UNDER GRADUATE
COURSE CATALOGUE
2025

CHAUDHARY CHARAN SINGH HARYANA AGRICULTURAL UNIVERSITY HISAR-125004

(A+ Grade NAEAB-ICAR ACCREDITED)

Foreword

It gives me immense pleasure to present the Undergraduate Academic Catalogue of Chaudhary Charan Singh Haryana Agricultural University, Hisar, developed in adherence to the academic guidelines laid down by the Indian Council of Agricultural Research (ICAR) and the holistic vision of the National Education Policy 2020 (NEP 2020).

This catalogue encompasses a wide array of undergraduate programmes-B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness Management, B.Tech. (Agricultural Engineering), B.Tech. (Biotechnology), B.Sc. (Hons.) Community Science and B.F.Sc. reflecting our institution's comprehensive and forward-looking approach to agricultural education.

Rooted in academic excellence and enriched with hands-on learning, the curriculum is crafted to develop skilled, innovative and socially responsible professionals. The NEP 2020's emphasis on multidisciplinary education, flexibility and learner-centric models is well-embedded in the structure of this catalogue. It is designed to empower students with critical thinking, entrepreneurial aptitude, ethical grounding and global awareness-traits essential for addressing the challenges and opportunities of the 21st century agri-food systems.

As we move toward a future of sustainable agriculture, climate resilience and technological integration, this academic catalogue stands as a guiding document that aligns education with employability, research with relevance and tradition with transformation.

I congratulate the all contributing faculty members, Dr. S.K. Pahuja (Dean, College of Agriculture and College of Agricultural Engineering & Technology), Dr. Beena Yadav (Dean, College of Community Science), Dr. K.D. Sharma (Dean, College of Biotechnology), Dr. Rajesh Gera (Dean, College of Basic Sciences & Humanities and College of Fisheries Science), Dr. Atul Dhingra, OSD to Vice-Chancellor and Head, Business Management and Dr. Mukesh Kumar, Associate Professor, Dept. of Genetics and Plant Breeding, College of Agriculture for their dedication, vision and hard work in preparing this catalogue. It will undoubtedly serve as a valuable academic compass for our students, educators and stakeholders.

Prof. B.R. Kamboj

Prof. B.R. Kamboj
Vice-Chancellor
CCSHAU, Hisar

Preface

I am delighted to present the Undergraduate Academic Catalogue of CCS Haryana Agricultural University, Hisar, meticulously prepared in alignment with the guidelines of the Indian Council of Agricultural Research (ICAR) and the National Education Policy 2020 (NEP 2020). This catalogue outlines the structure, curriculum and academic framework of our diverse undergraduate programs-B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness Management, B.Tech. Agricultural Engineering, B.Tech. Biotechnology, B.Sc. (Hons.) Community Science and B.F.Sc. The course catalogue and examination and evaluation system as per the recommendations of the Sixth Deans' Committee of ICAR and will be implemented from academic session 2025-26 of 4-year programme of all the colleges.

In tune with the vision of NEP 2020, this catalogue embodies a holistic and multi disciplinary approach, aiming to nurture critical thinking, practical skills, ethical grounding and entrepreneurial spirit among our students. The curriculum emphasizes experiential learning, skill development, and industry alignment, ensuring that our graduates are not only academically sound but also socially responsible and globally competent.

Each program has been thoughtfully designed to balance foundational knowledge with emerging scientific advancements, integrating local relevance with global perspectives. Special emphasis has been placed on internships, rural and industry exposure, interdisciplinary electives, and innovation-driven projects to foster creativity and real-world problem-solving abilities in our students.

This catalogue is a testament to our commitment to academic excellence, student-centric learning, and nation-building through quality education in agriculture and allied sciences. I sincerely hope it serves as a valuable guide for our students, faculty, and stakeholders, and contributes to shaping the next generation of agricultural professionals and leaders.

I acknowledge the dedicated efforts of Dr. Beena Yadav (Dean, College of Community Science), Dr. K.D. Sharma (Dean, College of Biotechnology), Dr. Rajesh Gera (Dean, College of Basic Sciences & Humanities and College of Fisheries Science), Dr. Atul Dhingra, OSD to Vice-Chancellor and Head, Business Management, Dr. Mukesh Kumar, Associate Professor, Dept. of Genetics and Plant Breeding, Dr. Anil Kumar, Sr. Scientist & Head, Dept. of Nematology, Dr. Subodh Aggarwal, Assistant Professor, Dept. of Business Management, Dr. Lomash Kumar, Assistant Professor, Dept. of Entomology, Dr. Neelam M. Rose, Professor & Head, Dept. of Apparel & Textile Science , Dr. Saroj Yadav, Associate Professor, Dept. of Apparel & Textile Science, Dr. Rachna Gulati, Professor, Dept. of Aquaculture & Post harvest Technology, Dr. Anupam Anand, Assistant Professor, Dept. of Fisheries Extension, Economics & Statistics, Dr. Kavita Sharma, Assistant Professor, Dept. of Fisheries Resource Management, Dr. Rajender Kumar, Assistant Professor, Dept. of Basic Engineering, Dr. Ajeev Kumar, Assistant Professor, Dept. of Agricultural Biotechnology and Dr. Kanika Rani, Assistant Professor, Dept. of Nanobiotechnology for curriculum development, revision and compilation of under graduate course curriculum of the university.

The help extended by Registrar, Dean, PGS, Directors and Officers of the university, the Head of departments and faculty members involved in the preparation of this document is gratefully acknowledged.

Dr. S. K. Pahuja

Dr. S. K. Pahuja
Dean, College of Agriculture
&
Chairperson
Committee for finalisation
of UG Course Curriculum
CCS HAU, Hisar

ACRONYMS

AAHM	Aquatic Animal Health Management
ABM	Agricultural Business Management
ABT	Agricultural Biotechnology
AE	Agricultural Engineering
AEC	Ability Enhancement Course
AEM	Aquatic Environment Management
AGRI	Agriculture
AIA	Agro-Industrial Attachment
AM	Agribusiness Management
ANBT	Animal Biotechnology
ATS	Apparel and Textile Science
AGRON	Agronomy
AG ECON	Agricultural Economics
AGM	Agricultural Meteorology
AQC	Aquaculture
BI	Bioinformatics
BIO	Biology
BIOCHEM	Biochemistry
BIOTECH	Biotechnology
CCA	Co-curricular Activity
CE	Civil Engineering
CS	Community Science
COMP	Computer Science
EE	Electronics and Electrical Engineering
EECM	Extension Education and Communication Management
ENG	English
ENT	Entomology
EXT	Extension Education
FE	Fish Engineering
FN	Foods and Nutrition
FEES	Fisheries Extension, Economics & Statistics
FMPE	Farm Machinery & Power Engineering
FOR	Forestry
FPT	Fish Processing Technology
FRM	Fisheries Resource Management
FS	Fisheries Science
GPB	Genetics & Plant Breeding
HDFS	Human Development and Family Studies
HORT	Horticulture
IBT	Industrial Biotechnology
LPM	Livestock Production Management
MATH	Mathematics

MBB	Molecular Biology & Biotechnology
MDC	Multi-Disciplinary Course
ME	Mechanical Engineering
MEB	Microbial and Environmental Biotechnology
MICRO	Microbiology
NBT	Bio-Nanotechnology
NCC	National Cadet Corps
NEMA	Nematology
NG	Non Gradial
NSS	National Service Scheme
PBT	Plant Biotechnology
PFE	Processing and Food Engineering
PL PATH	Plant Pathology
PL PHY	Plant Physiology
RAWE	Rural Agricultural Work Experience
REE	Renewable Bio-energy Engineering
RMCS	Resource Management and Consumer Science
SEC	Skill Enhancement Course
SOC	Sociology
SOILS	Soil Science
SST	Seed Science & Technology
STAT	Statistics
SWE	Soil and Water Engineering
TUT	Tutorial
VAC	Value Added Course
VSC	Vegetable Science

CONTENTS

Description	Page No.
General Information	1-6
College of Agriculture	7-190
College of Agricultural Engineering & Technology	191-312
College of Biotechnology	313-364
I.C. College of Community Science	365-494
College of Fisheries Science	495-590
College of Basic Sciences & Humanities	591-628
Directorate of Students' Welfare	629-634

GENERAL INFORMATION

Chaudhary Charan Singh Haryana Agricultural University, Hisar has revised Course Curriculum for undergraduate programmes in all the colleges of the University as per the recommendations of the Sixth Deans' Committee of ICAR and implemented from academic session 2025-26.

- The B.Sc. (Hons.)/ B.F.Sc./ B.Tech. programme are of 4 years duration, covering 166-174 credits of coursework. Additionally, students engage in 16 credits of non-gradial courses and 10 credits of MOOCs/online courses. The credit distributions for the different courses have been specified for individual disciplines.

General Credit Allocation Scheme of UG Programmes

Semester	Core Courses (Major+ Minor)	Multi-Disciplinary Courses (MDC)	Value Added Courses (VAC)	Ability Enhancement Courses (AEC)	Skill Enhancement Courses (SEC)	Internship/ Project/ Student READY/ RAWE & AIA	Total Credits	Non-Gradial	Online Courses/ MOOC
I	12	3(2)	-	2(3) + 2(4)	4	-	23	3(1+1a)	10
II	10	3(5)	3(6)	2(3) + 2(7)	4	-	24	2(1a+8a)	
Post-II semester	-	-	-	-	-	10(12)	-	-	
III	16	-	-	2(8)	2	-	20	3(3+1a)	
IV	12	3(9)	3(10)	-	2	-	20	2(1a+8a)	
Post-IV semester	-	-	-	-	-	10(13)	-	-	
V	21	-	-	-	-	-	21	5(3+1a+11)	
VI	21	-	-	-	-	-	21	1(1a)	
VII	20	-	-	-	-	-	20	-	
VIII	-	-	-	-	-	20	20	-	
Total	**112**	**9**	**6**	**10**	**12**	**20**	**169**	**16**	**10**

(1) Deeksharambh (Induction-cum-Foundation Course) of 2 credits (2 weeks duration)
(1a) Tutorial
(2) Farming based Livelihood systems
(3) NCC/NSS
(4) Communication Skills
(5) Entrepreneurship Development and Business Management
(6) Environmental Studies and Disaster Management
(7) Personality Development
(8) Physical Education, First Aid, Yoga Practices and Cultural Activities
(8a) Co-curricular Activity
(9) Agriculture Marketing and Trade
(10) Agriculture Informatics and Artificial Intelligence
(11) Educational Tour (10-14 days)
(12) Only for those opting for an exit with UG-Certificate
(13) Only for those opting for an exit with UG-Diploma

One multidisciplinary course in Agricultural Engineering discipline is different from the above common courses keeping in view the discipline specific requirement.

UNDERGRADUATE PROGRAMMES COLLEGE-WISE

Programme	Core Courses (Major+ Minor)	Multi-Disciplinary Course (MDC)	Value Added Course (VAC)	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Internship/ Project/ Student READY/ RAWE & AIA	Total Credits	Non-Gradial	Online Courses/ MOOC
B.Sc. (Hons.) Agriculture	112	9	6	10	12	20	169	17	10
B.Sc. (Hons.) Agribusiness Management	112	9	6	8	12	20	167	17	10
B.Tech. (Agricultural Engineering)	125	10	6	10	8	15	174	18	6
B.Tech. (Biotechnology)	112	9	6	8	12	20	167	16	10
B.Sc. (Hons.) Community Science	112	9	6	10	12	20	169	16	10
B.F.Sc.	117	9	6	8	12	20	172	16	10

- After the admission in the University, the students will register for *Deeksharambh* (0+2) (Non-gradial) the Foundation course of 2 weeks' duration in the 1st semester of the degree programme. It will include discussions on operational framework of academic process in the college and the university. There will be sessions with alumni, business leaders, University academic and research personnel on instilling social awareness, ethics and values, cultural heritage, folk art and craft, Indian Constitution etc. It will help to identify the strength and weakness of students, diverse potentialities and to enhance cultural integration of students from different backgrounds. It will also create a platform for students to learn from each other's life experiences.
- The first year of the degree programme comprises skill development courses/ modules along with other fundamental courses. After satisfactory completion of courses in two semesters of 1st year and subsequent satisfactory completion of 10 credits (10 weeks) of industry/ institute training/ internship, the student will become eligible for the award of UG-Certificate in admitted programme on exit. The students continuing the study further, would not have to attend the internship after 1st year.
- The second year has been designed with the skill development courses as well as fundamental courses related to degree programme with adequate theory and practical components, enabling the student to get acquainted with the basic principles and applications of agricultural sciences. After satisfactory completion of the courses during first two years and subsequent satisfactory completion of 10 credits (10 weeks) of internship/industry/institute training, the student will become eligible for the award of UG-Diploma in the admitted programme on exit. The students continuing the further study, need not to attend the internship after 2nd year. However, the students of B.Tech (Agricultural Engineering) are being offered 4 weeks In-Plant training as partial credits

after 4th Semester during break for completing the degree requirement with splitting in two slots (4 weeks each).

- The courses in the third year have been designed to impart in-depth knowledge of the subject to the students. There will not be an exit after 3rd year. During 5th semester, the students will have an educational tour of 10-12 days duration, which will be counted as 2 credits (Non-gradial).
- The fourth year of degree programmehas been meticulously designed not only to impart specialized knowledge to the students in the selected major disciplines but also to prepare the students to take up employment or entrepreneurship as their future career.
- During the 7th semester, the students will adequately select 20 credits from a basket of elective courses, each course giving an opportunity to gain advanced knowledge in frontier areas of science. The objective is to enable the student to acquire deeper understanding in any particular field.
- In the 8th semester of the degree programme, Student READY programme: Rural Agricultural Work Experience (RAWE), Experiential Learning, Hands-on Training, In-plant Training/ Industrial Aattachment/Internship and Project Work of 20 credits will be offered.
- In B.Tech (Agricultural Engineering) final year, the student will have the liberty to choose any three elective subjects, preferably from one or related disciplines. The objective is to enable the student to acquire deeper understanding in a particular field. In the final year, the Project-I (3 credits in 7th semester) and Project-II (4 credits in 8th semester) are meant for advanced skill development for research, employment and entrepreneurship. Under these courses, the student will have the option to take up a research project (R & D based/field study based) for developing research skills in form of project or take up incubation/ experiential learning-based activity for entrepreneurship development. The Project-I and II can also be taken up in collaboration with any organization/ industry.
- The students have to take a minimum of 10 credits of online courses (6 credits for B.Tech Agricultural Engineering) during four years as a partial requirement for the B.Sc. (Hons)/ B.F.Sc./B.Tech. programme. The online courses can be from any field such as Agriculture and allied sciences, Basic Sciences, Humanities, Psychology, Anthropology, Economics, Business Management, Languages including foreign language, Communication skills/ Music, etc. and can be taken from NPTEL, Mook IT, edX, Coursera, SWAYAM or any other such reputed portal accepted by the University. The objective is to allow the students to groom their passion or strengthen their knowledge and competency in any field beyond prescribed courses. These online courses will be non-gradial and separate certificates would be issued by institute/organization offering the courses. The student must submit the list of online courses along with the content he/she intends to undertake to the Dean/Assoc. Dean/Principal of the college for a permission and records.

Entry and Exit Options

The entry and exit options for the UG programme is shown in the figure below.

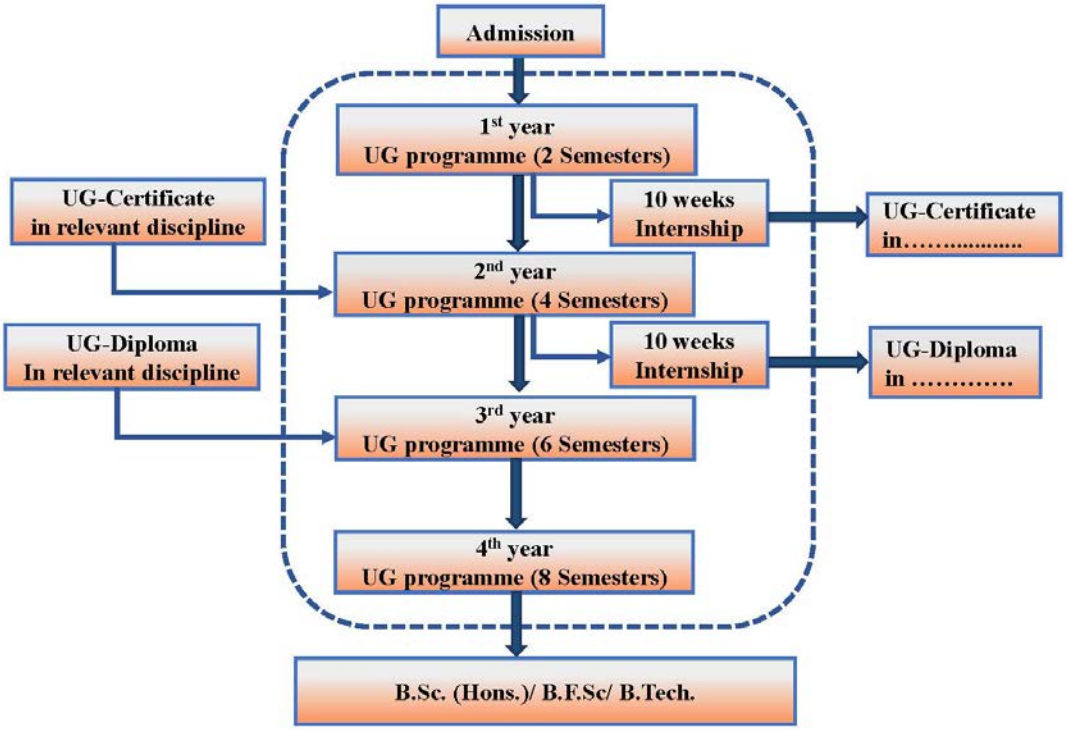


Figure 1: Entry and Exit Options for the UG Programmes

Entry Options: Students with UG-Certificate and UG-Diploma can take admission in 2nd and 3rd year, respectively of B.Sc.(Hons.)/ B.F.Sc./ B.Tech. degree programme.

Exit options

i. **UG-Certificate:** Exit after satisfactory completion of first year and 10 weeks' internship.

ii. **UG-Diploma:** Exit after satisfactory completion of second year and 10 weeks' internship.

iii. **B.Sc. (Hons.)/B.F.Sc./B.Tech.:** On successful completion of four-year degree requirements.

Examination and Evaluation System

Examination and evaluation system of under graduate programme of the University has been given below:

- External pattern of examination shall be followed only for the final theory portion to be conducted at the end of the semester for regular courses.
- External theory exam will be 50% and internal theory + practical- 50%.
- There will be mid-term examination for internal theory and evaluation will be internal.

- The question papers for non-credit courses will be set at the level of Dean/HOD concerned.
- The mid-term, practical and final-term examination shall be conducted during examination dates prescribed in the academic calendar.
- The date sheet will be provided by the Dean of the respective colleges.
- For a course with practical only, practical examination will be conducted twice during mid-term and final term.

