinner, Piaget and Vygotsky in relation to their educational implications.
- Evaluate teaching as a complex activity and its types, Maxims, Strategies, Methods, Techniques and Skills.
- Develop an understanding of the modalities of Teaching and Instruction.
- Critically analyse teaching as a profession and role of teacher.

### References:

- Bhatnagar, S: Educational Psychology, Agra, Legal Book Depot.
- Chauhan, S.S: Advanced Educational Psychology, Delhi, Vikas Publishers.
- Gupta, S.P. UchcharShikshaManovigyan, Allahabad, PustakBhavan.
- Mathur, S.S.: Educational Psychology, Agra, Vinod PustakMandir.
- Pathak, P.D.: ShikshaManovigyan, Agra, Vinod PustakMandir.
- Saraswat, Malti: ShikshaManovigyan, Alok Publishers
- Shukla & Saffaya: Educational Psychology.
- Kundu, C.L. and Tutoo, D.N. (2000) Educational Psychology. New Delhi: Sterling Publishers Pvt. Ltd.
- Kuppuswamy, B. (1998) *Advanced Educational Psychology* New Delhi Sterling Publishers
- Mangal, S.K. (1998) - *Advanced Educational Psychology*, Prentice hall of India, New Delhi.
- \*vk; %ekgu yky \*\*vf/lxe vlg f'k(k.k\*) vkj0 yky0 cpl fMi ka ¼ w kz i ddk"ku¼ ejBA
- HkVukxj] , 0 ch0 %\*\*vf/lxe vlg f'k(k.k\*) vkj0 yky0 cpl fMi ka ¼ w kz i ddk"ku¼ ejBA

### Website Sources:

- <https://www.learningclassesonline.com/p/b-ed-books-notes-study-material.html>
- [www.verywellmind.com](http://www.verywellmind.com)
- [www.managementstudyguide.com](http://www.managementstudyguide.com)
- [www.m.wikipedia.org](http://www.m.wikipedia.org)
- [www.online-psychology-degrees.org](http://www.online-psychology-degrees.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED322: ASSESSMENT FOR LEARNING**

**Course Objective:**

The purpose of this course is to expose the students to:

- Gain a critical understanding of issues in assessment and evaluation (from a constructivist paradigm).
- Become cognisant of key concepts, such as formative and summative assessment, evaluation and measurement, test, examination; be exposed to different kinds and forms of assessment that aid student learning.
- Become the use of a wide range of assessment tools, and learn to select and construct these appropriately.
- Evolve realistic, comprehensive and dynamic assessment procedures that are able to keep the whole student in view.

**Course Content:**

**Unit -I: Concept, meaning and overview of assessment & evaluation:**

Concept and meaning of assessment, examination, Testing, Measurement and Evaluation, Need and importance of Assessment, Perspective on assessment and evaluation of learning in a constructivist paradigm, critical review of current evaluation practices and their assumptions about learning and development, commercialization of assessment

**Unit -II: Approaches to assessment:**

Formative, summative, grading, continuous and comprehensive evaluation. Realistic, comprehensive and dynamic assessment procedures, Kinds of tasks; projects, assignments, performances. Observation of learning processes by self, by peers, by teacher. Self-assessment and peer –assessment, constructing portfolios,

**Unit -III: Assessment Tools:**

Assessment tools and their characteristics, constructions of assessment tools; *achievement test*, *diagnostic test & its application*. Quantitative and qualitative aspects of assessment: appropriate tools for each. Procedures for measurement of non- cognitive aspects

**Unit IV: Elementary Statistics:**

Statistics- meaning and its use in education. Collection, Classification and tabulation of data. Calculation and uses- Central tendencies (mean, median and mode) and variability (quartile deviation and standard deviation). Correlation (rank difference; meaning, use and calculation).

**Course Outcomes:**

After completing the course students will be able to:

- Understand the concept of Assessment and learning.
- Differentiate between assessment, measurement, evaluation and testing.

- Seek relationship among assessment for learning, curriculum, pedagogy and role of Teacher assessment.
- Explore practical strategies for implementing Assessment for Learning in the context of holistic development.
- Understand various issues and concerns related to Assessment for Learning.
- Apply various statistical techniques to analyze the data regarding students' various aspects in the classroom.

### References:

1. Bloom & Krathwohl : Taxonomy of Educational Objectives Handbook II, 1964.
2. Columbus, Ohio : Charles E. Merrill, 1960.
3. Lyman, H.B. : Test Scores and What They Mean – Prentice hall, Engle Wood, 1963.
4. Sharma, R.A. : Mapan Evam Mulyankan.
5. Soti, S.S : Educational Mental and Measurement.
6. Tuckman, B.W. : Measuring Educational Outcomes \_ Harcourt Bruce, New York, 1975.
7. Wood, D.A.: Test Construction: Development and Interpretation of Achievement Test.
8. ^vk; 7] ekgu yky( 1/2017½ \*\*vf/kxe dsfy, vkydu\*\* l w k z i dk'ku 1/kj0 yky cp fMi k4 ejBA

### Website Sources:

- <https://www.learningclassesonline.com/2019/08/assessment-for-learning-book.html>
- <http://www.ignouhelp.in/ignou-bed-study-material/>
- <http://www.tnteu.ac.in/pdf/assesment.pdf>
- <https://mgkvp.ac.in/Uploads/Lectures/15/702.pdf>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED323: YOGA EDUCATION, SELF UNDERSTANDING AND DEVELOPMENT**

**Course Objectives:**

Yoga in the development of self can play a very important role. Through yoga asans pranayam and meditation the body, mind, vital force and intellect are properly nurtured which results in healthy development. It enhances self esteem, self confidence and self respect. This course will expose the students to these asans.

**Course Content:**

**Unit I: Introduction to Yoga and Yogic Practices**

Yoga: meaning and initiation, what is Yoga? Conceptions of Yoga, History of development of yoga, the streams of Yoga: Astanga yoga Raja yoga, Yogic practices for healthy living

**Unit II Introduction to Yogic Texts**

Historicity of yoga as a discipline, Classification of yoga and yogic texts, Hatha yogic practices, Meditational processes

**Unit III: Yoga and Health**

Need of yoga for positive health, Role of mind in positive health as per ancient yogic literature, Concept of health, healing and disease: yogic perspectives, Potential cause of ill health, Yogic principles of healthy living

**Unit IV: Personality Development and Stress Management through Yoga**

Yogic Practices for Personality Development : Surya Namaskar, Asanas : Tadasana, Simhasana, Kukutasana, Akarna Dhanurasana, Matsyasana, Prnayama, Anuloma-Viloma Pranayama, Bhastrika Pranayama, Banda, Uddiyana Bandha, Dhyana (Meditation), What is Stress, Yoga as a Way of Life for Stress Management: Ahara, Vihara, Achara, Vichara, Vyavahara, Yogic Practices for Stress Management; Asanas, Hastottanasana, Padahastanasana, Trikonasana, Shashankasana, Ushtrasana, Ardhamatsyendrasana, Bhujangasana, Makarasana, Sarvangasana, Matsyasana, Shavasana; Pranayama, Bhramari Pranayama, Sheetali Pranayama; Yoga for Healthy Living, Shirshasana, Bakasana, Hamsasana, Mayurasana.

**Course Outcomes:**

After completing the course students will be able:

- To enable the student to have good health.

- To practice mental hygiene.
- To possess emotional stability.
- To attain higher level of consciousness.

### **References:**

1. Adair, J. and Allen, M. (1999). *Time Management and Personal Development*. London.
2. NCERT (2015). *Yoga: A Healthy Way of Living Secondary Stage*, New Delhi. (Also available in Hindi)
3. NCERT (2015). *Yoga: A Healthy Way of Living Upper Primary Stage*, New Delhi (Also available in Hindi)
4. Rohrer, J. (2002). *ABC of Awareness*. Oberurnen: UTD Media.
5. Simanowitz, V. and Pearce, P. (2003). *Personality Development*. Beckshire.
6. Stevens, N. (2008). *Learning to Coach*. United Kingdom.

### **Website Sources:**

- [www.ritapublication.com](http://www.ritapublication.com)
- [www.wikipedia.org](http://www.wikipedia.org)
- [www.ncert.com](http://www.ncert.com)

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED331: ORGANIC CHEMISTRY I**

**Course Objectives:**

The objectives of this course are:

- To understand optical isomerism, geometric isomerism and conformational isomerism.
- To study about nomenclature, synthesis, isomerism and physical properties of alkanes and cycloalkanes.
- To understand the difference between conformation and configurations.
- To understand the concept of aromaticity.
- To study about nomenclature, synthesis, isomerism and physical properties of aliphatic hydrocarbons, aromatic hydrocarbons, alkyl and aryl halides.

**Course Content:**

**Unit I: Stereochemistry of Organic Compounds**

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 of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature.

**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 and conformation. Conformational analysis of ethane and n-butane; Review of Newman projection and Sawhorse formulae, Fischer and flying wedge formulae.

**Unit II: Aliphatic Hydrocarbons**

**Alkanes:** Review of IUPAC nomenclature of branched and unbranched alkanes. Isomerism in alkanes and industrial source. Methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation), physical properties and chemical reactions of alkanes (halogenation, nitration, sulphonation, oxidation and isomerisation reactions). Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity.

**Alkenes:** Accounting for Reactions due to unsaturation in compounds. Nomenclature of alkenes, methods of formation (by dehydration, dehydrohalogenation and dehalogenation) with mechanism. Regioselectivity in alcohol dehydration. The Saytzeff rule, Chemical reactions of alkenes – Markownikoff's rule, hydroboration followed by oxidation, oxymercuration – reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with  $\text{KMnO}_4$ .

**Alkynes:** Nomenclature, structure and bonding in alkynes. Methods of formation (alkylation of acetylene and by elimination reactions). Acidity of alkynes. Chemical reactions of alkynes: hydroboration, oxidation, metal-ammonia reductions, oxidation.

**Unit III: Aromatic Hydrocarbons**

Factors responsible for the characteristic reactions of Aromatic compounds. Nomenclature of benzene derivatives. Structure of benzene: molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure, MO picture. Aromaticity: The Huckel rule, aromatic ions. Aromatic electrophilic substitution: General pattern of the mechanism, role of s- and p-complexes. Mechanism of nitration, halogenation, sulphonation and Friedel-Crafts reaction. Activating and deactivating substituents, orientation and ortho/para ratio. Methods of formation and chemical reactions of alkylbenzenes.

#### Unit IV: Alkyl and Aryl Halides

**Alkyl halides:** A study of Alkyl halides highlighting its synthetic applications. Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanism of nucleophilic substitution reactions of alkyl halides SN<sub>2</sub> and SN<sub>1</sub> reactions with energy profile diagrams.

**Aryl halides:** Methods of formation of aryl halides, nuclear and side chain reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions.

#### Course Outcomes:

After completing the course, the students will be able to:

- Recognize either molecule is aromatic, non-aromatic or antiaromatic.
- Assign R and S to given molecules.
- Do interconversion of Fischer to Newmann, Newmann to Sawhorse and vice versa.
- Recognize and draw constitutional isomers, stereoisomers, including enantiomers and diastereomers, racemic mixture and meso compounds.
- Understand the nomenclature, synthesis, isomerism and physical properties of aliphatic hydrocarbons, aromatic hydrocarbons, alkyl and aryl halides.

#### References:

1. Organic Chemistry: Seyhand N Ege.
2. Organic Chemistry: Morrison and Boyd.
3. Organic Chemistry: I L Finar.
4. Organic Chemistry: Hendricson, Cram and Hammond.
5. Organic Chemistry: Stanley H. Pine.

#### Website Sources:

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED351: PRACTICAL (CHEMISTRY)**

**Course Objective:**

- To emphasize the relevance of fundamentals and applications of chemistry practical in day today life.
- To take into account appropriate methods of analysis for the potential uses.
- To address the principles of general chemistry and specific topics relevant to various disciplines.
- To bring potential applications of chemistry and practical utility in order to become good teacher

**Course Content:**

1. Calibration of Thermometer using naphthalene / acetanilide / urea
2. Determination of melting point of Benzoic acid / cinnamic acid / *m* – dinitro benzene / *p*dichlorobenzene
3. Determination of boiling point of aniline / nitrobenzene / chlorobenzene
4. Distillation of water – alcohol mixture using water condenser; Distillation of chlorobenzene – nitrobenzene mixture using air-condenser
5. Crystallization: Benzoic acid from hot water, naphthalene from ethanol
6. Sublimation of camphor / phthalic acid / succinic acid

**Organic synthesis:**

1. Preparation of Iodoform from ethanol / acetone using sodium hypochlorite and KI
2. Preparation of *m*-dinitrobenzene from nitrobenzene by nitration
3. Preparation of *p*-bromoacetanilide from acetanilide by bromination
4. Preparation of 2,4,6-tribromo phenol from phenol / 2,4,6-tribromoaniline from aniline
5. Preparation of Acetanilide from aniline by acetylation
6. preparation of benzoic acid from benzamide by base hydrolysis
7. preparation of aspirin from salicylic acid by acetylation
8. preparation of *p*-bromoaniline from acetanilide
9. preparation of *o*-iodobenzoic acid from anthranilic acid
10. preparation of *p*-nitroacetanilide from acetanilide by nitration

**Course Outcomes:**

- Students are able to determine the melting and boiling points of given organic compounds.
- Ability to prepare organic complex compound of industrial applications.
- Ability to know the process of crystallisation as a separation method.

**Suggested Readings:**

- A Text Book of Quantitative Inorganic Analysis, A I Vogel.
- Systematic Experiments in Chemistry ArunSethi New Age International (p) Ltd. Cochin.

### **Web Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED332: ELECTRICITY AND ELECTROMAGNETISM**

**Course Objective:**

The goal of this course is to gain an understanding of *fundamental concepts in electricity and magnetism*, magnetic fields and their relationship to electrical fields.

**Course Content:**

**Unit I:**

Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss's theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere and continuous charge distributions (charged rod, ring, disk). Calculation of electric field from potential.

**Unit II:**

Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Combination of capacitors, energy stored in a capacitor, Energy per unit volume in electrostatic field. Gauss's theorem in dielectrics. Dielectric constant, Parallel plate capacitor completely filled with dielectric. Polarizability and susceptibility, Clausius-Mossotti equation. DC Circuits: Kirchhoff's laws, Voltage and Current dividers, Maximum power transfer theorem.

**Unit III:**

Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current. Magnetic force between two parallel current carrying conductors. Divergence and Curl of  $\mathbf{B}$ , Magnetic vector potential. Ampere's circuital law. Magnetic field due to a very long solenoid. Magnetism in matter: Magnetic intensity, magnetic induction, Magnetic susceptibility, permeability. Classification of magnetic substances- a brief introduction of dia-, para- and ferro-magnetic materials..

**Unit IV:**

Electromagnetic Induction: Review of Faraday's law of induction, Lenz's law, Motional EMF. Inductance: Self inductance, energy in a magnetic field, magnetic energy density. AC circuits: The  $j$  operator. sinusoidal voltage, current voltage relation in resistance, capacitance and inductance, Reactance and impedance, Power in AC circuits, RMS values, Power factor, LR and CR circuits. Series and parallel LCR circuits. Resonance. Mutual inductance and transformers.

**Course Outcomes:**

Students completing this course will be able to:

- Apply Gauss's law of electrostatics to solve a variety of problems.
- Define Polarizability and susceptibility.
- Understand Biot – Savart Law and its applications
- Apply Ampere's Circuital Law to solve problems.

- Understand Magnetic materials and their properties
- Explain Faraday's laws and Lenz's Law

### **Suggested Readings:**

- David J. Griffiths, Introduction To Electrodynamics, 4th Edition, Pearson
- D C Tayal, Electricity and Magnetism, 1988, Himalaya Publishing House.
- David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, 6th Edition, John Wiley, Inc.
- A N Matveev, Electricity and Magnetism, Mir Publishers, Moscow.
- F.W.Sears, Electricity and Magnetism, Addison Wesley Co.
- A F Kipp, Fundamentals of Electricity and Magnetism, McGraw Hill.
- Edward M. Purcell, Electricity and Magnetism, McGraw-Hill Education, 1986.
- J.H. Fewkes & J. Yarwood, Electricity and Magnetism, Vol. I, Oxford Univ. Press, 1991.
- Ronald Lane Reese, University Physics, 2003, Thomson Brooks/Cole.

### **Website Sources:**

- <https://mrcet.com>
- <https://en.wikipedia.org>
- <http://sites.science.oregonstate.edu>
- <https://uomustansiriyah.edu.iq>
- <https://www.electrical4u.com>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED352: PRACTICAL (PHYSICS)**

**Course Objective:**

The main objective of this course is to impart the knowledge to the students about the experiments so that students will get a better understanding of the concepts studied by them in the theory course and correlate with experimental observations.

**Course Content:**

**List of Experiments**

1. To determine the specific resistance of material of a given wire using Carey Foster Bridge.
2. To compare two resistance by means of potentiometer.
3. To convert Galvanometer into Ammeter with potentiometer.
4. To convert Galvanometer into Voltmeter with potentiometer.
  
5. To find out internal resistance of Lechlanche cell by Potentiometer.
6. To Study the CRO.
7. To determine the magnetic moment (M) of a magnet and horizontal component of Earth's Magnetic field.
8. To find the resistance of a Lead accumulator using Post office box.
9. To study the ballistic constant K of a moving coil Ballistic galvanometer and to calibrate ballistic galvanometer.
10. To determine the unknown frequency and to compare the frequency of two unknown signals using CRO.

**Course Outcomes:**

Students completing this course will be able to:

- Evaluate specific resistance of material
- compare two resistances
- convert Galvanometer into Ammeter and voltmeter
- Measure magnetic moment (M) of a magnet
- evaluate the ballistic constant

**Suggested Readings:**

- Practical Physics by Navneet Gupta
- Practical Physics by S. K. Gupta
- Practical Physics by S. L. Gupta

**Website Sources:**

- <http://www.iiserpune.ac.in>
- <http://vlab.amrita.edu>
- <https://www.niser.ac.in>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED333: REAL ANALYSIS**

**Course Objectives:**

The main aims of this course are to develop a deeper and more rigorous understanding of defining terms and proving results about convergence of sequences and series of real numbers, having wide applications in real-world problems.

**Course Content:**

**Unit I:**

The field axioms; Theorems about field properties, Order in  $\mathbb{R}$ -Absolute value, Completeness, some important subsets, Intervals, Countable and Uncountable sets. Neighborhoods, Open Sets, Closed Sets, Limit points of a set, Closure of a set, Interior of a set, Compactness, Connectedness.

**Unit II:**

Introduction to sequences, Convergent sequences, Divergent sequences, Oscillatory sequences, Bounded sequences, Some important limit theorems, Cauchy sequences, Monotonic sequences, Cluster points of a sequence, Limit superior and limit inferior of a sequence, Subsequences.

**Unit III:**

Introduction to Infinite Series, Sequence of partial sums of a series, Convergent series, Cauchy's general principle of Convergence for Series, A necessary condition for convergence, Series of positive terms, A fundamental result for series of positive terms, Geometric series, Comparison test, Cauchy's  $n$ th root test, D'Alembert's Ratio test, Raabe's test, Maclaurin's integral test.

**Unit IV:**

Riemann Integration: Upper and lower sums, Criterion for inerrability, Inerrability of continuous functions and monotone functions, Fundamental theorem of Calculus, Change of variables, Integration by parts, First and Second Mean Value Theorems of Integral Calculus.

**Course Outcomes:**

This course will enable the students to:

- Be familiar with the concept of sequences, series and recognize convergent, divergent, bounded, Cauchy and monotone sequences.
- Test the convergence and divergence of series using ratio test, root test and Leibnitz test.
- Understand the concepts of point-wise and uniform convergence.
- Understand Riemann integrability of continuous and monotone functions.

**Suggested Readings:**

- Mathematical Analysis by Malik and Savita Arora, New Age International Pvt. Ltd.
- Mathematical Analysis by Shanthinarayan, S. Chand and Co. Ltd.
- Mathematical Analysis by T M Apostol, Addison Wesley, Narosa, New Delhi, 2<sup>nd</sup> Edition.
- Real Analysis by J.M.Howie, Springer 2007.
- Real Analysis by Malik, Wiley Eastern.
- Real Analysis by Royden, Prentice Hall of India Pvt. Ltd.



## Website Sources:

- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED334: DIVERSITY OF ANIMALS–III AND COMPARATIVE ANATOMY**

**COURSE OBJECTIVE:**

The course is designed with an aim to provide scope and historical background of chordates. It will impart knowledge regarding basic concepts of origin of chordates and make the students understand the characteristics and classification of animals with notochord.

**COURSE CONTENT:**

**UNIT I: Histology, Pisces and Amphibia**

- a) **Histology:** Epithelial, connective, muscular and nervous tissues.
- b) **Pisces:** General Characters and Classification of Superclass Pisces up to orders with examples; Comparison of chondrichthyes and Osteichthyes; External morphology of *Scoliodon*.
- c) **Amphibia:** General characters and classification up to orders with examples, Parental care in Amphibia

**UNIT II: Reptilia, Aves and Mammalia**

- a) **Reptilia:** General Characters and Classification of classes up to orders with examples; Poisonous and non-poisonous snakes; Poison apparatus and biting mechanism in snakes.
- b) **Aves:** General Characters and classification up to orders, Flight adaptation and migration in birds.
- c) **Mammalia:** General Characters and Classification of the class Mammalia up to orders with examples, Affinities of Prototheria and Metatheria.

**UNIT III: Comparative Anatomy of Vertebrates–I**

Comparative study in chondrichthyes, amphibians, reptiles, birds and mammals:

- a) Digestive system
- b) Respiratory system
- c) Structure of heart
- d) Circulatory system

**UNIT IV: Comparative Anatomy of Vertebrates–II**

- a) Comparative study in Chondrichthyes, amphibians, reptiles, birds and mammals:
  - i) Nervous system (Brain, cranial nerves, spinal cord and spinal nerves)
  - ii) Sense organs (eye and ear)
  - ii) Urinogenital system
- b) Integument: scales of fishes; feather-types and structure of quill feather; mammalian skin

**Course outcomes:**

Upon completion of the course, students will be able to:

- Understand different classes of chordates, level of organization and evolutionary relationship between different subphyla and classes, within and outside the phylum.
- Study about diversity in animals making students understand about their distinguishing features.
- Appreciate similarities and differences in life functions among various groups of animals in Phylum Chordata.

### **Suggested Readings:**

- Modern Textbook of Zoology: Vertebrates by R.L. Kotpal – Rastogi Publications, Meerut, 3rd edition, 2008.
- A Text Book of Zoology Vol.II by Parkar and Hasswel – (MacMillan).
- A Text Book of Zoology Vol.II by R.D.Vidyarthi– (S. Chand & Co., Delhi).
- Life of Vertebrates by J.Z.Young – (Oxford University Press).
- The Vertebrate Body by A.S.Romer – (Vakils, Ferrer& Simons, Bombay).
- Elements of Chordate Anatomy by Weichert – (McGraw Hill).
- The Birds by R.L Kotpal (4th edition) – (Rastogi Publications, 2008).
- Bird Migration by D.R. Griffin – (Doubleday, Garden City, USA).
- The Book of Indian birds by Salim Ali
- Comparative anatomy of the vertebrates by George C Kent – 3rd saint Louis: The C.V. Mosby Company, 1973.
- Histology by A.K. Berry.

### **Website Resources:**

- <https://www.khanacademy.org/science/biology/crash-course-bio-ecology/crash-coursebiology-science/v/crash-course-biology-123>
- <https://opentextbc.ca/biology2eopenstax/chapter/chordates/>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED353: PRACTICAL (ZOOLOGY)**

**Course Objectives:**

Appreciate similarities and differences in life functions among various groups of animals in Phylum Chordata. · Comprehend the circulatory, nervous and skeletal system of chordates. Know about the habit and habitat of chordates in marine, freshwater and terrestrial ecosystems.

**Course Content:**

1. Study of specimens of Chondrichthyes:

a) *Stegostoma*    b) *Sphyrna*    c) *Narcine*    d) *Trygon*    e) *Torpedo*

2. Study of specimens of bony fish:

a) *Echeneis*    b) *Exocoetus*    c) *Clarias*    d) *Anabas*    e) *Anguilla*

f) Lungfish    g) *Hippocampus*

3. Mounting of fish scales:

a) Placoid scales    b) Ctenoid/Cycloid scales

4. Study of *Scoliodon*:

a) Afferent and efferent branchial system.  
b) Cranial nerves (5th, 7th, 9th and 10th)  
c) Membraneous labyrinth (ear canal)

5. Study of specimens of Amphibians:

a) *Ichthyophis*    b) *Bufo*    c) *Ambystoma*    d) Axolotl larva

6. Study of specimens of Reptilia:

a) Tortoise/Turtle/terrapin    b) *Gecko*    c) *Varanus*

7. Identification of poisonous and non-poisonous snakes:

a) *Hydrophis*    b) *Vipera russelli*    c) *Naja naja*    d) *Bungarus*  
e) *Dhaman*    f) *Dryophis*    g) *Typhlops*

8. Osteology:

a) Study of skulls of Frog/*Varanus*/Bird/Rabbit  
b) Study of fore and hind limb bones of Frog, *Varanus*/*Calotes*, Bird and Rabbit  
c) Study of pectoral and pelvic girdles of Frog, *Varanus*/*Calotes*, Bird and Rabbit  
d) Study of different types of vertebrae of frog and mammal

9. Local field visit to identify and classify 10 common birds and mammals; submission of report

10. Study of tissues: Epithelial, muscular, T.S. of bone and cartilage

11. Microtomy: Fixing, Block making, Section cutting, Double Staining, mounting and submission of slides.

**Course outcomes:**

- Comprehend the circulatory, nervous and skeletal system of chordates.
- Know about the habit and habitat of chordates in marine, freshwater and terrestrial ecosystems.

### **Suggested Readings:**

- **A Manual of Practical Zoology Chordates**

### **Website Resources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED335: GYMNOSPERMS AND REPRODUCTIVE  
BIOLOGY OF ANGIOSPERMS**

**Course Objective:**

The objective of this course is to familiarize the students with distribution, classification and affinities and economic importance of some gymnosperms. The main theme of this course is to study the reproductive development in flowering plants, cellular totipotency, culture media and techniques and application of tissue culture.

**Course Content:**

**Unit I:**

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

**Unit II:**

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

**Unit III:**

- a) Pollination and fertilization: Definitions, types of pollination, pollen-pistil interaction, self-incompatibility, double-fertilization.
- b) Endosperm: Definition, types – cellular, nuclear and helobial; endosperm haustoria.
- c) Embryo: Classification, types, development of Crucifer type.