Distribution of Marks for Various Examinations

Nature of courses Credit Hours (Theory + Practical)	**Internal (100)**				**External (100)**
	Mid-term Theory	**Assignment**	**Mid-term Practical**	**Final Practical**	
Courses with theory and practical					
1+1	30	20	NA	50	100
1+2	20	20	NA	60	100
2+1	40	20	NA	40	100
2+2	30	20	NA	50	100
3+1	50	20	NA	30	100
Courses with only theory	70	30	NA	NA	100
Courses with only practical	NA	30	70	100	NA

- After adding marks of all the examinations, the total will be divided by two for converting total marks out of 100 and combined (Theory + Practical) grade of each course will be awarded.
- The evaluation of the skill enhancement courses will be done as courses with practical only.
- Usually for any subject, there will be two assignment/quizzes within the semester, one before the midterm and one after midterm examination.
- The evaluation of internship will be done by the parent institute. The student shall submit a report to the parent institute and present the learnings before the other students and faculty after the internship programme.
- The online/MOOC courses, successfully completed by the student, will be indicated in the transcript with 'Satisfactory' grade.
- When students take deficiency course(s), they will be assessed as 'Satisfactory' or Unsatisfactory' without any grade points.

The course catalogue and examination & evaluation system as per the recommendations of Sixth Deans' committee implemented with effect from academic year 2025-26, starting from 1st year 4-year programme of all the colleges. In rest of the existing classes (2nd to 4th year 4-year programme) of all the colleges, the old course catalogue and examination system shall be followed.

I. C. COLLEGE OF COMMUNITY SCIENCE


3 Haryana Girls On NCC

I.C. COLLEGE OF COMMUNITY SCIENCE

B.SC. (HONS.) COMMUNITY SCIENCE, 4 YEAR PROGRAMME
COURSES: SEMESTER-WISE

Course No.	Course Title	Credits
I Semester		
CS 100	*Deeksharambh* (Induction cum Foundation Course of 2 weeks)	2 (0+2) NG
ATS 101	Textile Science and Fabric Care	3 (2+1)
EECM 101	Communication for Development	2 (1+1)
FN 101	Food Standards and Quality Control	2 (1+1)
HDFS 101	Infancy and Childhood	3 (2+1)
HDFS 102 (AEC)	Personality Development	2 (1+1)
RMCS 101	Fundamentals of Art and Design	2 (1+1)
SEC I	Skill Enhancement Course I*	2 (0+2)
SEC II	Skill Enhancement Course II*	1 (0+1)
AGRON 101 (MDC)	Farming Based Livelihood Systems	3 (2+1)
NCC I/ NSS I (AEC)	National Cadet Corps I/ National Service Scheme I	2 (0+2)
TUT	Tutorial	1 (1+0) NG
	Total Credits	**22 (10+12)**
*SEC I and SEC II courses are to be selected from the list of basket available under SEC Module I		
II Semester		
ATS 104	Fundamentals of Clothing Construction	3 (1+2)
FN 104	Food Science and Processing	3 (1+2)
HDFS 105	Theoretical Approaches to Parenting	2 (2+0)
RMCS 104	Fundamentals of Ergonomics	2 (1+1)
SEC III	Skill Enhancement Course III*	2 (0+2)
SEC IV	Skill Enhancement Course IV*	1 (0+1)
ABM 208 (MDC)	Entrepreneurship Development and Business Management	3 (2+1)
SOILS 102 (VAC)	Environmental Studies and Disaster Management	3 (2+1)
ENG 101 (AEC)	Communication Skills	2 (1+1)
NCC II/ NSS II (AEC)	National Cadet Corps II/ National Service Scheme II	2 (0+2)
CCA 102	Co-curricular Activity	1 (0+1) NG
TUT	Tutorial	1 (1+0) NG
	Total Credits	**23 (10+13)**
CS 200	Internship (10 weeks)**	10 (0+10)
*SEC III and SEC IV courses are to be selected from the list of basket available under SEC Module II **Compulsory Internship for students opting for an exit with UG-Certificate after 1st Year		

III Semester		
ATS 201	Pattern Making and Draping	3 (1+2)
EECM 201	Extension and Rural Development	3 (2+1)
FN 201	Food Packaging and Labelling	2 (1+1)
HDFS 201	Early Childhood Education	3 (2+1)
RMCS 201	Computer Aided Interior Designing I	3 (1+2)
SEC V	Skill Enhancement Course V*	2 (0+2)
SEC VI	Skill Enhancement Course VI*	1 (0+1)
SOC 201	Rural Sociology	2 (2+0)
NCC III/ NSS III	National Cadet Corps III/ National Service Scheme III	2 (0+2) NG
CCA 201 (AEC)	Physical Education, First Aid, Yoga Practices and Cultural Activities	2 (0+2)
TUT	Tutorial	1 (1+0) NG
	Total Credits	**21 (9+12)**
*SEC V and SEC VI courses are to be selected from the list of basket available under SEC Module III		
IV Semester		
ATS 204	Retailing and Merchandising	2 (1+1)
EECM 204	Training and Professional Development	2 (1+1)
FN 204	Institutional Food Service Management	3 (2+1)
HDFS 204	Theories and Practices in Early Childhood Education	2 (2+0)
RMCS 204	Housing and Space Management	3 (2+1)
SEC VII	Skill Enhancement Course VII*	2 (0+2)
SEC VIII	Skill Enhancement Course VIII*	1 (0+1)
AG ECON 301(MDC)	Agricultural Marketing and Trade	3 (2+1)
COMP 202 (VAC)	Agricultural Informatics and Artificial Intelligence	3 (2+1)
CCA 202	Co-curricular Activity	1 (0+1) NG
TUT	Tutorial	1 (1+0) NG
	Total Credits	**21 (12+9)**
CS 300	Internship (10 weeks)**	10 (0+10)
*SEC VII and SEC VIII courses are to be selected from the list of basket available under SEC Module IV **Compulsory Internship for students opting for an exit with UG-Diploma after 2nd Year		
V Semester		
ATS 301	Techniques of Fabric Construction	3 (1+2)
ATS 302	Principles of Textile Designing	3 (1+2)
EECM 301	Project Management	3 (2+1)
FN 301	Human Physiology	3 (3+0)
FN 302	Food Hygiene and Sanitation	1 (1+0)
HDFS 301	Adolescent Development	3 (2+1)
HDFS 302	Adulthood and Old Age	2 (1+1)
RMCS 301	Consumer Education	3 (1+2)
CS 351	Educational Tour	2 (0+2) NG
NCC IV/	National Cadet Corps IV/	2 (0+2) NG

NSS IV	National Service Scheme IV	
TUT	Tutorial	1 (1+0) NG
	Total Credits	**21 (12+9)**
VI Semester		
ATS 303	Traditional Textiles and Costumes of India	3 (2+1)
EECM 302	Diffusion and Adoption of Innovations	3 (2+1)
EECM 303	Seminar	1 (0+1)
FN 303	Nutritional Biochemistry	3 (2+1)
FN 304	Human Nutrition	3 (3+0)
HDFS 303	Marriage and Family Dynamics	3 (2+1)
RMCS 302	Principles of Management	2 (2+0)
RMCS 303	Computer Aided Interior Designing II	3 (0+3)
TUT	Tutorial	1 (1+0) NG
	Total Credits	**21 (13+8)**
VII Semester		
Students are required to choose any one package of elective courses (Major and Minor) out of Elective I-V		
Elective I: Apparel and Textile Science		
ATS 401	Advance Draping Techniques	3 (0+3)
ATS 402	CAD- Pattern Making and Grading	2 (0+2)
ATS 403	Quality Analysis in Textiles and Apparels	3 (2+1)
ATS 404	Apparel Production Management	3 (2+1)
ATS 405	Agro Textiles	2 (1+1)
ATS 406	Recent Advances in Textiles	2 (2+0)
EECM 406	Research Methodology	3 (2+1)
STAT 402	Statistical Methods	2 (1+1)
	Total Credits	**20 (10+10)**
Elective II: Extension Education and Communication Management		
EECM 401	Extension Programme Management	3 (1+2)
EECM 402	Extension Training Management	3 (1+2)
EECM 403	Advertising and Social Marketing	3 (1+2)
EECM 404	Public Relations and Communication Management	3 (1+2)
EECM 405	Web Designing	3 (0+3)
EECM 406	Research Methodology	3 (2+1)
STAT 402	Statistical Methods	2 (1+1)
	Total Credits	**20 (7+13)**
Elective III: Foods and Nutrition		
FN 401	Normal and Therapeutic Nutrition	3 (2+1)
FN 402	Food Product Development and Formulations	3 (2+1)
FN 403	Clinical Nutrition	2 (2+0)
FN 404	Diet and Nutrition Counselling	2 (0+2)
FN 405	Sports Nutrition	2 (2+0)
FN 406	Community Nutrition and Education	3 (2+1)
EECM 406	Research Methodology	3 (2+1)
STAT 402	Statistical Methods	2 (1+1)
	Total Credits	**20 (13+7)**

Elective IV: Human Development and Family Studies		
HDFS 401	Developmental Challenges in Children	3 (2+1)
HDFS 402	Methods and Materials for Teaching Young Children	3 (1+2)
HDFS 403	Computer Applications in ECCE	3 (1+2)
HDFS 404	Guidance and Counselling	3 (2+1)
HDFS 405	Parent Education and Community Welfare Programmes	3 (2+1)
EECM 406	Research Methodology	3 (2+1)
STAT 402	Statistical Methods	2 (1+1)
	Total Credits	**20 (11+9)**
Elective V: Resource Management and Consumer Science		
RMCS 401	Residential and Commercial Space Design	3 (1+2)
RMCS 402	Colour and Lighting in Interiors	3 (2+1)
RMCS 403	Tourism and Hospitality Management	3 (1+2)
RMCS 404	Financial Management and Consumer Behaviour	3 (2+1)
RMCS 405	Work Space and Product Design	3 (1+2)
EECM 406	Research Methodology	3 (2+1)
STAT 402	Statistical Methods	2 (1+1)
	Total Credits	**20 (10+10)**
VIII Semester		
Student READY: RAWE/Internship/In-plant/Industrial Attachment/Experiential Learning/ Hands-on-Training/ Project Work		
CS 499	Rural Agricultural Work Experience (RAWE) and Industrial Attachment in Community Science (IACS)	20
	Total Credits	**20**
	On-line Courses (MOOC)*	10
	Grand Total	**169+ 10 (MOOC)+ 16 NG**
*From SWAYAM, Diksha, NPTEL, mooKIT, edx, Coursera or any other portal under intimation to the Dean		

B.SC. (HONS.) COMMUNITY SCIENCE, 4 YEAR PROGRAMME
FOUNDATION, COMMON AND MINOR COURSES

Course No.	Course Title	Credits	Semester
FOUNDATION COURSES			
CS 100	*Deeksharambh* (Induction cum Foundation Course of 2 weeks)	2 (0+2) NG	I
CS 351	Educational Tour	2 (0+2) NG	V
	Total Credits	**4 (0+4) NG**	
COMMON COURSES			
Multidisciplinary Courses (MDC)			
AGRON 101 (MDC)	Farming Based Livelihood Systems	3 (2+1)	I
ABM 208 (MDC)	Entrepreneurship Development and Business Management	3 (2+1)	II
AG ECON 301 (MDC)	Agricultural Marketing and Trade	3 (2+1)	IV
	Total Credits	**9 (6+3)**	
Value Added Courses (VAC)			
SOILS 102 (VAC)	Environmental Studies and Disaster Management	3 (2+1)	II
COMP 202 (VAC)	Agricultural Informatics and Artificial Intelligence	3 (2+1)	IV
	Total Credits	**6 (4+2)**	
Ability Enhancement Course (AEC)			
HDFS 102 (AEC)	Personality Development	2 (1+1)	I
ENG 101 (AEC)	Communication Skills	2 (1+1)	II
NCC I/ NSS I (AEC)	National Cadet Corps I/ National Service Scheme I	2 (0+2)	I
NCC II/ NSS II (AEC)	National Cadet Corps II/ National Service Scheme II	2 (0+2)	II
CCA 201 (AEC)	Physical Education, First Aid, Yoga Practices and Cultural Activities	2 (0+2)	III
	Total Credits	**10 (2+8)**	
MINOR COURSES			
EECM 406	Research Methodology	3 (2+1)	VII
STAT 402	Statistical Methods	2 (1+1)	VII
	Total Credits	**5 (3+2)**	

SEC MODULES

Modules	Course No.	Course Title	Credits
SEC Module I: Any one module to be selected in I Semester			
Textile Design and Embellishment I	ATS 102 (SEC I)	Textile Dyeing and Printing	2 (0+2)
	ATS 103 (SEC II)	Fabric Embellishment	1 (0+1)
Extension Education for Community Development I	EECM 102 (SEC I)	Audio Visual Aids for Communication	2 (0+2)
	EECM 103 (SEC II)	Extension Teaching Methods	1 (0+1)
Bakery and Confectionery Management I	FN 102 (SEC I)	Biscuits and Cookies	2 (0+2)
	FN 103 (SEC II)	Breads and Buns	1 (0+1)
Childhood Development and Assessment I	HDFS 103 (SEC I)	Developmental Assessment I (Infancy and Toddlerhood)	2 (0+2)
	HDFS 104 (SEC II)	Developmental Assessment II (Childhood and Adolescence)	1 (0+1)
Event Management and Housekeeping I	RMCS 102 (SEC I)	Floral Art and Design I	2 (0+2)
	RMCS 103 (SEC II)	Housekeeping and Service Management I	1 (0+1)
SEC Module II: Any one module to be selected in II Semester			
Textile Design and Embellishment II	ATS105 (SEC III)	Indian Embroideries	2 (0+2)
	ATS 106 (SEC IV)	Quilting and Patchwork	1 (0+1)
Extension Education for Community Development II	EECM 104 (SEC III)	ICT and New Media	2 (0+2)
	EECM 105 (SEC IV)	Computerized Instructional Aids Production	1 (0+1)
Bakery and Confectionery Management II	FN 105 (SEC III)	Cakes and Pastries	2 (0+2)
	FN 106 (SEC IV)	Chocolate Making	1 (0+1)
Childhood Development and Assessment II	HDFS 106 (SEC III)	Health Practices in Early Childhood	2 (0+2)
	HDFS 107 (SEC IV)	Infant Stimulation Practices	1 (0+1)
Event Management and Housekeeping II	RMCS 105 (SEC III)	Event Planning and Management	2 (0+2)
	RMCS 106 (SEC IV)	Housekeeping and Service Management II	1 (0+1)
SEC Module III: Any one module to be selected in III Semester			
Fashion Design and Technology I	ATS 202 (SEC V)	Garment Designing Technology	2 (0+2)
	ATS 203 (SEC VI)	Accessory Designing	1 (0+1)
Communication Technology and Journalism I	EECM 202 (SEC V)	Electronic Journalism	2 (0+2)
	EECM 203 (SEC VI)	Print Journalism	1 (0+1)
Food Service	FN 202 (SEC V)	Quantity Cookery	2 (0+2)

Management I	FN 203 (SEC VI)	Traditional Indian Foods	1 (0+1)
Early Childhood Care and Education I	HDFS 202 (SEC V)	Programme Planning and Execution in ECCE Centers	2 (0+2)
	HDFS 203 (SEC VI)	Management of ECCE Centers	1 (0+1)
Interior Design and Decoration I	RMCS 202 (SEC V)	Floral Art and Design II	2 (0+2)
	RMCS 203 (SEC VI)	Interior Designing and Decoration I	1 (0+1)
SEC Module IV: Any one module to be selected in IV Semester			
Fashion Design and Technology II	ATS 205 (SEC VII)	Fashion Illustrations	2 (0+2)
	ATS 206 (SEC VIII)	Portfolio Development	1 (0+1)
Communication Technology and Journalism II	EECM 205 (SEC VII)	Audio and Video Recording	2 (0+2)
	EECM 206 (SEC VIII)	Instructional Video Production	1 (0+1)
Food Service Management II	FN 205 (SEC VII)	Food Preservation and Storage I	2 (0+2)
	FN 206 (SEC VIII)	Food Preservation and Storage II	1 (0+1)
Early Childhood Care and Education II	HDFS 205 (SEC VII)	Establishment of ECCE Centers	2 (0+2)
	HDFS 206 (SEC VIII)	Monitoring and Evaluation of ECCE Centers	1 (0+1)
Interior Design and Decoration II	RMCS 205 (SEC VII)	Interior Accessories and Furnishings	2 (0+2)
	RMCS 206 (SEC VIII)	Interior Designing and Decoration II	1 (0+1)

B.SC. (HONS.) COMMUNITY SCIENCE, 4 YEAR PROGRAMME
CORE COURSES: DEPARTMENT-WISE

Course No.	Course Title	Credits	Semester
Apparel and Textile Science			
ATS 101	Textile Science and Fabric Care	3 (2+1)	I
ATS 104	Fundamentals of Clothing Construction	3 (1+2)	II
ATS 201	Pattern Making and Draping	3 (1+2)	III
ATS 204	Retailing and Merchandising	2 (1+1)	IV
ATS 301	Techniques of Fabric Construction	3 (1+2)	V
ATS 302	Principles of Textile Designing	3 (1+2)	V
ATS 303	Traditional Textiles and Costumes of India	3 (2+1)	VI
	Total Credits	**20 (9+11)**	
Extension Education and Communication Management			
EECM 101	Communication for Development	2 (1+1)	I
EECM 201	Extension and Rural Development	3 (2+1)	III
EECM 204	Training and Professional Development	2 (1+1)	IV
EECM 301	Project Management	3 (2+1)	V
EECM 302	Diffusion and Adoption of Innovations	3 (2+1)	VI
EECM 303	Seminar	1 (0+1)	VI
EECM 406	Research Methodology	3 (2+1)	VII
	Total Credits	**17 (10+7)**	
Foods and Nutrition			
FN 101	Food Standards and Quality Control	2 (1+1)	I
FN 104	Food Science and Processing	3 (1+2)	II
FN 201	Food Packaging and Labelling	2 (1+1)	III
FN 204	Institutional Food Service Management	3 (2+1)	IV
FN 301	Human Physiology	3 (3+0)	V
FN 302	Food Hygiene and Sanitation	1 (1+0)	V
FN 303	Nutritional Biochemistry	3 (2+1)	VI
FN 304	Human Nutrition	3 (3+0)	VI
	Total Credits	**20 (14+6)**	
Human Development and Family Studies			
HDFS 101	Infancy and Childhood	3 (2+1)	I
HDFS 102	Personality Development	2 (1+1)	I
HDFS 105	Theoretical Approaches to Parenting	2 (2+0)	II
HDFS 201	Early Childhood Education	3 (2+1)	III
HDFS 204	Theories and Practices in Early Childhood Education	2 (2+0)	IV
HDFS 301	Adolescent Development	3 (2+1)	V
HDFS 302	Adulthood and Old Age	2 (1+1)	V
HDFS 303	Marriage and Family Dynamics	3 (2+1)	VI
	Total Credits	**20 (14+6)**	

Resource Management and Consumer Science			
RMCS 101	Fundamentals of Art and Design	2 (1+1)	I
RMCS 104	Fundamentals of Ergonomics	2 (1+1)	II
RMCS 201	Computer Aided Interior Designing I	3 (1+2)	III
RMCS 204	Housing and Space Management	3 (2+1)	IV
RMCS 301	Consumer Education	3 (1+2)	V
RMCS 302	Principles of Management	2 (2+0)	VI
RMCS 303	Computer Aided Interior Designing II	3 (0+3)	VI
	Total Credits	**18 (8+10)**	

SKILL ENHANCEMENT COURSES: DEPARTMENT-WISE

Module	Course No.	Course Title	Credits	Semester
Apparel and Textile Science				
Textile Design and Embellishment I	ATS 102 (SEC I)	Textile Dyeing and Printing	2 (0+2)	I
	ATS 103 (SEC II)	Fabric Embellishment	1 (0+1)	I
Textile Design and Embellishment II	ATS105 (SEC III)	Indian Embroideries	2 (0+2)	II
	ATS 106 (SEC IV)	Quilting and Patchwork	1 (0+1)	II
Fashion Design and Technology I	ATS 202 (SEC V)	Garment Designing Technology	2 (0+2)	III
	ATS 203 (SEC VI)	Accessory Designing	1 (0+1)	III
Fashion Design and Technology II	ATS 205 (SEC VII)	Fashion Illustrations	2 (0+2)	IV
	ATS 206 (SEC VIII)	Portfolio Development	1 (0+1)	IV
		Total Credits	**12 (0+12)**	
Extension Education and Communication Management				
Extension Education for Community Development I	EECM 102 (SEC I)	Audio Visual Aids for Communication	2 (0+2)	I
	EECM 103 (SEC II)	Extension Teaching Methods	1 (0+1)	I
Extension Education for Community Development II	EECM 104 (SEC III)	ICT and New Media	2 (0+2)	II
	EECM 105 (SEC IV)	Computerized Instructional Aids Production	1 (0+1)	II
Communication Technology and Journalism I	EECM 202 (SEC V)	Electronic Journalism	2 (0+2)	III
	EECM 203 (SEC VI)	Print Journalism	1 (0+1)	III

Communication Technology and Journalism II	EECM 205 (SEC VII)	Audio and Video Recording	2 (0+2)	IV
	EECM 206 (SEC VIII)	Instructional Video Production	1 (0+1)	IV
		Total Credits	**12 (0+12)**	
Foods and Nutrition				
Bakery and Confectionery Management I	FN 102 (SEC I)	Biscuits and Cookies	2 (0+2)	I
	FN 103 (SEC II)	Breads and Buns	1 (0+1)	I
Bakery and Confectionery Management II	FN 105 (SEC III)	Cakes and Pastries	2 (0+2)	II
	FN 106 (SEC IV)	Chocolate Making	1 (0+1)	II
Food Service Management I	FN 202 (SEC V)	Quantity Cookery	2 (0+2)	III
	FN 203 (SEC VI)	Traditional Indian Foods	1 (0+1)	III
Food Service Management II	FN 205 (SEC VII)	Food Preservation and Storage I	2 (0+2)	IV
	FN 206 (SEC VIII)	Food Preservation and Storage II	1 (0+1)	IV
		Total Credits	**12 (0+12)**	
Human Development and Family Studies				
Childhood Development and Assessment I	HDFS 103 (SEC I)	Developmental Assessment I (Infancy and Toddlerhood)	2 (0+2)	I
	HDFS 104 (SEC II)	Developmental Assessment II (Childhood and Adolescence)	1 (0+1)	I
Childhood Development and Assessment II	HDFS 106 (SEC III)	Health Practices in Early Childhood	2 (0+2)	II
	HDFS 107 (SEC IV)	Infant Stimulation Practices	1 (0+1)	II
Early Childhood Care and Education I	HDFS 202 (SEC V)	Programme Planning and Execution in ECCE Centers	2 (0+2)	III
	HDFS 203 (SEC VI)	Management of ECCE Centers	1 (0+1)	III
Early Childhood Care and Education II	HDFS 205 (SEC VII)	Establishment of ECCE Centers	2 (0+2)	IV
	HDFS 206 (SEC VIII)	Monitoring and Evaluation of ECCE Centers	1 (0+1)	IV
		Total Credits	**12 (0+12)**	
Resource Management and Consumer Science				
Event Management and Housekeeping I	RMCS 102 (SEC I)	Floral Art and Design I	2 (0+2)	I
	RMCS 103 (SEC II)	Housekeeping and Service Management I	1 (0+1)	I
Event Management and Housekeeping II	RMCS 105 (SEC III)	Event Planning and Management	2 (0+2)	II
	RMCS 106 (SEC IV)	Housekeeping and Service Management II	1 (0+1)	II

Interior Design and Decoration I	RMCS 202 (SEC V)	Floral Art and Design II	2 (0+2)	III
	RMCS 203 (SEC VI)	Interior Designing and Decoration I	1 (0+1)	III
Interior Design and Decoration II	RMCS 205 (SEC VII)	Interior Accessories and Furnishings	2 (0+2)	IV
	RMCS 206 (SEC VIII)	Interior Designing and Decoration II	1 (0+1)	IV
		Total Credits	**12 (0+12)**	

ELECTIVE COURSES: DEPARTMENT-WISE

Elective I: Apparel and Textile Science			
Course No.	**Course Title**	**Credits**	**Semester**
ATS 401	Advance Draping Techniques	3 (0+3)	VII
ATS 402	CAD- Pattern Making and Grading	2 (0+2)	VII
ATS 403	Quality Analysis in Textiles and Apparels	3 (2+1)	VII
ATS 404	Apparel Production Management	3 (2+1)	VII
ATS 405	Agro Textiles	2 (1+1)	VII
ATS 406	Recent Advances in Textiles	2 (2+0)	VII
	Total Credits	**15 (7+8)**	
Elective II: Extension Education and Communication Management			
EECM 401	Extension Programme Management	3 (1+2)	VII
EECM 402	Extension Training Management	3 (1+2)	VII
EECM 403	Advertising and Social Marketing	3 (1+2)	VII
EECM 404	Public Relations and Communication Management	3 (1+2)	VII
EECM 405	Web Designing	3 (0+3)	VII
	Total Credits	**15 (4+11)**	
Elective III: Foods and Nutrition			
FN 401	Normal and Therapeutic Nutrition	3 (2+1)	VII
FN 402	Food Product Development and Formulations	3 (2+1)	VII
FN 403	Clinical Nutrition	2 (2+0)	VII
FN 404	Diet and Nutrition Counselling	2 (0+2)	VII
FN 405	Sports Nutrition	2 (2+0)	VII
FN 406	Community Nutrition and Education	3 (2+1)	VII
	Total Credits	**15 (10+5)**	
Elective IV: Human Development and Family Studies			
HDFS 401	Developmental Challenges in Children	3 (2+1)	VII
HDFS 402	Methods and Materials for Teaching Young Children	3 (1+2)	VII
HDFS 403	Computer Applications in ECCE	3 (1+2)	VII
HDFS 404	Guidance and Counselling	3 (2+1)	VII
HDFS 405	Parent Education and Community Welfare Programmes	3 (2+1)	VII
	Total Credits	**15 (8+7)**	

Elective V: Resource Management and Consumer Science			
RMCS 401	Residential and Commercial Space Design	3 (1+2)	VII
RMCS 402	Colour and Lighting in Interiors	3 (2+1)	VII
RMCS 403	Tourism and Hospitality Management	3 (1+2)	VII
RMCS 404	Financial Management and Consumer Behaviour	3 (2+1)	VII
RMCS 405	Work Space and Product Design	3 (1+2)	VII
	Total Credits	**15 (7+8)**	

Student READY (Rural Entrepreneurship Awareness Development Yojana): RAWE/Internship/In-plant/Industrial Attachment/Experiential Learning/ Hands-on-Training/ Project Work

Course No.	Course Title	Credits	Semester
CS 499	Rural Agricultural Work Experience (RAWE) and Industrial Attachment in Community Science (IACS) (To be conducted jointly by Dept. of ATS, EECM, FN, HDFS and RMCS)	20	VIII
	Total Credits	**20**	

NON-GRADIAL COURSES

Course No.	Course Title	Credits	Semester
CS 100	*Deeksharambh* (Induction cum Foundation Course of 2 weeks)	2 (0+2)	I
CS 351	Educational Tour	2 (0+2)	V
TUT	Tutorial	1 (1+0)	I-VI
	Total Credits	**10 (6+4)**	

SUPPORTING COURSES: DEPARTMENT-WISE
COLLEGE OF AGRICULTURE

Course No.	Course Title	Credits	Semester
Agricultural Economics			
AG ECON 301 (MDC)	Agricultural Marketing and Trade	3 (2+1)	IV
	Total Credits	**3 (2+1)**	
Agronomy			
AGRON 101 (MDC)	Farming Based Livelihood Systems	3 (2+1)	I
	Total Credits	**3 (2+1)**	
Business Management			
ABM 208 (MDC)	Entrepreneurship Development and Business Management	3 (2+1)	II
	Total Credits	**3 (2+1)**	
Soil Science			
SOILS 102 (VAC)	Environmental Studies and Disaster Management	3 (2+1)	II
	Total Credits	**3 (2+1)**	

COLLEGE OF BASIC SCIENCES AND HUMANITIES

Course No.	Course Title	Credits	Semester
Computer Section			
COMP 202 (VAC)	Agricultural Informatics and Artificial Intelligence	3 (2+1)	IV
	Total Credits	**3 (2+1)**	
Languages and Haryanavi Culture			
ENG 101 (AEC)	Communication Skills	2 (1+1)	II
	Total Credits	**2 (1+1)**	
Mathematics and Statistics			
STAT 402	Statistical Methods	2 (1+1)	VII
	Total Credits	**2 (1+1)**	
Sociology			
SOC 201	Rural Sociology	2 (2+0)	III
	Total Credits	**2 (2+0)**	

DIRECTORATE OF STUDENTS' WELFARE

Course No.	Course Title	Credits	Semester
NCC I/ NSS I (AEC)	National Cadet Corps I/ National Service Scheme I	2 (0+2)	I
NCC II/ NSS II (AEC)	National Cadet Corps II/ National Service Scheme II	2 (0+2)	II
CCA 102	Co-curricular Activity	1 (0+1) NG	II
CCA 201 (AEC)	Physical Education, First Aid, Yoga Practices and Cultural Activities	2 (0+2)	III
NCC III/ NSS III	National Cadet Corps III/ National Service Scheme III	2 (0+2) NG	III
CCA 202	Co-curricular Activity	1 (0+1) NG	IV
NCC IV/ NSS IV	National Cadet Corps IV/ National Service Scheme IV	2 (0+2) NG	V
	Total Credits	**6 (0+6)**	

COURSE CONTENTS: DEPARTMENT- WISE
FOUNDATION COURSES

Course No.	Course Title	Credits	Semester
CS 100	*Deeksharambh* (Induction cum Foundation Course of 2 weeks)	2 (0+2) NG	I
CS 351	Educational Tour	2 (0+2) NG	V
	Total Credits	**4 (0+4)**	

CS 100	*DEEKSHARAMBH* (INDUCTION CUM FOUNDATION COURSE OF 2 WEEKS)	2 (0+2) NG	SEM I

Objectives

- To give a broad view and application areas of Community Science degree programme
- Helping students from different backgrounds for cultural integration
- Knowing about the operational framework of academic process in the university
- Instilling life and social skills, leadership qualities, team work spirit etc.
- Developing social awareness, ethics and values, creativity, etc.
- Helping students to identify the traditional values and indigenous cultures along with diverse potentialities both in indigenous and developed scenario.

Activities

i. Discussions on operational framework of academic process in the University as well as interactions with academic and research managers of the University
ii. Creating awareness on the subject of study and the traditional values in indigenous culture along with diverse potentialities both in indigenous and developed scenario.
iii. Interaction with alumni, business leaders, perspective employers, outstanding achievers in related fields and people with inspiring life experiences
iv. Group activities to identify the strength and weakness of students (with expert advice for their improvement) as well as to create a platform for students to learn from each other's life experiences
v. Activities to enhance cultural integration of students from different backgrounds.
vi. Field visits to related fields/ establishments
vii. Sessions on personality development (instilling life and social skills, social awareness, ethics and values, team work, leadership, etc.) and communication skills

CS 351	EDUCATIONAL TOUR	2 (0+2) NG	SEM V

To be conducted for 10-12 days after 5th Semester.

The students will visit industries/ institutions, preferably outside the state, so that, in addition to visiting the organizations/ industries (related to the profession), they will also be exposed to the geographical variability of different places/ states and the social and cultural differences existing in the country.

After the visit, the students will submit a report/ make a presentation.

APPAREL AND TEXTILE SCIENCE

Course No.	Course Title	Credits	Semester
Core Courses			
ATS 101	Textile Science and Fabric Care	3 (2+1)	I
ATS 104	Fundamentals of Clothing Construction	3 (1+2)	II
ATS 201	Pattern Making and Draping	3 (1+2)	III
ATS 204	Retailing and Merchandising	2 (1+1)	IV
ATS 301	Techniques of Fabric Construction	3 (1+2)	V
ATS 302	Principles of Textile Designing	3 (1+2)	V
ATS 303	Traditional Textiles and Costumes of India	3 (2+1)	VI
	Total Credits	**20 (9+11)**	
Skill Enhancement Courses			
Textile Design and Embellishment I			
ATS 102 (SEC I)	Textile Dyeing and Printing	2 (0+2)	I
ATS 103 (SEC II)	Fabric Embellishment	1 (0+1)	I
Textile Design and Embellishment II			
ATS105 (SEC III)	Indian Embroideries	2 (0+2)	II
ATS 106 (SEC IV)	Quilting and Patchwork	1 (0+1)	II
Fashion Design and Technology I			
ATS 202 (SEC V)	Garment Designing Technology	2 (0+2)	III
ATS 203 (SEC VI)	Accessory Designing	1 (0+1)	III
Fashion Design and Technology II			
ATS 205 (SEC VII)	Fashion Illustrations	2 (0+2)	IV
ATS 206 (SEC VIII)	Portfolio Development	1 (0+1)	IV
	Total Credits	**12 (0+12)**	
Elective I: Apparel and Textile Science			
ATS 401	Advance Draping Techniques	3 (0+3)	VII
ATS 402	CAD- Pattern Making and Grading	2 (0+2)	VII
ATS 403	Quality Analysis in Textiles and Apparels	3 (2+1)	VII
ATS 404	Apparel Production Management	3 (2+1)	VII
ATS 405	Agro Textiles	2 (1+1)	VII
ATS 406	Recent Advances in Textiles	2 (2+0)	VII
	Total Credits	**15 (7+8)**	
	Grand Total	**47 (16+31)**	

ATS 101	TEXTILE SCIENCE AND FABRIC CARE	3 (2+1)	SEM I

Objectives

1. To impart knowledge about the basics of textiles and their care
2. To develop a basic understanding of different textile fibres, yarns and fabrics
3. To gain the knowledge of processing of natural fibres and manufacturing of man-made fibres
4. To inculcate an understanding of fibre morphology, physical and chemical properties of different fibres
5. To learn about the laundry practices, care and storage of clothes made of natural and man-made fibres

Theory

Textile: terminology, forms of textile, importance of textile industry in national economy; classification of textile fibres; properties of textile fibres; primary and secondary properties; molecular structure of textile fibres: monomers, polymers and their types, polymerization and its types, degree of polymerization and orientation; cotton: fibre processing, fibre morphology, physical, chemical, biological properties and end-uses; bast fibres: flax, jute, hemp- fibre processing, fibre morphology, physical, chemical, biological properties and end-uses; wool and specialty hair fibres: classification, processing, fibre morphology, physical, chemical, biological properties and end-uses; silk: fibre processing, classification, fibre morphology, physical, chemical, biological properties and end-uses; spinning methods: mechanical spinning, ring spinning and chemical spinning- wet, melt and dry methods; common properties of man-made fibres; regenerated cellulosic fibres: viscose, cupramonium and high wet modulus rayons- fibre manufacturing, microscopic structure, physical, chemical, biological properties and end-uses; modified cellulosic fibres: diacetate and triacetate- fibre manufacturing, microscopic structure, physical, chemical, biological properties and end-uses; synthetic fibres: nylon, polyester, acrylic and elastomeric-fibre manufacturing, microscopic structure, physical, chemical, biological properties and end-uses; yarn: twist direction, twist amount, fibre length, classification of yarn on the basis of structure - simple yarns and different type of novelty yarns and their end-uses; methods of fabric construction: weaving, knitting, knotting, braiding, lace making and nonwoven; textile finishes: introduction, classification and common textile finishes; laundry: definition, principles, equipment, laundry methods and dry cleaning; stain removal: classification of stains and methods of removing different stains; laundry agents: water, soap and other laundry auxiliaries - stiffening agents, bleaches and blue; care of textiles: importance of labeling, labels and tags used in textiles; Labelling Act; storage of clothes: requirements for short term and long-term storage; folding and packaging of clothes.

Practical

Fibre identification: visual test, burning test, solubility and microscopic view; collection and identification of different types of yarns; collection and identification of samples of different fabric construction techniques; washing of garments made up of cotton, wool, silk and manmade fibres; dry cleaning; removal of different stains from fabric surface; visit to textile industry.

Suggested Readings

1. Joseph, M.L. 1986. Introductory Textile Science. 5th Ed. CBS College Publishing, New York.
2. Kozlowski R. and Mackiewicz-Talarczyk, M. 2020. eBook on Natural Fibres: Processing and Applications (Vol II). Woodhead Publishing, Elseiver.
3. Needles, H.L. 2001. Textile Fibres, Dyes, Finishes and Processes. Standard Publishers and Distributors, Delhi.
4. Potter, M.D. and Corbman, B.P. 1967. Textiles: Fibre to Fabric. Macmillan Hill Co., New York.
5. Rastogi D. and Chopra S. 2017. Book on Textile Science. Orient Blackswan Private Ltd., India.
6. Sekhri, S. 2011. Text Book of Fabric Science: Fundamentals to Finishing. PHI Learning Pvt. Ltd., New Delhi.
7. Stout, E.E. 1970. Introduction to Textiles. 3rd Ed. John Wiley and Sons Inc., New York.
8. Tortora, P.G. 1978. Understanding Textiles. Macmillan Publishing Company, New York.
9. Vatsala, R. 2003. Textbook of Textiles and Clothing. ICAR, New Delhi.
10. Vilensky, L.D. and Gohl, E.P.G. 2005. Textile Science. CBS Publishers and Distributors, Delhi.
11. Wingate, I.B. 1970. Textile Fabrics and their Selection. 6th Ed. Prentice Hall Inc., New Jersey.
12. Wynne, A. 1997. Textiles. Macmillan Education Ltd., London.

ATS 104	FUNDAMENTALS OF CLOTHING CONSTRUCTION	3 (1+2)	SEM II

Objectives

1. To educate students regarding importance and requirement of clothing in human life
2. To provide primary knowledge about different aspects of clothing construction
3. To develop basic stitching skills of the students

Theory

Terminology related to clothing construction; sewing tools and supplies, their selection and maintenance- tools required for measuring, drafting, cutting and stitching; different sewing supplies used in clothing construction; body measurements: importance, important body measurements, general rules for taking body measurements; sewing machine: its parts and their function, operation and maintenance, solving common machine problems; types of sewing machines; different methods of making paper pattern, their advantages and disadvantages; selection of fabric for clothing used for different purposes; preparation of fabrics for cutting and layout of paper pattern on different fabric patterns including plain, print, lines, plaid and check; implications of clothing in human life, functions of clothing: social, physical, economical and psychological; factors affecting clothing selection; elements and principles of design applied to apparel designing; clothing requirements

for infants, toddlers, pre-schoolers, school age children, teenagers, adults and senior citizens; role of clothing in personality development.