**Unit IV:**

- a) Fruit and seed : Development, structure of monocot and dicot seeds, dispersal mechanisms, importance.
- b) Brief account of apomixis and polyembryony.
- c) Brief history, cellular totipotency, culture media and techniques.
- d) Brief account of anther/ pollen culture, endosperm, embryo and protoplast culture, Applications of tissue culture.

**Course Outcomes:**

After completion of this course students will be able to

- Understand about habitats of gymnosperm plants their affinities, classification and economic importance.

- Explain the morphology, anatomy and reduction in gymnosperm plants.
- Understand the structure of male and female reproductive bodies in flowering plants.
- Familiarize to pollination processes.
- Learn about double fertilization and their significance
- Know about the structure and development of dicot and monocot embryos.
- Understand apomixes, polyembryony and parthenocarpy.
- Understand the scope and value of tissue culture, their techniques and culture media etc.

### **Suggested Readings:**

- Bhojwani S S and S P Bhatnagar, 2007. The Embryology of Angiosperms, Vikas Publishing House, Delhi.
- Chopra G.L., 1972, Gymnosperms, S. Nagin & Co., Jullandar.
- Gangulee, S.C., Kar and Ashok Kumar, College Botany Vol.II, Central Book Agency, Calcutta.
- Johri B.M. (Ed.), 1984, Embryology of Angiosperms, Springer-Verlag, Germany.
- Pandey, Mishra and Trivedi, 2000, A Text book of Botany Vol.II.
- Raven P.H, R.F.Evert and S.E.Eichhorn, 1999, Biology of Plants, 5th Ed., W.H.Freeman and Co., Worth Publishers, New York.
- Singh V., P.C.Pande & D K Jain 2006 Diversity and Systematics of Seed Plants, Rastogi Publications, Meerut.
- Sporne, K.R., 1974, Morphology of Gymnosperms, Hutchinson & Co., London.
- Swamy B.G.L. and K.V.Krishnamurthy, 1980, From Flower to Fruit, TMH Publishing House, New Delhi.

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- III**

**BSCBED354: PRACTICAL (BOTANY)**

**COURSE OBJECTIVE:**

The main Goal of this subject is to share the knowledge to the students about the experiments. The students will get a better understanding of the concept studied by them in theory course and correlate with experimental observations.

**COURSE CONTENT:**

- Study of morphology, anatomy and reproductive structures of genera of Gymnosperms included in theory syllabus.
- Study of structure of anther (*Datura*), microsporogenesis and pollen grains using permanent slides and mounts.
- Study of structure of ovules and embryo sac development (monosporic type) using permanent slides.
- Examination of a wide range of flowers for study of pollination.
- Study of pollen grains and pollinia.
- Preparation of culture medium with tissue culture procedures.

**Course Outcomes:**

After Completing this course, students will be able to:

- Gain knowledge on fixation, dehydration, hand sectioning, of some gymnosperms.
- Dissect out the pollinia from *Calotropis procera* flower and explain the structure.
- Explain the structure of T.S. of anther of *Datura*.
- Understand the types of placentation in different flower bud practically and physically.
- Observe and understand the pollination process in natural environment

**Suggested Reading:**

- A text Book of Practical Botany 2 by Bendre and Kumar
- Modern Practical Botany Vol. III by B.P. Pandey
- Practical Botany II by O.P Sharma

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used..**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BABED421: CONTEMPORARY INDIA AND EDUCATION**

**Course Objective:**

The objective of the study of this course is to:

- Give due recognition and importance to the social organization, traditions, customs and value systems of the various communities.
- Know about the various periods of Education in India.
- Know about the various Issues and Concerns of Education in India.

**Course Content:**

**Unit I: - Education in India:**

Vedic Period, Buddhist Period, Medieval Period and Modern Period.

**Unit II: - Education for Transformation:**

Different forms of diversity and inequality and implication for education - Religion, caste and tribe; sex, class and others. Education and economic development, education and scientific development, education and socialism, education and secularism.

**Unit III: - Policy Frameworks for Public Education:**

Language policy: Colonial debates on school language, Constitutional provisions, three language formula, multilingual education. Commission and policies: Recommendations of various Indian Education Commission- 1948-49, 1952-53, 1964-66 and New Education Policy 1986 and its review (G.O.I., 1992), National curriculum framework for school education 2005 & National Curriculum framework for teacher education 2009.

**Unit IV: - Issues and Concerns in Education:**

Right to Education, Sarva Shiksha Abhiyan, Mid-day meal, Role of National Commission on Protection of Child Right. Meaning and Concept of liberalization, globalization and privatization and its impact on education.

**Course outcomes:**

After completing this course students will be able to:

- Increase reliance on social mobilization to promote basic education.
- Emphasize on pre-primary education.
- Introduce the minimum level of learning in school.
- Adopt the child centered, activity based approach.

**Suggested Readings:**

- Agnihotri, R. (1994): *Adhunik bhartiya shikha samasyaye aor samadhan*, Jaipur Rajasthan Hindi Growth Academy.
- Anand, C.L. *et al* (1983). *The teacher and education in emerging Indian society*, New Delhi : NCERT
- Chaube S.P. & Akhilesh: *Landmark in modern Indian Education*, New Delhi, Vikaspublishing house.
- Mohan, J (1994): *Indian education in the emerging society*, New Delhi, sterling publishers.
- Pandey, R. (2014-15) : *Teacher in Emerging Indian Society*, Alok Prakashan, Allahabad
- Pathak, P.D. & Tyagi, G.S.D. (1994) : *Principle of Education*, Vinod Pustak Mandir, Agra
- Saxena, N.R.S. (2010). *Principles of education*, Meerut: International Publishing House.
- Sharma, R.A. (2013) : *Philosophical and Sociological Foundation of Education*, Lal Book Depot, Meerut

### Website Sources:

- [www.learningclassesonline.com](http://www.learningclassesonline.com)
- <http://www.ignouhelp.in/ignou-bed-study-material-in-hindi>
- <https://www.ncertbooks.guru/b-ed-books>
- <https://onlinecourses.swayam2.ac.in>
- <https://www.classcentral.com/course/swayam-contemporary-india-and-education-13960>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**BSc.BEd. Integrated Programme**  
**SEMESTER- IV**

**BSCBED422: ROLE OF ICT IN EDUCATION**

**Course Objective:**

The purpose of this course is to expose the student:

- To develop an understanding of the nature and scope of educational technology.
- To develop an awareness about the recent innovations and future perspectives of education technology.
- To acquaint with the challenges and opportunities emerging in integrating new technology in educational processes.
- To select, use and produce instructional material and media effectively.
- To develop the ability for critical appraisal of the audio-visual media.
- To become good practitioner of educational technology.

**Course Content:**

**Unit I: - Information and Communication Technology**

Information and Communication Technology: Meaning, nature and advantages. Emergence of new information technology- convergence of computing and telecommunications. Concepts, Nature, Theory and process of communication. Process, Components and types of Classroom communication.

**Unit II: - Components of Educational technology**

Software –meaning and types (system software, application software, proprietary software, open source software, shareware and freeware). Hardware fundamentals (anatomy, input devices, output devices, storage devices, display devices), hardware troubleshooting and diagnosis.

**Unit III: - Educational software applications**

Computer assisted instruction, Drill & practice software, Educational simulations, integrated learning system, Curriculum specific Educational software.

**Unit IV: - E-learning**

E-learning definitions, scope, trends, attributes & opportunities, Pedagogical designs & e-learning, Assessments, feedback and e-moderation, E-learning on line learning management, On line learning management system, Digital learning objects, Online learning course development models, Management and implementation of e-learning.

**Course outcomes:**

After completing this course students will be able to:

- Have a basic familiarity with computers
- Understand & appreciate ICT as an effective learning tools for learners
- Understand ICT as an enormous functional support to teachers.

**Suggested Readings:**

- Dahama, O. P. & Bhatnagar, O. P.; 'Education and Communication for development', Oxford & Page 68 of 71 IBH Publishing company, New Delhi.
- Dasgupta, D. N.; Communication and Education, Pointer Publishers.
- Lal, Madan; Essentials of Educational Technolog, Anmol Publications.
- Sareen, N.; Information and Communication Technology, Anmol Publication.
- Varma, Mahesh; Online Teaching Tools and Methods, Murari Lal & Sons.

### **Website Sources:**

- [www.bdu.ac.in](http://www.bdu.ac.in)
- [www.apa.org](http://www.apa.org)
- [www.investopedia.com](http://www.investopedia.com)
- [www.open.edu](http://www.open.edu)
- [www.ed.gov](http://www.ed.gov)
- [www.worldbank.org](http://www.worldbank.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**BSc.BEd. Integrated Programme**  
**SEMESTER- IV**

**BSCBED423: LANGUAGE ACROSS THE CURRICULUM**

**Course Objectives:**

The purpose of this course is to expose the student to:

- Develop sensitivity to the language diversity existing in the classroom
- Understand nature of classroom discourse and develop strategies for using oral language in the classroom
- Develop listening and speaking ability
- Understand interplay of language and society
- Prepare background for sound reading
- Understand multilingualism in the class

**Course Content:**

**Unit I: Language and Society:**

Relationship between language and society: identity, power and discrimination Multilingualism: differential status of Indian classroom language, dialects vs standard language.

**Unit II: Language Development and Acquisition:**

Theories of language development and its implementation in teaching, Psychological basis of language. Language acquisition: stages, language and thought, Language acquisition and cognitive development.

**Unit III: Classroom Discourse:**

Classroom discourse: meaning, nature and medium, Importance and elements of oral language. Strategies for using oral language: Discussion and questioning as tools for learning, Role of teacher in classroom discourse.

**Unit IV: Reading, Listening and Speaking:**

Need and importance, Types of reading: Skimming and scanning, strategies for effective reading: loud and silent readings, Developing listening skills, articulation of different sounds, stress, rhythm, tonal variations and intonation, Speech defects – lisp, slurring, stuttering and stammering and role of teacher in their resolution.

**Practicum/Assignment: Any one of the following:**

- Identification of speech defects of primary level students and making a remedial strategy for its resolution
- Critical analysis of any book written for children.

### Course Outcomes:

After completing this course students will be able to:

- Explain the meaning of ‘Language across the Curriculum’;
- Identify the attributes of a lesson with the goal of ‘Language across the Curriculum’;
- Justify the importance of ‘Language across the Curriculum’ in the total context of the curriculum;
- Enlist the advantages of considering and applying the idea of ‘Language across the Curriculum’ in the school/college context.
- State the aims of ‘Language across the Curriculum’ approach.

### Suggested Readings:

- Agnihotri, R.K. (1995). Multilingualism as a classroom resource. In K.Heugh, A. Seigruhn & P.Pluddemann (Eds.) *Multilingual education for South Africa*, Heinemann Educational Books.
- Anderson, R.C. (1984). Role of reader’s schema in comprehension, learning and memory. In R.C. Anderson *et al.* (Eds) *learning to read in American schools: Basal readers and content texts*. Psychology Press.
- Eller, R.G. (1989). Johnny can’t talk, either: The perpetuation of deficit theory in classrooms, - *The Reading Teacher*, 670-674.
- Grellet, F. (1981). *Developing reading skills: A practical guide to reading comprehension exercises*. Cambridge University Press.
- NCERT (2006). Position paper: National Focus Group on teaching of Indian language (NCF-2005). New Delhi: NCERT.
- Sinha, S. (2000). Acquiring literacy in schools. *Seminar*, 38-42.
- Thwaite, A. and Rivalland, J. (2009). How can analysis of classroom talk help teachers reflect on their practices? *Australian Journal of Language and Literacy*, 32(1), 38.

### Website Sources:

- [www.learningclassesonline.com](http://www.learningclassesonline.com)
- <http://www.ignouhelp.in/ignou-bed-study-material-in-hindi>
- <https://www.ncertbooks.guru/b-ed-books>
- <https://onlinecourses.swayam2.ac.in>
- <https://rm.coe.int/16805a31b0>
- <http://www.uou.ac.in/sites/default/files/bed17/CPS>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED431: THERMODYNAMICS, EQUILIBRIUM AND SOLUTIONS**

**Course Objectives:**

The purpose of this course is to expose the student to:

- To present a comprehensive and rigorous treatment of classical thermodynamics while retaining an engineering perspective.
- This course deals with the fundamentals of Thermodynamics including thermodynamic systems and properties, relationships among the thermos-physical properties, the laws of thermodynamics and applications of these basic laws in thermodynamic systems.
- This course will provide the essential tools required to study thermodynamic systems in Applied Thermodynamics.
- To develop an intuitive understanding of thermodynamics by emphasizing the physics and physical arguments.

**Course Content:**

**Unit I: Thermodynamics – I**

Concept of Energy, Historical perspectives, Generalisation of laws of Thermodynamics based on human experience with Nature and natural Processes. Language of thermodynamics: system, surroundings, etc. Types of system, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

First Law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule, Joule–Thomson coefficient and inversion temperature. Calculation of  $w.q.$   $dU$  and  $dT$  for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process temperature dependence of enthalpy, Kirchhoff's equation.

**Unit II: Thermodynamics – II**

Discussion of experiential knowledge to account for the spontaneity in changes around us, need for the Second law of thermodynamics, different statements of the law, Carnot cycle and its efficiency, Carnot theorem.

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 changes, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. Gibbs and Helmholtz functions: Gibbs function ( $G$ ) and Helmholtz function ( $A$ ) as thermodynamic quantities.  $A$  and  $G$  as criteria for thermodynamic equilibrium and spontaneity. Variation of  $G$  and  $A$  with  $P$ ,  $V$  and  $T$ .

**Unit III: Chemical Equilibrium and Phase Equilibria**

Recognising a system at Chemical Equilibrium. Attributes of Chemical Equilibrium, Equilibrium constant and free energy. Factors that affect the chemical equilibrium and Le Chatelier's principle. solubility product, common ion effect, selective precipitation.

Statement and meaning of the terms—phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system—water, and Sulphur systems. Phase equilibria of two component system—solid-liquid equilibria—simple eutectic. Pb-Ag Systems, desilverisation of lead. Simple eutectics, systems forming compounds with congruent melting points.

#### **Unit IV: Solutions**

To unify the equilibrium properties of simple mixtures on the basis of chemical potential. Solutions of Gases in liquids. Henry's law and its applications, solutions of solids in liquids. Colligative properties, Osmosis, Osmotic pressure, Vant Hoff Theory, Lowering of Vapour Pressure, Depression in Freezing point and Elevation in Boiling Point, Vant Hoff Factor.

Liquid – liquid mixtures: Ideal liquid mixtures, Raoult's and Henry's law. Non-ideal system – Azeotropes—HC— H<sub>2</sub>O and ethanol—water systems.

Partially miscible liquids— Phenol-water. Lower and upper consolute temperature. Effect of impurity on consolute temperature. Immiscible liquids, steam distillation.

#### **Course Outcomes:**

After completing this course students will be able to:

- Understanding of the basic concepts of thermodynamics such as system, state, state postulate, equilibrium and properties.
- Students may differentiate between Open, Closed and Isolated systems, Microscopic and Macroscopic approaches, Intensive and Extensive properties.
- Knowledge of various laws of thermodynamics and their application.
- Understanding of the concept of pressure, temperature, specific volume and temperature scales.
- Understanding of concept of equilibria, phase rule and solutions

#### **References:**

- Principles of physical chemistry: Puri, Sharma and Pathania, 47th edition.
- Physical Chemistry: Atkins.
- Phase rule: Gurdeep Raj, Goel Publishing house.

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED451: PRACTICAL (CHEMISTRY)**

**Course Objectives:**

The purpose of this course is to expose the student to:

- To emphasize the relevance of fundamentals and applications of chemistry practical in day today life.
- To take into account appropriate methods of physical parameter analysis .
- To address the principles of physical and analytical chemistry and specific topics relevant to various disciplines.

**Course Content:**

1. Determination of heat of neutralization of acids and bases .Verification of Hess's law of constant heat summation.
2. Determination of solubility of sparingly soluble salt at various temperatures, calculation of enthalpy of solution.
3. pH titration of acid versus base (observation of change in pH
4. Determination of equilibrium constant of hydrolysis of an ester (ethyl acetate/methyl acetate).
5. Determination of dissociation constant of a weak acid.
6. Determination of solubility product constant ( $K_{sp}$ ) of a sparingly soluble salt
7. Determination of dissociation constant of phenolphthalein/methyl orange by colorimetric method.
8. Determination of molecular weight of a given liquid by steam distillation.
9. Determination of percentage composition of the given NaCl solution by miscibility temperature method (phenol-water system).
10. Determination of distribution coefficient of benzoic acid between water and toluene or acetic acid between water and 1-butanol.
11. Determination of transition temperature of a given salt hydrate by thermometric method.
12. Determination of molecular weight of a given substance by Rast's method.
13. Determination of density, coefficient of viscosity and surface tension of the given liquid.
14. Determination of refractive index of pure liquids and liquid mixtures.

**.Course Outcomes:**

After completing this course students will be able to:

- Students are able to know thermometric method.
- Ability to prepare organic complex compound of industrial applications.
- Ability to know the process of determination of distribution coefficient.

**References:**

1. A Text Book of Quantitative Inorganic Analysis, A I Vogel.
2. Systematic Experiments in Chemistry ArunSethi New Age International (p) Ltd. Cochin.

## Web Sources:

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED432: OPTICS**

**Course Objective:**

This course goal is to impart knowledge about optical phenomena based on the wave description of light. The principles of interference, diffraction and polarization will be fully developed.

**Course Content:**

**Unit I: Nature of Light and Scattering**

Light. Dual nature of electromagnetic radiation, electromagnetic spectrum, energy and momentum of em wave. Electromagnetic nature of light. Wave front. Huygen's Principle. Rayleigh and Raman scattering of light. A qualitative account of fluorescence and phosphorescence, the Raman Effect experiment and its explanation, intensity and polarisation of Raman lines, some applications of Raman Effect.

**Unit II: Interference**

Definition of Coherence, Methods of production of Coherent sources by division of wavefront and division of amplitude. Theory of interference (condition for constructive and destructive interference). Young's double slit experiment, Lloyd's Mirror and Fresnel's Biprism. Interference in Thin Films: parallel and wedge-shaped films. Newton's Rings: measurement of wavelength and refractive index. Michelson and Fabry-Perot interferometers: determination of wavelength of light. Wavelength difference.

**Unit III: Diffraction**

Fraunhofer Diffraction, Diffraction at a single slit, double slit, multiple slits, Diffraction grating, Resolving power – Rayleigh's criterion, Resolving power of a grating and telescope. Fresnel diffraction, half period zone, zone plate, diffraction at a circular aperture and at a straight edge, a slit and a wire using half-period zone analysis.

**Unit IV: Polarisation**

Polarization by reflection, Brewster's law, Malus law, Double refraction, Production and detection of linearly, circularly and elliptically polarized light, Quarter and half wave plates, Polaroids, Nicol prism, Optical activity, Fresnel's theory, Rotatory polarization, use of biquartz.

**Course Outcomes:**

Students completing this course will be able to:

- Gain knowledge on various theories of light.
- Understand the properties of light like coherence, polarization, interference, diffraction.
- Explain Fabry Perot interferometers and its applications.
- Know about the applications of diffraction and polarization.
- Understand the resolving power of different optical instruments.

**References:**

1. F A Jenkins and H E White, Fundamentals of Optics, McGraw-Hill, 1976.
2. B.K. Mathur, Principles of Optics, Gopal Printing, 1995.

3. H.R. Gulati and D.R. Khanna, Fundamentals of Optics, R. Chand, 1991.
4. Eugene Hecht, Optics, Pearson Education India, 2012.
5. N. Subramaniam, Brijlal, and M. N. Avadhanulu Textbook of Optics, S. Chand Limited, 2004.
6. A K Ghatak, Optics, Tata McGraw-Hill Education, 2009.
7. Ariel Lipson, Stephen G. Lipson, Henry Lipson, Optical Physics, Cambridge University Press, 2010.

**Website Sources:**

- <https://www.veerashaivacollege.org>
- <http://www.hep.manchester.ac.uk>
- <https://content.kopykitab.com>
- <http://www.vpscience.org>
- <https://nanopdf.com>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED452: PRACTICAL (PHYSICS)**

**Course Objective:**

In this Course students would gain the practical knowledge by performing various experiments like measuring thickness of wire, wavelength, and verification of truth table etc.

**Course Content:**

**List of Experiments**

1. Measurement of wavelength of laser by diffraction grating.
2. To study the diffraction pattern of laser light and determine its wavelength.
3. Measurement of thickness of wire by Laser.
4. Measurement of the wavelength of the Laser by Double slit.
5. To measure the divergence of a Laser beam.
6. To Plot frequency response curve of a single stage RC coupled amplifier.
7. To verify the truth table of various Logic Gates Circuits.
8. To verify the truth table of Half Adder and Full Adder.
9. To study the rectification by half wave rectifier.
10. To verify the basic laws of Boolean expression using logic gates.

**Course Outcomes:**

Students completing this course will be able to:

- Measure of thickness of wire
- Calculate wavelength of laser
- Verify truth table of logic gates, half added and full adder.
- Verify Boolean expressions.

**References:**

1. Practical Physics by Navneet Gupta.
2. Practical Physics by S. K. Gupta.
3. Hand book of Electronics by Gupta Kumar.
4. Practical Physics by S. L. Gupta.

**Website Sources:**

- <https://www.education.com>
- <https://www.electronics-tutorials.ws>
- <https://www.circuitstoday.com>
- <https://www.niser.ac.in>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED433: DIFFERENTIAL EQUATIONS**

**Course Objectives:**

The main aims of this course are to help the students to develop skills and knowledge of standard concepts in ordinary and partial differential equations and also provide the standard methods for solving differential equations.

**Course Content:**

**Unit I:**

Definition, Formation of a differential equation, Solution of a differential equation, Equations of the first order and first degree, Variables separable, Integrating factors, Homogeneous form – Reducible to homogeneous form, Linear equations, Bernoulli's equation, Exact equations.

**Unit II:**

Equations of the first order and higher degree, Clairaut's equation solvable for  $x$  and  $y$  and  $p$ , Orthogonal trajectories in polar and Cartesian form, Operator  $D$ , Rules for finding the particular integral, Cauchy-Euler differential equation, Legendre's differential equations, Simultaneous differential equations.

**Unit III:**

Equations which do not contain  $x$ , Equation whose one solution is known, Equations which can be solved by changing the independent variable and dependent variable, Variation of parameters, Total differential equation :  $Pdx + Qdy + Rdz = 0$ , Simultaneous equations of the form  $dx/P = dy/Q = dz/R$ .

**Unit IV:**

Formation by elimination of arbitrary constants, Formation by elimination of arbitrary functions, Solution by direct integration, Lagrange's linear equations  $Pp + Qq = R$ , Standard types of first order non-linear partial differential equations, Homogeneous linear equations with constant coefficients, Rules for finding the complementary functions, Rules for finding the particular integral, Separation of variables.

**Course Outcomes:**

This course will enable the students to:

- Solve the exact, linear and Bernoulli equations and find orthogonal trajectories.
- Apply the method of variation of parameters to solve linear differential equations.
- Formulate and solve various types of first and second order partial differential equations.

**References:**

1. A Short Course in Differential Equations by Rainville and Bedient, IBH.
2. Advanced Engineering Mathematics by Kreyszig, Wiley Eastern Ltd.
3. An Introduction to Partial Differential Equations by Stephenson, ELBS.
4. Differential Equations by Simmons, McGraw-Hill Education
5. Higher Engineering Mathematics by Grewal, Wiley Eastern Ltd.

6. Introductory Course in Differential Equations by Murray, Orient Longman.

**Website Sources:**

- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**BSc.BEd. Integrated Programme**  
**SEMESTER- IV**

**BSCBED434: ECOLOGY, BIOGEOGRAPHY AND WILDLIFE**

**Course Objectives:**

The primary aim of the syllabus is to sensitize the students about the paramount role and importance of nature. The study of Ecology imparts us the knowledge about the judicious use of existing ecological resources for sustainable development. Ecology is the only branch of science which briefs us on the ways and means of living with nature for mutual benefit.

**Course Content:**

**Unit I: Environment and Pollution**

- a) **Environment**– Atmosphere, lithosphere and hydrosphere as habitats and ecological factors
- b) **Abiotic factors:** Temperature and light – as ecological factors; limiting factors; Liebig – Blackman’s law of limiting factors; Shelford’s law of tolerance, Factor – compensation.
- c) **Biogeochemical cycle** – Oxygen water, Phosphorus, nitrogen and sulphur cycles.
- d) **Pollution and environmental hazards**–air, water, soil – pollution, causes and remedial measures, replenishment; Global warming and climate change.

**Unit II: Population and Community**

- a) **Population:** Definition and attributes – density, mortality, natality, vital index, age distribution, growth patterns, migration, dispersal and dispersion; Environmental resistance, carrying capacity of environment.
- b) **Biotic community:** Definition and structure, Ecotone, edge effects, niche, community stability. Intra and Interspecific interaction – animal associations.

**Unit III: Habitat Ecology**

- a) **Ecosystem**– Types, structure, functions and examples; Dynamics of Ecosystem- Ecological pyramids, energy flow in ecosystem (food chain, food web), productivity.
- b) **Aquatic Ecosystem:** Types and examples. Physico-chemical properties and biotic communities of lake and sea (adaptation of plankton, nekton and neuston).
- c) **Terrestrial ecosystem**– Types and physico-chemical properties; biomes – forest, desert and grassland.
- d) **Ecological succession.**

**Unit IV: Biogeography**

- a) **Biogeography:** Biogeographical realms of the world with emphasis to Indian region. Forest types, flora and fauna, Discontinuous distribution.
- b) **Wildlife:** Biodiversity and its importance; Red data book; Endemic species, keystone species, Causes of extinction of wildlife; National parks, sanctuaries and bio reserves of India, Hotspots, National and International efforts for conservation of wildlife.



## **Course Outcomes:**

Upon completion of the course, students should be able to:

- Demonstrate an understanding of key concepts in ecology with emphasis on historical perspective, role of physical factors and concept of limiting factors.
- Comprehend the population characteristics, dynamics, growth models and interactions.
- Understand the community characteristics, ecosystem development and climax theories.

## **References:**

1. Fundamentals of Ecology by E.P. Odum – W.B. Saunders, Philadelphia.
2. Environmental Studies by S.V.S. Rana – (Rastogi Publications, 2008).
3. Animal Ecology by S.P. Singh, 6th Revised Edition – (Rastogi Publications, 2008).
4. Basic Ecology by E.P Odum (Holt, Rinehart & Winston, New York).
5. Limnology by Welch (McGraw Hill).
6. <http://www.iucn.org> (for wildlife and Red Data Book).

## **Website Sources:**

- Swayam (MHRD) Portal
- [https://en.wikipedia.org/wiki/Population\\_ecology](https://en.wikipedia.org/wiki/Population_ecology)
- [https://www.tutorialspoint.com/environmental\\_studies/environmental\\_studies\\_ecological\\_pyramid.htm](https://www.tutorialspoint.com/environmental_studies/environmental_studies_ecological_pyramid.htm)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED453: PRACTICAL (ZOOLOGY)**

**Course Objectives:**

Study of ecology will provide students opportunity to understand its practical aspects and helps them to solve many contemporary ecological issues such as global warming, land degradation, habitat loss, desertification and pollution etc. The hands-on experiences of laboratory will also enable students to understand the ecosystem and ecology in a better way.

**Course Content:**

**List of experiments**

- a) Estimation of dissolved oxygen in the pond water.
- b) Estimation of dissolved alkalinity in the pond water.
- c) Estimation of dissolved salinity in the pond water.
- d) Gut content analysis in fish – status in food chain (herbivore, carnivore, omnivore).
- e) Qualitative analysis of marine plankton to identify the most common mero- and holoplankton.
- f) Identification of the most common Nekton in aquatic environment (marine and fresh water).
- g) Population study of ciliates in the culture medium and local insects for growth pattern (logistic and exponential curves).
- h) Collection and qualitative and quantitative analysis of soil organisms – Depiction of histogram and pie diagram.
- i) Animal adaptation in different habits and habitats – a) Fossorial b) Arboreal c) Volent d) Cursorial e) Aquatic.

The students will undertake biological study tour to study, identify different specimens and economically important species.

The students will visit sanctuary/park/reserve to study wildlife and endangered species and submit report.

**Course outcomes:**

Upon completion of the course, students should be able to:

- Know about the types of ecosystems, food chains, food webs, energy models, and ecological efficiencies.
- Apply the basic principles of ecology in wildlife conservation and management.
- Inculcate scientific quantitative skills, evaluate experimental design and read graphs.

**References:**

1. Practical Ecology-by K. S. Rao.
2. Practical Methods in Ecology- by Peter A. Henderson.

## Website Sources:

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED435: PLANT ANATOMY AND ECOLOGY**

**Course Objectives:**

This course aims to study the cellular structures and their role in plant development, tissues system, Water and food conducting elements, secondary growth in plants. This course also aims to familiarize the students with environment and its factors and to know the interrelationship between organisms in populations and communities and to aware the students regarding environmental issues and problems at local, national and international levels, Biodiversity and its conservation.

**Course Content:**

**Unit I:**

- 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.

**Unit II:**

- a) Vascular tissues: Structure of xylem and phloem, functions, primary and secondary vascular tissues, types of wood.
- b) Review of anatomy of stem, root and leaf of dicot and monocot.
- c) Secondary growth in root and stem. Brief account of anomalous secondary growth – Bougainvillea, Dracaena.

**Unit III:**

- d) Ecological Factors: Brief account of edaphic, climatic, physiographic and biotic factors and their ecological importance.
- a) Ecosystem : Structure, abiotic and biotic components, bio-energetic approach, food chain, food web, ecological pyramids, bio-geo-chemical cycles of carbon, nitrogen and phosphorus.
- b) Community ecology: Community characteristics, frequency, density, cover, life forms.
- c) Plant succession: General features, events in succession, brief account of xerarch succession.

**Unit IV:**

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

**Course Outcome:**

On completion this course, students will be able to:

- Understand the meristems and role in plant development.
- Draw and explain the structures of various tissues in plants and their functions.
- Know how the secondary growth takes place in some dicot stem.
- Explain the ecological interconnectedness of life on earth by tracing energy and nutrient flow through the environment.
- Understand the effects of the physical features of the environment on the structure of populations, communities, and ecosystems.
- Describe the plant succession and plant adaptations.
- Understand the environmental pollution and its effects.
- Understand the biodiversity and its conservation.

### References:

1. Esau, K., 1977, Anatomy of Seed Plants, 2nd Ed., John Wiley & Sons, New York.
2. Fahn, A. 1974, Plant Anatomy 2nd Ed., Pergamon Press, Oxford.
3. Gangulee S.C. & Kar.1980, College Botany Vol.I, Central Book Agency, Calcutta.
4. Kormondy, E.J. 1996, Concepts of Ecology, Viva Books Pvt. Ltd., New Delhi.
5. Krebs, C.J.1989, Ecological Methodology, Harper and Row, New York.
6. Misra, R. 1968, Ecology Work Book, Oxford & IBH, New Delhi.
7. Mitra, J.N., An Introduction to Systematic Botany and Ecology, World Press, Calcutta.
8. Moore P.W. and S.B.Chapman, 1986, Methods in Plant Ecology, Blackwell Scientific Publications.
9. Mouseth J.D., 1988, Plant Anatomy. The Benjamin/cummings Publishing Co. Inc., California, USA.
10. Odum, E.P. 1983, Basic Ecology, Saunders, Philadelphia.
11. Sharma, P.D., 2006, Environmental biology, Rastogi Publications, Meerut.
12. Singh V., P.C.Pande & D K Jain 2006, Angiosperms, Rastogi Publications, Meerut.
13. Vashishta, P.C. A Text book of Plant Anatomy, Predeep Publications, Jullandar.

### Website Sources:

- [cqe.jaltopianoblu.it](http://cqe.jaltopianoblu.it) > botany-notes-pdf
- [en.wikipedia.org](http://en.wikipedia.org)
- [onlineecourses.nptel.ac.in](http://onlineecourses.nptel.ac.in)
- [www.digitalbookindex.org](http://www.digitalbookindex.org)
- [www.freebookcentre.net](http://www.freebookcentre.net)
- [www.kalyanipublication.co.in](http://www.kalyanipublication.co.in)
- [www.kopykitab.com](http://www.kopykitab.com)
- [www.pdf.com](http://www.pdf.com)
- [www.pdfdrive.com/botany-books.html](http://www.pdfdrive.com/botany-books.html)
- [www.topfreebooks.org](http://www.topfreebooks.org) >
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www1.biologie.uni-hamburg.de](http://www1.biologie.uni-hamburg.de)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- IV**

**BSCBED454: PRACTICAL (BOTANY)**

**Course Objective:**

The main objective of this course is to share the knowledge to the students about the experiments. The students will get a better understanding of the concept studied by them in theory course and correlate with experimental observations.

**Course Content:**

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 animal secondary growth in Dracana.
5. Study of density, diversity, frequency of herbaceous species by quadrat method and to compare the frequency distribution with Raunkair's Standard Frequency Diagram.
6. To estimate Importance Value Index on the basis of relative frequency, relative density and relative biomass.
7. To determine moisture content and water holding capacity of soils.
8. To estimate transparency, pH and temperature of different water bodies.
9. To estimate salinity of different water samples.
10. Study of ecological anatomy of hydrophytes, xerophytes, halophytes, epiphytes and parasites.  
Field study of diversity in leaf shape, size, thickness and surface properties.

**Course Outcomes:**

The students completing this course will be able to:

- Explain and differentiate between dicot and monocot plants morphologically and anatomically.
- Understand the tissues system in plants organs
- Analyse the density, frequency and abundance of plant community in a particular area.
- Estimate the pH, temperature and salinity of water bodies and soil samples.
- Identify the plants found in different habitats.
- Enhance their interest in nature.

**References:**

1. A text Book of Practical Botany<sup>2</sup> by Bendre and Kumar.
2. Modern Practical Botany Vol. III by B.P. Pandey.
3. Practical Botany II by O.P Sharma.

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

***Third YEAR***  
**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED521: GENDER, SCHOOL AND SOCIETY**

**Course Objectives:**

The purpose of this course is to expose students to:

- Understand the basic terms, concepts used gender study
- Understand the gender discrimination in construction and dissemination of knowledge
- Develop the awareness and sensitivity
- Learn about gender issues in school, curriculum, textual material across disciplines, pedagogical process and gender
- Understand the gradual paradigm shift from women studies to gender studies.

**Course Content:**

**Unit I:-**

Gender, patriarchy, masculinity and feminism – in cross cultural perspectives Gender bias, gender stereotyping and empowerment, Equity and equality in relation with caste, class, religion, ethnicity, disability and region.

**Unit-II:-**

In the structure of knowledge, in the development of curriculum, gender and hidden curriculum, Gender in text and context (text books inter sectionality with other disciplines, classroom processes including pedagogy) in the class room, in the management of school, Teachers as agent of change.

**Unit-III:-**

Sites of conflict: social and emotional Understanding the importance of addressing sexual harassment in family, neighborhood and other formal and informal institutions. Agencies perpetuating violence: family, school, work place and media (print and electronic) Institutions redressing sexual harassment and abuse.

**Unit-IV:-**

Socialization theory, Gender difference theory, Structural theory, Deconstructive theory.

**Course Outcomes:**

After reading this syllabus student will be able to:

- Understand the importance of universalisation of Secondary Education and the constitutional provisions for realising it.
- Understand the issues related to gender in education in Indian society.
- Examine the issues and concerns related to universalisation of Secondary Education.
- Analyse the strategies used for realising you eat and the outcomes of their implementation.
- Identify the various causes for inequality in school.

- Realise the importance of right to education and the provisions made for realising it.
- Understand what is the meaning of gender;
- Explain the difference between sex and gender
- Comprehend some of the key concepts of gender studies which encourage critical thinking.

### **References:**

1. Chandra, Karuna: Structures and Ideologies, Socialization and education of the girl.
2. Kumar, K.: Political agenda of education, New Delhi.

### **Website Sources:**

- <http://egyankosh.ac.in/handle/123456789/46084>
- <http://www.bdu.ac.in/cde/docs/ebooks/BEd/II/GENDER,%20SCHOOL,%20SOCIETY%20AND%20INCLUSIVE%20SCHOOL.pdf>

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED522: PEDAGOGY OF PHYSICAL SCIENCE-I**

**Course Objectives:**

The objectives of this course are to enable student-teachers to:

- Develop a broad understanding of the principles and procedures used in modern physical science education.
- Develop their essential skill for practicing modern physical science education.
- Develop their skills necessary for preparing international accessories.
- Prepare acceptance lesson models which lay down this procedure to the acceptance for preparing designs for lesson.
- Manage introduction activity in such a way that the vast majority of the learners attain most of the objectives.

**Course Content:**

**Unit-I:- Nature of Science:**

Science as a domain of enquiry, as a process of constructing knowledge, Science as a interdisciplinary area of learning. Facts, concepts, principles, law and theories – their characteristics in content of Science (Citing example of each). Contribution of Eminent Scientist; Issac Newton, Dalton, Albert Einestien, Graham Bell, J.C. Bose, C.V. Raman, Vikram Sarabhai, H.J. Bhabha, D.S. Kothari.

**Unit-II:- Aims and Objectives of Teaching Physical Science**

General aims and objectives of teaching physical science at secondary and senior secondary school stage, instructional objectives with special emphasis on Bloom's taxonomy, Concept of entering and terminal behaviour, defining desired outcomes (statements of objectives) for different levels of education like primary, upper primary, secondary and senior secondary.

**Unit-III:- Methodology of Teaching Physical Science**

Methods - Lecture, Demonstration, Lecture-cum Demonstration, Heuristic, project, Laboratory, Problem Solving, Techniques – Team-Teaching, Computer Assistance Teaching, Excursion, science – museums, science – club, science – fair, science projects, Micro teaching skills- Introduction, Reinforcement, Probing Question, Stimulus variation, Explaining, Black Board- Writing etc, Use of ICT in teaching-learning process of physical sciences with computer-aided methods like-Power Point, Multimedia, Simulation, Softwares, Webinars etc.

**Course Outcomes:**

After completing this course students will be able to :

- Understand the nature and characteristics of language of mathematics and its correlation with science and other subjects.

- State the need and importance of evaluation.
- State the aims and objectives of teaching mathematics.
- Understand the various methods and techniques of teaching mathematics.
- Develop an ability to understand various methods of evaluation of students' performance in mathematics.
- Develop skills of making teaching learning process experiential and joyful

### **References:**

1. Bennett, Jeffrey : on teaching Science (print/e-book) Big Kid Science Publication.
2. Chauhan S.S. : Innovation in teaching, Vikas Publication, New Delhi.
3. Das, R.C. : Science teaching in schools, Sterling Publication, New Delhi.
4. Kulshrestha, S.P. : Teaching of Physical Science, R.Lal Book Depot, Meeru.
5. Norman Herr : The source book for teaching Science (e-book/print) Wiley Publication.
6. Pandey, Shashi Kiran : Science teaching, Vani Prakashan, New Delhi.
7. Pathak, R.P. : Teaching skills, Pearson Publication, New Delhi.
8. Rawat, D.C. : Teaching of Science, Vinod Pustak, Agra.
9. Siddiqui, N.N. & Siddiqui, M.N. : Teaching of Science, Doaba House, New Delhi.
10. Singh, R. : Teaching methods in schools, Commonwealth Publication, Delhi..
11. Sood, J.K. : Teaching of Physical Science, Agarwal Publication, Agra.
12. Yadav, M.S. : Objective Science, Anmol Publication, New Delhi.

### **Website Sources:**

- <http://egyankosh.ac.in/bitstream/123456789/46799/1/BES-143B2-E.pdf>
- <https://www.youtube.com/watch?v=d4oi-Q28wbs>
- <https://www.learningclassesonline.com/2019/09/pedagogy-of-mathematics-in-hindi.html>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED523: PEDAGOGY OF MATHEMATICS - 1**

**Course Objectives:**

- The objectives of this course are to enable the pupil and teacher to:
- Understand and appreciate the uses and significance of mathematics in daily life.
  - Learn successfully various approaches to mathematics and to use them judiciously.
  - Know the methods of planning instruction for the classroom.
  - Prepare curricular activities and organize the library in it as per the needs.
  - Appreciate and organize activities to develop aesthetics of mathematics.
  - Obtain feedback both about teaching as well as student's learning.

**Course Content:**

**Unit-I:- Entering into the Discipline**

Meaning and nature of mathematics, use and significance of mathematics, Contribution of some great mathematicians - Aryabhata, Bhaskaracharya, Ramanujam, Euclid, Pythagorus, Rene Decarte, Aims and objectives of teaching mathematics at secondary and senior secondary levels, Objectives of teaching mathematics in terms of behaviour of outcomes.

**Unit-II:- Methodology for Mathematics Teaching**

Methods of teaching: Inductive- Deductive, Analytic- Synthetic, Problem solving, Heuristics, Project & Laboratory Method, Techniques of teaching: Oral, Written, Drill, Home-Assignment, Supervised study, and programmed learning technique, Micro teaching skills-Introduction, Reinforcement, Probing Question, Stimulus variation, Explaining, Blackboard Writing etc, Use of ICT in teaching-learning process of mathematics with computer-aided methods like-Power Point, Multimedia, Simulation, Softwares, Webinars etc.

**Unit-III:- Developing Lesson Plan, Unit Plan and Material Aids**

Lesson plan - meaning, purpose and performa of lesson plan and its rationality, Unit plan – meaning and purpose of unit plan, Teaching –aids importance and classification, Developing/preparing low cost improvised teaching aids, relevant to local ethos, Application of computer in teaching of mathematics.

**Course Outcomes:**

After completing this course students will be able to :

- Develop skills of making teaching learning process experiential and joyful.

- Understand the nature and characteristics of language of mathematics and its correlation with science and other subjects.
- State the need and importance of evaluation.
- State the aims and objectives of teaching mathematics.
- Understand the various methods and techniques of teaching mathematics.
- Develop an ability to understand various methods of evaluation of students' performance in mathematics.

### **References:**

1. Maheshwari, B.K.: Teaching of Mathematics.
2. Shukla, S.C. :Teaching of Mathematics.
3. Kulshrestha, A. K., Teaching of Mathematics.

### **Website Sources:**

- <https://www.youtube.com/watch?v=3xWDOUIILWs>
- <https://hi.wikipedia.org/wiki>
- [www.vkmaheshwari.com](http://www.vkmaheshwari.com)
- [www.pinterest.com](http://www.pinterest.com)>pin

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED524: PEDAGOGY OF BIOLOGICAL SCIENCE- 1**

**Course Objectives:**

The objectives of this course are to enable student-teachers to:

- Develop broad understanding of principles and knowledge used in biology science.
- Develop their essential skills for practicing biological science.
- Know various approaches and methods of teaching life science.
- Lesson planning of biological science properly.
- Prepare tools for evaluation in biological sciences.

**Course Content:**

**Unit-I: - Nature, Concepts and Importance**

History and nature of biological sciences, Importance of biological science for environment, health and peace, Interdisciplinary linkage of biological science and other school subjects, Value of biological sciences in our lives, Four Indian eminent biologists and their discoveries.

**Unit-II: - Objectives of Teaching Biological Sciences**

General aims and objectives of teaching biology difference between aims and objectives, Bloom's taxonomy of educational objectives, Writing objectives in terms of learning outcomes (behavioural term) for different levels of school teaching VIII, IX and X classes-RCEM approach of writing objectives.

**Unit-III: - Exploring learning**

Inductive and deductive approach, different methods and techniques of teaching biological sciences, Teacher centered approaches-lecture, demonstration, lecture cum demonstration, Child centered approach-project method, heuristic problem solving, assignment, Use of ICT in teaching-learning process of biological sciences with computer-aided methods like-Power Point, Simulation, Softwares, Webinars etc, Micro-teaching skills- Introduction, Explaining, Probing questioning, Illustration, Stimulus variation, Blackboard writing etc, Analysis of content, preparing unit plan, lesson plan.

**Course Outcomes:**

After completing this course students will be able to:

- Develop an understanding of the nature of biology.
- Develop skills of making teaching learning process experiential and joyful
- Identify the place of Biology in curriculum.
- Implement the action research in classroom teaching further in their teaching.
- Recall and understand about the methods of teaching biology.
- State the importance of evaluation.
- Understand the importance of audio visual aids and further use them in classroom.

- Understand the role and importance of biology.

## References:

1. Agarwal D.D.: *Modern Methods of Teaching Biology*, New Delhi: Sorup and Sons, 2002.
2. Aggarwal, D. D. (2008). *Modern Method of Teaching Biology*, Karanpaper Books. New Delhi.
3. Dr. S.C. Kulshreshtha; *Teaching of biology*.
4. Dr. S.C. Shukla; *Teaching of biology*.
5. K.Yadav; *Teaching of Life Sciences*.
6. Mangal S. K.: *Teaching of science*, New Delhi: Arya Book Depot, 1992.
7. Sharma, R.C. (2006). *Modern Science Teaching* .New Delhi: Dhanpat Rai Publications.
8. Yadav Seema and Singh A.K.: *Teaching of Life Science*, New Delhi: Dominant Publications.
9. Yadav, M.S. (2003) *Teaching of Science*. New Delhi: Anmol Publications.

## Website Sources:

- <https://www.learningclassesonline.com/2019/09/teaching-of-biological-science-in-hindi.html>
- <http://assets.v mou.ac.in/BED125.pdf>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED555: PRACTICUM: SCHOOL ATTACHMENT PROGRAMME-I**

**Course Objectives:**

The purpose of this course is to expose students to:

- Developing social and personal skills.
- Developing observation and perception skills.
- Adding relevance and meaning to learning.
- Providing first-hand real-world experiences.
- Enhancing motivation and interest in the subject.

**Course Content:**

- The student teachers will visit the neighbourhood schools for two weeks school Observation (Ten Lessons per Subject) to get acquainted with the school environment and its functions and processes and submit the report.
- The student teachers will familiarize themselves with school structure and administration.
- The student teachers will visit schools and interact with teachers to know about the assessment practices like CCE, grading patterns and reporting the performance of students and submit the report
- Students will analyse the assessment records and the report cards to study the models of assessment and procedures followed in reporting students' performance. The students will attend the PTA meetings where feedback about students' performance is given by the teachers and submit the report.
- The student teachers will observe minimum 3 classes of regular teachers for understanding the skills and strategies used in teaching by them.
- The student teachers will visit different types of schools such as Government, Government aided and private schools to study their governing norms, regulations and participation in the community.
- The student teachers will visit the schools run by community/NGO or other organizations like minority run schools, schools in SC/ST dominated areas, schools in slum areas, special and inclusive schools and submit the report.

**Course Outcomes:**

After completing the course students will be able to:

- Develop a comprehensive and critical understanding on diversities, disabilities, marginalization and inclusive education.
- Understand obstacles to learning due to discriminatory practices with respect to curriculum, teaching approaches, school organization, and various social and cultural factors.
- Implicit and explicit structures in our schools that act as a hindrance in including all students.

- Deliver pedagogies, curricula and assessments suitable to various inequalities, diversities and disabilities in Indian classroom.
- Develop an understanding of Technicality of Teaching roles.
- Curriculum Analysis helped in planning for classes.
- Involve and interact with the school activities and were accountable for the same.
- Understand the psycho-social needs of children.

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED531: TRANSITION ELEMENTS, COORDINATION COMPOUNDS  
AND CHEMICAL KINETICS**

**Course Objectives:**

The purpose of this course is to expose students to:

- Develop an understanding of Transition elements, Coordination compounds and Chemical kinetics.
- Know the most common structures observed for metal complexes.
- Predict the relative stabilities of metal complexes with different ligands.
- Describe the structures of complexes containing monodentate and polydentate ligands
- Use standard nomenclature rules to name coordination compounds
- Identify several natural and technological occurrences of coordination compounds

**Course Content:**

**Unit I: d-block and f-block elements**

To relate the electronic configuration to the properties and structure of transition metals and their compounds. Characteristic properties of d-block elements. Properties of the elements of the first transition series, their binary compounds and complexes illustrating relative stability of their oxidation states, coordination number and geometry. Position of lanthanides and actinides in the periodic table, lanthanide contraction and its consequences, spectral and magnetic properties of lanthanides, General properties of actinides:

**Unit II: Coordination Compounds**

To apply theories that explain certain properties and structure of transition metal complexes. Werner's coordination theory and its experimental verification, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes. Limitations of VBT. Elementary treatment of crystal field theory, splitting of d-orbitals in square planar, tetrahedral and octahedral complexes, factors affecting crystal field parameters, Explanation of magnetic behavior and color of complexes using CFT, effective atomic number concept.

**Unit III: Chemical Kinetics**

Understanding the factors that influence a chemical reaction and rationalising them on the basis of known theories of reaction rates. 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. 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.

#### **Unit IV: Surface Phenomena**

**Adsorption:** Introduction-Absorption and adsorption (definition, examples and differences) types of adsorptions-physical and chemical (definition, examples and differences between them), factors influencing the adsorption of gases on solids. Adsorption isotherms: definition, Mathematical expression for Freundlich and Langmuir's adsorption isotherms. Applications of adsorptions.

**Catalysis:** Definition, general characteristics, action of catalytic promoters and inhibitors. Homogeneous catalysis (definition and examples), Heterogeneous catalysis (definition and examples) mechanism of heterogeneous catalysis (based on adsorption theory) enzyme catalysis (definition and examples) Mechanism of enzyme catalysed reaction (lock and key mechanism)

#### **Course Outcomes:**

The students will be able to:

- Explain the fundamental concepts in coordination chemistry of transition metals.
- Understand rate of reaction and factors affecting it.
- Derive integrated rate expressions for zero order, first order, second order and third order reaction.
- Understand theories of reaction kinetics and differentiate them.
- Understand about recently lanthanides have been used in lasers.
- Know about actinides elements are used as nuclear fuels for various purposes.

#### **References:**

1. Inorganic Chemistry: James Huhey.
2. Essentials of physical chemistry ArunBahl, B.S. Bahl,G.D. Tuli.
3. Concise Inorganic Chemistry J.D.Lee 5th edition, Wiley publishers.
4. Advanced Inorganic Chemistry SatyaPrakash G.D. Tuli S.K. Basu, R.D. Madan.
5. S.Chand and company pvt. Ltd.
6. Principles of Physical Chemistry Puri, Sharma and Pathania.

#### **Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED551: PRACTICAL (CHEMISTRY)**

**Course Objectives:**

The objectives of this course are:

- To emphasize the applications of chemistry practical in day today life.
- To take into account appropriate methods of physical parameter analysis .
- To address the principles of physical and analytical chemistry and specific topics relevant to various disciplines.

**Course Content:**

1. Iodination of Acetone by titration and Colorimetry.
2. Acid Hydrolysis of Ester
3. Reaction between Potassium Peroxydisulphate and Potassium Iodide.
4. Base Hydrolysis of an Ester by Titration and Conductometry
5. Iodine clock reaction
6. Solvolysis of Tertiary Butyl Chloride by Titrimetry, conductometry and pH metry
7. Inversion of Cane Sugar
8. Colorimetric study of kinetics of oxidation of Indigo carmine by Chloromine-T.
9. To study the adsorption of acetic acid on activated charcoal
10. To determine the relative strength of Hydrochloric acid and sulphuric acid by studying the kinetics of hydrolysis of ethyl acetate.
11. To study kinetically the reaction rate of decomposition of iodine by hydrogen peroxide.
12. Determination of Copper by colorimetric method using ammonia as the complexing agent.
13. Determination of Ferric ion by colorimetric method using potassium thiocyanate as the complexing agent.
14. Estimation of Manganese in pyrolusite by volumetric method
15. Preparation of a complex: potassium trioxalato aluminate(III) trihydrate or potassium trioxalato cobaltate(III)
16. To determine the rate constant for the inversion of sucrose using polarimeter.

**Course Outcomes:**

Students are able:

- To know preparation of a complex.
- To prepare inorganic complex compound of industrial applications.
- To know the colorimetric method.

**References:**

1. A Text Book of Quantitative Inorganic Analysis, A I Vogel.

2. Systematic Experiments in Chemistry ArunSethi New Age International (p) Ltd. Cochin.

**Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED532: ATOMIC AND MOLECULAR PHYSICS**

**Course Objective:**

The goal of this course is to study basics of atomic and molecular Physics that are needed for explaining optical emission spectra of atoms and molecules.

**Course Content:**

**Unit I:**

Inadequacy of Bohr atomic model, correction due to finite mass of the nucleus, Rydberg constant in terms of reduced mass, Excitation and Ionization potentials, Franck-Hertz experiment, Bohr-Sommerfeld Model of atom, relativistic mass correction, vector model of an atom, Electron spin, space quantisation, magnetic moment of an electron due to its orbital motion. Stern-Gerlach experiment and its theory.

**Unit II:**

Spin-orbit interaction and Fine structure of spectral lines. Quantum numbers and selection rules. Pauli's exclusion principle. Electronic configuration of atoms. Valence electron and a brief mention of L-S and J-J coupling for multi electron atoms.

**Unit III:**

Fine structure lines of Sodium Zeeman effect. Explanation of Zeeman Effect on the basis of vector model of atom, Expression for Zeeman shift and experimental details. Mention on anomalous Zeeman effect, A qualitative mention of Paschen – Back and Stark effects.

**Unit IV:**

Molecular formation, the molecular ion, H<sub>2</sub> – molecule. Salient features of molecular spectra. Rotation, vibration and electronic spectra of molecules, associated quantum numbers and selection rules. Theory of pure rotation and rotation- vibration spectra, Raman and Infrared (IR) spectra, simple applications.