Practical

Use and maintenance of different sewing tools; equipment and supplies used for clothing construction; sewing machine: operation and care, identifying and solving machine problems; sample preparation of hand stitches: basting, hemming, back stitch, overcast stitch, blanket stitch, buttonhole stitch, cross stitch, slip stitch etc.; attaching different fasteners: button and button hole, hook and eye, snap, tape; different types of smocking stitches: cable, chain, diamond, honey comb, lattice; seams and seam finishes: plain, french, flat-fell, double-top stitched, welt and different seam finishing methods; creating fullness through different types of pleats, gathers, tucks, dart, shirring; edge finishing: straight edge finishing, curve edge finishing, decorative edge finishing; placket openings and finishing: one piece, two piece, binding; taking body measurements for different garments; preparation of fabric for paper pattern layout, marking, cutting and stitching; making basic block of bodice, sleeve and skirt and their adaptation; drafting, cutting and stitching of bib, napkin, frock, skirt and apron.

Suggested Readings

1. Armstrong, H.J. 1986. Pattern Making for Fashion Design. Harper and Row, New York.
2. Cooklin, G. 1991. Introduction to Clothing Manufacture. Blackwell Publishing, UK.
3. Doongaji, S. and Deshpande, R. 1957. Basic Processes and Clothing Construction. 3rd Ed. Raj Prakashan, New Delhi.
4. Horn, M.J. 1981. Second Skin. Hounghton Muffin, London.
5. Kefgen, M. and Phyllis, T.S. 1971. Individuality in Clothing Selection and Personal Appearance. The Macmillan Company, New York.
6. Labanya, M. and Vastala, R. 2004. Textbook of Fundamentals of Clothing Construction. ICAR, New Delhi.
7. Lewis, V.S. 1984. Comparative Clothing Construction Techniques. Surjeet Publication, New Delhi.
8. Mansfield, E.A. and Lucas, E.L. 1974. Clothing Construction. 2nd Ed. Houghton Mifflin Company, London.
9. Mazumdar, L. and Vatsala, R. 2004. Text Book of Fundamentals of Clothing Construction. ICAR, New Delhi.
10. Sakshi. 2013. Fundamentals of Clothing Construction. University Press, G.B. Pant University of Agriculture and Technology, Pantnagar.
11. Thomos, A.J. 1993. The Art of Sewing. UBS Publishers, Bombay.
12. Vatsala, R. 2003. Textbook of Textiles and Clothing. ICAR, New Delhi

E-Resources

1. http://www.stitchrippers.com/forum/Topic/sewing-terminology
2. Sannapapamma, K.J. and Jahan, S. TXAD111-Fundamentals of Clothing Construction. ecourse.iasri.res.in

ATS 201	PATTERN MAKING AND DRAPING	3 (1+2)	SEM III

Objectives

1. To develop understanding about basics of pattern making and draping
2. To enable students to develop patterns for designer garments
3. To upgrade skills for commercialized apparel manufacturing using advance pattern making techniques
4. To develop skills in developing patterns for designer garments, obtaining perfect fit and create harmony between the fabric and garment design

Theory

Flat pattern: terminology, tools, applications and limitations; anthropometric measurements: importance, standardization and standard measurement charts of children and adults; pattern development process: design analysis, plotting, alteration of basic patterns and development of production patterns for fabric layout; principles of pattern making: dart manipulation, added fullness and contouring; pattern making techniques: slash-spread and pivot-transfer; draping: terminology, tools, applications and limitations; basic draping techniques for bodice front and back, skirt front and back; application of dart manipulation, added fullness and contouring principles in draping; factors affecting pattern making and apparel construction using special fabrics: stretch fabrics, knits, checks, plaids, velvet and lace etc.; fitting: principles of fitting, standards for good fit, common fitting problems and their remedies; pattern grading: importance, terminology and techniques.

Practical

Taking measurements: circumference, horizontal and vertical measurements; flat pattern technique: preparation of basic pattern set- bodice front and back, skirt front and back and sleeve; development of patterns for designer garments through flat pattern making techniques of slash-spread and pivot-transfer: design analysis, adaptation of basic patterns to design patterns having single-dart series, two-dart series, tuck-darts, graduated, radiating and parallel darts, pleats, flare, gathers, princess style lines; development of design patterns through flat pattern making technique of added fullness: design analysis, adaptation of basic patterns by adding fullness in different forms and at various locations; development of design patterns through flat pattern making technique of contouring: designs analysis, adaptation of basic patterns to empire, surplice, off-shoulder and halter designs; preparation of paper patterns for different yokes, collars, necklines, sleeves and skirts; development of design patterns through flat pattern making technique for six garments incorporating various style features- two of each principle of pattern making; construction of three garments using developed design patterns- one each of dart manipulation, added fullness and contouring and assessment of their fitting; draping: preparation of muslin for draping, development of foundation block for upper and lower garments; designing of six garment patterns through draping using dart manipulation, added fullness, contouring- two of each principle of pattern making; designing upper garment patterns with different yokes, collars, built-up necklines and cowls; construction of three garments using developed draped design patterns - one each of dart manipulation, added fullness and contouring for casual,

formal and party wear and assessment of their fitting; pattern grading: grading of garment pattern-any one of the constructed garments.

Suggested Readings

1. Amaden-Crawford, C. 2018. The Art of Fashion Draping. Bloomsbury Publishing Inc., USA.
2. Bane, A. 1972. Flat Pattern Design. McGraw-Hill Publication, USA.
3. Bane, A. 1996. Creative Clothing Construction. McGraw-Hill Publication, USA.
4. Bray, N. 2003. Dress Fitting: Basic Principles and Practice. Classic Edition, Blackwell Publishing, UK.
5. Cooklin, G. 1991. Pattern Grading for Women's Clothes. Blackwell Publishing, UK.
6. Goulbourn, M. 1998. Introducing Fashion Cutting, Grading and Modelling. Batsford Publications, UK.
7. Handford, J. 2003. Professional Pattern Grading for Women's, Men's and Children's Apparel. Fairchild Books, New York.
8. Kiisel, K. 2020. Draping: The Complete Course. Laurence King Publishing, UK.
9. Mee, J. and Purdy, M. 1987. Modelling on the Dress Stand. BSP Professional Books, Hyderabad.
10. Tate, S.L. 2003. Inside Fashion Design. 5th Ed. Prentice Hall Publishing Co., USA.
11. Taylor, P.J. and Shoben M.M. 1990. Grading for the Fashion Industry. Stanely Homes Ltd., UK.
12. Winfred, A. 2015. Metric Pattern Cutting for Women's Wear. Blackwell Publishing, UK.

ATS 204	RETAILING AND MERCHANDISING	2 (1+1)	SEM IV

Objectives

1. To learn about retailing and various formats of retailing
2. To understand the organizational structure of the retail firms
3. To know about the merchandising division in an apparel firm
4. To gain knowledge of the sales promotion techniques used in the industry
5. To become familiar with the export and import procedures and organizations in export promotion

Theory

Retailing: introduction to textile and apparel industry, nature, scope and importance of retailing and merchandising; retailing concept and principles, retail life cycle, market segmentation, key players at domestic, national and global level; retailing and merchandising in India: status, evolution and trends; classification of retail formats: store or onsite retailers, non-store or off-site retailers, e-tailing and online/virtual sales and promotions; organizational set up: on site retailers and off-site retailers; merchandising: concepts, terminology of merchandising, factors affecting buying function, merchandising plan, buying plan, fashion calendar and merchandising planner; merchandising: functions of buying for store, chain store, buying house, studios, export houses, catalogue sales; merchandising: categories, textile, apparel

and fashion merchandising, retail merchandising; roles and responsibilities of merchandiser, merchandising team; factors affecting merchandising: franchising, trade promotions, supply chain management, logistics management, physical distribution; sales promotion techniques: fashion advertising and promotion– media, trends and methods; visual merchandising: introduction, functions, elements, interior display, exterior display, planogram, trends, mall designing and visual display planning for commercial spaces; export and import procedures in India; primary and ancillary documents.

Practical

Introduction to retail markets; developing questionnaire and survey to assess the retail/wholesale scenario in apparel and textiles; analysis of textile and apparel market: visit to wholesale/retail and exclusive showrooms/factory outlets/chain stores and reporting; analysis of textile and apparel market to study value addition techniques and products; analysis of textile and apparel market reports in view of selected product category for business development; development and presentation of the visual display techniques for textiles/apparel retail outlets; planning promotion techniques for textile or apparel/fashion items in retail outlet (can utilize the products developed in other courses also); textile or apparel/fashion promotion event planning and organization: design and product development, textile and apparel categories, fashion direction, forecasting, product specification, sample/prototype development, range planning, product assortment and their significance in product planning and pricing of the products.

Suggested Readings

1. Berman, B. 1983. Retail Management- A Strategic Approach. Macmillan Publishing Co., New York.
2. Bell, J. 2006. Silent Selling. 3rd Ed. Fairchild Publications, New York.
3. Bellenger, D.N. and Goldstucker, J.L. 1983. Retailing Basics. Richard D. Irwin Inc., USA.
4. Bickle, C. 2005. Fashion Marketing– Theory, Principles and Practice. Marianne Fairchild Publications, New York.
5. Diamond, E. 2006. Fashion Retailing. Pearson Publications, London.
6. Donnellan, J. 2013. Merchandise Buying and Management. A & C Black, Bloomsbury Publishing India Pvt. Ltd., New Delhi.
7. Easey, M. 2000. Fashion Marketing, 2nd Ed. Blackwell Publications, UK.
8. Fiore, A.M. and Kinkle, P.A. 1997. Understanding Aesthetics for the Merchandising and Design Professional. Fairchild Publications, New York.
9. Frings, G.S. 1998. Fashion from Concept to Consumer. Prentice Hall, USA.
10. Jackson, T. and Shaw, D. 2001. Mastering Fashion Buying and Merchandising Management. Palgrave Publication, London.
11. Kincade, D.H. and Gibson. 2012. Merchandising of Fashion Products. Pearson Education, London.
12. Kumar, M.K. 2010. Apparel Merchandising. Abhishek Publications, Chandigarh.
13. Poloian, L.G. 2003. Retailing Principles– A Global Outlook, Fairchild Publications, New York.
14.

15. Pradhan, S. 2008. Retailing and Merchandising– Text and Cases. Mc Graw Hill Publications, USA.
16. Rabolt, N. and Miller, J. 2008. Concepts and Cases in Retail and Merchandise Management, Mc Graw Hill Publications, USA.
17. Rabolt, N.J. 2009. Retailing and Merchandising Management, Mc Graw Hill Co., USA.
18. Rosenau, J.A. and Wilson, D.L. 2006. Apparel Merchandising– The Line Starts Here. 2nd Ed. Fairchild Publications, New York.
19. Stone, E. 1985. Fashion Merchandising, 4th Ed. Mc Graw Hill Co., USA.
20. Stone, E. 2007. Fashion. Fairchild Publications, New York.
21. Stone, E. 2007. In Fashion– Fun, Fame, Fortune. Fairchild Publications, New York.

E-Resources

1. e-Book on Research Methodology by C.K. Kothari (2021 Ed.)
2. e-Book on Retail Recovery by Mark Piginton
3. e-Book on The Effects of E-Commerce on Retail Supply Chains by Steven Humphrey (2021 Ed.)
4. e-Book on An Introduction to Fashion Retailing from Managing to Merchandising by Dimitri Koumbis (2021 Ed.)
5. http://ecoursesonline.iasri.res.in/course/view.php?id=233
6. https://bookauthority.org/book/Retail-Recovery/1472987179
7. https://bookauthority.org/book/The-Effects-of-E-Commerce-on-Retail-Supply-Chains/ B098CWD6JB
8. https://bookauthority.org/book/An-Introduction-to-Fashion-Retailing/1350098272

ATS 301	TECHNIQUES OF FABRIC CONSTRUCTION	3 (1+2)	SEM V

Objectives

1. To acquire an understanding of looms and knitting machines
2. To develop skills in making different types of weaves and knits
3. To acquaint with the various fabric construction methods

Theory

Introduction of different types of fabric construction techniques; woven fabrics: simple and compound woven structures, characteristics of woven fabric; history of weaving and looms; classification of looms; handloom: kinds, principal parts and their functions, loom accessories and their functions; preparation of yarn for weaving; mechanism of weaving: primary, secondary and tertiary motions; basic weaves: plain, twill, satin and their variations; complex/fancy weaves: extra yarn fabrics, pile fabrics, leno weave, dobby and jacquard weave; knitting: principle of knitting, types of knitting machines, their parts and functions; knitting stitches: warp and weft knits, types of knit fabrics; other methods of fabric construction: braiding, tufting, net, lace making, crocheting, macramé, stitch through fabrics, quilted fabrics, laminated fabrics, bonded fabrics, felt, nonwoven and films.

Practical

Observation of fabric structures: woven, knitted and nonwoven fabrics; collection of fabric samples of different types of basic and fancy weave and their identification; manual representation of woven designs on graph sheet: plain weave, rib weave, basket weave, twill weave, satin and sateen weaves; handloom and its parts; observation of loom setting, weaving calculations and yarn preparation and making a plain weave sample on loom; introduction and practice to various tools used in CAD weave software; representation of basic weaves: plain, rib, basket, twill and satin using textile design software; hand knitting: two needle method, holding the needles and the yarn, casting on and knitting of plain, rib and purl knit samples; knots of macramé; stitches of crochet; manual felting; visit to weavers service center/textile industry for observation of weaving/knitting mechanism/manufacturing of non-woven fabrics.

Suggested Readings

1. Gokarneshan, N. 2020. Fabric Structure and Design. 3rd Ed. New Age International Pvt. Ltd., New Delhi.
2. John, G. 1999. World Textiles: A Visual Guide to Traditional Techniques. Thames Hudson Publications, London.
3. Joseph, M.L. 1986. Introductory Textile Science. 5th Ed. CBS College Publishing, New York.
4. Kadolph, S.J. 2013. Textiles. Pearson New International Education Ltd, Asia.
5. Kaur, N. 2011. Fashion Concepts. Comdex: Fashion Design (Vol I). Dreamtech Press, New Delhi.
6. Spencer, J.D. 1983. Knitting Technology. Pergamon Press, England.
7. Stout, E.E. 1970. Introduction to Textiles. 3rd Ed. John Wiley and Sons Inc., New York.
8. Vatsala, R. 2003. Textbook of Textiles and Clothing. ICAR, New Delhi.
9. Wynne, A. 1997. Textiles. Macmillan Education Ltd., London

E-Resources

1. https://textilelearner.net/application-of-cad-in-textile
2. https://textilelearner.net/best-textile-design-software
3. https://www.slideshare.net/mjrtipu/different-software-use-for-textile-design
4. https://www.textileblog.com/cad-cam-in-textile-and-garment-industry

ATS 302	PRINCIPLES OF TEXTILE DESIGNING	3 (1+2)	SEM V

Objectives

1. To impart knowledge about textile designing process
2. To inculcate ability to arrange motifs to develop design for various articles

Theory

Textile designing: introduction, terminology and basic process; skills and qualities required in textile designer; classification of textile designs: structural and decorative; elements of design: line, shape, space, form and colour; colour: colour wheel, value

and intensity charts; principles of design: balance, rhythm, proportion, emphasis and harmony; application of design principles in textile designing; motif: unit, selection and development; geometry involved in basic textile designing: translation, rotation, reflection and glide reflection; software for textile designing.

Practical

Methods of producing designs on textiles: structural designs through yarn manipulation, weaving, knitting & other techniques and decorative designs through printing, dyeing, painting, finishing, embroidery and appliqué work; elements of design: drawing various types of lines, shapes, forms and concept of positive and negative design space; colour: related and contrasting colour schemes; principles of design: planning of basic shapes, scale of shapes and forms, division of space, creating optical illusion with lines and shapes; balance: creating formal and informal balance in design; rhythm: creating rhythm through repetition, progression, radiation and gradation of colour and pattern; emphasis: creating emphasis in design by the use of contrast, hue, value, line, shape & and size and use of spacing around motif; harmony: harmony of line, shape, size, colour and texture in a design; motif as basic unit of design, selection of components of motif, motif development, symmetrical and asymmetrical motifs and their arrangements; pattern arrangements with motif in different repeats; tools and menu of CAD software and its use for motif development; development of patterns using different types of motifs: developing geometrical/abstract/stylized/naturalistic motifs and pattern arrangements using different colour schemes to create variety in pattern; use of CAD for pattern arrangement using different design repeat and colour schemes; development of different types of border patterns; preparation of swatch book: fabric samples of different types of applied designs- dyed and printed fabrics.

Suggested Readings

1. Bhatnagar, P. 2005. Decorative Design History in Indian Textiles and Costumes. Abhishek Publications, Chandigarh,
2. Broomer, G.F. and Horn, G.F. 1977. Art in Your World. Davis Publications, Inc., Worcester, Massachusetts.
3. Evans, H.M. and Dumesnil, C.D. 1982. An Invitation to Design. Macmillan Publishing Co. Inc., New York.
4. Gahlot, M. and Naik, S.D. 2014. Principles of Design and Application. E-Home Science Courseware Consortium (NAIP).
5. Harold, C. and Pomeroy, J. 1996. Fashion Design and Product Development. Blackwell Science, UK.
6. Miller, J. 2003. The Style Source Book. Octopus Publishing, London.
7. Naik, S.D. and Wilson, J.A. 2006. Surface Designing of Textile Fabrics. New Age International Pvt. Limited Publishers, New Delhi.
8. Wilson, J. 2001. Hand Book of Textile Design: Principles, Processes and Practice. CRC Press, Woodhead Publishing Limited, Cambridge.
9. Wilson, J. 2001. Handbook of Textile Design. Woodhead Publishing Series in Textiles.

E- Resources

1. https://nios.ac.in/media/documents/srsec321newE/321-E-Lesson-29B.pdf
2. https://www.mathsisfun.com/geometry/index.html
3. https://coe.hawaii.edu/ethnomath/wp- content/uploads/sites/12/2019/10/Geometry-Translations-Rotation-Reflection-and-Dilations-in-Ethnic-Patterns-and-Designs.pdf
4. https://teachers.yale.edu/curriculum/viewer/initiative_10.04.09_u
5. https://en.wikipedia.org/wiki/Textile_design
6. https://www.emis.de/monographs/Isometrica/isometrica-2.pdf
7. https://condor.depaul.edu/ppereira/sym/Notes/Seven.pdf
8. https://silo.tips/download/borders-decorative-borders-are-everywhere-an-expression-of-the-pleasure-we- find
9. https://math.okstate.edu/geoset/Projects/Borders/howclass.htm

ATS 303	TRADITIONAL TEXTILES AND COSTUMES OF INDIA	3 (2+1)	SEM VI

Objectives

1. To learn the characteristic features/designs of the traditional textiles and costumes of different states of India
2. To develop an understanding of the classification of traditional textiles based on their production process
3. To develop an understanding of the methods and materials used in processing and production for different traditional textiles
4. To develop an understanding of the techniques of traditional embroideries, prints and woven textiles
5. To inculcate skill for adaptation of traditional textiles' designs and costumes' styles in contemporary textiles and apparels

Theory

Traditional textiles and costumes: historic perspective, classification and importance of traditional Indian textiles and costumes in textile and apparel industry; introduction of textile arts: embroideries, rugs, carpets, shawls, sarees and wraps; factors affecting diversity of textiles and costumes of India: geographical factors, socio-economic factors, customs, traditions and religious factors; traditional costumes of Northern India: Jammu and Kashmir, Punjab and Haryana; traditional costumes of Western India: Rajasthan, Gujarat and Maharashtra; traditional costumes of Southern India: Andhra Pradesh, Tamil Nadu, Kerala and Karnataka; traditional costumes of Eastern India: Orissa, West Bengal, Assam, Nagaland, Meghalaya, Manipur, Arunachal Pradesh, Mizoram and Tripura; traditional costumes of Central India: Uttar Pradesh, Madhya Pradesh and Bihar; importance of geographical indications for traditional Indian textiles; origin, material and techniques used in woven textiles: Kota Doria, Patola, Sujani, Tangaliya, Pachhedi, Chanderi, Maheshwari, Brocades, Dacca muslin, Baluchari, Jamdani Tangail, Paithani, Himroo, Amru, Dharmavaram, Sambhalpuri, Vichitrapuri, Venkatgiri, Gadwal, Narayanpet, Ilkal, Khann, Kanjeevaram, Lepcha, Pochampalli, Ikat, shawls from Kashmir, Assam and Nagaland; origin, material and

techniques used in painted textiles: Patachitra, Pichhavai, Worli and Phad, mordant painted textiles- Madhubani and Kalamkari (Masulipatnam and Srikalahasti); origin, material and techniques used in printed textiles: Calico printing and hand block printed- Ajrakh, Rogan, Sanganeri, Bagh, Dabu; origin, material and techniques used in dyed textiles: yarn resist dyed- Patola, Mashru, Ikat and Bandhej, fabric resist dyed- Sugadi, Bandhej and Laheriya.

Practical

Documentation of motifs and sample preparation of traditional embroideries; creative projects: preparation of one article by adapting traditional embroidery motifs in contemporary textiles; preparation of portfolio and collection of visuals that depict the different traditional textiles and its application in contemporary apparel designing: pictures of traditional textiles with the descriptive analysis and pictures of the traditional costumes with constructional details; documentation of traditional textiles and styles in traditional costumes and development of portfolio: collection of images and samples for development of theme board, storyboard, development of range of textile/apparel products, display and presentation of portfolio; collection of varied style of male and female traditional costumes of different states of India for hands on experience; creating dolls display of traditional costumes of different states; preparation of mini costumes of both male and female in group assignments and project work; creative project: organizing exhibition/fashion show; visit to National craft museum and exhibition/art galleries.

Suggested Readings

1. A Compendium of Indian Handicrafts and Handlooms covered under Geographical Indications (GI), Ministry of Textiles, Govt. of India, New Delhi.
2. Annalce, G. 1987. One World of Fashion. Fair Child Publications, New York.
3. Bhatnagar, P. 2005. Decorative Design History in Indian Textiles and Costumes. Abhishek Publication, Chandigarh.
4. Bhatnagar, P. 2006. Traditional Indian Costumes and Textiles. Abhishek Publications, Chandigarh.
5. Cassin-Scott, J. 1994. The Illustrated Encyclopedia of Costume and Fashion. StudioVista.
6. Chattopadhyay, K. 1974. Carpet and Floor Covering of India. Vikas Publishing House Pvt. Ltd., Uttar Pradesh.
7. Chattopadhyay, K. 1977. Indian Embroidery. Wiley Eastern Limited, New Delhi.
8. Chisti, R.K. 2013. Sari Tradition and Beyond, Roli Books Pvt Ltd. New Delhi.
9. Gillow, J. and Barnard, M. 2014. Indian Textiles. 1st Ed. Thames and Hudson Ltd., London.
10. Gosh, G. and Shukla G. 2014. Ikat Textiles of India. APH Publishing Co., New Delhi.
11. Karolia, A. 2019. Traditional Indian Handcrafted Textiles: History, Techniques, Processes, Design Vol I & II (1st Ed). Niyogi Books Pvt. Ltd., New Delhi
12. Mehta, R J. 1970. Master Piece of Indian Textiles. D. B. Taraporevale Sons and Co. Pvt. Ltd., Bombay.

13. Naik, S. D. 1996. Traditional Embroideries of India. APH Publishing Co., New Delhi.
14. Pandit, S. 1979. Indian Embroideries and its Variegated Charms. Vikas Publishing House Pvt. Ltd., Baroda, Gujarat
15. Treasure of Indian Textiles. 1980. Calico Museum. Ahmedabad. Marg Publication, Bombay.

SKILL ENHANCEMENT COURSES

ATS 102 (SEC I)	TEXTILE DYEING AND PRINTING	2 (0+2)	SEM I

Objectives

1. To impart skills in dyeing of cotton fabric with different dyes and designing of fabric through tie & dye and batik techniques
2. To develop competence in printing by using blocks, screens and stencils
3. To give hands on experience in fabric surface enrichment through dyeing and printing techniques

Practical

Introduction to dyeing and printing: classification of dyes and their suitability to different fibres; different styles of printing: resist, direct and discharge; different methods of printing: stencil, block, screen and heat transfer printing; preparation of fabric for dyeing and printing: desizing, scouring and bleaching of cotton fabric; dyeing of cotton fabric with direct dyes, reactive dyes and naphthol dyes, preparation of shade card with different dye concentrations; dyeing of textiles with natural dyes and application of mordants; sample preparation through different techniques of tie and dye: pleating (diagonal and straight), tied circles, folding, object tying, ruching, stitching, marbling; sample designing through different techniques of batik with wax resist: painting, scratching, sprinkling and marbling; dyeing with naphthol dyes, washing and dewaxing; preparation of printing paste and printing of cotton fabric through block printing; screen printing: preparation of screen and printing on fabric; stencil printing: preparation of stencils, negative and positive printing with painting and spraying methods; preparation of one article using any of the above techniques or combination of them.

Suggested Readings

1. Gahlot, M and Rani, A. 2016. A Laboratory Manual on Textile Designing and Basic Finishing. University Press, G.B. Pant University of Agriculture & Technology, Pantnagar.
2. Gopal Krishnan, D. and Karthik, T. 2016. Basics of Textile Chemical Processing. Daya Publishing House, Astral International Pvt. Ltd., New Delhi.
3. Hall, A.J. 1955. Handbook of Textile Dyeing and Printing. The National Trade Press, New York.
4. Mahapatra, N.N. 2016. Textile Dyes and Dyeing. Woodhead Publishing Series in Textiles, India.
5.

6. Matthew, C. 2011. Handbook of Textile and Industrial Dyeing: Volume 1- Principles, Processes and Types of Dyes. Woodhead Publishing Series in Textiles, India
7. Matthew, C. 2011. Handbook of Textile and Industrial Dyeing: Volume 2- Applications of Dyes. Woodhead Publishing Series in Textiles, India.
8. Prayag, R.S. 1988. Technology of Textile Printing. Sri Printers, New Delhi.
9. Shenai, V.A. 1985. Technology of Printing, Technology of Textile Processing. Vol. IV. Sevak Publications, Mumbai.
10. Shenai, V.A. 1994. Technology of Dyeing. Sevak Publications, Mumbai.
11. Story, J. 1974. The Thames and Hudson Manual of Textile Printing. Thames and Hudson Ltd., London.

ATS 103 (SEC II)	FABRIC EMBELLISHMENT	1 (0+1)	SEM I

Objectives

1. To develop awareness among students about fabric embellishment
2. To develop skills in various embellishment techniques

Practical

Fabric embellishment: an introduction; survey of embellishment materials available in the market; introduction about embroidery tools; basic hand embroidery stitches: stem, chain, lazy dazy, buttonhole, herringbone, satin, long and short, bullion knot, french knot, feather, fly, spider stitch; other fancy embroidery stitches; metal thread embroidery: ari, zardosi, gota patti, danka; bead work and mirror work; preparation of five samples using basic and fancy embroidery, metal thread embroidery, bead work and mirror work; machine embroidery: introduction to motif embroidery machine and border embroidery machine; sample preparation using machine embroidery.

Suggested Readings

1. Carr, H. and Latham, B. 1992. Fashion Design and Product Development. Blackwell Science, UK.
2. Gahlot, M. and Rani, A. 2016. Textile Designing and Basic Finishing. University Press, G.B. Pant University of Agriculture and Technology, Pantnagar
3. Tyles, D.J. 1991. Materials Management in Clothing Production, Blackwell Science, UK.
4. Withers, S. 2005. Bead Work. Chartwell Books, New York.

ATS 105 (SEC III)	INDIAN EMBROIDERIES	2 (0+2)	SEM II

Objectives

1. To learn the characteristic features/designs of the traditional embroideries of different states of India
2. To develop an understanding of the methods and materials used in different traditional embroideries
3. To develop an understanding of the techniques of traditional embroideries of India

Practical

Historic perspective, classification and importance of traditional Indian embroideries; documentation of motifs of traditional Indian embroideries of different states of India; sample preparation of traditional Indian embroideries: kashida of Kashmir, chamba rumal, phulkari and bagh of Punjab, embroideries of Gujarat, chikankari and zari work of Uttar Pradesh, kanthas of Bengal, manipuri embroidery, kasuti of Karnataka, patchwork of Bihar and Orissa and folk embroidery of Rajasthan; project: preparation of one article by adapting traditional motifs and embroidery in contemporary textiles; visit to National Craft Museum and exhibition/art galleries.

Suggested Readings

1. A Compendium of Indian Handicrafts and Handlooms covered under Geographical Indications (GI), Ministry of Textiles, Govt. of India, New Delhi.
2. Kale, S. 2012. Kashmir to Kanyakumari Indian Embroidery: State by State Embroidery of India. Author House Publisher.
3. Naik, S.D. 2012. Traditional Embroideries of India. APH Publishing Corporation, New Delhi.
4. Naik, S.D. 1997. Folk Embroidery and Traditional Handloom Weaving. APH Publishing Corporation, New Delhi.
5. Pauline, B. 2016. Encyclopedia of Embroidery Techniques, A Unique Visual Directory of all the Major Embroidery Techniques plus Inspirational Examples of Traditional and Innovative Finished Work.
6. Rai, I. 2008. Indian Embroidery and Textiles. 1st Ed. Books Treasure, Jodhpur.

ATS 106 (SEC IV)	QUILTING AND PATCHWORK	1 (0+1)	SEM II

Objectives

1. To develop awareness among students about quilting techniques
2. To develop skills in various designs of quilting and patchwork

Practical

Patch work: definition, different styles of patchwork; techniques: pieced patchwork, shell patchwork, suffolk puffs, crazy patchwork, log cabin patchwork, strip patchwork, seminole patchwork, folded star patchwork, mayflower patchwork and pleated patchwork; applique: definition, various styles of applique; techniques: standard applique, applique perse, reverse applique, padded applique, folded applique, shadow applique, lace appliqué; quilting: definition, various styles of quilting-wadded quilting, padded quilting, corded quilting, shadow quilting; preparation of commercially viable two articles using above techniques.

Suggested Readings

1. Allen, W.H. 1985. Mc-calls Big Book of Quilts and Other Treasures, London Fall Cheryl, London.
2. Happy Quilts. 1994. Storling Publisher, New York.
3. Villasenor, D. and Villasenor, J. 2022. Indian Designs: For Use as Quilt Patterns,

Needlepoint, Applique, Machine and Hand Embroidery, Clothing, Trapunto, Fabric Painting, Crafts Projects ... Other Uses (Native American). Naturegraph and Keven Brown Publications.

ATS 202 (SEC V)	GARMENT DESIGNING TECHNOLOGY	2 (0+2)	SEM III

Objectives

1. To develop awareness among students about garment designing
2. To develop skills in various fabric construction techniques

Practical

Selection of figure template for children, women and men; designing of garments for children using different construction features: yoke, gathers, pleats, tucks, shirring, smocking, trimmings; designing of garments for women using different construction features: collar, sleeve and neckline; designing of garments for men using different construction features: shoulder yoke, collar, sleeve and cuff; drafting and construction of garments for children, women and men: fancy frock, blouse, *kameez-salwar* (ladies), *kurta-pyjama* (gents) and night dress/gown.

Suggested Readings

1. Erwin, M.D. 1979. Clothing for Moderns. Macmillan Publishing Co. Inc., New York.
2. Gawne E.J. 1975. Dress: The Clothing Text Book. C.A. Bennett Co., New York.
3. Meadows, C.S. 2003. Know Your Fashion Accessories. Fairchild Books, New York.
4. Pankowski, E. 1972. Art Principles in Clothing. Macmillan Publishing Co. Inc., New York.

ATS 203 (SEC VI)	ACCESSORY DESIGNING	1 (0+1)	SEM III

Objectives

1. To develop awareness among students about accessory designing
2. To develop skills in construction of various accessories

Practical

Accessories: introduction and classification- footwear, hand bags, belt, jewellery, gloves, hats, scarves and umbrella; designing of accessories for children, women and men; selection of designs for construction of accessories; accessories construction for children, women and men**.**

Suggested Readings

1. Erwin, M.D. 1979. Clothing for Moderns. Macmillan Publishing Co. Inc., New York.
2. Gawne E. J. 1975. Dress: The Clothing Text Book. C.A. Bennett Co., New York.
3. Meadows, C.S. 2003. Know Your Fashion Accessories. Fairchild Books, New York.

4. Pankowski, E. 1972. Art Principles in Clothing. Macmillan Publishing Co. Inc., New York.
5. Peacock, J. 2000. Fashion Accessories- The Complete 20th Century Source Book. Thames and Hudson Ltd., London.

ATS 205 (SEC VII)	FASHION ILLUSTRATIONS	2 (0+2)	SEM IV

Objectives

To gain knowledge on fashion illustrations

Practical

Human body and body proportion theory; preparation of fashion figure; drawing 10 and 12 head fashion figures using geometric body shape; figures in different poses; drawing of facial features: eyes, nose and lips; proportion of body parts: head, face, hand and feet according to different age groups; sketching figures of different age groups based on head theory; sketching of garment features (minimum three of each): collars, neckline, fasteners, sleeves, pockets, cuffs and hemline; sketching of added fullness: frills, flounce, gathers and pleats; sketching of accessories: hats, shoes, boots, belts and purses; designing of garments for children and adult: male and female; illustration of fabric design and texture using different media: water colour, pencil colour, poster colour, crayon colour and collage; role of fashion illustrator and career opportunities; theme based portfolio development through CAD.

Suggested Readings

1. Allen and Seaman. 1994. Fashion Drawing- The Basic Principles. B.T. Batsford, London.
2. Berthoud, F. 2011. Francois Berthoud Studio: The Art of Fashion Illustration Hatje Cantz, Bilingual Edition.
3. Bina, A. 2012. Fashion Sketchbook. 4th Ed. Fairchild Books, New York.
4. Brambatt, M. 2017. Fashion Illustration and Design: Methods and Techniques for Achieving Professional Results. Promopress Publishing, Spain.
5. Hart, C. 2013. Fashion Design Studio: Learn to Draw Figures, Fashion, Hairstyles and More (Creative Girls Draw). Sterling, Illustrated Edition.
6. Ireland, P.J. 1970. Fashion Design Drawing. B.T. Batsford Ltd., London.
7. Ireland, P.J. 1974. Fashion Drawing for Advertising. B.T. Batsford Ltd., London.
8. Ireland, P.J. 1980. Basic Fashion Design. B.T. Batsford Ltd., London.
9. Kathryn, K.C. and Munslow, J. 1997. Illustrating Fashion. Oxford. Blackwell Science, UK.
10. Kiper, A. 2011. Fashion Illustration: Inspiration and Technique, David and Charles Publishing, England.
11. Riegelman, N. 2009. 9 Heads: A Guide to Drawing Fashion. Pearson Education, Boston.

ATS 206 (SEC VIII)	PORTFOLIO DEVELOPMENT	1 (0+1)	SEM IV

Objectives

1. To impart practical skills for developing theme based portfolio
2. To make students understand the importance and significance of portfolio development through CAD

Practical

Introduction to CAD, different advanced software used in fashion industry; portfolio preparation: definition, types and importance, contents of portfolio, different portfolio presentation, skills and material management; experimenting and creating a story board, steps of forecasting, mood board, client board and colour board, swatch board; illustrations and flat sketches; production of spec sheet and costing; development of logo, hang tags, concept board; theme based portfolio development through CAD.

Suggested Readings

1. Luther, C. 2008. Career in Textile and Fashion Designing. Abhishek Publications, Chandigarh.
2. Srivastva, M. and Deepthi, S.S. Computer Aided Designing– e-manual(TXAD). ecourse.iasri.res.in
3. Vastrad, J., Sakshi and Deepthi, S.S. Computer Aided Designing– Textile Designing – e-manual (TXAD). ecourse.iasri.res.in

ELECTIVE I: APPAREL AND TEXTILE SCIENCE

ATS 401	ADVANCE DRAPING TECHNIQUES	3 (0+3)	SEM VII

Objectives

1. To impart skills to make pattern from sketch/photograph using draping technique
2. To enable the students to obtain perfect fit and harmony between the fabric and design of the garment

Practical

Draping, trueing and stitching: dartless shirt, surplice front, bustier; draping and stitching skirts; draping collars, sleeves, lowered exaggerated armhole sleeves, cowls, flounces, ruffles and peplums; dresses: sundress and sculptured dress; draping knits; designing custom clothing; analysis and presentation.

Suggested Readings

1. Amaden-Crawford, C. 2018. The Art of Fashion Draping. 5th Ed. Bloomsbury Publishing Inc., USA.
2. Bane, A. 1996. Creative Clothing Construction. Mc Graw-Hill Publication, USA.
3. Bray, N. 1994. Dress Fitting. Blackwell Publishing, France.
4. Cooklin, G. 2004. Pattern Grading for Women's Clothes. Blackwell Publishing, France.
5. Joseph-Armstrong, H. 2005. Patternmaking for Fashion Design. Pearson Education Inc., India.
6. Mee, J. and Purdy, M. 1987. Modeling on the Dress Stand. BSP Professional Books, Hyderabad.

ATS 402	CAD- PATTERN MAKING AND GRADING	2 (0+2)	SEM VII

Objectives

1. To impart skills in Computer Aided Apparel Designing
2. To learn skills in pattern making and grading using CAD software

Practical

Introduction to pattern making software; basics of pattern making tools: system and general tool bar, edit tool bar, accessories tool bar, insert tool bar, modify tool bar and advance tool bar; basics of pattern making menus: file menu, edit menu, piece menu, grading menu, pleat menu, dart menu, design menu, view menu, option menu and help menu; creating and grading basic patterns: bodice front, back and sleeve, skirt front and back; fundamentals of pattern making software; detailed use of drawing and editing tools; creating basic sloper/pattern set: bodice front and back, skirt front and back and sleeve; development of sloper/patterns of selected designed dresses using pattern making software; grading sloper/ patterns in pattern making software; marker making in pattern making software by manual and automatic methods; preparation of portfolio of developed sloper/patterns.