**Course Outcomes:**

Students completing this course will be able to:

- Motivate the necessity of using quantum mechanics calculations for describing atomic and molecular processes.
- Difference between atomic emission spectroscopy and atomic absorption spectroscopy and Atomic spectrum.
- Understand Atomic emission / absorption spectroscopy.
- Describe Zeeman's effect, Paschen back effect and Stark effect.
- Understand Molecular spectroscopy, and Lande splitting factor.
- Explain Molecular Spectra of diatomic molecules.
- Differentiate between Vibrational and Rotational energy levels.

## References:

1. H. S. Mani and G. K. Mehta, Introduction to Modern Physics, Affiliated East-West Press, India, 1990.
2. Arthur Beiser, Perspectives of Modern Physics, McGraw-Hill Inc., US; International edition edition.
3. J.R. Taylor, C.D. Zafiratos, Modern Physics, M.A. Dubson, PHI Learning, 2009.
4. R.A. Serway, C.J. Moses, and C.A.Moyer, Modern Physics, Cengage Learning, 2005.
5. G. Kaur and G.R. Pickrell, Modern Physics, McGraw Hill, 2014.
6. Rich Meyer, Kennard, Coop, Introduction to Modern Physics, Tata McGraw Hill, 2002.
7. R. Murugesan and K. Sivaprasath Modern Physics, S. Chand Publisher, 1994.
8. J. R. Reitz, F. J. Milford, and R. W. Christy, Foundations of Electromagnetic Theory, Addison-Wesley; 4 editions, 2008.

## Website Sources:

- <https://courses.lumenlearning.com>
- <https://www.khanacademy.org>
- <https://en.wikipedia.org>
- <https://arshadnotes.files.wordpress.com>
- <https://sahussaintu.files.wordpress.com>
- <https://www.britannica.com>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED552: PRACTICAL (PHYSICS)**

**Course Objective:**

The main goal of this course is to provide knowledge to the students about the Experiments. The students will get a better understanding by performing various experiments like hybrid parameters of transistors, LDR, Zener diode and UJT etc.

**Course Content:**

**List of Experiments**

1. Measurement of Hybrid parameter of a transistor.
2. To study the resonance in series LCR circuit with source of given frequency (A.C. mains).
3. To study and Plot the characteristic of L.D.R.
4. To study the FET amplifier in CS configuration.
5. To study the integrator circuit and observe the effect of RC upon fixed time form.
6. To draw the characteristic of Zener diode in reverse and forward bias voltage.
7. To measure certain UJT parameters and study the operation of UJT relaxation oscillator.
8. To Study the ripple factor in a d.c power supply.
9. To study the characteristics of a Tunnel diode.
10. To study emitter follower/ Darlington pair amplifier.

**Course Outcomes:**

Students completing this course will be able to:

- Measure hybrid parameters of transistors
- Study characteristics of L.D.R., FET, Tunnel diode and Zener diode.
- Evaluate ripple factor of dc supply.
- Calculate UJT parameters

**References:**

1. Practical Physics by Navneet Gupta.
2. Practical Physics by S. K. Gupta.
3. Hand book of Electronics by Gupta Kumar.
4. Practical Physics by S. L. Gupta.

**Website Sources:**

- <http://www.iiserpune.ac.in>
- <http://vlab.amrita.edu>
- <https://www.niser.ac.in>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED533: MULTIVARIATE CALCULUS & VECTOR CALCULUS**

**Course Objectives:**

The main aims of this course are to help for finding the integrals of multivariable functions viz. double and triple integrals with their applications, properties like gradient, divergence, curl associated with derivatives of vector point functions and integrals of vector point functions

**Course Content:**

**Unit I:**

Definition of a line integral and basic properties, Evaluation of line integrals, Definition of double integral, Conversion to iterated integrals, Evaluation of Double integral, change of variables, Surface areas. Definition of a triple integral, Evaluation, Volume as a Triple integral.

**Unit II:**

Improper integrals of the first and second kinds, Convergence, Gamma and Beta functions, Connection between Beta and Gamma functions.

**Unit III:**

Quadratic Curves, surfaces, sphere, cylinder, cone, Ellipsoid, Hyperboloid, Paraboloid.

**Unit IV:**

Vectors, Scalars, Vector field, Scalar field, Vector differentiation, The Vector Differential operator  $\text{del}$ , gradient, curl, Vector integration, The Divergence theorem of Gauss, Stoke's Theorem, Green's Theorem in plane (without proof).

**Course Outcomes:**

This course will enable the students to:

- Understand the basic concepts and know the basic techniques of differential and integral calculus of functions of several variables.
- Apply the theory to calculate the gradients, directional derivatives, arc length of curves, area of surfaces, and volume of solids.
- Solve problems involving maxima and minima, line integral and surface integral, and vector calculus.
- Develop mathematical maturity to undertake higher level studies in mathematics and related fields.

**References:**

1. Advanced Calculus by David Widder, Dover Publications Inc.
2. Calculus – Single and Multivariable by Hughes Hallet, Wiley.
3. Calculus and analytic geometry by Thomas and Finny, Pearson Education India.
4. Calculus by Lipman Bers, Vols 1 and 2, IBH.
5. First Course in Calculus by Serge Lang, Springer.

**Website Sources:**



- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED534: DEVELOPMENTAL BIOLOGY AND APPLIED  
ZOOLOGY AND ETHOLOGY**

**Course Objective:**

The main aim of the paper on Developmental Biology is to provide the undergraduate students an in-depth knowledge on the embryonic and post embryonic developmental processes. An important aspect of developmental biology is its implication in medicine which is also dealt with in this course. The economic impact of the organisms is often huge and that makes it even more important to study them.

**Course Content:**

**UNIT I: GAMETOGENESIS AND DEVELOPMENT-I**

- a) **Gametogenesis**–Structure and types of sperm, Spermatogenesis; Structure and types of eggs, Oogenesis
- b) **Fertilization**– Types, mechanism and its significances. Parthenogenesis
- c) **Cleavage**– Characters, types, patterns of cleavage, planes of cleavages, factors influencing cleavage.
- d) **Gastrulation**: Morphogenetic movements
- e) **Organizer phenomenon**– Organizer concept of Spemann, induction; competence, determination and differentiation

**UNIT II: DEVELOPMENT-II**

- a) Development of chick up to three germ layers and neurulation.
- b) Salient features of chick embryos of different ages – 18 hrs, 24 hrs, 33 hrs and 48 hrs, 72 hrs and 96 hrs of incubation
- c) Extra-embryonic membranes of chick – development, structure and functions of amnion, chorion, yolk sac and allantois
- d) Placenta in mammals– Structure, classification and types

**UNIT III: APPLIED ZOOLOGY**

- a) **Beneficial animals**: Basic principles: i) Sericulture ii) Apiculture iii) Aquaculture - fish, prawn and shell fish.
- b) **Harmful animals**: Pests – morphology, life cycle, damages caused and control measures of common insect pests of stored food grains and crops, nematode pests of crops, insect vectors (each two); Control – biological control (pheromone traps) and integrated pest management (IPM).

**UNIT IV: ETHOLOGY**

Definition and objectives of Ethology; Concept of motivation and releaser in behaviour; Innate behaviour, taxes, reflexes, instinctive behaviour (3); Learning, imprinting and its significance; biological clocks; Social behaviour in honey bees and monkey; Aggressive behaviour.

## Course Outcomes:

Upon completion of the course, students should be able to:

- Understand the events that lead to formation of a multicellular organism from a single fertilized egg, the zygote.
- Acquire basic knowledge of the cellular processes of development and the molecular mechanisms underlying these.
- Describe the general patterns and sequential developmental stages during embryogenesis; and understand how the developmental processes lead to establishment of body plan of multicellular organisms.
- Develop skills and realize significance of diagnosis of parasitic attack and treatment of patient or host.

## References:

1. Developmental Biology by K.V.Sastry & Vinita Shukla – (Rastogi Publications, 2008).
2. Introduction to Embryology by B.I. Balinsky – (W.B. Saunders, Philadelphia).
3. A Hand Book of Sericulture by Iyonemura & M.N.RamaRao.
4. Bee keeping by J.E.Eckert and F.R.Shaw.
5. Economic Zoology by G.S. Shukla & V.B. Upadhya.
6. Chordate Embryology by Verma P.S & Agarwal VK – Chand & Co.
7. Animal Behaviour by V.G.Dethier and E. S. tellar -(Prentice hall of India, New Delhi).
8. The study of Instinct by N Tinbergen.
9. The Dancing Bees by K V Frisch.

## Website Sources:

- [https://en.wikipedia.org/wiki/Developmental\\_biology#:~:text=Developmental](https://en.wikipedia.org/wiki/Developmental_biology#:~:text=Developmental)
- <https://microbenotes.com/category/developmental-biology/>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED553: PRACTICAL (ZOOLOGY)**

**Course Content:**

The approach of this paper is to make the students realize the most fascinating aspect of developmental biology that a single fertilized egg can give rise to a fully developed complex organism. The course explains the basic principles and concepts underlying the developmental processes at the level. The course shall surely skill the students to see, appreciate and understand the diversities of parasites in the whole spectrum of the study of life. The course shall also make the students aware about the possible scopes of the subject which include research and applied aspects including entrepreneurial works.

**Course Content:**

1. Study of different types of eggs (Insect, Frog, Hen).
2. Study of permanent slides of different developmental stages in Frog  
a) egg, b) early cleavage, c) morula, d) blastula, e) gastrula.
3. Study of permanent slides/different developmental stages of a) neural plate, b) neural fold, c) Early tadpole, d) hind limb stage, e) hind limb and fore limb stage, f) short tailed stage, g) young Frog.
4. Preparation of window on hen's egg to study development of embryo.
5. Incubation of fertilized egg of chick, preparation of permanent mounting of embryo from incubated egg and identification of age of the embryo.
6. Study of permanent slides of chick embryos of  
a) 18 hrs, b) 24 hrs, c) 33 hrs, d) 48 hrs of incubation
7. Study of common insect pests of stored grains and crops.
8. Study of common insect vectors.
9. Study of economically important  
a) Fishes, b) crustaceans, c) molluscs.
10. Study of Preferences: a) Preening behaviour in birds, b) Photo-, chemo-, and Geotaxes in *Drosophila*
11. Stimuli eliciting aggressive displays in male Siamese fighter fish; b) colour change in female Siamese fighter fish
12. Experiments with maze for studying behavioural motivation in rat.
13. **Sericulture Project** – Moriculture, Collection of laying, incubation, black boxing, brushing, rearing, moulting, spinning, harvesting cocoons, reeling, raw silk (study of some economic traits – fecundity, larval duration, cocoon weight, shell weight and silk weight).

**Course Outcome:**

Upon completion of the course, students should be able to:

- Discuss the general mechanisms involved in morphogenesis and to explain how different cells and tissues interact in a coordinated way to form various tissues and organs.
- Understand about the evolutionary development of various animals.
- Develop skills and realize significance of diagnosis of parasitic attack and treatment of patient or host.

**References:**

1. A manual of practical zoology: biodiversity, cell biology, genetics & developmental biology part 1 (M.M. Trigunayat).

**Website Sources:**

- <https://ocw.mit.edu/courses/biology/7-22-developmental-biology-fall-2005/index.htm>
- [https://embryology.med.unsw.edu.au/embryology/index.php/Main\\_Page](https://embryology.med.unsw.edu.au/embryology/index.php/Main_Page)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED535: BOTANICAL NOMENCLATURE, ANGIOSPERM  
TAXONOMY AND UTILIZATION OF PLANTS**

**Course Objective:**

The objective of this course is to enhance the knowledge of the students about the flowering plants, their classification, nomenclature, herbarium and botanical gardens. The students will also learn about the botanical description, cultivation and economic importance of some food crops, oil yielding plants, fiber yielding plants, medicinal plants and timber yielding plants.

**Course Content**

**Unit I:**

ICBN, principles and aims; type concept, concept of genus and specific epithet, Principle of priority, units of classification.

Brief account of regional, national and international herbaria, significance of herbaria; identification keys and floras.

An outlines of artificial, natural and phylogenetic systems of classification. Salient features and outline classification of Bentham and Hooker and Hutchinson.

**Unit II:**

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

**Unit III:**

Study of the diagnostic features, salient vegetative and floral characteristics and economically important plants of following families: i) Apocyanaceae ii) Asclepiadaceae, iii) Solanaceae, iv) Liliaceae, v) Poaceae, vi) Arecaceae

**Unit IV:**

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.
- d) Timber and bamboos: Rosewood, teakwood, honne, canes and bamboos.
- e) Beverages: coffee, tea, cocoa.
- f) Spices and condiments: General account, cardamom, clove, pepper, ginger, cinnamon, saffron, turmeric, mustard.
- g) Rubber: Hevea, Ficus.
- h) Medicinal plants: Brief account of ethnobotany, uses of Cinchona, Rauwolfia, Poppy, Ashwagandha and Gheekwar.

**Course Outcomes:**

Students who successfully complete this course will be able to know:

- What is the role of ICBN in plant taxonomy? What are different data sources in Classification of flowering plants?
- What are different methods of naming plants? What are different principles of nomenclature? Why name changes?
- What are artificial, natural and phylogenetic systems of classification?
- What are different methods of collecting and preserving plants? What is the importance of maintaining plants in botanic gardens?
- Comparison among different flowering plants groups.
- Learn the importance of plant of different plants.

### References:

1. Davis, P.H. and V.H.Heywood, 1963, Principles of Angiosperm Taxonomy, Oliver and Boyd, London.
2. Heywood, V.H. and D.M.Moore (Ed.) 1984, Current concepts in Plant Taxonomy, Academic Press, London.
3. Hutchinson, J., The families of Flowering Plants, Clarendon Pres, Oxford.
4. Jones, A.B. and A.Luchsinger, 1979, Plant Systematics, McGraw Hill Book Co., New York.
5. Kochhar S.L.1981, Economic Botany in the Tropics, MacMillan India Ltd., Delhi.
6. Lawrence, G.H.M. 1950 Taxonomy of Vascular Plants, MacMillan, London.
7. Priti Shukla and Misra, 1988, Taxonomy of Angiosperms, Vikas Publishing House, New Delhi.
8. Singh V. and D.K.Jain, 2005, Taxonomy of Angiosperms, Rastogi Publications, Meerut.
9. Singh, G.1999, Plant Systematics: Theory and Practice, Oxford and IBH Pvt. Ltd., New Delhi.
10. Stace, C.A. 1989, Plant Taxonomy and Biosystematics (2nd Ed.), Edward Arnold, London.
11. Vashista P.C. 1980, Taxonomy of Angiosperms, Sultanchand & Co., New Delhi.

### Website Sources:

- <http://www.equisetites.de>
- <https://www.science.gov>
- [www.pdfdrive.com/botany-books.html](http://www.pdfdrive.com/botany-books.html)
- [www1.biologie.uni-hamburg.de](http://www1.biologie.uni-hamburg.de)
- [www.pdf.com](http://www.pdf.com)
- [en.wikipedia.org](http://en.wikipedia.org)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www.freebookcentre.net](http://www.freebookcentre.net)
- [www.nativeplants.org](http://www.nativeplants.org)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- V**

**BSCBED554: PRACTICAL (BOTANY)**

**Course Objective:**

This course aims to familiarize the students with technical terms and their definitions, preparation of herbarium and to enhance the knowledge about the medicinal significance of the indigenous plants.

**Course Content:**

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. Submission of herbarium collection of at least 25 local wild plants.
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 (Write their botanical name, family, part used, active principle and diseases/disorders for which they are prescribed).

**Course Outcomes:**

The students completing this course will be able to:

- Have knowledge of taxonomic terms and plants identification as well as their economic importance.
- Develop the skill of collection and preservation of plant specimens.
- Study the different food crops, plants fibers, medicinal plants and timber yielding plants.

**References:**

1. A text Book of Practical Botany<sup>2</sup> by Bendre and Kumar.
2. Modern Practical Botany Vol. III by B.P. Pandey.
3. Practical Botany II by O.P Sharma.

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED621: CREATING AN INCLUSIVE SCHOOL**

**Course Objectives:**

The purpose of this course is to expose students to:

- Understand the concept and nature of inclusive education
- Understand the global and national commitments towards the education of children with diverse needs
- Prepare conducive teaching learning environment in inclusive schools
- Identify and utilize existing resources for promoting inclusive practices

**Course Content:**

**Unit I: Basic Concepts and Introduction to Inclusive Education**

Meaning of Impairment, Disability and Handicap; Concept of Special Educational Needs and Diverse Needs, Difference between Special Education, Integration and Inclusive Education. Significance of Inclusive Education; Factors Affecting and Promoting Inclusion.

**Unit II: Nature and Needs of Diverse Learners-Identification of Diverse Learners in the Classroom**

Sensory Impairment: Hearing impairment and Visual impairment Physical Disabilities: Orthopaedic impairment, Cerebral Palsy, Special Health Problems, Congenital defects; Slow Learners and Under Achievers; Intellectual Disability; Learning disabilities and ADHD; Autism Spectrum Disorders; Multiple disabilities ; Emotional and Behavioural Problems; Gifted and Creative; Socially Disadvantaged, Economically Deprived, Religious and Linguistic Minorities, Inhabitants of Geographically Difficult Areas.

**Unit III: Preparing Schools for Inclusion-General Considerations and Provisions**

Concept of Inclusive School, Competencies and Characteristics of inclusive Teacher Physical Consideration, Socio-Emotional Considerations, Curricular Considerations Provision of Assistive devices, equipment's and technological support. Special provisions in Evaluation.

**Unit IV: Inclusive Practices in Classroom**

Making learning more meaningful: Responding to special needs by developing strategies for differentiating content, curriculum adaptation and adjustment, lesson planning and TLM. Pedagogical strategies to respond to needs of individual students: Cooperative learning strategies in the classroom, peer tutoring, buddy system, reflective teaching, multisensory teaching. Use of ICT suitable for different disabilities.

**Practicum**

- Collection of data regarding children with special needs.
- Visit to Inclusive Schools and to observe classroom transaction of any one of such school and make a report of the same.

- Identifying one/two pupils with special needs in the primary schools and preparing a profile of these pupils.
- Preparation of teaching aids, toys, charts, flash cards for children having any one type of disability. (Visit to Resource Room)
- Preparation of Lesson Plan, instruction material for teaching students with disability in inclusive school.
- Developing list of teaching activities of CWSN in the school.
- Visits to different institutions dealing with different disabilities and Observation of their Classroom.
- In addition, school and community based activities may be organized.

### Course Outcomes:

After the completion of the course, Students will be able to

- Identify specific identities that exist beyond the superficial .Examples of this would be cultural background, socio-economic status, country of origin.
- Discuss possible impacts of a person self-defined identity on his/her learning or on his/her ability to teach diverse students.
- Recognize examples of unconscious bias, both in themselves and in others.

### References:

1. Fimian, M.J., Fafard, M., and Howell, K.W.: *A Teacher's guide to Human Resources in Special Education: Para Professionals, Volunteers, and peer tutors*. Boston: Allyn and Bacon, Inc.
2. Furth, H. (1964). *Thinking without Language*. New York: Free Press.
3. Hallahan, D.P. and Kauffman, J.K. (1988). *Exceptional Children: Introduction to special Education*. N.J.: Englewood Cliffs.
4. Jangira, N.K. (1986). *Special Education Scenario in Britain and India*. Gurgaon: The Academic Press.
5. Jangira, N.K. (2013). NCERT: The Mother of Inclusive Education, Regional Institute of Education NCERT, Ajmer. (Also available on Google search Jangira special education).
6. Julba, A. (2014) Teachers creating Inclusive classrooms: Issues and challenges – A research study
7. Kapoor, S. (2015). Index of Inclusive School Quality, Brotherhood, Delhi.
8. Kothari, R.G. and Mistry, H.S. (2011). *Problems of students and Teachers of the special schools – A study of Gujarat state*. Germany: VDM Publication.
9. Maitra, K. & Saxena, V. (ed)(2008) *Inclusion: Issues and Perspectives*, Kanishka.
10. Meadow, K.P. (1980). *Deafness and child development*. Berkley, C.A.: University of California Press.
11. Messily, K. (2012). *Confronting Marginalisation in Education: A Framework for Promoting inclusion*, Routledge, London.
12. Mithu, A. and Michael, B. (2005). *Inclusive Education: From rhetoric to Reality*, New Delhi: Viva Books Pvt. Ltd.
13. NCERT (2006) Position Paper: National Focus Group on Education of Children with Special Needs, NCERT, New Delhi.

### Website Sources:

- <https://www.mgkvp.ac.in/Uploads/Lectures/15/696.pdf>
- <http://egyankosh.ac.in/handle/123456789/46059>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED622: PEDAGOGY OF PHYSICAL SCIENCE-II**

**Course Objective:**

The objective of the course is to enable the student- teachers to:

- Develop a broad understanding of the principles and procedures used in modern physical science education.
- Develop their essential skill for practicing modern physical science education.
- Develop their skills necessary for preparing international accessories.
- Prepare acceptance lesson models which lay down this procedure to the acceptance for preparing designs for lesson.
- Manage introduction activity in such a way that the vast majority of the learners attain most of the objectives.

**Course Content:**

**Unit-I:- Curriculum and Instructional Material Development**

Meaning, definition and principles of curriculum construction and its types, Curriculum organization using procedure like concentric, topical, process and integrated approaches, adaptation of the curriculum according to the local needs and the availability of local resources, Development of physical science curriculum at different stages of school education e.g. primary, upper primary, secondary and senior secondary, Current trends in science curriculum, Preparation, selection and use of teaching aids, Curriculum accessories and support material - text books, journals, hand books, student's workbook, display slide, laboratory materials.

**Unit-II: - Content Analysis and Lesson Planning**

Content analysis, pedagogical analysis of content (Taking an example of any one topic of physical science). Following points should be followed for pedagogical analysis – Identification of minor and major concepts, listing behavioral outcomes, Listing activity and experiments, listing evaluation procedure, Developing unit plans and lesson plans.

**Unit-III: - Evaluation in Physical Science Teaching**

Evaluation: meaning and needs, formative and summative evaluation, Process of development of tests for measuring specific outcomes - cognitive outcomes, affective outcomes and psychomotor outcomes, Diagnostic testing and remedial teaching, Preparation of achievement test, development of improvised apparatus.

**Course Outcomes:**

After completing this course students will be able to:

- Understand the nature and characteristics of language of mathematics and its correlation with science and other subjects.
- State the need and importance of evaluation.
- State the aims and objectives of teaching mathematics.
- Understand the various methods and techniques of teaching mathematics.

- Develop an ability to understand various methods of evaluation of students' performance in mathematics.
- Develop skills of making teaching learning process experiential and joyful

## **References:**

1. Kulshrestha, S.P. : Teaching of Physical Science, R.Lal Book Depot, Meerut
2. Sood, J.K. : Teaching of Physical Science, Agarwal Publication, Agra
3. Pandey, Shashi Kiran : Science teaching, Vani Prakashan, New Delhi
4. Rawat, D.C. : Teaching of Science, Vinod Pustak, Agra
5. Das, R.C. : Science teaching in schools, Steerling Publication, New Delhi
6. Bennett, Jeffrey : on teaching Science (print/e-book) Big Kid Science Publication
7. Singh, R. : Teaching methods in schools, Commonwealth Publication, Delhi.
8. Norman Herr : The source book for teaching Science (e-book/print) Wiley Publication
9. Pathak, R.P. : Teaching skills, Pearson Publication, New Delhi
10. Yadav, M.S. : Objective Science, Anmol Publication, New Delhi
11. Siddiqui, N.N. & Siddiqui, M.N. : Teaching of Science, Doaba House, New Delhi
12. Chauhan S.S. : Innovation in teaching, Vikas Publication, New Delhi

## **Website Sources:**

- <http://egyankosh.ac.in/bitstream/123456789/46799/1/BES-143B2-E.pdf>
- <https://www.learningclassesonline.com/2019/09/pedagogy-of-mathematics-in-hindi.html>
- <https://www.youtube.com/watch?v=d4oi-Q28wbs>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED623: PEDAGOGY OF MATHEMATICS-II**

**Course Objective:**

The objective of the course is to enable the student- teachers to:

- Understand and appreciate the uses and significance of mathematics in daily life.
- Learn successfully various approaches to mathematics and to use them judiciously.
- Know the methods of planning instruction for the classroom.
- Prepare curricular activities and organize the library in it as per the needs.
- Appreciate and organize activities to develop aesthetics of mathematics.
- Obtain feedback both about teaching as well as student's learning.

**Course Contents:**

**Unit I: -**

Using mathematics as a game for recreation, organizing Quiz programmes, skill development in answering puzzles, magic squares, word search etc., developing a math's laboratory, Learning about the short cuts mentioned in Vedic mathematics.

**Unit -II: -**

Principles and rationale of curriculum development, organizing the syllabi both logically and psychologically according to the age groups of children, Planning activities and methods of developing the substitute/ alternative material to the prescribed syllabus for completing it in due course of time, Organization of mathematics laboratory, Text book of mathematics- qualities of a good text book of mathematics, Using mathematics as a game for recreation; organizing quiz programmes, skill-development in answering puzzles riddles, magic squares, word search etc, Learning about the short cuts mentioned in Vedic mathematics, Development of maths laboratory

**Unit III: -**

Meaning and needs of evaluation, Process of obtaining feedback and evaluation in mathematics in terms of cognitive affective and psychomotor behavioral development Comprehensive and continuous evaluation (C.C.E.) in mathematics, Development of test item (short answer and objective type), Diagnostic testing and remedial teaching Preparation of an achievement test

**Course Outcomes:**

After completing this course students will be able to :

- Develop skills of making teaching learning process experiential and joyful.
- Understand the nature and characteristics of language of mathematics and its correlation with science and other subjects.

- State the need and importance of evaluation.
- State the aims and objectives of teaching mathematics.
- Understand the various methods and techniques of teaching mathematics.
- Develop an ability to understand various methods of evaluation of students' performance in mathematics.

### **References:**

1. Maheshwari, B.K.: Teaching of Mathematics.
2. Shukla, S.C.: Teaching of Mathematics.
3. Kulshrestha, A. K., Teaching of Mathematics.

### **Website Sources:**

- <https://www.youtube.com/watch?v=3xWDOUIILWs>
- <https://hi.wikipedia.org/wiki>
- [www.vkmaheshwari.com](http://www.vkmaheshwari.com)
- [www.pinterest.com](http://www.pinterest.com)>pin

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED624: PEDAGOGY OF BIOLOGICAL SCIENCE-II**

**Course Objectives:**

The objective of the course is to enable the student- teachers to:

- Develop broad understanding of principles and knowledge used in biology science.
- Develop their essential skills for practicing biological science.
- Know various approaches and methods of teaching life science.
- Lesson planning of biological science properly.
- Prepare tools for evaluation in biological sciences.

**Course Content:**

**Unit-I: -**

Curriculum and resource utilization: Principles for designing a Biology curriculum. Approaches to curriculum organization using procedures like concentric, topical, process and integrated approaches. Adapting the curriculum to local needs and requirements and the availability of local resource. Practical work in Biology; record writing for Biology projects.

**Unit- II: -**

Curricular accessories and support material – Textbooks, Journals, Handbooks, student's work books, display slides, laboratory materials, audio-video support material, etc. – their critical evaluation from the point of view of teaching biology.

**Unit-III: -**

Evaluating outcomes of biology teaching: Merits and limitations of different item formats for assessing learning outcomes of biology teaching. Writing items in different formats for evaluating learning outcomes at various levels of cognitive, affective and psychomotor domain. Try-out, item analysis and selection of items suitable for formative and summative evaluation. Diagnostic testing and remedial teaching; developing formative evaluation instruments as aids to learning.

**Course Outcomes:**

After completing this course students will be able to:

- Develop an understanding of the nature of biology.
- Understand the role and importance of biology.
- Identify the place of Biology in curriculum.
- Recall and understand about the methods of teaching biology.
- State the importance of evaluation.
- Implement the action research in classroom teaching further in their teaching.
- Understand the importance of audio visual aids and further use them in classroom.
- Develop skills of making teaching learning process experiential and joyful

## References:

1. Agarwal D.D.: *Modern Methods of Teaching Biology*, New Delhi: Sorup and Sons, 2002
2. Mangal S. K.: *Teaching of science*, New Delhi: Arya Book Depot, 1992
3. Yadav Seema and Singh A.K.: *Teaching of Life Science*, New Delhi: Dominant Publications
4. Aggarwal, D. D. (2008). *Modern Method of Teaching Biology*, Karanpaper Books. New Delhi
5. Sharma, R.C. (2006). *Modern Science Teaching*. New Delhi: Dhanpat Rai Publications.
6. Yadav, M.S. (2003) *Teaching of Science*. New Delhi: Anmol Publications
7. K.Yadav “Teaching of Life Sciences.”
8. Dr. S.C. Kulshreshtha; *Teaching of biology*.
9. Dr. S.C. Shukla; *Teaching of biology*.

## Website Sources:

- <https://www.learningclassesonline.com/2019/09/teaching-of-biological-science-in-hindi.html>
- <http://assets.vmou.ac.in/BED125.pdf>

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED655: PRACTICUM: SCHOOL ATTACHMENT PROGRAMME-II**

**Course Objective:**

The purpose of this course is to expose students to:

- Develop social and personal skills.
- Develop observation and perception skills.
- Add relevance and meaning to learning.
- Provide first-hand real-world experiences.
- Enhance motivation and interest in the subject.

**Course Content**

During this phase student teachers are expected to begin developing their own understanding about facilities available in school, learners and their learning context, curriculum transactions in school. Student teachers gain understanding being into actual school environment by observation, gathering information and interaction with students, teachers and school Head.

The following tasks centered on school, learner contexts and teacher context are suggested to be carried out by student teachers in this phase.

- Analyze how the curriculum proposed at the national /state levels are translated into class room practices by observing teacher's classes of any one subject
- Identity the resources and facilities used by the teacher for teaching a lesson and interact with teacher to identify the resource mobilization.
- Study of the availability of facilities and resources catering to curriculum transaction at upper primary and secondary levels - labs, library, activity rooms, learning resources, art and craft resources and resources for physical education and yoga.
- Study of the facilities and scope for inclusiveness in school environment.
- Observation of classes to understand the learning processes; Study the learners coming from diverse back grounds and their interaction in classrooms - social context of learners; Individual differences; learning facilities for Inclusive children.
- Observation of learners in various contexts ( participation in school activities, play ground, lunch time, participatory role in school functioning, maintenance of class room and school surroundings, responsibilities taken in various club activities etc.).
- Understand the dynamics of classroom processes and multiple roles of teacher & learners.
- Understand the Classroom management strategies employed by the teacher.
- Interact with teachers to understand how unit and lesson planning are done in their subjects
- Understand school policies and practices to address student learning difficulties remediation, extra study hours etc. - at macro level- across subjects and at micro level within the class room.
- Analyze test- question papers in subjects to understand what is assessed; types of questions/items used; and with reference to the objectives of the unit/lesson

- Reflect on the processes employed in CCE and the observed outcomes.

### **Course Outcomes:**

After completing the course students will be able to:

- Develop a comprehensive and critical understanding on diversities, disabilities, marginalization and inclusive education.
- Understand obstacles to learning due to discriminatory practices with respect to curriculum, teaching approaches, school organization, and various social and cultural factors.
- Implicit and explicit structures in our schools that act as a hindrance in including all students.
- Deliver pedagogies, curricula and assessments suitable to various inequalities, diversities and disabilities in Indian classroom.
- Develop an understanding of Technicality of Teaching roles.
- Curriculum Analysis helped in planning for classes.
- Involve and interact with the school activities and were accountable for the same.
- Understand the psycho-social needs of children.

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED631: ORGANIC CHEMISTRY – II**

**Course Objectives:**

The objectives of this course are:

- To understand the methods for preparation of alcohols.
- To understand the different classes of alcohols.
- To understand the structure of carboxylic acid and their derivatives.
- To understand the reactivity of different carboxylic acid derivatives.
- To understand the chemical reactions of phenols.
- To understand how to name different aldehydes and ketones.
- To understand the reactivity of different carbonyl compounds towards nucleophilic reaction.
- To understand how to write the products of addition reaction to carbonyl compounds.
- To understand to differentiate between primary, secondary and tertiary amines.

**Course Content:**

**Unit I: Alcohols and Phenols**

Monohydric alcohols: Nomenclature, methods of formation (reduction of aldehydes, ketones, carboxylic acids and esters). Hydrogen bonding, Acidic nature. Reactions of alcohols (oxidation, esterification, dehydration). Dihydric alcohols: Nomenclature, methods of formation (from alkenes and alkyl dihalides), chemical reactions of vicinal glycols-oxidative cleavage [Pb(OAc)<sub>4</sub> and HIO<sub>4</sub>] and Pinacolpinacolone rearrangement. Trihydric alcohols: Nomenclature and methods of formation (from alkenes and alkenals), chemical reactions of glycerol (with nitric acid, oxalic acid and HI). Phenols: Nomenclature, structure and bonding, Preparation of phenol. Physical properties and acidic character of phenol. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols: Electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis and Reimer-Tiemann reaction.

**Unit II: Carbonyl Compounds 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 acids. Physical properties. Mechanism of nucleophilic addition to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Use of acetals as protecting group. Baeyer-Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH<sub>4</sub> and NaBH<sub>4</sub> reductions. Halogenation of enolizable ketones. An introduction to s, b unsaturated aldehydes and ketones.

**Unit III: Carboxylic Acids and their Derivatives**

Nomenclature, structure and bonding. Preparation of carboxylic acids – by oxidation, using Grignard reagents and hydrolysis of nitriles. Physical properties, acidity of carboxylic acids, effect of substituents on acid strength. Reactions of carboxylic acids: HVZ reaction, synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation. Methods of formation and chemical reactions hydroxy acids – malic, tartaric and citric acids. Unsaturated monocarboxylic acids: Methods of formation and chemical reactions Dicarboxylic acids: Methods of formation and effect of heat and dehydrating agents. Carboxylic acid derivatives: Structure and nomenclature of acid chlorides, esters, amides and acid anhydrides. Preparation of carboxylic acid derivatives, chemical reactions. Mechanism of esterification and hydrolysis (acid, base conditions).

#### **Unit IV: Organic Compounds of Nitrogen**

**Nitro Compounds:** Introduction, Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media. Picric acid.

**Aliphatic and Aromatic amines:** Structure and nomenclature of amines, Preparation of alkyl and aryl amines (reduction of nitro compounds, nitrites), reductive amination of aldehydic and ketonic compounds. Gabriel-phthalimide reaction, Hofmann bromamide reaction. Reactivity, physical properties, stereochemistry of amines. Separation of a mixture of primary, secondary and tertiary amines (Hinsberg's method). Structural features effecting basicity of amines. Reactions of amines, electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid. Synthetic transformations of aryl diazonium salts.

#### **Course Outcomes:**

After completing the course, students will be able to:

- Able to recognize structures of acid halides, esters, amides, acid anhydrides.
- Able to convert given name of alcohol to structure.
- Able to write the order of reactivity of different carboxylic acid derivatives.
- Able to describe different classes of alcohols.
- Able to write down structure of phenol and phenoxide ion.
- Students are able to recognize mechanism of different reactions related to carbonyl compounds.
- Students are able to differentiate between given different amines.

#### **References:**

1. Advanced organic chemistry ArunBahl and B.S. Bhal
2. Organic Chemistry: Reagents and Reactions Agrawal, Goel Publishing House 53<sup>rd</sup> edition 2015
3. Organic Chemistry John Macmumy 9th Edition 2016.
4. Organic Chemistry J.Clayden, N. Greeves and S.Warren 2nd Edition 2012 Oxford University Press.

#### **Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED651: PRACTICAL (CHEMISTRY)**

**Course Objectives:**

The objectives of the course are:

- To emphasize the applications of chemistry practical in day today life.
- To take into account appropriate methods of analysis of organic compounds.
- To address the principles of organic chemistry and specific topics relevant to various disciplines like analytical chemistry.

**COURSE CONTENT:**

**A. Qualitative organic analysis**

1. Separation of organic mixtures containing two solid components using water, NaHCO<sub>3</sub>, NaOH
2. Analysis of an organic compound: Detection of extra elements (N,S and X) and functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, alcohols, amines, amides, nitro and anilides) in simple organic compounds. Identification of organic compound based on functional group analysis, determination of physical constant (mp / bp).

**B. Chromatographic Techniques**

**(i) Thin Layer Chromatography**

- a) Determination of R<sub>f</sub> values and identification of organic compounds:
- b) Identification of plant pigments by thin layer chromatography
- c) Preparation and separation of 2,4-dinitrophenylhydrazones of acetone / 2-butanone using toluene : light petroleum (2:3 ratio)
- d) Separation of mixture of dyes

**(ii) Paper Chromatography**

Determination of R<sub>f</sub> values and identification of organic compounds:

- a) Separation of mixture of amino acids
- b) Separation of mixture of D-galactose and D-fructose using n-butanol: acetic acid: water (4:5:1) ; Spray reagent: anilinehydrogenphthalate

**(iii) Column Chromatography**

Separation and identification of ortho and para nitro anilines

**Course Outcomes:**

After completing the students will be able to:

- Know R<sub>f</sub> values and identification of organic compounds:.
- Know the Qualitative organic analysis.
- Know the Chromatographic Techniques.

**References:**

1. A Text Book of Qualitative Organic Analysis, A I Vogel
2. A Text Book of Quantitative Organic Analysis, A I Vogel
3. Systematic experiments in Chemistry ArunSethi, New Age International(P) Ltd.

**Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED632: CLASSICAL & QUANTUM MECHANICS**

**Course Objective:**

The objectives of this course are to apprise the students about fundamental concepts in the dynamics of system of particles, motion of rigid body, Lagrangian and Hamiltonian formulation and to give them exposure basic postulates and formulations of quantum Mechanics.

**Course Content:**

**Unit I:**

Constraints- sclerenomic and rheonomic constraints, holonomic and non holonomic constraints, Generalized co-ordinates and velocities, Principle of virtual work, D'Alembert's principle, Euler- Lagrange equations, Cyclic co-ordinates, Conservation laws and symmetry properties, applications of Lagrangian formulation (simple pendulum). Canonical momenta & Hamiltonian of a system. Hamilton's equations of motion. Hamiltonian for a harmonic oscillator.

**Unit II:**

Inadequacies of Classical Physics– black body radiation and photoelectric effect, Planck's hypothesis of black body radiation, Einstein's explanation of photoelectric effect with derivation, Wave-particle duality, de Broglie's hypothesis of matter waves, concept of group velocity and phase velocity and their relationship, Davisson and Germer experiment. Uncertainty Principle.

**Unit III:**

Wave function, interpretation of wave function, postulates of quantum mechanics, probability density, Eigen functions and eigen values, expectation values, Normalization of wave functions, development of time dependent and time independent Schrodinger wave equation.

**Unit IV:**

Operator method of deriving Schrodinger equation. Applications of Schrodinger wave equation– one dimensional infinite potential well, finite potential well, phenomenon of tunneling, one dimensional harmonic oscillator, hydrogen atom (only qualitative discussion).

**Course Outcomes:**

Students completing this course will be able to:

- Understand constraints, necessity of Lagrangian and Hamiltonian formulations.
- Describe Wave-particle duality, de Broglie's hypothesis
- Explain Importance of quantum mechanics compared to classical mechanics.
- Apply various tools to calculate eigen values, eigen functions.
- Derive time dependent and time independent Schrodinger equations and to apply them to solve problems.

**References:**

1. Arthur Beiser, Perspectives of Modern Physics, McGraw-Hill Inc.,US; International edition edition.
2. H.Goldstein, C.P. Poole, J.L. Safko, Classical Mechanics 3rd Edn., Pearson Education, 2002.
3. L. D. Landau and E. M. Lifshitz, Mechanics, Pergamon, 1976.
4. P.S. Joag, N.C. Rana, Classical Mechanics 1st Edn., McGraw Hall.
5. R. D. Gregory, Classical Mechanics, Cambridge University Press, 2015.
6. L. I. Schiff, Quantum Mechanics, 3rd Edn., Tata McGraw Hill, 2010.
7. R. Shankar, Principles of Quantum Mechanics 2nd edition, Springer, 2014.
8. David J Griffith, Introduction to Quantum Mechanics, Addison Wesley; 2 edition, 2004.
9. P. M. Mathews and K. Venkatesan, A Text book of Quantum Mechanics, 2nd edition, McGraw Hill, 2010.
10. R. Eisberg and R. Resnick, Quantum Mechanics, 2nd edition, Wiley, 2002.
11. G. Aruldas, Quantum Mechanics, 2nd edition, PHI Learning of India, 2002.
12. Reed, Quantum Mechanics, Jones and Bartlett Learning, 2008.

### **Website Sources:**

- <https://ocw.mit.edu>
- <https://cnx.org/>
- <https://sites.astro.caltech.edu/>
- <https://www.damtp.cam.ac.uk/>
- <http://www.physics.usu.edu/>
- <https://ocw.mit.edu>
- <http://physics.weber.edu>
- <http://wcchew.ece.illinois.edu>
- <https://chem.libretexts.org>
- <https://ww2.odu.edu>
- <http://www.pas.rochester.edu>
- <https://en.wikipedia.org/wiki>
- <http://www-personal.umich.edu>

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED652: PRACTICAL (PHYSICS)**

**Course Objective:**

The main goal of this subject is to share the knowledge to the students about the various network theorems. The students will get a better understanding of the concepts studied by them in the theory course and correlate them with experimental observations.

**Course Content:**

**List of Experiments**

1. To verify superposition theorem and determine the current flowing through the load resistance.
2. To verify Thevenin theorem and determine the current flowing through the load resistance.
3. To verify Norton theorem and determine the current flowing through the load resistance.
4. To Plot the V-I characteristics of P-N junction diode.
5. To plot the input and output characteristics of transistor in Common Emitter Configuration.
6. To plot the input and output characteristics of transistor in Common Base Configuration.
7. To study a push Pull amplifier using transistor.
8. To verify the condition of oscillation in Phase shift oscillator.
9. To measure the self-inductance of a given coil by Anderson's bridge method.
10. To study the differentiator circuit and obtain differentiated pulse from it at different frequencies

**Course Outcomes:**

Students completing this course will be able to:

- Verify various network theorems.
- Plot V-I characteristics of diode.
- Plot input and output Characteristics of transistor.

**References:**

- Practical Physics by Navneet Gupta.
- Practical Physics by S. K. Gupta.
- Hand book of Electronics by Gupta Kumar.
- Practical Physics by S. L. Gupta.
- Networks, Lines and Fields- John D Ryder ( Prentice-Hall).
- Electronic Principles – Malvino.

**Website Courses:**

- <https://www.electronics-tutorials.ws>
- <http://itmgoi.in>
- <https://www.electronics-tutorials.ws>
- <https://www.electronicshub.org>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED633: GROUPS AND RINGS**

**Course Objectives:**

The main aims of this course are to introduce the concepts and to develop working knowledge on Groups, Normal Subgroups, Auto morphism groups, Finite groups and Rings.

**Course Content:**

**Unit I:**

Groups, Examples, Properties and types, Sub-groups. Cyclic groups and properties, Cosets, Lagrange's theorem and its Consequences, Dihedral groups, Normal subgroups, Quotient groups.

**Unit II:**

Homomorphism and Isomorphism of groups, Kernel of a Homomorphism, Fundamental theorem of Homomorphism, Cauchy's theorem for abelian groups, Permutation group, Alternating Group, Cayley's Theorem.

**Unit III:**

Rings, Integral Domains, Division Rings, Fields, Properties, Field of quotients. Ideals, Quotient rings Maximal, Prime and Principal ideals, Principal ideal ring, Divisibility in an Integral domain.

**Unit IV:**

Homomorphism of a ring, Kernel, Isomorphism, Fundamental theorem of Homomorphism, Polynomial rings, Divisibility, Irreducible polynomials, Division Algorithm, Greatest Common Divisor, Euclidean Algorithm.

**Course Outcomes:**

This course will enable the students to:

- Identify the concept of Normal groups and Quotients groups.
- Analyze Permutation groups and counting principle.
- Explain Sylow's theorem and its applications.
- Provide information on ideals and Quotient rings, Field of Quotient of an integral domain.

**References:**

1. A Brief Survey of Modern Algebra by Birkhoff and Maclane, IBH.
2. A First Course in Abstract Algebra by Fraleigh, Addison-Wesley.
3. Algebra by Michael Artin, Prentice Hall of India Pvt. Ltd.
4. Basic Abstract Algebra, 2nd Edition by P.B.Bhattacharya, S K Jain and S R Nagpaul, Cambridge University Press.
5. Contemporary Abstract Algebra by Joseph A. Gallian, Narosa Publishing House.
6. Higher Engineering Mathematics by Kreyszig, Wiley.
7. Modern Algebra – An Introduction by Durban, 5th Edition, Wiley.

8. Modern Algebra by Vasishtha, Krishna Prakashan Media Pvt. Ltd.
9. Topics in Algebra by Herstein, Wiley.

**Website Sources:**

- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED634: ANIMAL PHYSIOLOGY, ENDOCRINOLOGY AND  
IMMUNOLOGY**

**Course Content:**

Physiology is the study of life, specifically, how cells, tissues and organ function. It is a core and fundamental scientific discipline that underpins the health and well-being of living organisms. Besides satisfying a natural curiosity about how our body systems function, it gives us knowledge about the functions of all the parts and systems of the body. The immune system is incredibly complex. This course is hence designed to enable understanding the molecular and cellular basis of the development and function of the immune system and identification of its biological, clinical and therapeutic implications.

**Course Content:**

**Unit I: Digestion, Circulation and Respiration**

- a) **Digestion**–Physiology of digestion, role of enzymes and GI hormones. Absorption of carbohydrates, proteins, lipids, vitamins and minerals
- b) **Circulation**: Composition of blood and physiology of blood clotting; Lymphatic system; origin, conduction and regulation of heart beat, heart beat and pulse, cardiac cycle, blood pressure.
- c) **Respiration**– Mechanism of breathing (external respiration) in man; structure and function of haemoglobin; Transport of gases - oxygen transport, oxygen equilibrium curve, Bohr effect; Transport of carbon dioxide, chloride shift; Control and regulation of respiration

**Unit II: Excretion, Nerve and Muscle Physiology**

- a) **Excretion**: Nitrogenous waste products – Ammonotelism, ureotelism, uricotelism; Ornithine cycle; outline structure of human kidney and nephron, physiology of urine formation, counter-current mechanism; micturation; dialysis
- b) **Homeostasis**– thermoregulation in animals – Poikilotherms, heterotherms and homeotherms, adaptive changes in animals
- c) **Nervous Co-ordination**– Structure and types of neuron and synapses; Physiology of transmission of impulse across axons and synapses, neuroinhibitors and neurotransmitters (4)
- d) **Muscle contraction**–Ultrastructure of striated muscle, Contractile and regulatory proteins, neuro-muscular junction, mechanism of skeletal muscle contraction

**Unit III: Endocrinology**

- a) General organization of mammalian endocrine system
- b) Pituitary, thyroid, parathyroid, adrenal and gonads – Structure and functions of their secretions, abnormalities, A brief account on hormonal control of human pregnancy

- c) Hormones: properties, feed-back mechanism, classification, mode of action of hormones (steroid and peptides)
- d) **Reproductive cycles**– Estrous cycle in cow and menstrual cycle

#### **Unit IV: Immunology**

Introduction to Immunology, Types of Immunity, Lymphoid organs, Cells of immune system; Overview of antigen, structure and types of antibody, antigen-antibody reaction; Immune responses – Humoral and cell-mediated immunities (2); Autoimmunity and hypersensitivity; **AIDS** - Structure of HIV, preventive measures of AIDS.

#### **Course outcome:**

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

- Describe the basic mechanisms, distinctions and functional interplay of innate and adaptive immunity
- Relate to errors occurring during development leading to congenital disorders and human diseases.

#### **Suggested Readings:**

1. Animal Physiology by A. Maria Kuttikan & N. Arumugam – (Saras Publication, Nagercoil, Tamil Nadu).
2. Regulatory mechanism in Vertebrates by Kamleshwar Pandey and J.P. Shukla – (Rastogi Publications, 2008).
3. Animal Physiology by K.A. Goyal and K.V. Sastry – (Rastogi Publications, 2008).
4. Endocrinology and Reproductive Biology by K.V. Sastry – (Rastogi Publications, 2008).
5. Animal Physiology by Arora M.P. (1989) – Himalaya Publishing House.
6. Textbook of Medical Physiology by Guyton A.C. & Hall J.E. (1996) – (W.B. Saunders & Co.).
7. General and Comparative Physiology by Hoar W.S. (1983) – (Prentice Hall Publication).
8. A textbook of Animal Physiology by Hurtkat P.C. & Mathur P.N. (1976) – (S. Chand & Co.).
9. Textbook of Animal Physiology by Nagabhushanam R. & Kodarkar M.S. (1978) – (IBH).
10. General Endocrinology by Turner C.D. & Gangara J.T. (1971) – (W.B. Saunders & Co.)
11. Immunology by Dulsi Fatima

#### **Website Sources:**

- <https://www.hhmi.org/biointeractive/human-embryonic-development>
- <https://www.khanacademy.org/science/biology/developmental-biology>
- <https://ocw.mit.edu/courses/biology/7-22-developmental-biology-fall-2005/index.htm>
- [https://embryology.med.unsw.edu.au/embryology/index.php/Main\\_Page](https://embryology.med.unsw.edu.au/embryology/index.php/Main_Page)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED653: PRACTICAL (ZOOLOGY)**

**Course Objective:**

This course is hence designed to enable understanding basis of the development and function of the immune system and identification of its biological, clinical and therapeutic implications.

**Course Content:**

**List of Experiments**

1. Preparation of blood smears.
2. Total count of RBC.
3. Total count of WBC.
4. Differential count of Leucocytes.
5. Estimation of haemoglobin.
6. Human urine analysis for a) Nitrogenous substances, b) Normal inorganic constituents, c) Abnormal constituents – (i) glucose, (ii) protein, (iii) ketone bodies.
7. To set up simple experiments to find out the rate of respiration in terrestrial/aquatic animals like cockroach, fish or rat.
8. Study of stained slides of mammals –  
T.S. of a) Stomach b) Intestine c) Kidney d) Liver e) Pituitary, f) Adrenal gland, g) Thyroid, h) Testis, i) Ovary, j) Placenta, k) Pancreas.
9. Effect of different Conc. NaCl on RBCs.

**Course outcomes:**

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

- Describe basic and state-of-the-art experimental methods and technologies
- Integrate knowledge of each subsystem to see their contribution to the functioning of higher-level systems in health and disease including basis of vaccination, autoimmunity, immunodeficiency, hypersensitivity and tolerance

**Reference:**

1. Practical Immunology by Hay Frank C.

**Website Sources:**

- E-content on e-PG Pathshala portal of Government of India:  
<https://epgp.inflibnet.ac.in/Fundamentals>
- <https://www.asmscience.org/content/book>

**Note: Latest editions of all the suggested readings must be used.**

# IFTM UNIVERSITY, MORADABAD

## DEPARTMENT OF EDUCATION B.Sc.-B.Ed. Integrated Programme SEMESTER- VI

### BSCBED635: PLANT PHYSIOLOGY AND METABOLISM

#### Course Objective:

This course aims to familiarize the students with various physiological processes, water absorption, transpirations, ascent of sap, photosynthesis and respiration. The main objective of this course is to understand the growth hormones and their role in plant's physiology, Nutrients elements and their role in metabolic processes.

#### Course Content:

##### Unit I:

- a) Importance of water to plant life, properties of water.
- b) Diffusion, osmosis and imbibition – definitions, concept of water potential, osmotic potential.
- c) Absorption of water: Root as an absorbing organ, mechanism and pathways of water active and passive absorption movement from root hair to root xylem - symplast, apoplast and trans-membrane pathways.
- d) Ascent of sap: Vertical pathway of water in plants, structural properties of xylem, root pressure theory, cohesion – tension hypothesis.

##### Unit II:

- a) Transpiration: Definition, types, mechanism of stomatal opening and closing (role of K<sup>+</sup> and Abscisic acid), factors and significance of transpiration, guttation.
- b) Cellular Respiration: Introduction, respiratory quotient, aerobic and anaerobic respiration, structure of mitochondrion, glycolysis, synthesis of acetyl CoA, Krebs cycle, oxidative phosphorylation, electron carrier complexes factor affecting respiration.

##### Unit III:

- a) Photosynthesis: Introduction, ultrastructure of chloroplast, photosynthetic pigments, absorption and action spectra, photochemical (light) reaction, photophosphorylation, Z-scheme, Calvin cycle, C<sub>4</sub> pathway, CAM pathway, photorespiration, factors and significance of photosynthesis.
- b) Transport of Organic Substances: Ultrastructure and functions of phloem, (sieve tube), mechanism of phloem transport, source – sink relationship, theories and factors affecting.
- c) Mineral Nutrition: Major and micro-nutrients, Nitrogen Metabolism: biological nitrogen fixation. Role of N, P, K, Ca, Mg, Fe, N and Zn in plant metabolism, Mineral deficiency symptoms.

##### Unit IV:

- a) Growth and Development: Definitions, phases of growth and development, photomorphogenesis, physiological role and factor affecting the growth of plants.
- b) Plant growth Regulators: General account, discovery, chemical nature, physiological effects and applications of auxins, kinins, gibberellins, ethylene and abscisic acid.