Suggested Readings

1. Luther, C. 2008. Career in Textile and Fashion Designing. Abhishek Publications, Chandigarh.
2. Srivastva, M. and Deepthi, S.S. Computer Aided Designing– e-manual(TXAD). ecourse.iasri.res.in
3. Vastrad, J., Sakshi and Deepthi, S.S. Computer Aided Designing– Textile Designing – e-manual (TXAD). ecourse.iasri.res.in

ATS 403	QUALITY ANALYSIS IN TEXTILES AND APPARELS	3 (2+1)	SEM VII

Objectives

1. To inculcate knowledge on quality control aspects
2. To impart knowledge and hands on experience on textile testing procedures
3. To impart skills in inspection and quality analysis of different apparels

Theory

Importance of quality control and textile testing; introduction to various organizations/institutes dealing with textile testing; sampling techniques of fibre, yarn and fabric testing; standard conditions of testing and their importance; testing of fibre dimensions: length, thickness, fineness, crimp, moisture content, strength, elasticity, linear density and fibre imperfections; testing of yarn dimensions: count, twist, single yarn strength and elongation, lea strength, evenness, hairiness, crimp, moisture regain, burst strength, pilling and yarn imperfections; testing of fabrics: physical, mechanical, comfort, colour fastness and fabric imperfections; physical testing of fabrics: thickness, GSM, fabric count, drapability, shrinkage, stiffness, elongation, crease

resistance and thermal conductivity; mechanical testing of fabrics: tensile strength, tear strength, dimensional stability, abrasion resistance, bending length and flexural rigidity; testing of comfort properties of fabrics: heat transfer, thermal protection, air and moisture permeability, water absorption and water repellence; tests for colour fastness: washing, perspiration, light, rubbing and dry cleaning; Accepted Quality level (AQL): pre-production, production and post-production inspection of fabrics, sewing threads, buttons, zippers, buckles and ancillaries like linings and interlinings, labels and packaging material; Statistical Quality Control (SQC): different statistical techniques and their application in textile and apparel testing.

Practical

Demonstration of fibre testing for length, thickness, fineness, crimp, moisture content, strength, elasticity and linear density; demonstration of yarn testing for count, twist, single yarn strength and elongation, lea strength, evenness, hairiness, crimp, moisture regain, burst strength and pilling; physical testing of fabrics for thickness, GSM, fabric count, drapability, thermal conductivity, shrinkage, stiffness, elongation and crease resistance; mechanical testing of fabrics for tensile strength, tear strength, dimensional stability, abrasion resistance, bending length and flexural rigidity; testing of fabrics for comfort properties: heat transfer, thermal protection, air and moisture permeability, water absorption and water repellence; quality analysis of selected apparels: women's *kurti*, men's shirt and t-shirt; visit to textile testing laboratory/ quality control department in a textile or apparel industry.

Suggested Readings

1. Booth, J.E. 1996. Principles of Textile Testing. CBS Publishers and Distributors Pvt. Ltd, Delhi.
2. Goel, A. and Kholiya, R. 2014. Textile Testing- A Laboratory Manual. University Press, G. B. Pant University of Agriculture and Technology, Pantnagar.
3. Grover, E.B. and Hamby, D.S. 2011. Handbook of Textile Testing and Quality Control. Wiley India Pvt. Ltd., New Delhi.
4. Kothari, V.K. 1999. Testing and Quality Management. IAFL Publications, New Delhi.
5. Mehta, P.V., Satish, P.E. and Bhardwaj, K. 1998. Managing Quality in the Apparel Industry. New Age International Publishers, New Delhi.
6. Paul, J. 2005. Textile Testing. APH Publishing Corporation New Delhi.
7. Rao, J.V. 2008. Quality Evaluation. NITRA Handbook.
8. Saville, B.P. 1999. Physical Testing of Textiles. Woodhead Publishing Ltd.,. New Delhi.

ATS 404	APPAREL PRODUCTION MANAGEMENT	3 (2+1)	SEM VII

Objectives

1. To make students aware of the apparel production system
2. To endow the students with the advanced apparel production process
3. To introduce students with various trends in management of garment industry
4. To familiarize students with apparel costing methods and pricing techniques

Theory

Introduction to apparel industry: apparel product types, organizational structure and sectors of the garment industry, developments in recent years, opportunities and challenges in Indian apparel sector, overview of global apparel industry; different departments of apparel industry and their functioning: design department, marketing and business development department, purchasing department, finance department, production department, operations department; apparel production technology: material sourcing, cutting technology: forms of spreading for different types of fabrics, types of spreading machinery, cutting techniques, considerations of cutting parameters for different fabrics, cutting machines and its working principle; fusing technology: fusing materials, components of fusing, types of resin coating and its applications, fusing machine- types, working principle and their application; sewing technology: features, mechanism, working principle and application of single needle lock stitch (SNLS) machine, double needle lock stitch (DNLS) machine, over lock machine, blind stitch machine, button sewer and buttonhole machines, bar tack machines; stitches and seams, feed mechanism and working aids, needles and threads; pressing and finishing technology: classification of pressing, components of pressing/finishing machinery and equipment; thread trimming, quality checking of garments and pressing; apparel production systems; warehousing: assortment and storage methods; packing: function and scope of packing, packing methods, instructions, materials, weight ratio and labelling considerations for shipment by air and sea, packing marks; capital management: support system- banks, govt. agencies and institutions; fixed and working capital; cost accounting: classification of cost elements- direct and indirect; determination of factory cost, administration cost and sales cost of an apparel product; manufacturing cost account statement: preparation and analysis, cost behaviour patterns- fixed, variable and semi variable; calculations related to job order costing and process costing; pricing methods: cost plus pricing methods/ full cost pricing, conversion cost pricing, differential cost pricing; variable cost pricing, direct cost pricing; derivation of cost of apparel products: woven / knits; CM, CMT cost analysis for various styles; activity based costing, cost analysis for various styles of garments; FOB/CIF/C&F pricing of apparels; personnel management: human resource planning, job analysis, recruitment and selection, training and development, performance appraisal, communication, career planning and development, conflict solution, personal audit, organization development, work environment; trade globalization and its effect on Indian apparel industry

Practical

Demonstration of different cutting, fusing, sewing and pressing/ finishing machines; project work: development of two textile/apparel products, preparation of costing sheets, costing and sale of prepared textile/apparel products; visit to different departments of apparel industry.

Suggested Readings

1. Carr, H. and Latham, B. 2008. The Technology of Clothing Manufacture. 4th Ed. Blackwell Publishing, UK.
2. Chuter, A.J. 1995. Introduction to Clothing Production Management. 2nd Ed. Blackwell Publishing, UK.
3. Cooklin, G. 2006. Introduction to Clothing Manufacturing. 2nd Ed. Blackwell Publishing, UK.
4. Eberle, H. 2008. Clothing Technology: From Fibre to Fashion. 5th Ed.

Vollmer Gmbh & Co., Verlag Europa-Lehrmittel, Nourney.
5. Gawb, T.A. 1994. The Art of Sewing. UBS Publishers and Distributers Ltd., New York.
6. Grace, K. and Glock, R. 2005. Apparel Manufacturing: Sewn Product Analysis. 4th Ed. Pearson/Prentice Hall, New Jersey.
7. Grace, K. and Glock, R. 2011. Going Global: The Textile and Apparel Industry. 2nd Ed. Fairchild Books, USA.
8. Jones, R. 2006. The Apparel Industry. 2nd Ed. Wiley-Blackwell, USA.
9. Leap, L. and Crino, M.D. 1989. Personal/Human Resource Management. Macmillan Publishing Co., USA.
10. Mc Devitt, P.J.M. 2010. Apparel Production Management and the Technical Package. Bloomsbury Academic, USA.
11. Monappa, A. and Mirza Saiyadin, S. 1991. Personal Management. Mc Graw Hill Publishing Company, USA.
12. Nance Vich, J.M. 1998. Human Resource Management. Irvin/ Mc Graw Hill, Publishing Company, USA.
13. Shaeffer, C. 2001. Sewing for the Apparel Industry. 1st Ed. Prentice-Hall, USA.

E- Resources

1. https://www.onlineclothingstudy.com/2018/11/different-departments-in-garment.html
2. https://www.techtarget.com/searchhrsoftware/definition/human-resource-management-HRM
3. https://en.wikipedia.org/wiki/Human_resource_management
4. Newspaper: Economic Times
5. Hayavadana C. e-course TXAD- Apparel Industry Management, ANGRAU, Hyderabad.

ATS 405	AGRO TEXTILES	2 (1+1)	SEM VII

Objectives

1. To impart knowledge about various agro textiles, their uses, applications and advantages
2. To acquaint the students with various techniques of manufacturing of different agro textiles
3. To enable the students to identify the properties required for agro textiles and study the recent development in the field

Theory

Agro textiles: introduction, history, significance, fibres used, fabric construction details, properties required, production techniques and advantages; substantial role of agro textiles in agricultural applications; meaning, need, application, materials used, types, characteristics, advantages and constraints of different agro-textiles: sun screen, bird protection nets, plant nets, ground covers, wind protectors, windshield, root ball net, insect meshes, turf protection net, mulch mats, monofil nets, cold and frost controls, covering pallets, anti-hail stone nets, harvesting nets, packing materials; agro textiles for animal husbandry, fishing and aquaculture; meaning, need, application, materials used, types, characteristics, advantages and constraints of different agro textiles used in animal husbandry, fishing and aquaculture; significance

of agro textiles in technical textiles industries, past, present and future prospects, techno-economics of agro tech, marketing strategy.

Practical

Introduction to different types of agrotextiles: showcasing the fabric samples and their applications; survey for agro textiles in the market and collection of swatches; identification of swatches, preparation of agro textile portfolio; assessment of the functional property of agro textiles; mini project: designing agro-textiles for specific functional performance.

Suggested Readings

1. Hira, M.A. 2012. Agro-textile Products and their Usage. Sasmira, Mumbai.
2. Horrocks, A.R. and Anand, S.C. 2000. Handbook of Technical Textiles. Woodhead Publication Ltd., Cambridge.

E- Resources

1. www.textileworld.com/textile-world/agrotextiles-a-growing-field
2. textilelearner.blogspot.com/2012/02/agro-textiles-general- property.htm
3. http://www.textilemedia.com/technical-textiles/new-textile-materials/agrotextiles
4. http://www.textileworld.com/Issues/2005/September/Nonwovens_Technical_Textiles/ Agrotextiles- A Growing Field
5. http://www.fibre2fashion.com/industry-article/textile-industry-articles/agrotextiles-a-rising-wave
6. http://www.indiantextilejournal.com/articles
7. Handbook of Agro textiles: www.technotex.gov.in
8. http://www.technicaltextile.net/articles/agro-textiles/detail.aspx7article icl=5386

ATS 406	RECENT ADVANCES IN TEXTILES	2 (2+0)	SEM VII

Objectives

1. To develop an understanding among students about recent trends in fibres, fabrics, chemical processing and bio-finishes
2. To impart knowledge about smart textiles, wearable clothing, use of microfibres, nano fibres and their applications, microencapsulation, nanotechnology, technical textiles and application areas

Theory

Recent researches in production and manufacturing of textile fibres, yarns and fabrics; bio-finishes and processing of natural textiles and their conversion into clothing; developments in the field of functional textiles, technical textiles and its application areas; use of special techniques in textile processing; thrust areas of contemporary research and future projections.

Suggested Readings

1. Journals of Apparels and Textiles
2. Online researches available on CERA and other web portals.

EXTENSION EDUCATION
AND COMMUNICATION MANAGEMENT

Course No.	Course Title	Credits	Semester
Core Courses			
EECM 101	Communication for Development	2 (1+1)	I
EECM 201	Extension and Rural Development	3 (2+1)	III
EECM 204	Training and Professional Development	2 (1+1)	IV
EECM 301	Project Management	3 (2+1)	V
EECM 302	Diffusion and Adoption of Innovations	3 (2+1)	VI
EECM 303	Seminar	1 (0+1)	VI
EECM 406	Research Methodology	3 (2+1)	VII
	Total Credits	**17 (10+7)**	
Skill Enhancement Courses			
Extension Education for Community Development I			
EECM 102 (SEC I)	Audio Visual Aids for Communication	2 (0+2)	I
EECM 103 (SEC II)	Extension Teaching Methods	1 (0+1)	I
Extension Education for Community Development II			
EECM 104 (SEC III)	ICT and New Media	2 (0+2)	II
EECM 105 (SEC IV)	Computerized Instructional Aids Production	1 (0+1)	II
Communication Technology and Journalism I			
EECM 202 (SEC V)	Electronic Journalism	2 (0+2)	III
EECM 203 (SEC VI)	Print Journalism	1 (0+1)	III
Communication Technology and Journalism II			
EECM 205 (SEC VII)	Audio and Video Recording	2 (0+2)	IV
EECM 206 (SEC VIII)	Instructional Video Production	1 (0+1)	IV
	Total Credits	**12 (0+12)**	
Elective II: Extension Education and Communication Management			
EECM 401	Extension Programme Management	3 (1+2)	VII
EECM 402	Extension Training Management	3 (1+2)	VII
EECM 403	Advertising and Social Marketing	3 (1+2)	VII
EECM 404	Public Relations and Communication Management	3 (1+2)	VII
EECM 405	Web Designing	3 (0+3)	VII
	Total Credits	**15 (4+11)**	
	Grand Total	**44 (14+30)**	

EECM 101	COMMUNICATION FOR DEVELOPMENT	2 (1+1)	SEM I

Objectives

1. To develop competence in effective communication
2. To develop understanding of various concepts of communication process
3. To develop competence in oral and written communication

Theory

Communication process: concept, elements and their characteristics, principles of communication, basic functions of communication; models of communication, barriers of communication; concepts related to communication: fidelity of communication, empathy, credibility, feedback in communication, communication gap and distortion; forms and types of communication: oral and written communication, non-verbal communication, intrapersonal communication, interpersonal communication, organizational communication, digital communication.

Practical

Practice sessions on written communication: writing official letters, notices/circulars, preparing minutes of meetings; practice sessions on oral communication: planning and delivering an effective talk; practice sessions on how to improve intrapersonal and interpersonal communication; planning for digital communication: arranging educational programmes using digital media.

Suggested Readings

1. Dasgupta, S. 1989. Diffusion Agricultural Innovations in Village India. Wiley Eastern Ltd, New Delhi.
2. Jalihal, K.A. and Veerabhadraiah, V. 2007. Fundamentals of Extension Education and Management in Extension. Concept Publ. Co.
3. Ray, G.L. 2005. Extension Communication and Management. Kalyani Publ.
4. Reddy, A.A. 1987. Extension Education. Shree Lakshmi Press, Guntur, AP.
5. Somani, L.L. 2012. Extension Methodologies for Transfer of Agricultural Technology. Image Print Media, Udaipur.
6. Supe, S.V. 2009. Textbook of Extension Education. Agrotech Publishing Academy, Udaipur.

EECM 201	EXTENSION AND RURAL DEVELOPMENT	3 (2+1)	SEM III

Objectives

1. To develop understanding regarding the extension support system
2. To impart knowledge on rural development programmes
3. To make them understand the role of extension agencies in rural development
4. To develop competency in working with the village people in line with the local and national rural development programmes

Theory

Extension education: concept, importance, philosophy, principles and objectives; evolution of extension education: glimpses of pre-independence era, post-independence era; community: meaning and definition, types of communities; community mobilisation: meaning and importance; leadership development; community development programme: concept, objectives, organization, activities. strategies, achievement and failures; community science: concept, significance and evolution of community science; rural development: concept, need, meaning, aim, functions and role of extension agencies in rural development; Panchayati Raj Institutions: concept, power, role and responsibilities; five-year plans: concept of five-year plans (FYP); Planning Commission and Niti Aayog; Sustainable Development Goals (SDGs); rural development programmes/organisations: SGSY (1999), NRLM (2011), DDU-AY (Deen Dayal Antyodaya Yojana (DAY), IAY (1985), Pradhan Matri Awas Yajana Gramin (PMAY-G), Mahatma Gandhi National Rural Employment Gurantee Act (MGNREGA), Integrated Child Development Service Scheme (ICDS), Pradhan Mantri Social Security Schemes-social welfare and social safety programme, Poshan Abhiyaan, National Health Mission (NHM), Swach Bharat Mission, Pradhan Mantri Kaushol Bikash Yojana (PMKBY), Din Dayal Upadhyaya Gramin Kausholya Yojana (DDUGKY), Skill Development Programme, Sansadadarsh Gram Yojana (SAGY), National Rurban Mission (NRUM), Atma Nirbhar Bharat Abhiyaan, District Water Management Agency (DWMA); Agricultural Technology Management Agency (ATMA); Role Of International/National Organization: United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF), Food and Agriculture Organization (FAO), Bill & Melinda Gates Foundation (BMGF); national organization and state level organization: Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVKs); Integrated Tribal Development Project/Area (ITDA/ITDP), District Agricultural Advisory and Transfer of Technology Centres (DAATTCs), District Rural Development Agency (DRDA), Farmer Producer Organization/Company (FPO/FPC), Self-Help Groups (SHGs) in rural development; evolution of extension as broad based extension with multiple stakeholders' i.e. govt/private/NGO/CSR funds.

Practical

Studying the village profile by visiting village: establishing rapport with rural families and leaders, use of survey method, identification of needs of rural families and grass root level workers, exploring income generating activities, collecting information regarding the role of existing rural development programme operational in village area, prepare a village profile based on collected information, presentation of report; exposure visit to: KVK, PHC (for collecting information on health service specially to women and children), AWCs, Mahila Mandals/SHGs/Youth Clubs, cooperatives to make interaction programme with extension professionals of the institutions.

Suggested Readings

1. Chamola S.D and Bharati A. 2018. Agriculture and Rural Development in India. Global Vision Publishing House.

2. Ganesan, R., Mohamed I. and Anandaraja N. 2019. Reaching the Unreached. Associated Publishing Company, New Delhi.
3. Mondal S. 2017. Fundamentals of Agricultural Extension Education, Kalyani Publishers, Ludhiana.
4. Mondal S. 2018. Textbook of Agricultural Extension with Global Innovations, Kalyani Publishers, New Delhi.
5. NP Abdul Azeez and Akhtar Jawed S.M. 2016. Rural Development in India. Kalpaz Publications.
6. Ray G.L. and Mondal S. 2016. Rural Development. Kalyani Publishers, Ludhiana.
7. Supe S.V. 2017. A Textbook of Extension Education. Agrotech Publishing. Udaipur.

EECM 204	TRAINING AND PROFESSIONAL DEVELOPMENT	2 (1+1)	SEM IV

Objectives

1. To impart basic knowledge on types and techniques of training for professional development
2. To develop the skill on designing and conducting a training programme
3. To develop an understanding of the various training techniques like team building, group discussion and brain storming for professional development

Theory

Basic concepts of learning: principles of learning, learning patterns, characteristics of learning process, advantages and limitations; theories of learning: behaviorism, cognitivism, social learning theory, social constructivism, multiple intelligences, brain-based learning, purpose of learning theories in training and professional development; interaction with trainees and training officials and find out the method and apply the same for professionals; training approach: basic concept, purpose, steps, types, advantages and limitations of training approach; preparation of training, content and procedures (methods and materials); purpose and meaning of training for professional development, types of training for professional development: pre-service training, in service training and staff development; evaluation and assessment of training; detect and predict defects in the procedural design of a training activities; phases of training: planning phase (setting the goals and objectives of an organization), analyzing (the human resources, efficiency indices and organizational climate), implementation phase (publicity, develop training brochures, annual calendar of learning opportunities, time about their teaching plans), evaluation phase (reaction, behavior and result); types of evaluation : evaluation for planning, process of evaluation, terminal evaluation and impact evaluation; key elements of the training activities are systematically monitored, problems are to be identified and attempts are to be made to rectify.