- 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.

### **Course Outcomes:**

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

- Understand the plants and plant cells in relation to water, the movement of sap and absorption of water in plant body.
- Know micro and macronutrients and their role in plant developments.
- Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C<sub>3</sub> and C<sub>4</sub> pathways.
- Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.
- Understand the plant movements, physiology of flowering, seed dormancy and germination.

### **References:**

1. Hopkins, W.J. 1995, Introduction to Plant Physiology, John Wiley and Sons, Inc., New York.
2. John, J.L., 1994, Fundamentals of Biochemistry, Sultanchand & Co., New Delhi.
3. Lehninger A.B., 1982, Principles of Biochemistry, CBS Publishers and Distributors, New Delhi.
4. Leo, P.J. and R.C. Leegood, 1999, Plant Biochemistry and Molecular Biology, John Wiley & Sons, England.
5. Salisbury, F.B. and C.W. Ross, 1992, Plant Physiology (4th Ed.) Wadsworth Publishing Co. USA.
6. Srivastava H.S. and N Shankar, 2006, Plant Physiology and Biochemistry, Rastogi Publications, Meerut,
7. Srivastava, H.S., 2005, Plant Physiology, Biochemistry and Biotechnology, Rastogi Publications, Meerut.
8. Taiz, L. and E. Zeiger, 1998, Plant Physiology (2nd Ed.), Sinauer Associates Inc. USA.

### **Website Sources:**

- [www.pdfdrive.com/botany-books.html](http://www.pdfdrive.com/botany-books.html)
- [www.digitalbookindex.org](http://www.digitalbookindex.org)
- [www1.biologie.uni-hamburg.de](http://www1.biologie.uni-hamburg.de)
- [www.topfreebooks.org](http://www.topfreebooks.org)
- [www.pdf.com](http://www.pdf.com)
- [en.wikipedia.org](http://en.wikipedia.org)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www.freebookcentre.net](http://www.freebookcentre.net)

**Note: Latest editions of all the suggested readings must be used.**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VI**

**BSCBED654: PRACTICAL (BOTANY)**

**Course Objective:**

This course aims to familiarize the students with various physiological processes, water absorption, transpirations, ascent of sap, photosynthesis and respiration. The main objective of this course is to understand the growth hormones and their role in plant's physiology, Nutrients elements and their role in metabolic processes.

**Course Content:**

1. Study of Osmosis (Exosmosis & Endosmosis) by Pofeto Osmoscope.
2. Study of Plasmolysis in Hydrilla/ Tradescantia leaves.
3. Study of transpiration rate under different conditions by using Ganong's/ Farmer's Potometer.
4. Study of RQ different respiratory substrates (Carbohydrates, Proteins, fats) by using Gangong's respirometer.
5. Estimation of the protein content in extracts of plant material by Lowry's methods.
6. Study of the presence of starch in green leaf.
7. Study of the seed germination and seedling growth under the salt stress condition.
8. Measurement of growth by using arch auxanometer.
9. Comparison of rate of photosynthesis under different environmental conditions by using Wilmat's bubblers.
10. Demonstration of necessity of light, CO<sub>2</sub> and chlorophyll for photosynthesis.
11. Plotting the absorption spectrum of chlorophylls.
12. Quantitative estimation of chlorophylls by colorimetry.
13. Demonstration of aerobic and anaerobic respiration.
14. Study the distribution of growth in roots.
15. Observation of cyclosis in plant materials.
16. Testing the germinability of seeds using TTC.

**Course Outcomes:**

The students completing this course will be able to know:

- How the physiological processes are performed in plants by using different instruments.
- Why osmosis and plasmolysis both processes are necessary for the plants.
- Estimation of protein, starch and chlorophyll contents.
- What effects of salt stress on seed germination and seedling growth.

**References:**

1. Practical Botany II by O.P Sharma.
2. A text Book of Practical Botany 2 by Bendre and Kumar.

3. Modern Practical Botany Vol. III by B.P. Pandey.

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

## ***FORTH YEAR***

**IFTM UNIVERSITY, MORADABAD  
DEPARTMENT OF EDUCATION  
B.Sc.-B.Ed. Integrated Programme  
SEMESTER- VII**

### **BSCBED721; HEALTH AND PHYSICAL EDUCATION**

#### **Course Objective:**

The purpose of this course is to expose students to:

- Introduce with the concept of wholistic health and various dimension and determinants of health.
- Acquaint them to school health programmed its importance.
- Sensitize the student towards physical fitness & its importance.
- Help them acquire the skills for assessment of physical fitness.
- Introduce them to the philosophical bases of Yoga.
- Understand the process of stress management through Yoga education.
- Acquire the knowledge of techniques of performing yogasana and develop the skill for the same.

#### **Course Content:**

##### **Unit I: Health Education Scenario in India**

Introduction to the concept of health, significance and importance in the context of ancient and modern Indian perspective Identity of Educational Institutional Plants: Structure, Infra-Structure and Environment, Time-Space-Personnel-Material Constellation Educational Management System, Emerging Health & Total Quality of the Educational Institutions, Status of Health Education in India from Pre-Natal Education through Higher Education, Yoga & Yog, Health & Hygiene, Clean Toilets, Work & Leisure, Quality of Health – Role of Education, Administrators, Teachers, Students, Supporters,

##### **Unit II: Tech-related Health Risks**

Identification of the technological health hazards – Smartphone Stress, Acne caused by the Cell Phones, Blackberry Stress Injuries to the Thumb, Radiation from the cell phones, Cell Phone Sickness, Cell Phone & Car Accidents, Allergies & Phones, Crazy Phones, Computers Causing Wrist Pain, Back & Neck Pain, Decreased Sperm Count from the WIFI, Laptop Burns, Laptop Headaches, Sleeping Problems from the Laptops, Decreased attention span from using Facebook, The Internet Causing Anxiety, Headphone Use leading to Accidents, Hearing Loss from Headphones, Visual Impairment, Death from Social Networking, Environmental Degradation, Aggression, Social Crimes--- Evolving Controlling & Regulatory Mechanisms.

##### **Unit III: Approaches to Sound Health**

Physical fitness, strength, endurance and flexibility, its components, sports skills, indigenous and self-defence activities. Games and sports – athletics (general physical fitness exercises), games

(lead-up games, relays and major games) rhythmic activities, gymnastics and their impact on health. Fundamental skills of games and sports; Sports for recreation and competition; Rules and regulation of sports; sports ethics; sports awards and scholarships, sportsmanship. Yoga. Safety and security – Safety measures to be taken in Libraries, Laboratories, Classrooms, Halls, Play Fields, Water Tanks, Swimming Pools, Community Pools, Roads Human Development Index (HDI), Health: Vision, Goals and Objectives of Government of India, Experiments on Influence of Surroundings & Thought, Science of Laughter & Smiles, Health Observation Programs, Impact of TV Serials. Role of Institutions (schools, family and sports), health services, policies and major health and physical education-related programme, blood banks, role of media.

#### **Unit IV: First Aid – Principles and Uses**

Structure and function of human body and the principles of first aid. First aid equipments. Fractures-causes and symptoms and the first aid related to them, Muscular sprains cause, symptoms and remedies, First aid related to hemorrhage, respiratory discomfort, First aid related to Natural and artificial carriage of sick and wounded person, Treatment of unconsciousness, Treatment of heat stroke, General disease affecting in the local area and measures to prevent them.

#### **Practicum**

Surfing to know the diseases in India. Preventive & Ameliorative measures for health hazards. Playing Games. Athletics. Yoga. Reflective Dialogues on Serials, such as, Satyamev Jayate on Health of the People. Preparation of inventories on myths on exercises and different type of food. Make an inventory of energy rich food and nutritious food (locally available) indicating its health value. Strategies for positive thinking and motivation. Preparation of first aid kit.

#### **Course Outcomes:**

After the completion of the course, Students will be able:

- To enable the student to have good health.
- To practice mental hygiene.
- To possess emotional stability.
- To attain higher level of consciousness.

#### **References:**

1. Agarwal, Satya P. (1998). The social role of the Gītā: how and why, Motilal Banarsidass, ISBN 978-81-208-1524-7, retrieved 17 June 2010.
2. Arora, P. (2005) Sex Education in schools, Prabhat Prakashan
3. Bette J., Logdson & Others, “Physical Education for Children”, Lea and Febiger, Philadelphia.
4. Deboarh, A. Wuest, Charles, A. Bucher: “Foundation of Physical Education Exercise Science and Sports”, Tata McGraw Hill Pvt. Ltd., New Delhi.
5. Gharote, M.L. (2004). Applied Yoga, Kaivalyadhama S.M.Y.M. Samiti, Lonavala.
6. Ghore, M.M.; “Anatomy and Physiology of Yogic Practices”. Lonavala Yoga Institute, Lonavala.
7. Goel, Devraj & Goel, Chhaya (2013). Universe of Swami Vivekananda & Complete.
8. Jack, H. Wilmore, David, L. Costil, W. Larry Kenney, “Physiology of Sports and Exercise: Human Kinetics Publication.

9. Jason Liu and Dr. Gwendalle Cooper (2009) *Scientific Analysis of the Effects of Falun Dafa* Presented at International Conference of Psychologists, February 27, 2009 by Catherine Hennessy.
10. John, Cheffers; Tom, Evaul: "Introduction to Physical Education – Concept of Human Movement". Prentice Hall Engle Wood: New Jersey.
11. John, E. Mixton, Ann, E. Jewett: "An Introduction to Physical Education, W.B. Saunders Company, London.
12. MDNIY (2010). "Yoga Teachers Manual for School Teachers, New Delhi.
13. Mehroo D. Bengalee (1976). *Child Guidance*. Sheth Publishers, Educational Publishers, 35, Everest, Pedder Road, Bombay.
14. Ministry of Health & Family Welfare, Government of India, *Annual Report to the People on Health*, December 2011.
15. NCERT (2013). Training and Resource materials on Adolescence Education, NCERT, New Delhi (This material is also available on [www.aeparc.org](http://www.aeparc.org).[www.ncert.nic.in](http://www.ncert.nic.in))
16. NCERT (2014). Population Education, Source Material, NCERT, New Delhi.
17. NCERT (2015). Yoga: A Healthy Way of Living Secondary Stage, New Delhi.
18. NCERT (2015). Yoga: A Healthy Way of Living Upper Primary Stage, New Delhi.
19. Park, K.; "Preventive and Social Medicine" Banarsidas Bhanoth, Publishers Nagpur Road, Jablapur, India.
20. Porter, Noah (2003). *Falun Gong in the United States: An Ethnographic Study*, Master Thesis, Department of Anthropology, College of Arts and Sciences, University of South Florida.
21. Roberts, S. Weinberg & Daniel Gould, "Foundation of Sports and Exercise Psychology", Human Kinetics Publication.
22. Stephen, J. Williams, Paul R. Torrents, "Introduction to Health Service", Delmore Publications.
23. Swami Satyanand Saraswati, "Asana Pranayama Mudra Bandh", Bihar School of Yoga, Munger.
24. Uppal, A.K.; Lawrance Gray Kumar, "Biomechanics in Physical Education and Exercise Science: Friends Publication, New Delhi.
25. Wholistic Social Development, CASE Publication under UGC SAP, The M.S. University of Baroda, Vadodara.

### Website Sources:

- Position Paper National Focus Group on Health and Physical Education, NCERT
- [http://www.ncert.nic.in/new\\_ncert/ncert/rightside/links/pdf/focus\\_group/health\\_prelims\\_final.pdf](http://www.ncert.nic.in/new_ncert/ncert/rightside/links/pdf/focus_group/health_prelims_final.pdf)
- Learning curves: sports in education, (2013) Azim Premji Foundation
- <http://azimpremjifoundation.org/pdf/learning-curve-17.pdf>
- [www.FalunDafa.org](http://www.FalunDafa.org)
- [www.http://greatist.com/health/19-worst-tech-related-health-risks](http://www.greatist.com/health/19-worst-tech-related-health-risks)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

*Select any Two School Subjects on the basis of General Education Component (GEC)*

**BSCBED755: PRACTICUM: INTERNSHIP IN SCHOOL SUBJECT**

**PHYSICAL SCIENCE**

**BSCBED756: PRACTICUM: INTERNSHIP IN SCHOOL SUBJECT**

**MATHEMATICS**

**BSCBED757: PRACTICUM: INTERNSHIP IN SCHOOL SUBJECT**

**BIOLOGICAL SCIENCE**

**Course Objective:**

The purpose of this course is to expose students to:

- Understanding the Internship School and the community around.
- Analysis of school syllabus and textbooks.
- Observing the classroom teaching of regular teachers.
- Observation of classroom teaching of peer student-teachers.
- Preparation of case study of the internship school and the innovative activities that the school undertakes.
- Preparation of Lesson Plans and Unit Plans.
- Teaching the units of the prescribed syllabus in two subjects currently being taught in the school.
- Teaching as a substitute teacher.
- Mobilisation and development of teaching-learning resources.
- Preparation of a question papers and other assessment tools.

- Preparation of a diagnostic tests and organisation of remedial teaching.
- Undertake case study of a child.
- Undertake action research project on at least one problem area of schooling.
- Community work, community survey etc.
- Maintenance of a reflective diary or journal to record day to day happenings and reflections thereon.
- Writing a term paper on a selected theme.

### **Course Outcomes:**

After the completion of the course, Students will be able to:

- Develop a comprehensive and critical understanding on diversities, disabilities, marginalization and inclusive education.
- Understand obstacles to learning due to discriminatory practices with respect to curriculum, teaching approaches, school organization, and various social and cultural factors.
- Implicit and explicit structures in our schools that act as a hindrance in including all students.
- Deliver pedagogies, curricula and assessments suitable to various inequalities, diversities and disabilities in Indian classroom.
- Develop an understanding of Technicality of Teaching roles.
- Curriculum Analysis helped in planning for classes.
- Involve and interact with the school activities and were accountable for the same.
- Understand the psycho-social needs of children.

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED731: ELECTROCHEMISTRY AND PHOTOCHEMISTRY**

**Course Objectives:**

The objectives of this course are:

- To understand the concepts of electrochemistry.
- To understand the working and reaction of electrochemical cells.
- To understand the Nernst equation.
- To understand the photochemical reactions and their applications.

**Course Content:**

**Unit I: Electrochemistry – I**

To study the behaviour and reactions of ions in a variety of environments through the laws that govern them. 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 Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Transport number, definition and determination by Hittorf method. Applications of conductivity measurements: Determination of degree of dissociation, determination of  $K_a$  of acids, determination of solubility product of a sparingly soluble salt.

**Unit II: Electrochemistry – II**

Electrode reactions, Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode-reference electrodes–standard electrode potential, sign conventions, electrochemical series and its significance. To draw up a scheme for discussing the equilibrium position for an ionic reaction in terms of the electrode potential. 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 ( $\Delta G$ ,  $\Delta H$  and  $K$ ), Chemical cells with and without transport.

**Unit III: Electrochemistry – III**

Concentration cell with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient. Definition of pH and  $pK_a$  determination of pH using hydrogen, quinhydrone and glass electrodes, hydrogen over voltage Power storage, Lead Battery, Ni-Cd cells, Fuel Cells, Hydrogen–Oxygen cell. Thermodynamic and Kinetic basis of corrosion, methods of inhibition of corrosion

**Unit IV: Photochemistry**

Discussing the Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus – Drapper law, Stark – Einstein law, Jablonski diagram showing various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radioactive processes (internal conversion,



intersystem crossing), quantum yield, photosensitized reactions – energy transfer processes (simple examples), Chemiluminescence.

### **Course Outcomes:**

After the completion of the course, the students will be:

- Able to recognize the reaction of electrochemical cells and types
- Able to predict the reversible and irreversible reaction.
- Have knowledge of photochemical laws and their applications
- Able to solve numerical problems related to electrochemistry

### **References:**

1. Photochemistry Gurudeep Raj Goel Publishing House
2. Principles of Physical Chemistry Puri, Sharma, Pathania 47th Edition Vishal Publishing Co.
3. Elements of Electrochemistry by Samuel Glasstone and Lewis
4. Principles of Physical chemistry -Marron and Prutton

### **Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED751: PRACTICAL (CHEMISTRY)**

**Course Objectives:**

The objectives of this course are:

- To determine the solubility and solubility constant.
- To know equivalent conductance of a strong electrolyte.
- To understand potentiometry.

**Course Content:**

1. To determine the equivalent conductance of a strong electrolyte at several concentrations and verify Onsager's equation.
2. Conductometric titration of a strong acid Vs. strong base, strong base Vs. weak acid, strong base Vs mixture of acids (strong and weak) to determine the concentration of acids in a given solution and in mixture.
3. To determine the concentration of the given acid solution and concentration of acids in a mixture by potentiometric titration using sodium hydroxide solution.
4. Determination of Pka value of a weak acid by potentiometry.
5. Determination of the dissociation constant of a weak acid by conductometry
6. To determine the equivalent conductance of a weak electrolyte at different concentrations and verify Ostwald's dilution law. Also to find out the dissociation constant of a weak electrolyte.
7. To determine the solubility and solubility constant of a weak electrolyte conductometrically.
8. To find the composition of the complex formed between iron (III) and salicylic acid by Job's method.
9. To find out the amount of copper sulphate in the given solution by titrating with standard alkali by conductometry.
10. To determine the amount of FAS in the given solution by potentiometric titration with standard potassium dichromate and potassium permanganate solutions.
11. Estimation of Silver nitrate by potentiometric titration with standard potassium chloride solution.

**Course Outcomes:**

After the completion of the course, the students will be:

- Students are able to know solubility and solubility constant of a weak electrolyte.
- Ability to know the Quantitative analysis.
- Ability to know the dissociation constant of a weak acid by.

**References:**

1. A Text Book of Qualitative Organic Analysis, A I Vogel
2. A Text Book of Quantitative Organic Analysis, A I Vogel

3. Systematic experiments in Chemistry ArunSethi, New Age International(P) Ltd.

**Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED732: NUCLEAR AND PARTICLE PHYSICS**

**Course Objective:**

This course aims is to familiarize the students about content areas of nuclear properties, nuclear models and particle physics.

**Course Content:**

**Unit I:**

Basic properties of nucleus– charge, spin, radii, mass, magnetic moment. Nuclear forces and their characteristics. Yukawa’s Theory (Qualitative), Packing fraction and binding energy, average binding energy and its variation with mass number, main features of binding energy versus mass number curve, Nuclear stability.

**Unit II:**

Nuclear Models– Liquid drop model approach, semi empirical mass formula and significance of various terms, condition of nuclear stability. Two nucleon separation energies, Fermi gas model (degenerate fermion gas, nuclear symmetry potential in Fermi gas), evidence for nuclear shell structure, nuclear magic numbers, basic assumption of shell model.

**Unit III:**

Radioactive decay – Half life, mean life, Activity-decay constant. Radioactive displacement laws. Theory of a decay,  $\alpha$ -emission, Gamow factor. Geiger- Nuttal law. Beta decay, energy kinematics for Beta decay, positron emission Beta spectra. Neutrino hypothesis, K electron capture, internal conversion, Gamma decay, pair production, successive disintegration, units of radio activity, radioactive dating, uncontrolled and controlled chain reactions, nuclear fission and fusion. Energy liberated in nuclear fission.

**Unit IV:**

*Particle Accelerators and Detectors:* Cockroft– Walton voltage multiplier, LINAC, Cyclotron, Betatron.

*Nuclear Detectors:* GM counter, scintillation detector, bubble chamber, principle of semiconductor detector.

**Course Outcomes:**

Students completing this course will be able to:

- Acquire basic knowledge about nuclear properties such as mass, spin, radius, mass defect, binding energy etc.
- Develop the understanding of nuclear disintegration
- Understand the various nuclear models.
- Construction, working and applications of accelerators and detectors.

**References:**

1. Kaplan, Nuclear Physics, Narosa, 2002.

2. Kenneth S. Krane, Introductory nuclear Physics, Wiley India Pvt. Ltd., 2008.
3. Bernard L. Cohen, Concepts of nuclear physics, Tata McGraw Hill, 1998.
4. Subramanyam and Brijlal, Atomic and Nuclear Physics, S. Chand & Company Ltd. 2013.
5. R.A. Dunlap, Introduction to the physics of nuclei & particles, Thomson Asia, 2004.
6. Arthur Beiser, Perspectives of Modern Physics, McGraw-Hill Inc.,US; International edition.
7. D. Griffith, Introduction to Elementary Particles, John Wiley & Sons, 2008.

### **Website Sources:**

- <https://en.wikipedia.org>
- <https://fys.kuleuven.be>
- <http://oregonstate.edu>
- <https://cds.cern.ch>
- <http://physics-database.group.shef.ac.uk>
- <https://www.physics.umd.edu>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED752: PRACTICAL (PHYSICS)**

**Course Objectives:**

This objective of this course is to familiarize the students about G M counters, FET, Hartley oscillator and spectrometer etc. by performing experiments.

**Course Content:**

(A minimum of TEN experiments to be selected from the following)

1. GM Counter characteristics.
2. GM Counter– Absorption coefficient.
3. Determination of Half life of Co-60.
4. Simulation experiment on radioactive decay.
5. Verification of inverse square law for beta rays.
6. Verification of inverse square law for gamma rays.
7. Rutherford model– Simulation technique.
8. Ionization potential of Xenon.
9. Measurement of Mercury spectrum wavelength.
10. Spectrometer-Quartz prism-Refractive indices of quartz for the ordinary and extraordinary rays.
11. LCR Parallel resonance
12. LCR Series resonance.
13. FET characteristics.
14. Hartley oscillator.

**Course Outcomes:**

Students completing this course will be able to:

- Understand characteristics of GM Counter
- Plot characteristics of FET
- Verify inverse square law
- Evaluate ionization of Xenon

**References:**

1. Solid State Electronic Devices by B.G. Streetman.
2. Integrated Electronics by J. Millman and C.C. Halkias.
3. Electronics Devices and Circuit Theory by R.L. Boylested and L. Nashelysky.
4. Electronic Devices and Circuits by Balbir Kumar and S. B. Jain.

**Website Sources**

- <https://circuitglobe.com>
- <https://ecee.colorado.edu>

- <https://ecee.colorado.edu>
- <https://en.wikipedia.org>
- <http://www.sasurieengg.com>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED733: LINEAR ALGEBRA**

**Course Objectives:**

The main aims of this course are to clear the basic concept of linear algebra, it play an important role to study and analyze the mathematical problems. The student learns about vector Spaces, inner product spaces, linear transformation on these spaces and their canonical forms and types of linear transformations.

**Course Content:**

**Unit I:**

Vector spaces, Subspaces, Linear Combinations, Linear span, Linear dependence and Linear independence of vectors, Basis and Dimension, Finite dimensional vector space – some properties. Quotient spaces, Homomorphisms and Isomorphisms of vector spaces, Direct sums.

**Unit II:**

Inner product spaces, Euclidean vector spaces, Distance, Length, Properties, Cauchy- Schwarz inequality, Orthogonal and orthonormal vectors, Gram Schmidt Orthogonalisation Process, Orthogonal complement.

**Unit III:**

Matrices of Linear maps, Change of basis and the effect of associated matrices, Kernel and Image of a linear transformation, Rank and Nullity theorems.

**Unit IV:**

Singular and non-singular linear transformations, Minimal Polynomial.

**Course Outcomes:**

This course will enable the students to:

- Understand the concepts of Linear independence, bases and Dual spaces.
- Discuss Algebra of Linear Transformations and Characteristics roots.
- Study canonical forms and Nilpotent transformations.
- Analyze rational canonical forms and Determinants.
- Understand the Hermitian, Unitary and Normal Transformations.

**References:**

1. Brief Survey of Modern Algebra, Birkhoff and MacLane, IBH
2. Elementary Linear Algebra with Applications, Keith Nicholson, PWS – Kent Publishing Company
3. Introduction to Linear Algebra by Stewart, Van Nostrand Co. Ltd.



4. Linear algebra – a geometric approach by Kumaresan. S, Prentice Hall India Learning Private Limited
5. Linear Algebra by Larry Smith, Spinger Verlag.
6. Linear Algebra by Serge Lang, Addison Wesley Publishing company Inc.
7. Linear Algebra, Surjith Sinth, Vikas Publishing House Pvt. Ltd.
8. Modern Algebra by Vasishta, Krishna Prakashan Media Ltd.
9. Modern Algebra, Vol.II, by Narayanan and Manicavachagam Pillay, S. Vishwanathan and Co.
10. Theory and Problems of Linear Algebra, Saymour Lipschitz, Schaum's outline, TMH Publishing Co.
11. Vector Algebra, Shantinarayan and P K Mittal, S Chand and Co. Ltd.

### **Website Sources:**

- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED734: CELL BIOLOGY, GENETICS AND EVOLUTION**

**Course Objectives:**

The objectives of the course are to help the students to learn and develop an understanding of a cell as a basic unit of life. This course is designed to enable them to understand the functions of cellular organelles and how a cell carries out and regulates cellular functions. Unknown to them, human beings had been applying the principles of genetics by engaging in selective breeding of domesticated animals for many centuries. However, it was only with the work of Mendel and advent of 20th century, that basic principles of the science of genetics were formulated

**Course Content:**

**Unit I: CELL AND CELL ORGANELLES – I**

Prokaryotic and Eukaryotic cells: Plant and animal cell differences, Cell theory; Protoplasm and its properties; Cytoskeleton – Microtubules, Microfilament. Cell membrane – Ultrastructure, fluid mosaic model and functions; Structures and functions of Endoplasmic Reticulum, Mitochondria, Golgi complex, Ribosomes and Lysosomes.

**Unit II: CELL ORGANELLES – II and GENETICS – I**

- a) **Nucleus** – structure (nuclear membranes, nucleoplasm and nucleolus).
- b) **Chromosomes** – Structure of eukaryotic chromosome (nucleosome model), giant chromosome – Polytene and lampbrush chromosomes; Mitosis and Meiosis, Cell-cycle and regulation
- c) **Inheritance:** Mendel's Laws, Monohybrid cross, dihybrid cross, test cross
- d) **Deviation of Mendelism:** Incomplete dominance and codominance
- e) **Interaction of genes:** Epistasis – (dominant and recessive) Complimentary genes; multiple gene–inheritance of skin colour in man; Multiple alleles – inheritance of coat colour in rabbit, and ABO blood groups in man
- f) **Linkage and crossing over:** Types, process and significances.

**Unit III: GENETICS - II**

- a) **Sex determination:** Genetically controlled mechanism (sex chromosome mechanism, genic balance mechanism, haplo-diploidy mechanism); sex determination in humans; Barr body, Structure of Y chromosome and sex determining genes in human.
- b) **Sex linked inheritance:** Sex linked inheritance in *Drosophila* (eye colour) and humans; sex limited and sex influenced characters
- c) **Cytoplasmic inheritance:** (i) Kappa particles in *Paramecium*
- d) **Chromosomal aberrations:** Structural and numerical aberration in human (Syndromes)

**UNIT IV: EVOLUTION**

- a) **Origin of Life:** Theories on origin of life, Urey Miller's experiment

- b) **Theories of Evolution:** Lamarckism and Darwinism, Neo-Lamarckism, de Vries theory of mutation and its significance in evolution; Hardy-Weinberg's Law, Genetic drift, Modern synthetic theory of evolution; Concept of species and speciation; brief Evolution of man.

### **Course outcomes:**

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

- Have a deeper understanding of the varied branches of the biological sciences like microbiology, evolutionary biology, genomics and metagenomics.
- Understand fundamental principles of cell biology.
- Explain structure and functions of cell organelles involved in diverse cellular processes.
- Gain knowledge of the basic principles of inheritance.

### **References:**

1. Cell and Molecular Biology by P.K. Gupta – (Rastogi Publications, 2008).
2. Cell Biology by C.B. Powar – (Himalya Publishing House, Bombay).
3. Cell Biology by De Robertis *et al.* – (W.B. Saunders, Philadelphia).
4. Genes (Vol. I – VII) by Levin B. – CBS Publishers.
5. Cytology, Genetics & Evolution by Gupta PK (1992) – Rastogi Publications.
6. Principles of Genetics by Sinnott, Dunn and Dobzhansky – (McGraw Hill).
7. Cytogenetics by P.K. Gupta – (Rastogi Publications, 2008).
8. Evolutionary Biology by B.S. Tomar & S.P. Singh – (Rastogi Publications, 2008).
9. The origin of life by K. John – (Reinhold Publishing Corpn).
10. The evolution of Man by G.W. Lasker – (Holt, Rinehart & Winston).

### **Website Sources:**

- <https://swayam.gov.in/course/150-cell-biology>
- <https://swayam.gov.in/courses/5173-biochemistry-and-cell-biology>
- <https://www.jove.com/science-education-library/9/cell-biology>
- <https://swayam.gov.in/courses/4922-genetics-and-genomics>
- <https://www.coursera.org/learn/genetics-evolution>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED753: PRACTICAL (ZOOLOGY)**

**Course Objective:**

The course will help in building sound fundamental knowledge of the principles of genetics, to be used as a stepping stone for higher studies and research in this field. It is designed to enable them to understand the functions of cellular organelles and how a cell carries out and regulates cellular functions.

**Course Content:**

**List of experiments**

1. Staining of mitochondria in the buccal epithelial cells of man.
2. Preparation of mitosis in onion root tips.
3. Micrometry: Use of ocular and stage micrometers to measure cell and nuclear dimensions of human buccal epithelial cells/Study of Barr body.
4. Preparation of slides of grasshopper (*Poeciloceris pictus*) testis for the various stages of meiosis.
5. Preparation of salivary gland chromosomes of chironomous larva for banding patterns.
6. Study of Karyotype and idiogram of man.
7. Culture of *Drosophila* – Collection, handling, rearing and maintenance of culture: a) Identification of sexes of *Drosophila*, b) Study of the life cycle of *Drosophila*.
8. Sorting out and study of mutant flies of *Drosophila* with reference to their various contrasting characters in comparison with normal flies-vestigial wings, ebony body, curled wing, sepia eye, white eye and bar eye.
9. Identification of blood groups (ABO) and Rh factor in man.
10. Study of fossil models of Trilobites and fishes/Archaeopteryx.
11. Study of cranial capacity and feature of skulls of prehistoric to modern man.

**Project 1:** Conducting breeding experiments to verify the law of segregation, law of independent assortment and law of sex linked inheritance.

**OR**

**Project 2:** Analysis of inheritance of selected traits in human population; PTU-test, blood group distribution pattern, rolling of tongue, ear lobe attachment, baldness etc.

**Course outcomes:**

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

- Understand fundamental principles of cell biology.
- Explain structure and functions of cell organelles involved in diverse cellular processes.
- Appreciate how cells grow, divide, survive, die and regulate these important processes.

**References:**

1. A manual of practical zoology: biodiversity, cell biology, genetics & developmental biology part 1 (M.M. Trigunayat).
2. Laboratory Manual of Cell Biology (Rina Majumdar, Rama Sisodia).

**Website Sources:**

- <https://sjce.ac.in/wp-content/uploads/2018/04/Cell-Biology-Genetics-Laboratory-Manual-17-18.pdf>
- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED735: CELL BIOLOGY AND GENETICS**

**Course Objectives:**

The objective of the present course content is to provide a foundation and background in cellular and acellular entities of plants and animals, Ultra structure of cell and its organelles in relation to functions, Chromosomal aberrations and Mutations, Cell cycle. This course will also deal with Mendelian and non-Mendelian inheritance.

**Course Content:**

**CELL BIOLOGY**

**Unit I:**

- a) Ultrastructure of prokaryotic and eukaryotic cells.
- b) Cell- organelles: Ultrastructure and functions of plant cell wall, plasma membrane, Golgi complex, Endoplasmic reticulum, Mitochondrion.

**Unit II:**

- a) Ultrastructure and functions of chloroplast, ribosome, lysosome and microbodies.
- b) Nucleus – Ultrastructure of eukaryotic nucleus.
- c) Chromosomes – Brief account of morphology and organization of prokaryotic and eukaryotic chromosome; Nucleosome model, concept of karyotype and idiogram (brief).

**Unit III:**

- a) Chromosomal alterations: (i) Structural variations – Deletion, Duplication, Translocation and Inversion. (ii) Numerical Variations – Aneuploidy and euploidy.
- b) Cell Division : Cell-cycle, events of cell division, karyokinesis, cytokinesis, cell-cycle;
- c) Mitosis, Meiosis and their significance.

**Unit IV:**

**GENETICS**

- a) Mendelism –Mendel’s laws of inheritance, solving problems related to Mendel’s laws.
- b) Inheritance of genes: Incomplete dominance, complementary gene action (flower colour in sweet pea), supplementary gene action (coat colour in mice), epistasis (fruit colour in summer squash), multiple factor inheritance (ear size in maize).
- c) Sex determination in plants – Melandrium.
- d) Cytoplasmic inheritance – plastid inheritance in *Mirabilis*, cytoplasmic male sterility in maize.
- e) Genetic variations: Mutations – spontaneous and induced, transposable genetic elements.

**Course Outcomes:**

On completion of the course, students will able to understand:

- Difference between prokaryotic eukaryotic cell and ultra structure of plant cell.
- Structure and functions of cell organelles.

- The eukaryotic cell cycle and mitotic and meiotic cell division.
- Structure and chemistry of chromosomes, types of chromosomes.
- Nucleosome model, concept of karyotype and idiogram
- Explain the Mendelian inheritance, post mendelian inheritance, chromosomal aberration gene mutations.

### References:

1. Atherly, A.G. J.R.Girton and J.F.MacDonald, 1999, The Science of Genetics, Saunders College Publishing, Fortworth, USA.
2. Gardner, A., 1990, Principles of Genetics (6th Ed.), John Wiley & Sons Inc., USA.
3. Gunning, B.E.S. and M.W.Steer 1999, Plant Cell Biology, Structure and Function, Jones & Bartlett Publishers, Boston, Massachusetts.
4. Gupta P.K. 2000, Cytology, Genetics and Evolution, Rastogi Publications, Meerut.
5. Gupta, P.K. 2005, Elements of Genetics, Rastogi Publications, Meerut.
6. Gupta, P.K.1999, A Textbook of Cell and Molecular Biology, Rastogi Publications, Meerut.
7. Harris, N. and K.J.Oparka, 1994, Plant Cell Biology: A Practical Approach, IRL Press, Oxford Univ.Press, Oxford, UK.
8. Russel, P.J. 1998, Genetics, The Benjamin/Cummings Publishing Co. Inc., USA.
9. Singh, S.P. and B.S.Tomar, 2006, Cell Biology, Rastogi Publications, Meerut.
10. Snustad D.P. and M.J.Simmons 2000, Principles of Genetics, John Wiley & Sons, Inc. USA.
11. Wolfe, S.L. 1993, Molecular and Cell Biology, Wadsworth Publishing Co., California, USA.

### Website Sources:

- [en.wikipedia.org](http://en.wikipedia.org)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [www.digitalbookindex.org](http://www.digitalbookindex.org)
- [www.freebookcentre.net](http://www.freebookcentre.net)
- [www.pdf.com](http://www.pdf.com)
- [www.pdfdrive.com/botany-books.html](http://www.pdfdrive.com/botany-books.html)
- [www.topfreebooks.org](http://www.topfreebooks.org)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www1.biologie.uni-hamburg.de](http://www1.biologie.uni-hamburg.de)

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VII**

**BSCBED754: PRACTICAL (BOTANY)**

**Course Content:**

The main Goal of this subject is to share the knowledge to the students about the experiments. The students will get a better understanding of the concept studied by them in theory course and correlate with experimental observations.

**Course Content:**

1. Comparative study of cell structure in onion cells, Hydrilla and Chara/Spirogyra.
2. Study of cyclosis in Tradescantia staminal cells.
3. Study of plastids to examine pigment distribution in plants (e.g. Cassia, Lycopersicon and Capsicum)
4. Examination of electron micrographs of virus, bacteria, Cyanobacteria. and eukaryotic cells with special reference to organelles;
5. Study of various stages of mitosis and meiosis by preparing slides of suitable plant materials (onion root tips and onion flower buds).
6. Working out the laws of inheritance using seeds/ beads.
7. Working out genetic problems related to Mendelian laws of inheritance and interaction of genes.

**Course Outcomes:**

After successfully completing this course, the students will be able to:

- Understand the various stages occurred in mitotic and meiotic cell divisions.
- Apply quantitative problem-solving skills to genetics problems and issues.
- Select and apply experimental procedures to solve genetic problems.
- Perform the emasculation technique in various crop plants.
- Know cell structures of Onion cell, *Hydrilla* and *Chara/Spirogyra* cell.

**References:**

1. A text Book of Practical Botany 2 by Bendre and Kumar.
2. Practical Biotechnology by R.S.Gaud.

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED821: EDUCATIONAL ADMINISTRATION AND  
MANAGEMENT**

**Course Objectives:**

The purpose of this course is to expose students:

- To understand the concept and concerns of educational administration
- To understand the role of the headmaster and the teacher in school management
- To understand the concept and importance of communication and its possible barriers in educational administration
- To critically analyze the administrative scenario in relation to the functioning of the other secondary schools of the area
- To explain the scientific practices of educational management and keep him/her to apply it in work situation

**Course Content:**

**Unit- I:**

Conceptual framework: concept of educational administration.

Concept of educational management, human beings as inputs, process and products.

Total quality management- concept and its significance to school.

**Unit -II:**

Role and functions of headmaster/ teacher: basic functions of administration planning, organizing directing and controlling. Maintenance of disciplines, control in management. Educational Supervision and inspection, defects in the present supervision and inspection. Scope of educational supervision, Types of supervision. Providing guidance, leadership function. Crisis in Management, Decision Making.

**Unit -III:**

Management of schools: role of headmaster in planning of school activities approaches to management manpower approach, cost benefit approach, social demand approach, social justice approach. Delegation of authority and accountability. Role of headmaster in motivating the staff, in resolution of interpersonal conflicts. Role of the headmaster in creating resources and managing financial matters. Optimum use of available resources for growth and development of the school, Staff development programs, Role of teachers in school management and administration, Teacher as a successful classroom manager.

**Unit -IV:**

Budget (School), Institutional Planning, Administrative Structure in the field of Education in Centre, State, District and Local Level. Role and Function of the Board of Secondary Education in Controlling Secondary Schools and Problems of Government Secondary School's Administration, Administration of University Education in India.

**Course Outcomes:**

After the completion of the course, Students will be able:

- Ensure adequate utilization of all resources.
- Ensure professional ethics and professional development.
- Mobilize the community.
- Ensure qualitative improvement of education.

**References:**

1. Mittal, M.L.; Education administration & management.
2. Mathur, S.S.; Education administration & management.
3. \*vk; 7] ekgu yky 2014% \*\*'k{k d i'kkl u , oai dU/ku\*\* ( I w k z i d k "ku %vkj0 yky c d fMi k s} ej BA
4. \*vk; 7] ekgu yky 2016% \*\*'k{k d i'kkl u , oai dU/k\*\* ( I w k z i d k "ku %vkj0 yky c d fMi k s} ej BA
5. 'kekZ] vkj0 , 0 2008% \*\*'k{k d i'kkl u , oai dU/ku\*\* ( I w k z i d k "ku %vkj0 yky c d fMi k s} ej BA

**Website Sources:**

- [https://ddceutkal.ac.in/Syllabus/MA\\_Education/Paper\\_8.pdf](https://ddceutkal.ac.in/Syllabus/MA_Education/Paper_8.pdf)
- <http://egyankosh.ac.in/handle/123456789/49329>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED822: GUIDANCE AND COUNSELLING IN SCHOOLS**

**Course Objectives:**

The purpose of this course is to expose students:

- To develop the understanding of the need and importance of career information for e-pupils
- To identify their role and function in locating, collecting, evaluating and disseminating career information for the use of pupils
- To develop an understanding of how one's ability, interests and aptitudes are related to world of work
- To know about the importance of developing the right attitudes and values at every stage of education.

**Course Content:**

**Unit I: Meaning and Nature of Guidance**

Guidance: Concept, aims, objectives, functions and principles. Need & Procedure for (Educational, Psychological and Social) guidance. Purposes and Principles of organization of different Guidance Services Organization of guidance services at Secondary Level: Need and Importance Group Guidance: Concept, Need, Significance and Principles, Organization of Guidance programs in schools. Role of Guidance Personnel in organization of guidance services in School: Counsellor, Career Master, Psychologist, Doctor, Teacher Counsellor, Head of the Institution, Teacher, Social Worker

**Unit II: Meaning and Nature of Counselling**

Counselling: Meaning and nature; Difference between Guidance & Counselling; Principles and approaches of counselling, Individual and Group Counselling; Skills in Counselling-Skills for Listening, Questioning, Responding, & Communicating. Methods and Process of Counselling Academic, Personal, Career and Behaviour problems of students with special needs, viz. socio-emotional problems of children with disabilities and deprived groups such as SC, ST and girls, need for Counselling; Professional Ethics and Code of Conduct; Qualities and Qualifications of an effective Counsellor

**Unit III: Tools and Techniques of Guidance**

Testing and Non-Testing Techniques for Studying and Appraisal of students:

- a) Testing Techniques: Intelligence/ Mental Ability tests, Aptitude Tests, Attitude Scales, Interest inventories, and Personality Tests,
- b) Non-testing Techniques: Interview, Observation and Case Study, c) Tools-Questionnaire, Anecdotal Record, Cumulative Record Cards, etc. Role of the teacher in Assessment and Testing.

**Unit IV: Career Guidance and Counselling**

Educational and Career Information in Guidance and Counselling: Meaning, Importance, collection, types, classification of occupational information; Dissemination of Occupational Information: Class talk, career talk, Group discussion, Preparation of Charts and Poster, Career Exhibition, Career conference; Guidance for gifted, slow learner, socio-economically disadvantaged children; Career development: Meaning and Importance; Teacher's role in Career planning, Vocational training and placement opportunities for CWSN. Broad outline with respect to the emerging courses and career options available in India; Guidelines for Establishment of Guidance Cell or Career Corners in Schools.

### **Course Outcomes:**

After undergoing this course the student will be able to:

- Understand the needs to address the children with diversities in classroom.
- Identify the causes for classifying various diversities.
- Acquainted about the policies and programmes for inclusive children.
- Differentiate between disability and inclusion.
- Specify the implementation of inclusion to normalise the children with diversities.
- Apply supportive services to children the diversities in mainstream and provide them guidance and counselling for better adjustment in society.
- Apply software on assistive devices in inclusive schools.

### **References:**

1. Agarwal, J.C.: Educational & vocational guidance & counselling.
2. Aggarwal, J. C. (2004). Educational Vocational Guidance and Counselling, Delhi: Doaba House.
3. Asch, M. (2000). Principles of Guidance and Counselling, New Delhi: Sarup and Sons.
4. Bhatia, K. K., (2002). Principles of Guidance and Counselling, Ludhiana: Vinod Publications.
5. Bhatnagar, R. P.; Rani. S. (2001); Guidance and Counselling in Education and Psychology.
6. Chauhan, S. S. (2008). Principles and Techniques of Guidance. UP: Vikas Publishing House Pvt. Ltd.
7. Coorey, S.M (1953).Action Research to Improve School Practices, New York: Teacher's Columbia University.
8. Gibson, R.L. and Mitchell (2008). Introduction to Counselling and Guidance. New Delhi: PHI Learning Pvt. Ltd.
9. Granz, R. M. (2005). Foundation and Principle of Guidance, Boston: Allyn& Bacon.
10. Gupta, V. K. (2004). Educational Guidance and Counselling, Ludhiana: Ankur Publications.
11. Joneja G. K. (1997); Occupational Information in Guidance, NCERT publication.
12. Jones, J. A. (1970). Principles of Guidance, Bombay: Tata, New York: McGraw Hill.
13. Kakkar, S.B (2015) Educational Psychology, *PHI Learning: Publications*
14. Kocher, S. K. (2007). Educational Guidance and Counselling, New Delhi: Sterling.
15. Myres, G. E. (2005). Principles and Techniques of Vocational Guidance, New York: McGraw Hill.
16. Nanda, S. K.and Sagar, S. (1972). Fundamentals of Guidance. Chandigarh: N.B.S. Educational Publishers.
17. Nayak A.K. (2004); Guidance and Counseling.
18. NCERT (2005). National Curriculum Framework-2005,NCERT,New Delhi

19. NCERT (2008). Counselling Process and Strategies (Module 2). New Delhi: NCERT.
20. NCERT (2008). Guidance for Human Development and Adjustment (Module3) New Delhi: NCERT.
21. NCERT (2008). Introduction to Guidance (Module 1). New Delhi: NCERT.
22. Oberoi, S.C.: Career information in career guidance.
23. Oberoi, S.C.: Educational & vocational guidance and counselling.

**Website Sources:**

- <http://oer.avu.org/bitstream/handle/123456789/153/GUIDANCE%20AND%20COUNSELING.pdf?sequence=1>
- <http://www.apa.org/ethics/code/principles.pdf>
- [http://www.ncert.nic.in/departments/nie/dse/activities/advisory\\_board/pdf/guidelines\\_for\\_guidance\\_and\\_counseling.pdf](http://www.ncert.nic.in/departments/nie/dse/activities/advisory_board/pdf/guidelines_for_guidance_and_counseling.pdf)
- <http://www.egyankosh.ac.in/>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED855: PRACTICUM: READING AND REFLECTING ON TEXT**

**Course Objective:**

This course will serve as a foundation to enable student-teachers to read and respond to a variety of texts in different ways depending on the purposes of reading, like-personal or creative or critical or all of these.

**Course Content:**

Reading – Meaning and Process, Importance of Reading across Curriculum, Characteristics of Reading, Developing reading skills. Role of libraries in promoting reading habits. Levels of reading – literal, interpretative, critical and creative, Types of reading – intensive and extensive reading, oral & silent reading, Reading techniques – skimming and scanning. Methodology of reading. Types of Texts – Narrative, expository, descriptive, suggestive, empirical, conceptual, ethnography, policy documents, field notes; Importance of Different Texts in Curriculum. Developing Critical Reading Skills, Developing Reflective Skills, Activities for Developing Reading Skills, Developing Metacognition for Reading, Developing Reading Comprehension Developing Vocabulary for Reading, Problems of Reading.

This course will serve as a practicum to enable student-teachers to read and respond to a variety of texts in different ways depending on the purposes of reading, like-personal or creative or critical or all of these. Student-teachers are expected to sit in the library regularly and to review at least 03-books of different categories in about 500 words each. These may be as follows –

- Review of text books related to core courses
- Review of reference Book related to core courses
- Review of Text Books related to Pedagogy courses
- Review of Reference to Book related to Pedagogy courses.
- Review of Policy Documents, Autobiography, Commission Reports, etc.
- Review of studies about school, historical books and other educational miscellaneous books.

**Course Outcomes:**

After undergoing this course the student will be able:

- To develop study – habits develop skill of reading & writing and develop skill of summarization.
- To develop skill of note-taking.
- To develop the reading capacity.
- To develop the creative ability, logical ability, analytical power, thinking skill and reading skill.
- To develop the methods and approaches about reading.

- To know the measurement and evaluation of reading.
- To understand the co-relation among different subject.
- To know the diagnostic and remedial of reading.
- To be motivated to writing on different topic and to be aware of difficulties or Reading and writing.
- To develop the interest in reading and writing.
- To be motivate for discussion in small groups by reading and writing.
- To learn to care for books.
- To learn to use reading and writing work done in classroom.
- Best qualities can develop in student teacher due to best reading and writing.
- Be motivated to bring essential changes in their lifestyle because of best type of reading and writing.

### References:

1. Bright, J.A., and McGregor, G.P. (1970). *Teaching English as a Second Language*. ELBS: Longman.
2. Doff, A. (1988). *Teach English: Training Course for Teachers*. Cambridge: Cambridge University Press.
3. Hill, L.A., and Dobbyn, M.A. (1979). *Training Course, Trainer's Book*. London: Cassell.
4. Hubbard, P., and Hywel, J. et al (1983). *A Training Course for TEFL*. Oxford University Press.
5. Joseph, K.S. (2004). *Self Instruction in English Grammar and Figures of Speech* Vadodara: Gold Rock Publications.
6. Mukalel, J.C. (1998). *Approaches to English Language Teaching*. New Delhi: Discovery publishing house.
7. Mukalel, J.C. (1998). *Creative Approaches to Classroom Teaching*. New Delhi: Discovery publishing house.
8. Mukalel, J.C. (1998). *Psychology of Language Teaching*. New Delhi: Discovery Publishing House.
9. Mukalel, J.C., and Ahmed, S. B. (1984). *Teaching English in India*. New Delhi: Arya Book Depot.
10. Nagaraj, G. (1996). *English Language Teaching Approaches, Methods*.

### Website Sources:

- <https://www.ncertbooks.guru>
- <http://sabarishedn.blogspot.com/2016/03/epc-1-reading-and-reflecting-on-texts.html><http://www.ignouhelp.in>
- <http://www.egyankosh.ac.in/bitstream/123456789/53429/1/Block-1.pdf>
- <http://ggite.ac.in/namaste-lesson/epc-1-reading-and-reflecting-on-texts>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED831: SPECTROSCOPY, NATURAL PRODUCTS AND  
HETEROCYCLICS**

**Course Objectives:**

The main aim of Heterocyclic compounds study is:

- To develop novel, efficient, convenient, selective and environmentally benign synthetic methods in organic chemistry.
- To develop green methodologies for the synthesis of nitrogen containing heterocyclic.
- To understand the basic features of spectroscopy in order to study the NMR spectroscopy to understand the important role of nuclear magnetic resonance spectroscopy in the study of the structures of organic compounds.
- To develop an understanding of the significance of the number, positions, intensities and splitting of signals in nuclear magnetic resonance spectra.
- To assign structures to simple molecules on the basis of nuclear magnetic resonance spectra

**Course Content:**

**Unit I: Spectroscopy**

**UV and Visible spectroscopy:** Introduction, absorption laws, instrumentation, formation of absorption bands, types of electronic transitions, chromophores, auxochromes, absorption and intensity shifts, solvent effects.

**IR spectroscopy:** Introduction, theory of molecular vibrations, vibrational frequency, factors influencing vibrational frequencies, finger print region and applications of IR spectroscopy.

**NMR spectroscopy:** Introduction, instrumentation, number of signals, position of signals (Chemical shift), shielding and deshielding effects, factors influencing chemical shifts inductive effect, anisotropic effect and hydrogen bonding. Splitting of signals, spin-spin coupling, chemical exchange and coupling constant. Structural determination of simple organic compounds using UV, IR and NMR spectral data.

**Unit II: Natural Products**

**Carbohydrates:** Introduction, classification and nomenclature. Configuration of monosaccharides. Erythro and threo diastereomers. Interconversions in carbohydrates – glucose to fructose, fructose to glucose, aldopentose to aldohexose and aldohexose to aldopentose. Epimerisation, mechanism of osazone formation, Determination of ring size of monosaccharides. Structural elucidation of D (+) glucose. Mechanism of Mutarotation. Constitution of disaccharides - maltose, sucrose and lactose.

**Amino acids, Peptides, Proteins and Nucleic acids**

Classification, structure and stereochemistry of amino acids. Acid-base behaviour, isoelectric point and electrophoresis proteins. Peptide structure determination - peptides. Nucleic acids: Introduction, constituents of nucleic acids. The double helical structure of DNA.

**Unit III: Dyes, Drugs and Macromolecules**



**Dyes:** Introduction, Classification of dyes, Colour and constitution (electronic concept), synthesis and uses of Methyl orange, Phenolphthalein, Fluorescein and Indigo.

**Drugs:** Introduction, classification.

**Macromolecules:** Introduction, Classification, Types of polymerization – chain polymerization, step polymerization, free radical polymerization, co-polymerisation, Ionic polymerization, Coordination polymerization. Natural and synthetic rubbers – buna S. Synthetic fibres – nylon 6, nylon 6, 6. Conducting polymers.

#### **Unit IV: Heterocyclic Compounds**

Introduction, methods of formation of five membered heterocycles – furan, thiophene and pyrrole. Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and their chemical reactions. Six membered heterocycles: methods of formation of pyridine. Comparison of basicity of pyridine, piperidine and pyrrole.

#### **Course Outcomes:**

- The students should be able to demonstrate advanced knowledge and understanding in aspect of protein structure.
- The students will be able to introduce about basic chemistry of the heterocyclic.
- The students will get familiar with particular properties and reactions for the most important heterocyclic as well as different systems of nomenclature.
- Able to recognize different regions for different spectroscopy.
- After completion of course students should have the ability to identify organic compounds by analysis and interpretation of spectral data.
- Students should have the ability to explain common terms in NMR spectroscopy such as chemical shift, coupling constant and anisotropy and describe how they are affected by molecular structure.

#### **References:**

1. Organic Spectroscopy by P S Kalsi.
2. Organic Chemistry: I L Finar Vol II.
3. Application of absorption Spectroscopy to Organic Compounds: John R Dyer.
4. Organic Spectroscopy: William Kemp.
5. Fundamentals of Molecular Spectroscopy: C N Banwell.

#### **Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED851: PRACTICAL (CHEMISTRY)**

**Course Objectives:**

The objectives of the course are:

- To synthesize different organic compounds.
- To know two step organic synthesis.
- To understand quantitative organic analysis.