Practical

Designing training programme: gain attention, inform learner and objectives, stimulate recall of prior learning, present stimulus material, provide learner guidance, elicit performance, provide feedback, assess performance, enhance retention transfer, interact with trainers and learn the practical requirements

Suggested Readings

1. Bhattacharyya D. 2015. Training and Development. Sage Publication Limited, New Delhi
2. Dahama, O.P. 1979. Extension and Rural Welfare, Ram Parsad and Sons, New Delhi.
3. Flippo, E.B. 1961. Principles of Personnel Management. McGraw Hill, New York.
4. Kirkpatrick, D. (1976). Training and Development Handbook. New York: McGraw Hill
5. Lynton, R.P. and Pareek, U. 1990. Training for development., Kumarian Press, West Hartford
6. McGhee, W. and Thayer, P. W. 1961. Training in Business and Industry. John Wiley and Sons, New York

EECM 301	PROJECT MANAGEMENT	3 (2+1)	SEM V

Objectives

1. To develop understanding regarding project, project management and its techniques
2. To develop skill in writing a project proposal

Theory

Project: concept, characteristics and types; project management: concept and elements; phases of project life cycle: initiation, planning, execution, and closure; formulation of project proposal: concept and need; elements of project formulation; project appraisal: feasibility analysis, techno-economic analysis, input analysis, financial analysis, cost- benefit analysis and network analysis; project management techniques: PERT and CPM.

Practical

Visit to institutions managing following types of projects: technology generation project, transfer of technology (ToT) project, women entrepreneurship project, women and child development project, agriculture development project and rural development project; preparation of reports of the institutions visited; presentation of report; visit to state level funding agencies; preparing reports of the funding agencies visited; preparation of a short-term project proposal; presentation of project proposal; working on project management techniques: PERT, CPM.

Suggested Readings

1. Agarwal M. R. 2010. Project Management. Garima Publications, Jaipur (Raj.)
2. Goel B.B. 2008. Project Management- Principles & Techniques. Deep & Deep Publications Pvt. Ltd, New Delhi.

EECM 302	DIFFUSION AND ADOPTION OF INNOVATIONS	3 (2+1)	SEM VI

Objectives

1. To develop skills in identification of appropriate technologies for rural families
2. To develop competence in diffusion of need-based technologies among rural families

Theory

Concept and elements of diffusion process; perceived attributes of innovation; adoption: definition, adoption process, innovation-decision process; types of innovation-decision and consequences of innovation; factor affecting adoption of an innovation; innovativeness and adopter categories: concept, types and characteristics; types of adopter categories and their characteristics; change agents and opinions leader; change proneness: acceptance and resistance to social change; appropriate technologies for rural families with special reference to community science; appropriate technologies for rural families with special reference to drudgery reduction, agriculture and animal husbandry; constraints in adoption of technologies; behavior change communication (BCC) strategies.

Practical

Content analysis of adoption studies; identification of key communicators and opinion leaders in locality; identification and rating of appropriate technologies by rural women; survey on adoption of appropriate technologies in community; diffusion of need based appropriate technologies among rural families through various communication methods; diffusion of need based appropriate technologies among rural families through various communication methods demonstration, group discussion, role play and exhibition etc.; case studies/success stories regarding adoption of technologies; identification of constraints faced by rural families in adoption of technologies; preparation and presentation of report.

Suggested Readings

1. Dasgupta, S. 1989. Diffusion Agricultural Innovations in Village India. Wiley Eastern Ltd, New Delhi
2. Reddy, A.A. 1987. Extension Education. Shree Lakshmi Press, Guntur, AP.
3. Rogers, E.M. (2003). Diffusion of Innovations. The Free Press, New York.
4. Somani, L.L. (2012). Extension Methodologies for Transfer of Agricultural Technology. Image Print Media, Udaipur.
5. Supe, S.V. (2009). Textbook of Extension Education. Agrotech Publishing Academy, Udaipur.

EECM 303	SEMINAR	1 (0+1)	SEM VI

O**bjectives**

1. To promote academic curiosity by exploring current issues, trends and innovations relevant to community science
2. To encourage teamwork, peer evaluation and constructive feedback for continuous improvement

Practical

Planning, preparation and presentation of current issues/topic relevant to community science; report submission.

EECM 406	RESEARCH METHODOLOGY	3 (2+1)	SEM VII

Objective

To understand the meaning and importance of research, research procedures and develop skills in designing and executing research.

Theory

Research: meaning and importance; types of research; qualities of researcher; steps of research: selection and delineating of research problem, statement of general and specific objective, formulation of assumptions and hypothesis, planning research design, selection and development of data collection tools, collection of data, analysis and interpretation of data, drawing conclusion, writing research report; understanding some concepts in research: assumption, delimitations, operational definition, measurement and its levels, variable and their types; hypothesis: meaning, importance, characteristics and ways of stating hypothesis; review of literature: importance, sources of literature, organizing review, collection and presentation; research design: historical or documentary, experimental, ex-post-facto, survey, case study, field studies; sampling: meaning and importance, sampling techniques, determine size of sample; techniques of data collection: observation, interview and questionnaire, projective technique; data analysis: tools and methods; interpretations of data: documentation and presentation, summary, conclusion and recommendations; writing abstract; the research report: formal style of writing; tables and figures, appendices and bibliography.

Practical

Identifying problem; formulating research hypothesis; questionnaire design; collection of secondary data; analysis and report writing; use of reference management software; article writing.

Suggested Readings

1. Bajpai, S.R. 1966. Methods of Social Survey and Research. Kitab Ghar.
2. Best, J.W. and Kahn, J.V. 1983. Research in Education. Prentice Hall of India.
3. Good, C.V. 1966. Essential of Education Research. Appleton Century Crofts, Mereelith Corp.
4. Kaul, L. 1984. Methodology of Education Research. Vikas Publ.
5. Kerlinger, F. 1973. Foundations of Behavioural Research. Rinehart Winetons

SKILL ENHANCEMENT COURSES

EECM 102 (SEC I)	AUDIO VISUAL AIDS FOR COMMUNICATION	2 (0+2)	SEM I

Objectives

1. To equip with practical skills in planning and preparation of various audio-visual aids
2. To provide hands-on experience in the use and presentation of various audio-visual aids

Practical

Planning, designing and preparation of posters; planning, designing and preparation of charts: flow charts, striptease charts and line charts, flip chart and overlay charts; planning, designing and development of 2d & 3d models; planning, designing and preparation of flash cards; collection of samples; planning, recording and presentation of simple audio messages; organization of exhibition with audio visual aids.

Suggested Readings

1. Chauhan, J. 2016. Communication and Extension Management. Kushal Publications and Distributors.
2. Dahama, O.P. and Bhatnagar, O.P. 2012. Education and Communication for Development. Oxford & IBH Publishing Co. Pvt. Ltd.
3. Dubey, V.K. and Bishnoi, I. 2009. Extension Education and Communication. New Age International Publishers, New Delhi
4. Grover, I., Yadav, L., Kaushik, S. and Varma, S.K. 2002. Communication and Instructional Technology. Agrotech Publishing Academy, Udaipur.
5. Ray, G.L. 2017. Extension Communication and Management. Kalyani Publishers, Ludhiana.
6. Sandhu, A.S. 2019. Textbook on Agricultural Communication (Process and Methods). CBS Publishers and Distributors Pvt. Ltd.

EECM 103 (SEC II)	EXTENSION TEACHING METHODS	1 (0+1)	SEM I

Objectives

1. To enhance the extension teaching skills for development communication
2. To develop an understanding about the extension teaching methods for dissemination of information
3. To provide hands on experience for application of extension teaching methods

Practical

Orientation to various extension teaching methods ; planning & use of selected extension teaching methods; familiarization with individual methods: farm and home visit; group methods: method demonstration, group meeting, focuses group discussion, role play, drama, small group teaching method; mass methods: farm publications, circular letters, campaigns, exhibitions, posters, banners, radio, tv, and social networking sites; selection and use of suitable audio-visual aids for effective extension teaching; e-extension: internet and teleconferencing; mobile phone:

features and applications; computer based instruction: teaching/learning platforms; preparation and presentation of a lesson plan using extension teaching methods.

Suggested Readings

1. Dahama, O.P. and Bhatnagar, O.P. 2012. Education and Communication for Development. Oxford & IBH Publishing Co. Pvt. Ltd.
2. Dubey, V.K. and Bishnoi, I. 2009. Extension Education and Communication. New Age International Publishers, New Delhi
3. Ray, G.L. 2017. Extension Communication and Management. Kalyani Publishers, Ludhiana.
4. Reddy, A. 2007. Extension Education. Sree Lakshmi Press, Guntur.

EECM 104 (SEC III)	ICT AND NEW MEDIA	2 (0+2)	SEM II

Objectives

1. To provide hands-on experience on application of ICT tools and devices
2. To develop an understanding about the e-learning tools
3. To build competency in usage of different digital platforms for dissemination of information

Practical

e-learning systems: learning objects development, fundamental characteristics of learning objects, typical components of learning objects; role of internet in e-learning: computer networking, domain names and URL, ISP, types of internet protocols; social media for e-learning under web 2.0 platform: youtube, blogs, vlogs, virtual classrooms; social networking sites: facebook, linkedin, whatsapp. open access resources: e-books, e-journals and e-newspapers, e-magazines and web portals; important online technologies for creation of computerized learning materials: screen capture, render forest. lucid charts, kids inspiration, sketch up, classtools.net. mind42, slide share. socrative, testmoz, quiz star; photoshop cs5: getting started, working with selections, painting and editing, layers, channels, masks and animation.

Suggested Readings

1. Reinhardt, R. and Dowd, S. 2004. Macromedia Flash Mx 2004 Bible. John Wiley & Sons
2. Vaghan, T. 2002. Multimedia- Making it Work. 5th Ed. Tata McGraw Hill, USA

EECM 105 (SEC IV)	COMPUTERIZED INSTRUCTIONAL AIDS PRODUCTION	1 (0+1)	SEM II

Objectives

1. To develop an understanding about the software used for production of computerized information material
2. To build competency in application of different software tools for production of instructional aids

Practical

Familiarization with the parts of computer; software for creation of instructional materials MS Word 2020/latest version: getting started, editing documents, proofing tools, text formatting, formatting document, using templates, creating tables and charts, using reference and review option in word and WPS for smartphones and creating google forms; MS PowerPoint 2020/latest version: getting started, working with text in slides, working with charts, printing, animating custom shows and adding hyperlinks; recording ppt's screen capture recordings and e-presentations; MS-Excel 2020/latest version: getting started, using workbooks, entering data, editing data, formatting worksheet, working with range of cells, creating formulas and functions, working with charts, object linking and embedding; illustrator/latest designing software: familiarization and working with software; planning, designing and production of selected instructional aids: visiting card, customized cards for gift hampers, leaflet, folder, poster, brochure, booklet, newsletter, and magazine.

Suggested Readings

1. Jain, S., Geetha, M., and Kratika 2012. Computer Course Windows 7 with MS Office 2010. BPB Publications, New Delhi.
2. Murthy, G.R.K., Reddy, K.M., Ramarao, D., Rao, V.K.J and Kumar, V.V.S. 2012. Resource Material on Innovative Approaches to E- Learning. National Academy of Agricultural Research Management, Rajendranagar, Hyderabad.
3. Rajaraman, V. 2001. Fundamentals of computers. Prentice-Hall India Private Ltd, New Delhi.

E-resource

1. https://www.renderforest.com
2. https://www.socrative.com
3. Sarvanan, R., Nesarani P.M., Rao, M.V and Rao V.K.J., 2015. AEM -204 Information and Communication Technology in Agriculture, National Institute of Agricultural Extension Management, Rajendranagar, Hyderabad.

EECM 202 (SEC V)	ELECTRONIC JOURNALISM	2 (0+2)	SEM III

Objectives

1. To equip with necessary knowledge about electronic media
2. To impart skills in development and usage of various electronic media
3. To develop skills in production technology of TV and radio programs

Practical

Visit to radio station: doordarshan/local television channel; formats of radio programmes: features, discussions, news bulletins, drama, talk, writing and editing script for radio programme, rehearsal, recording and editing with computer-based editing software and presentation for radio script; application of photographic principles; screening of tv programmes: cultural, political, sports, news and developmental; video script: basic production script, different types of video scripts; planning writing and editing script for video programme: 1 minute program, documentary, drama, educational programme, advertisements, storyboard; practice

news reading, anchoring for radio programme, presenting radio and TV news; rehearsal, recording and editing with computer-based editing software and presentation.

Suggested Readings

1. Bhatt, S.C. 2007. Broadcast journalism: Basic Principles. Har Anand Publisher, Delhi.
2. Hedgecoe, J. 1997. The Photographer's Handbook: A complete reference manual of photographic techniques, procedures and equipment. Ebury Press.
3. Millerson, G. and Owens, J. 2008. Television production. Focal Press, London.
4. Millerson, G. and Owens, J. 2008. Video Production Handbook. Focal Press, London
5. Ray, G.L. 2004. Communication and Management. Kalyani Publishers, New Delhi.
6. Sandhu, A.S. 1993. Textbook on Agricultural Communication: Process and Methods. Oxford and IBH Publishing Pvt. Ltd., New Delhi.

E-resources

1. Neuendorf, K.A. 2019. The Content Analysis Guidebook. Online Publication. DOI:https://dx.doi.org/10.4135/9781071802878 https://methods.sagepub.com/book/mono/the-content-analysis-guidebook-2e/chpt/5-measurement-validity
2. Waters, A. 2018. Confident Digital Content: master the fundamentals of online video, design, writing and social media to surcharge your career https://books.google.co.in/books/about/Confident_Digital_Content.html

EECM 203 (SEC VI)	PRINT JOURNALISM	1 (0+1)	SEM III

Objectives

1. To equip with necessary knowledge about print journalism
2. To impart skills in development and use of various print media
3. To develop comprehensive skill in writing and editing of print media

Practical

Identification and discussion on various types of print material; planning and production of news: news gathering by using direct and indirect methods, interview techniques; different forms of news reports and writing news: curtain raiser, spot news/live report, investigative report/interpretative, in-depth report/advocacy report, cultural events, civil and social events reporting, crime and sports reporting; specialized reporting: environment and ecology, agriculture, health/nutrition issues, women and children issues, human interest stories, travelogues, humor writing and types of column writing; editing of news; article writing: planning, production and editing; feature writing: planning, production and editing; advertisements: planning, production and editing; exposure visits and hands on experience on printing technology; visit to university press to understand the production process and equipments.

Suggested Readings

1. Ahuja, B.N. 2009. Theory and Practice of Journalism. Surjeet Publications
2. Bhatnagar, R. 2001. Print Media and Broadcast Journalism. Indian Publisher Distributors, New Delhi.
3. Bisht, M.S. 2007. Journalism Techniques and Practices. Cybertech Publications: New Delhi.
4. Dash, A. 2011. Basic concepts of journalism. Discovery Publishing House
5. Kamath, M.V. 2018. The Journalist's Handbook. Sangam Books
6. Rangaswami, P. 1984. Basic journalism. Macmillan India Limited.

EECM 205 (SEC VII)	AUDIO AND VIDEO RECORDING	2 (0+2)	SEM IV

Objectives

1. To impart skills in handling video camera and camera support systems
2. To provide technical exposure to shooting
3. To build competency in planning, writing and shooting basic video production
4. To impart skill in audio and video recording, editing and mixing

Practical

Visit to communication wing; exposure to different types of cameras; care and maintenance of cameras; familiarization of video camera and parts of video camera, other accessories, changing and loading battery pack, handling of camera support systems; handling of video camera: home video camera and practicing video camera with white balance, compositions of video camera, VHS camera and advanced professional cameras; practical exercise on focusing, zooming and shooting; planning of different camera positions: long shot, medium shot, close up, zoom, tilting and panning, lighting techniques and moods; familiarization of drone camera and its parts, handling and operation of drone cameras; practical exercise on different types of video scripts: basic production script, story board script, camera script, one minute programme, documentary production and drama; shooting with different camera positions in outdoor: long shot, medium shot, close up, zoom, tilting and panning; exposure to audio recording equipments: handling of audio editing software, sound: audio recording and voice dubbing and audio mixing; presentation of produced programme.

Suggested Readings

1. Arkin, G. 1975. Television Sound Operation. McGraw-Hill Book Company, New York.
2. Eargle, J. 1980. Sound Recording. Van Nostrand Reinhold.
3. Millerson, G. and Owens, J. 2008. Television production. Focal Press, London.
4. Millerson, G. and Owens, J. 2008. Video Production Handbook. Focal Press, London
5. Wetzel, A. 1985. Television production. McGraw-Hill Book Company, New York.
6. Zettl, H. 2010. Video Basics
7. Cengage Learning

EECM 206 (SEC VIII)	INSTRUCTIONAL VIDEO PRODUCTION	1 (0+1)	SEM IV

Objectives

1. To build competency in mobile editing applications
2. To impart skill in linear and non-linear editing techniques
3. To get familiar with the video editing open-source software

Practical

Hands on experience of DSLR and video camera; familiarization of open-source software for video and audio editing; using of smart phones (mobile) in mobile apps: video editing, synchronization of audio, exporting final video output; familiarization of creating videos using images and text, designing of video titles with using adobe photoshop (text), importing text titles from photoshop in video editing; familiarization of voice recording techniques with using of smart phones (mobile); practicing: installing of video and audio software into desktop computer, installing of audio recording equipment with sound card; advanced techniques of exporting of final video for different formats and sizes; advanced video editing techniques: voice synchronization to video with using advanced software, working with video libraries and graphics libraries, recording techniques: online and offline editing as well as linear and nonlinear editing of video and audio; editing of the recorded outdoor programme by non-linear editing; importing video: working methods of offline video editing; advanced techniques of editing: cut, mix with advanced software etc.; using graphics and animation in video production; application of open source software: gimp, blender, open broad casting software (OBS), google sketch up and any other; presentation of produced programme.

Suggested Readings

E-resources

1. A basic tutorial of Blender 3 D https://www.cs.auckland.ac.nz/~jli023/opengl/blender3dtutorial.htm
2. Blender master class book pdf
3. Camp Blender http://web.engr.oregonstate.edu/~mjb/blender/blender.1pp.pdf
4. Computer Graphics & Animation book pdf
5. Editing Digital Video: The Complete Creative and Technical Guide (Digital Video and Audio) by Robert M. Goodman, Patrick McGrath
6. http://cs.wellesley.edu/~cs110/lectures/M01-color/graphics.pdf
7. http://dl.finebook.ir/book/9e/11032.pdf
8. https://onlinecourses.swayam2.ac.in/ntr21_ed09/preview
9. https://www.docdroid.net/UKocmTz/arcsynthesis.pdf.html#page=194
10. Learning Modern 3D Graphics Programming book pdf
11. Television Production by Gerald Millerson Using Sketch Ups http://web.engr.oregonstate.edu/~mjb/sketchup/ sketchup.1pp.pdf

ELECTIVE II: EXTENSION EDUCATION AND COMMUNICATION MANAGEMENT

EECM 401	EXTENSION PROGRAMME MANAGEMENT	3 (1+2)	SEM VII

Objectives

1. To understand the importance of extension programme and programme planning
2. To impart knowledge regarding monitoring and evaluation of extension programmes
3. To acquire skills in collecting village information using PRA tools
4. To gain practical experience in developing schedules and collecting information in rural areas
5. To develop practical experience in planning, implementing and evaluating small need-based programme

Theory

Extension programme: meaning, definition, objectives and characteristics; extension programme planning: meaning, concept, objectives and principles; steps in extension programme planning; professional abilities needed by planners and criteria for programme planning; programme implementation: steps and constraints in implementation of programmes at grass root level, role of local leaders and local bodies, environment and rapport building; organizations and extension agencies in programme implementation; participatory rural appraisal (PRA) tools and techniques: transect walk, seasonal calendar, venn diagram, daily routine charts, flow diagram, social mapping and matrix ranking; monitoring and evaluation of extension programme: meaning: definition, concept and types; pros and cons of few national level extension programme.