**Course Contents:**

**1. Two step organic synthesis**

1. Synthesis of p-bromoaniline from acetanilide
2. Preparation of o-iodobenzoic acid from anthranilic acid
3. Preparation of m-nitrobenzoic acid from methyl benzoate
4. Preparation of Paracetamol
5. Synthesis of Quinoline

**2. Quantitative organic analysis**

1. Estimation of aniline/ phenol by bromate-bromide method
2. Estimation of glucose by Fehlings method/ Spectrophotometry using 3, 5 dinitro salicylic acid
3. Determination of iodine value of oil by Wij's method/ Chloramine-T method
4. Determination of saponification value of an ester / oil
5. Estimation of amino acid by formal titration method
6. Estimation of ascorbic acid in Vitamin C tablets by Volumetry
7. Estimation of Paracetamol by titrimetric and spectro photo metric methods.
8. Colorimetric Estimation of proteins by Biuret method

**Course Outcomes:**

After the completion of the course, Students will be able:

- To know iodine value of oil.
- To know the estimation of ascorbic acid in Vitamin C.
- To know the preparation of organic compounds of pharmaceutical use.

**References:**

1. A Text Book of Qualitative Organic Analysis, A I Vogel.
2. A Text Book of Quantitative Organic Analysis, A I Vogel.
3. Systematic experiments in Chemistry ArunSethi, New Age International (P) Ltd.
4. Organic synthesis-special techniques V.K. Ahluwalia, 2nd Edition Narosa PublishingHouse.
5. Organic Synthesis A.I. Vogel.

**Website Sources:**

- <https://www.gopracticals.com/basic-engineering/>
- <https://edu.rsc.org/resources/practical>
- <https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US>

**Note: Latest editions of all the suggested readings must be used**

# IFTM UNIVERSITY, MORADABAD

## DEPARTMENT OF EDUCATION B.Sc.-B.Ed. Integrated Programme SEMESTER- VIII

### BSCBED832: SOLID STATE PHYSICS

#### Course Objective:

This course introduces the basic concepts and principles required to understand the various properties exhibited by condensed matter, especially solids.

#### Course Content:

##### Unit I: Crystal Structure

Solids: Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis. Unit Cell. Miller Indices. Interplanar spacing. Types of Lattices. Brillouin Zones. Coordination number, packing fraction for cubic crystals (sc, bcc and fcc). Diffraction of X-rays by Crystals. Bragg's Law.

##### Unit II:

Elementary Lattice Dynamics: Lattice Vibrations and Phonons: Linear Monoatomic and Diatomic Chains. Acoustical and Optical Phonons. Dulong and Petit's Law, Einstein and

##### Unit III:

Electrical Properties: Free electron model of a metal, solution of one dimensional Schrodinger equation in constant potential, Density of states. Fermi energy, Energy bands in solids, Distinction between metals, semiconductors and insulators. Kronig- Penney model. P and N type Semiconductors. Conductivity of Semiconductors, mobility.

##### Unit IV: Superconductivity

Superconductivity: Qualitative description,. Experimental Results. Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth.

#### Course Outcomes:

Students completing this course will be able to:

- Understand the concept of reciprocal space lattice and know the significance of Brillouin zones.
- Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.
- Distinguish between metals, semiconductors and insulators.
- Describe Kronig- Penney model.
- Understand Photoconductivity & Luminescence.
- Understand the basics of superconductors, their types and applications.

#### References:

1. Charles Kittel, Introduction to Solid State Physics, 8th Ed., Wiley India Pvt. Ltd., 2004.
2. A J Dekker, Solid State Physics, Macmillan, 1965.

3. J.P. Srivastava, Elements of Solid State Physics, 2nd Ed., Prentice-Hall of India, 2006.
4. Leonid V. Azaroff, Introduction to Solids, Tata Mc-Graw Hill, 2004.
5. M. A. Wahab, Solid State Physics: Structure and Properties of Materials, Alpha Science International, Ltd., 2005.
6. Neil W. Ashcroft and N. David Mermin, Solid State Physics, Cengage Learning, 1976.
7. S O Pillai, Solid State Physics, NEW AGE, 2009.
8. G. I. Epifanov, Solid State Physics, Central Books Ltd., 1979.
9. M. Ali Omar, Elementary Solid State Physics, Pearson India, 1999.
10. H. Ibach and H Luth, Solid-state Physics, Springer, 2009.

### **Website Sources:**

- <https://lampx.tugraz.at>
- <http://www.egyankosh.ac.in>
- <https://www.phys.sinica.edu.tw>
- <http://bvcoend.ac.in>
- <http://www.irm.umn.edu>
- <https://en.wikipedia.org>
- <http://ecoursesonline.iasri.res.in>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED852: PRACTICAL (PHYSICS)**

**Course Objective:**

The objective of this course is to impart the knowledge to the students about the Experiments so that they correlate their theory course with experimental observations.

**Course Content:**

(A minimum of TEN experiments to be selected from the following)

1. Measurement of susceptibility of a paramagnetic solution (Quinck`s Tube Method)
2. To measure the Magnetic susceptibility of Solids.
3. To determine the Coupling Coefficient of a Piezoelectric crystal.
4. Determination of Hall coefficient in semiconductors.
5. Determination of Curie temperature– ferromagnet.
6. To determine the complex dielectric constant and plasma frequency of metal using Surface Plasmon resonance (SPR).
7. To determine the refractive index of a dielectric layer using SPR.
8. To study the PE Hysteresis loop of a Ferroelectric Crystal.
9. To draw the B- H curve of iron using a Solenoid and determine the energy loss from Hysteresis.
10. To measure the resistivity of a semiconductor (Ge) crystal with temperature by fourprobe method (from room temperature to 150o C) and to determine its band gap.
11. Franck-Hertz experiment.
12. Powder XRD pattern of KCl.
13. Powder XRD pattern of NaCl.
14. Powder XRD pattern of CaCl<sub>2</sub>.
15. Solar cell experiment.

**Course Outcomes:**

Students completing this course will be able to:

- Determine hall coefficient
- Measurement of Magnetic susceptibility
- Calculate refractive index of a dielectric layer
- Plot B- H curve of iron
- 

**References:**

1. Solid State Electronic Devices by B.G. Streetman.
2. Integrated Electronics by J. Millman and C.C. Halkias.
3. Electronics Devices and Circuit Theory by R.L. Boylested and L. Nashelysky.

4. Electronic Devices and Circuits by Balbir Kumar and S. B. Jain.

**Website Sources:**

- <https://physics.iitm.ac.in>
- <http://davjalandhar.com>
- <https://www.electronics-tutorials.ws>
- <https://www.osapublishing.org>

**Note: Latest editions of all the suggested readings must be used**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED833: COMPLEX ANALYSIS& NUMERICAL ANALYSIS**

**Course Objectives:**

The main aims of this course are to study Cauchy integral formula, local properties of analytic functions, general form of Cauchy's theorem and evaluation of definite integrals and harmonic functions. Numerical analysis in order to solve the problems arising in various fields of application such as in science, engineering and economics etc. study of system of linear & non-linear equations, numerical initial and boundary value problems of ordinary differential equations.

**Course Content:**

**Unit I:**

Functions of a Complex Variable, Limits, Continuous Functions, Differentiability, The Cauchy-Riemann Equations, Analytic Functions, Harmonic Functions, Conformal Mappings. Elementary Transformations, Bilinear Transformations, Cross ratio, Fixed Points of Bilinear Transformations.

**Unit II:**

Complex Integration: Introduction, Definite Integral, Cauchy's Theorem, Cauchy's integral Formula, Higher Derivatives. Power Series: Introduction, Sequences and Series, Sequences and Series of Functions, Power Series, Elementary Functions.

**Unit III:**

Numerical Methods: Numerical Solutions of Algebraic and Transcendental equations, Bisection Method, Method of false position, Iteration method, Newton-Raphson method. Finite differences, Forward and Backward differences, Weierstrass theorem, Interpolation, Newton-Gregory forward and backward interpolation formulae, divided differences, Lagrange's interpolation formula.

**Unit IV:**

Numerical Differentiation: Finding first and second derivatives using interpolation formulae, Difference equations. Integration: General quadrature formula, Trapezoidal Rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Weddle's rule, Newton-Cotes quadrature formula, Gauss quadrature.

**Course Outcomes:**

This course will enable the students to:

- Analyze Analytic functions and exponential functions.
- Apply Cauchy's theorem for disk and the Integral formula.
- Understand Local properties of Analytic functions.
- Study Residue theorem and the argument principle.
- Differentiate the Taylor's series and Laurent series.
- Identity and analyze different types of errors encountered in numerical computing.
- Apply the knowledge of Numerical Mathematics to solve problems efficiently arising in science, engineering and economics etc.

- Utilize the tools of the Numerical Mathematics in order to formulate the real-world problems from the view point of numerical mathematics.

## **References:**

1. An Introduction to the Theory of Functions of a Complex Variable by Copson, Oxford.
2. Complex Analysis by Ahlfors, McGraw Hill International Edition.
3. Complex Analysis by Serge Lang, Springer Verlag.
4. Foundations of Complex Analysis by Ponnuswamy, Narosa Publishing House.
5. Introduction to the Theory of Functions of a Complex Variable by Palka, SpringerVerlag.
6. Theory of Functions of a Complex Variable by Shanthinarayan, S. Chand and Co. Ltd.

## **Website Sources:**

- [www.pdfdrive.com](http://www.pdfdrive.com)
- [www.dmi.gov.in](http://www.dmi.gov.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [en.wikipedia.org](http://en.wikipedia.org)

**Note: Latest editions of all the suggested readings must be used**



**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED834: BIOCHEMISTRY, MOLECULAR BIOLOGY AND  
BIOTECHNOLOGY**

**Course Objectives:**

The objective of the course is to understand the core biological phenomena at the molecular level and to comprehend the fundamental principles of chemistry that govern complex biological systems.

**Course Content:**

**Unit I: Biochemistry - I**

- a) **Carbohydrates** – Classification, chemical structures of mono, oligo and polysaccharides; carbohydrate metabolism – Glycolysis, TCA cycle, electron transport system.
- b) **Proteins** – Classification and structural properties; Amino acids – Amino acid metabolism, transamination, decarboxylation
- c) **Lipids** – Classification and properties; Lipid metabolism – oxidative pathway of saturated and unsaturated fatty acids

**Unit II: Biochemistry – II**

- a) **Enzymology** – Nature of enzymes, nomenclature and classification, mechanism of enzyme action – lock and key hypothesis, induce fit hypothesis; regulation of enzyme action and factors affecting enzyme action, Coenzymes and inhibitors.
- b) **Vitamins and minerals** – Role of vitamin and minerals in normal health
- c) **Nucleic acids:** Discovery, DNA- structure, forms, denaturation, bacterial, plasmid, plasmid and mitochondrial DNA

**Unit III: Molecular Biology – I**

- a) RNA- structure, types (rRNA, mRNA, tRNA), and functions.
- b) Replication of DNA in prokaryotes.
- c) **Gene expression:** Central dogma; Transcription in prokaryotes; Genetic code; Translation in prokaryotes.

**Unit IV: Molecular Biology – II and Biotechnology**

- a) Regulation of gene expression in prokaryotes – lac operons
- b) **Genetic engineering:** History, restriction endonucleases, ligases, vectors (pBR322, TDNA), cDNA library, cloning, PCR, bioinformatics
- c) **Biotechnology:** Transgenic animals (giant mouse, transgenic sheep), monoclonal antibodies, gene therapy. Human genome project.

**Course Outcomes:**

After completion of the course, students will be able to

- Gain knowledge and skill in the fundamentals of biochemical sciences, interactions and interdependence of physiological and biochemical processes.
- Get exposed to various processes used in industries.
- Demonstrate foundation knowledge in biochemistry; synthesis of proteins, lipids, nucleic acids, and carbohydrates; and their role in metabolic pathways along with their regulation.

### **References:**

1. Principles of Biochemistry by Lehninger AB (CBS Publishers and Distributors, New Delhi).
2. Animal Physiology and Biochemistry by K.V. Sastry – (Rastogi Publications, 2008).
3. Cell and Molecular Biology: Concepts and Experiments by Gerald Karp.
4. Molecular Biology of the Cell by Bruce Alberts.
5. Molecular Cell Biology by Harvey Lodish, David Baltimore and Arnold Berk.
6. Biotechnology: Applying the Genetic Revolution by David P. Clark BA, 2008
7. Biotechnology by V. Kumaresan (Saras Publication).

### **Website Sources:**

- CECGurukul ([www.cec.nic.in](http://www.cec.nic.in))
- <https://www.youtube.com/user/cecedusat/featured>.
- National Institute of Science Communication and Information Resources (NISCAIR) (<http://www.niscair.res.in/>) and National Science Digital Library (NSDL) ([www.nsdlib.niscair.res.in](http://www.nsdlib.niscair.res.in)).
- National Digital Library of India (NDL India; <https://ndl.iitkgp.ac.in/>).

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED853: PRACTICAL (ZOOLOGY)**

**Course Objectives:**

The objective of the course is to make the study relevant, interesting, encouraging to the students to join the industry or to prepare them for higher studies including research. The new and updated syllabus is based on a basic and applied approach to ensure that students develop problem solving skills, laboratory skills, chemistry communication skills, team skills as well as ethics.

**Course Content:**

1. Effect of temperature on the salivary amylase enzyme activity.
2. Effect of pH on the salivary amylase enzyme activity.
3. Effect of substrate concentration on the salivary amylase enzyme activity.
4. Detection of various enzymes in the digestive tract of cockroach.
5. Separation and analysis of amino acids in body fluids and food using paper chromatography.
6. Qualitative and quantitative estimation of carbohydrates, proteins and lipids in food/animal tissues.
7. Demonstration of separation of proteins/enzymes with electrophoresis.

**Course Outcomes:**

Upon completion of the course, students will be able to

- Demonstrate foundation knowledge in biochemistry; synthesis of proteins, lipids, nucleic acids, and carbohydrates; and their role in metabolic pathways along with their regulation.
- Know about classical laboratory techniques, use modern instrumentation, design and conduct scientific experiments, and analyze the resulting data.
- Be knowledgeable in proper procedures and regulations in handling and disposal of chemicals.

**References:**

1. A manual of practical zoology: biodiversity, cell biology, genetics & developmental biology part 1 (M.M. Trigunayat).
2. Advanced lab practices in biochemistry & molecular biology (Swati Agarwal & Suphiya Khan)

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED835: MOLECULAR BIOLOGY, BIOCHEMISTRY &  
BIOTECHNOLOGY**

**Course Objectives**

The objective of this course is to gain the understanding of students about Nucleic acids, their replication, gene structure and regulation in prokaryotes, operon concept-lac and tryptophan operon, genetic code. This course also familiarize the students with enzymes, mechanism of enzymes, synthesis and biological role of ATP, Chemistry of Nucleic acid, general account of vitamins, biomolecules and their significance as well as nitrogen metabolism. This course aims to introduce to the students with basics concepts of biotechnology and its application in different fields

**Course Content:**

**Unit I:**

Nucleic acids DNA and RNA; (i) DNA: types, characteristics, structural properties and functions. Satellite and repetitive DNA, mitochondrial and plasmid DNA, replication of DNA in prokaryotes and eukaryotes. (ii) RNA: Types, structure, characteristics, structural properties and functions, Role of RNAs in protein synthesis. Gene structure and regulation in prokaryotes, operon concept – lac and tryptophan operon, genetic code.

**Unit II:**

Nitrogen Metabolism: Forms of nitrogen, cellular conversion of nitrates to ammonium ions, assimilation of  $\text{NH}_4^+$  ions, biological nitrogen fixation, amino acids – nature, classification, structures. Proteins – classification, structure – primary, secondary, tertiary and quaternary, transcription, m-RNA processing, translation. Inhibitors of protein synthesis.

**Unit III:**

Carbohydrates: Introduction, classification, chemical structures of mono, oligo and polysaccharides.

Lipids: Introduction, classification, chemical structures, saturated and unsaturated fatty acids,

Enzymology: 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.

**Unit IV: Biotechnology and Bioinformatics**

- 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, transgenic plants.
- c) Brief account of recent advances in Plant bio-technology; products of bio technology
- d) Brief account of Bioinformatics – genomics, proteomics.

**Course Outcomes:**

- Nucleic acid as genetic material, types of DNA, DNA replication and enzymes involved in DNA replication.
- Understand the structure and general features of enzymes, concept of enzyme activity and enzyme inhibition.
- Have the knowledge of DNA chemical constituents, and its replication.
- Understand the structure of biomolecules like carbohydrates, proteins, lipids and vitamins.
- Understand nitrogen metabolism in plants.
- Describe bio-catalysis, pathway engineering, bioprocess control and downstream processing.
- Demonstrate their ability to reason both inductively and deductively with experimental information and data.
- Explain the theory and practice of recombinant DNA technology.
- Select and apply experimental procedures to the spectrum of fields making use of biotechnology.

### **References:**

1. Alberts, B., D.Bray, J.Lewis, M.Raff, K.Roberts and I.O.Watson, 1999, Molecular Biology of Cell, Garland Publishing Co., Inc., New York.
2. Jain.J.L. 1994, Fundamentals of Biochemistry, Sultanchand & Co., New Delhi.
3. Lea, P.J. and R.C.Leegood, 1999, Plant Biochemistry and Molecular Biology, John Wiley & Sons, England.
4. Lehninger, A.B., Principles of Biochemistry, CBS Publishers and Distributors, New Delhi.
5. Lodish, H., A.Berk, S.L.Zipursky, P.Matsudaiva, D. Baltimore, and J.Darnell, 2000.
6. Malacinski, G.M., 2005, Essentials of Microbiology (4th Ed.), Narosa Publishing House, New Delhi.
7. Molecular Cell biology, W.H. Freeman & Co., New York.
8. Old, R.W. and S.B.Primrose, 1989, Principles of Gene Manipulation, Blackwell Scientific Publication, Oxford, UK.
9. Srivastava, H.S.2005, Plant Physiology, Biochemistry and Biotechnology, Rastogi Publications, Meerut.

### **Website Sources:**

- [www.pdfdrive.com/botany-books.html](http://www.pdfdrive.com/botany-books.html)
- [www.pdf.com](http://www.pdf.com)
- [en.wikipedia.org](http://en.wikipedia.org)
- [onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
- [www.freebookcentre.net](http://www.freebookcentre.net)
- <https://gurukpo.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM UNIVERSITY, MORADABAD**  
**DEPARTMENT OF EDUCATION**  
**B.Sc.-B.Ed. Integrated Programme**  
**SEMESTER- VIII**

**BSCBED853: PRACTICAL (BOTANY)**

**Course Objective:**

The main objective of this subject is to share the knowledge to the students about the experiments. The students will get a better understanding of the concept studied by them in theory course and correlate with experimental observations.

**Course Content:**

1. Isolation of DNA from coconut endosperm.
2. Effect of pH and temperature on activity of amylase in germinating seeds.
3. Study of catalase and peroxidase enzyme activity as influenced by pH and temperature.
4. Separation of amino acids by paper chromatography.
5. Study of root nodules in leguminous plants.
6. To test for the presence of carbohydrates, proteins and lipids.

**Course Outcomes:**

The students completing this course will be able to know:

- How DNA is isolated from coconut endosperm?
- The effects of pH and temperature on amylase, catalase and peroxidase activity.
- How to separate amino acids by paper chromatography?
- Qualitative and quantitative test for the presence of carbohydrates, proteins and lipids.

**References:**

1. A text Book of Practical Botany 2 by Bendre and Kumar.
2. Practical Botany II by O.P. Sharma.

**Website Sources:**

- <https://oer.galileo.usg.edu>
- <http://www.biologycorner.com>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM University, Moradabad**  
**B.Sc.-B.Ed. (Integrated Education)**  
**Programme**

**w.e.f. Session 2019-20**

Audit Course: 1

S.N.	Course Code	Course Name
1.	UDM	Disaster Management

**Note:** Course of Disaster Management is mandatory to study as an audit paper in the 5<sup>th</sup> Semester.

Audit Course: 2

S.N.	Course Code	Course Name
1.	ES	Environmental Studies

**Note:** Course of Environmental Studies is mandatory to study as an audit paper in the 6<sup>th</sup> Semester.

**IFTM University, Moradabad**  
**B.Sc.-B.Ed. (Integrated Education)**  
**Programme:**

**UDM: Disaster Management (UDM)**

**Credit: 3**

**Course Objectives:**

The objectives of the course are:

- To provide students an understanding to the concepts and aspects of disaster and its relationship with development.
- To ensure awareness of Disaster Risk Reduction (DRR) approaches among students.
- To assist students develop ability to respond to their environment with potential response to disaster.

**UNIT I: Introduction to Disasters**

**(12Sessions)**

- Definition: Disaster, Hazard, Vulnerability, Resilience, Risks
- Types of disasters – Earthquake, Landslide, Flood, Drought, Fire, campus shooting, bomb threat, terrorist incidence and financial emergency etc.
- Causes and Impacts including social, economic, political, environmental, health, psychosocial, etc. Differential impacts- in terms of caste, class, gender, age, location, disability.
- Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

**UNIT II: Approaches to Disaster Risk Reduction**

**(10 Sessions)**

- Disaster life cycle – its analysis, phases, culture of safety, prevention, mitigation and preparedness
- Community based DRR (Disaster Risk Reduction), Structural-non-structural measures,
- Roles and responsibilities of community: Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders

**UNIT III: Inter-Relationship between Disasters and Development**

**(08 Sessions)**

- Factors affecting Vulnerabilities, impact of Development projects such as dams, embankments, changes in Land-use etc.
- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India – Relevance of indigenous knowledge, appropriate technology and local resources.
- Role of international co-operations in Disaster Management

**UNIT IV: Disaster Risk Management in India**

**(08 Sessions)**

- Hazard and Vulnerability profile of India. Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management
- Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy – Other related policies, plans, programmes and legislation
- Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

**UNIT V: Disaster Management: Applications, Case Studies and Field Works**

**(07 Sessions)**

The project /fieldwork is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Projects must be conceived creatively based on the geographic



location and hazard profile of the region where the college is located. A few ideas or suggestions are discussed below.

Several governmental initiatives require Urban Local Bodies (ULBs) and Panchayati Raj Institutions (PRIs) to be pro active in preparing DM plans and community based disaster preparedness plans. Information on these would be available with the district collector or Municipal corporations.

Teachers could ask students to explore and map disaster prone areas, vulnerable sites, vulnerability of people (specific groups) and resources. The students along with teacher could work on ways of addressing these vulnerabilities, preparing plans and consultation with local administration or NGOs.

Students could conduct mock drills in schools, colleges or hospitals. They could also work on school safety, safety of college buildings, training in first aid.

Other examples could be- identifying how a large dam, road/ highway or an embankment or the location of an industry affects local environment and resources or how displacement of large sections of people creates severe vulnerabilities may be mapped by student project work.

The suggested topics for Project work for student could be as follows:

- Monitoring and evaluation plan for disaster response
- Low cost Home based water purification methods
- Planning Nutrition intervention programmes
- Safety tips before during and after earthquake, cyclone, floods and fire accidents.
- MockDrills
- Major disasters in India
- Disaster Management in India
- Flood affected areas and damages in India
- Heat waves in India
- Earth quakes in India
- Historical Tsunamis in India
- Nuclear emergence
- Traffic accidents in India
- Train Accidents
- Major disease outbreak
- Disaster management structure in India
- Precaution, mitigation of disaster in India
- Warning system in India to prevent disaster
- Bhopal gas tragedy
- Kutch earth quake
- Tsunami (2004)
- Kosi Calamity 2008
- Mayapuri radiation exposure Delhi (2010)
- Mock exercises

#### **Any field works related to disaster management.**

**Learning Outcomes:** The students will be able to identify the nature and causes of disaster. Also the students will be able to apply the disaster risk reduction mechanism.

**Teaching Resources:** Emphasis will be on interactive teaching learning methods. Tools could be Range of Films- documentaries and feature films related to disasters and their impacts and on vulnerabilities of people are available which a teacher could choose with care and screen. This could form a basis for classroom discussion.

#### **References:**

1. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press.
2. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disasters, Routledge.

3. Carter, Nick. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.
4. Cuny, F. Development and Disasters, Oxford University Press. Document on World Summit on Sustainable Development .
5. Damon P. Coppola, Introduction to International Disaster Management, Butterworth-Heinemann,
6. Govt. of India: Disaster Management Act 2005, Government of India, New Delhi. Government of India, 2009.
7. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi.
8. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IAS and Sage Publishers, New Delhi.
9. Satish Modh, Introduction to Disaster Management, Macmillan Publisher India Ltd.
10. Singhal J.P. "Disaster Management", Laxmi Publications. ISBN-10: 9380386427 ISBN-13: 978-9380386423.
11. Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April.
12. Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi Indian Journal of Social Work.
13. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., ISBN-10: 1259007367, ISBN-13: 978-1259007361]

### **Website Sources:**

- <http://nidm.gov.in/>
- <http://nidmssp.in>
- <http://www.drishtiiias.com/upsc-exam-gs-resources-COMMUNITY-BASED-DISASTER-MANAGEMENT>

**Note: Latest editions of all the suggested readings must be used.**

**IFTM University, Moradabad**  
**B.Sc.-B.Ed. (Integrated Education)**

**Programme:**

**ES: Environmental Studies (ES)**

**Credits: 3**

**Course Objective:**

The aim of ES is to improve management of environment and provide satisfactory solutions to environment issues and to provide students opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.

**Unit1**

**2 Session**

Nature, Definition, Scope and Importance of Environmental Studies.

**Unit 2**

**10 Session**

Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems. Forest resources: Use and over-exploitation, Deforestation, Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

**Unit 3**

**8 Session**

World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Role of an individual in conservation of natural resources & equitable use of resources for sustainable lifestyles.

**Unit 4**

**8 Session**

Ecosystems: Concept of an Ecosystem, Structure and Function of an Ecosystem, Energy flow in the ecosystem. Hot-spots of Bio-diversity, Threats to Bio-diversity: Habitat Loss, poaching of wildlife, man-wildlife conflicts. Conservation of Bio-diversity: In-situ and Ex-situ conservation of biodiversity. Environmental Pollution Definition, Cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards, Solid Waste Management: Causes, effects and control measures of urban and industrial wastes & Role of an individual in prevention of pollution.

**Unit 5**

**8 Session**

Social Issues and the Environment: 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. Environmental Ethics : Issues and possible

solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Environment Protection Act: 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.

## Field Work

## 2 Session

Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc.

## Course Outcomes:

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

- Improve management of environment and provide satisfactory solutions to environmental issues.
- Acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.

## References:

1. (M) Magazine (R) Reference (TB) Textbook
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment (R)
9. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
10. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
11. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
12. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
13. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
14. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
15. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
16. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
17. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
18. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
19. Survey of the Environment, The Hindu (M)
20. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB) XI
21. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
22. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (R)
23. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

**Website Sources:**

- [www.bvcoend.ac.in](http://www.bvcoend.ac.in)
- [www.open.edu](http://www.open.edu)

**Note: Latest editions of all the suggested readings must be used**