Practical

Visit to village to identify rural institutions, key informants and establishing rapport; identifying needs and problems of the village with the help of questionnaire; application of different PRA tools for data collection: transect walk, seasonal calendar, venn diagram, daily routine charts, flow diagram, social mapping and matrix ranking; development of schedule for collecting baseline information of village; conducting village and household survey: socio-economic survey, nutritional status, agricultural problems and use of government schemes/programs; development of need assessment schedule; collection of data through the developed schedules; conduction of need assessment; analysis of data; preparation of survey reports; planning a small need-based programme; developing a detailed plan of work for the need-based programme; implementation of the need-based programme; evaluation of the need-based programme implemented; documentation and presentation of programme findings.

Suggested Readings

1. Dahama, O.P. and Bhatnagar, O.P. 2003. Education and Communication for Development. Oxford IBH, New Delhi.

2. Govind, S., Tamilselvi, G. and Meenambigai, J. 2013. Extension Education and Rural Development. Agrobios, Jodhpur.
3. Gupta, D.D. 2011. Extension Education: Core contents and emerging areas. Agrobios, Jodhpur.
4. Ray, G.L. 2004. Extension Communication and Management. Kalyani Publishers, New Delhi.
5. Reddy, A.A. 2001. Extension Education. Sri Lakshmi Press, Baptala.
6. Sandhu, A.S. 2003. Extension Programme Planning. Oxford IBH Publishing, New Delhi.
7. Supe, S.V. 2011. Integrated Extension Education. Agrotech Publishing Academy, Udaipur.

EECM 402	EXTENSION TRAINING MANAGEMENT	3 (1+2)	SEM VII

Objectives

1. To develop understanding about process of training
2. To develop skills in use of different training methods
3. To develop competence in designing, implementation & evaluation of training programme

Theory

Training: concept, models and importance; types of training: extension trainings. online and blended training; phases of training and its management; qualities of a good trainer; adult learning: characteristics of adult learner and principles of adult learning; facilitation skills in training; identification of training needs; training methods : lecture, demonstration, field trip, group discussion, case study, role play, T-group training, games, practice clinics and small group task; steps of designing training programme; training evaluation : meaning, importance, indicators and methods; problems in training; important training institutions in India for extension functionaries, farmers & entrepreneurs.

Practical

Visit to training institutes; hands on experience on training methods: lecture, lecturette, demonstration, case study, role play, games; hands on experience: identifying training needs and needs analysis; formulation of training objectives; familiarization with different steps of training, ice-breaking session, online and blended training, monitoring and evaluation tools; checklist for planning training programme; planning of a training programme according to mode of training; procurement of training material and all preparation; execution of training programme; evaluation of training programme; preparation and presentation of report.

Suggested Readings

1. Lynton, R. and Pareek, U. 1991. Training for development, Vistar Publ., New Delhi
2. Singh, R.P. 2000. Management of Training Programmes. Anmol Publications Pvt. Ltd. New Delhi.
3. Singh, R.P., Jhamtani, A. and Singh, P. 1996. Training Management- A hand book. Jain brothers, New Delhi.

EECM 403	ADVERTISING AND SOCIAL MARKETING	3 (1+2)	SEM VII

Objectives

1. To build competence in designing digital social advertisements
2. To capacitate students in developing and implementing social marketing program

Theory

Evolution and history of advertising; relevance of advertising in marketing; role of advertising agency; types of advertising: traditional, digital advertising, commercial and social advertising; various media for advertising; advertising writing process: steps for writing effective advertisement; laws and ethics in advertising; different types of advertising strategies; steps to create advertising strategy for marketing; social marketing: concept, need and philosophy, difference between commercial and social marketing; principles and importance of social marketing in development; marketing mix of social marketing; models of social marketing; role and strategies for digital marketing in community development; social marketing process: assessment and analysis of the problems; planning for social marketing strategy based on the identified problems; execution of social marketing programme; planning for publicity campaign; execution of publicity campaign; evaluation of programme and reporting.

Practical

Visit to advertising agency and report writing; designing social advertisements for newspaper, radio, television, poster, hoardings and wall paintings; designing digital advertisement on social issues for social platforms like linkedin, instagram, whatsapp and facebook; analysis of the situation to find out the social problems in a community: collect information through secondary sources like newspapers, government documents etc.; focus group discussions with groups/ community to identify social problems and analyzing the situation; scanning social market situations-opportunities and constraints; assessment and analysis of the problems; preparation of report on collected information; planning for social marketing strategy based on the identified problems: purpose, target audiences, objectives and goals, marketing mix strategies **(**4Ps**)**, evaluation, budget, and implementation plans; designing and pricing social products; execution of social marketing program using seven step model of social marketing: pre knowledge test at field level (selected village); rally on selected social issue at selected village; skill training on selected problem; field trip to relevant stakeholder (SAU/ state departments/ entrepreneurs/ SHGs); post knowledge test at field level (selected village); evaluation of social marketing programme; report writing, oral presentations and discussions based on observations and experiences gained in social marketing program.

Suggested Readings

1. Kotler, P. and Roberto, E.L. 1989. Social Marketing: strategies for changing public behavior. The free press, New York.
2. Manoff, R.K. 1985. Social marketing: New imperative for Public Health. Praeger, New York.

E-resources

1. Bhasin, H. 2021. Advertising Strategy in Marketing – Definition and Types Retrieved from https://www.marketing91.com/advertising-strategy/
2. Indeed editorial team. 2021. How to write an effective advertisement: a complete guide. Retrieved from https://in.indeed.com/career-advice/career-development /how-to-write-an-effective advertisement.

EECM 404	PUBLIC RELATIONS AND COMMUNICATION MANAGEMENT	3 (1+2)	SEM VII

Objectives

1. To provide knowledge about public relations and imparting skills in designing and preparing public relations tools
2. To equip students in planning and executing public relations program
3. To provide knowledge and capacitate students in effectively using communication skills and communication management

Theory

Public relation: concept, related terms and evolution; role of government institutions in maintaining public relations; process, publics, principles, models and tools of public relation; laws and ethics of PR: law of defamation, law of invasion of privacy, copyright act, trademark, protection of civil rights act, consumer protection act, RTI etc; communication skills: reading, writing, speaking, listening and soft skills; public speaking: characteristics, techniques, importance, modes of delivery in public speaking, check list, need and purpose of public speaking; communication techniques and communication network; factors affecting communication efficiency and effectiveness; communication fidelity and source creditability; barriers of communication: factors affecting and types.

Practical

Visit to public relation office for analyzing their public relations activities: under government sector, non-government institutions and university PRO office; designing: flyer, brochure, newsletter for establishing and maintaining public relations of your organization; plan a public relation strategy for popularizing new technology developed by your organization; writing different types of press releases and feature article; prepare a consumer survey to know about preferences and attitude of your clientele regarding new technology; prepare presentation for popularizing new technology among your clientele and show it to them, use public relations tools for it; gather data on prepared consumer survey and analyse it; prepare feedback form and get it filled from clientele; learning activities to assess and learn listening skills, improving reading skills with an emphasis on building vocabulary and correct use of grammar; writing report; simulation games in communication distortion; exercise on informative speaking, persuasive speaking, entertaining speaking, impromptu speaking, extempore speaking, memorize speaking and manuscript speaking.

Suggested Readings

1. Chandrakandan, K., Karthikeyan, C., Venkatesan, C. and Balaji, B. 2002. Public Relations. Authors' press global network, Delhi.
2. Loyd, H. 1970. Public relations. The English Universities Press Ltd., London.
3. Sharma, D. 2004. Public relations: An emerging specialized profession. Deep and Deep Publications Pvt. Ltd. New Delhi
4. Stephenson, H. 1960. Handbook of Public relations. McGraw hill book co, New York.

EECM 405	WEB DESIGNING	3 (0+3)	SEM VII

Objectives

1. To get insight of using tools in Adobe Photoshop, Dream Weaver
2. To learn the basics to advanced HTML, Markup language, structural tags and attributes for web construction
3. To gain hands on experience with working on website for page wise, popup windows, cascading styles, navigational elements
4. To design websites, mobile application screens, advertisements with animations

Practical

Orientation to web designing, software used and familiarization with stock photography, image graphics, vector graphics and tools; hands on experience with adobe photoshop: pallets, colour modes, resolution options, file types and using tools with real time example layers, blending, filters and designing of website, designing banners for web site, web advertisements; introduction of HTML 5.0: working on basic structure of markup language and hands on experience on markup language and semantic markup language; construction of web site: working on head section, structural tags and attributes for construction of web site, content/ media tags, working on forms, home page and other page, adding navigational elements and links, adding asides and side bars and applying styles, creating popup windows; hands on experience with cascading style sheets: border images, shadows, gradients, text-shadow and stroke etc; adobe dream weaver: basics, meta tags, script tags, links, inserting tables, images, videos, template design and importing etc; live website design project: designing template, adding menu system to project insertion of web banners and advertisements and final project evaluation; designing for social media: blog, twitter, face book; familiarization and working on SEO, web analytics and making use of web analytics configuration of web analytics with domain name; introduction of user interface design and hands on experience: user interface elements and principles, creating mock-ups, buttons, menus and forms; designing of icons and vector objects, creating pages in HTML by using user interface design; applying style sheets and navigational elements and link, designing of mobile application screen mock-ups/ screen in HTML; presentation of developed websites; final practical examination.

Suggested Readings

1. Abdullah. 2011. Web technology. Himalaya publishing house.

2. Chisholm W. and May M. 2008. Universal Design for Web Applications: Web Applications That Reach Everyone. O'Reilly Media.
3. Shelly, G.B., Cashman T.J., Woods, D.M and Dorin, W.J. 2008. HTML: Comprehensive Concepts and Techniques. Cengage Learning.
4. Thakur, M. 2010. Multimedia and Applications. Abhishek Publications

E-resources

1. https://kinsta.com/blog/web-design-courses/
2. https://www.sanjaywebdesigner.com/articles/web-design-course-learn-from-best-websitedesigning-tips/
3. https://www.udemy.com/course/web-design-secrets/

FOODS AND NUTRITION

Course No.	Course Title	Credits	Semester
Core Courses			
FN 101	Food Standards and Quality Control	2 (1+1)	I
FN 104	Food Science and Processing	3 (1+2)	II
FN 201	Food Packaging and Labelling	2 (1+1)	III
FN 204	Institutional Food Service Management	3 (2+1)	IV
FN 301	Human Physiology	3 (3+0)	V
FN 302	Food Hygiene and Sanitation	1 (1+0)	V
FN 303	Nutritional Biochemistry	3 (2+1)	VI
FN 304	Human Nutrition	3 (3+0)	VI
	Total Credits	**20 (14+6)**	
Skill Enhancement Courses			
Bakery and Confectionery Management I			
FN 102 (SEC I)	Biscuits and Cookies	2 (0+2)	I
FN 103 (SEC II)	Breads and Buns	1 (0+1)	I
Bakery and Confectionery Management II			
FN 105 (SEC III)	Cakes and Pastries	2 (0+2)	II
FN 106 (SEC IV)	Chocolate Making	1 (0+1)	II
Food Service Management I			
FN 202 (SEC V)	Quantity Cookery	2 (0+2)	III
FN 203 (SEC VI)	Traditional Indian Foods	1 (0+1)	III
Food Service Management II			
FN 205 (SEC VII)	Food Preservation and Storage I	2 (0+2)	IV
FN 206 (SEC VIII)	Food Preservation and Storage II	1 (0+1)	IV
	Total Credits	**12 (0+12)**	
Elective I: Foods and Nutrition			
FN 401	Normal and Therapeutic Nutrition	3 (2+1)	VII
FN 402	Food Product Development and Formulations	3 (2+1)	VII
FN 403	Clinical Nutrition	2 (2+0)	VII
FN 404	Diet and Nutrition Counselling	2 (0+2)	VII
FN 405	Sports Nutrition	2 (2+0)	VII
FN 406	Community Nutrition and Education	3 (2+1)	VII
	Total Credits	**15 (10+5)**	
	Grand Total	**47 (24+23)**	

FN 101	FOOD STANDARDS AND QUALITY CONTROL	2 (1+1)	SEM I

Objectives

1. To understand the adverse effects of chemical substances in food on human beings and about food laws and regulations to prevent adulteration in food.
2. To acquire knowledge about the quality and safety aspects of food.
3. To induce sufficient knowledge regarding national and international food safety standards and regulations

Theory

Food quality: meaning and definition of food quality, quality factors in raw and cooked foods, indicators of food quality; meaning, importance and ways of food quality assessment; Total Quality Management; HACCP; good hygienic practices; Good Manufacturing Practices: risk analysis, risk management, risk assessment, risk communication- traceability and authentication; water quality: methods of assessment & purification; sensory evaluation: physiological basis, sensory characteristics of foods, types, selection and training of sensory panel, requirements and types of sensory evaluation tests, analysis and interpretation of sensory evaluation tests, methods of sensory evaluation and evaluation cards, ranking and rating procedures, different methods of quantitative descriptive analysis; determination of sensory thresholds and taste interactions; objective methods for quality evaluation: introduction and application; consumer studies: types of consumer studies, preference studies- objectives of consumer preference studies and factors affecting consumer acceptance; food laws and regulations at national level and international level: Food Safety & Standards Rules, 2011, FSSAI, AGMARK, BIS, food export and import regulations in India, Codex Alimentarius, eco-friendly products, ISO and others; food adulteration: meaning, detection of common adulterants; food packaging material: potential contaminants from food packaging material; food toxins and contaminants: occurrence, types, their harmful effects, detection in foods, toxicological effects, limits and methods of removal; food hygiene and sanitation.

Practical

Detection of common adulterants in foods; sensory evaluation of some finished products; quality evaluation of some products using objective methods; visit to quality control laboratory/ food processing industries, FCI, AGMARK, food toxicology lab and note the procedures and parameters used for quality assessment; market survey; collection of food labels and preparation of Scrap Book.

Suggested Readings

1. Impact WTO and Codex.
2. McWilliams, M. 2000. Foods Experimental Perspectives, 4th edition, Prentice-Hall, Inc New Jersey.
3. https://www.fssai.gov.in/https://agriexchange.apeda.gov.in/IR_Standards/Import_Regulation/Food and Agricultural Import Regulations and Standards Report New Delhi India 3 52019.pdf

FN 104	FOOD SCIENCE AND PROCESSING	3 (1+2)	SEM II

Objectives

1. To develop the skills for understanding structural, compositional and nutritional importance of various foods and their processed products.
2. To develop the skills on the properties of food and various food groups and their role in food products.

Theory

Food groups, importance of food guide pyramid and my plate; objectives of cooking, processing, preservation, methods of cooking and processing with their merits and demerits; nutritive value of foods during cooking and processing; cereals and millets: structure, composition, processing techniques, effect of heat and acid, functions of starch in the cookery; legumes, nuts and oil seeds: composition, processing techniques, effect of heat, acid and alkali; fruits and vegetables: types, composition, pigments, changes caused by heat, acid and alkali, techniques of processing of fruits and vegetables; milk and milk products: composition, types, products, effect of acid on milk cookery, uses and functions, milk processing- products; egg: structure, composition, grading of egg, function and changes during cooking; meat, poultry and fish: types, structure, composition, pigments, factors affecting tenderness, post-mortem changes and changes during cooking, processed meat, poultry and fish products; sugars: types, composition, manufacturing process, effect of heat and acid, functions in cookery; fats and oils: kind, composition, effect of heat, functions in cookery, processing techniques, rancidity of fats; brief overview of beverages; condiments and spices: importance in daily life, processed spice products.

Practical

Laboratory conduct and responsibilities; knowledge of different food stuffs in English, Hindi and local language; terms used in cookery, weights and measures; identification and use of different kitchen items and equipment; identification and listing of various food groups; market survey of processed and preserved foods; cereal cookery, cereal processing: extrusion, puffing, flaking, germination and baking; pulse processing: germination, puffing, convenience mixes; preparation of cereal and pulse combined products and other regional preparations; nuts and oilseeds: oil extraction, preparation of *chikki*, *til*, *ladoos* and *thandai*; milk cookery: processed milk products; egg cookery: quality evaluation of egg, preparation of boiled egg, scrambled egg, poached egg; meat and fish cookery: preparation of meat and fish-based products; fruits and vegetables cookery: processed fruits and vegetables products (preparation of sauces, pickles, squash, RTS, jam, jelly and chips), curry and salad; sugar cookery: stages and products, crystalline and non-crystalline candies; fats and oils: preparation of *puris*, cakes and biscuits; appetizers; visit to food industries.

Suggested Readings

1. Potter, N.N. 1996. Food Science. The AVI Publishing Company, Inc., Westport,

Connecticut.
2. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y. 1997. Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.
3. Khadder, V., 1999. Text book of Food, Storage and Preservation. Kalyani Publishers, New Dehi.
4. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
5. Jood, S. and Khetarpaul, N. 2002. Food Preservation. Geeta Somani Agrotech Publishing Academy, Udaipur.
6. Sivasankar, B. 2002. Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi.

FN 201	FOOD PACKAGING AND LABELLING	2 (1+1)	SEM III

Objectives

This course will enable students to:

1. To impart knowledge of various areas related to food processing and packaging
2. To develop skills required in various industries, research labs and in the field of food and human health.
3. To enable the students to understand packaging materials and effective packaging processes.

Theory

Packaging: introduction, importance and role in extending shelf life of foods; packaging materials: paper, glass, metals and plastics; characteristics of basic packaging materials: paper (paper board, corrugated paper, fibre board), glass, metal, plastics, foils and laminates, retort pouches; different forms of packaging: rigid, semi-rigid, flexible; different packaging system: dehydrated foods, frozen foods, dairy products, fresh fruits, vegetables, meat, poultry, sea foods, beverages, microwave food products; printing of packages, barcodes & other marking, legal requirements of packaging materials and product information, properties of packaging materials: tensile strength, bursting strength, tearing resistance, puncture resistance, impact strength, tear strength, methods of testing and evaluation, barrier properties of packaging materials; theory of permeability, coefficient and factors affecting permeability; gas and water transmission rate and its measurement; testing of package performance; transport worthiness tests; safety aspects/assessment of food packaging materials; aseptic packaging of foods- sterilization of packaging material, food contact surfaces; modern packaging techniques- vacuum packaging, Modified Atmosphere Packaging (MAP), eco-friendly packaging, active food packaging: definition, scope, physical and chemical principles, edible films and coatings; microbiological aspects of packaging materials; regulation related to hazardous packaging; disposal of waste package materials; hazards from packaging materials in food; standard packages: laws, regulation and general guidelines on giving declarations- (FSSAI) ; packaging equipment and machinery: vacuum packaging

machine, CA & AMP, MA packaging machine, gas packaging machine, seal and shrink packaging machine, Form & AMP, fill sealing machine; aseptic packaging systems, retort pouches, bottling machines, carton making machines; basic concept of printing on packaging, package printing machines.

Practical

Familiarization of different types of packaging material; testing of packaging materials like thickness, GSM, grease resistance, bursting strength, tearing resistance, water vapour transmission rate (WVTR), puncture resistance; vacuum packaging and determination of storage life; testing the compression strength of the boxes; packaging of food material in seal and shrink-packaging machine and study its shelf life; testing of strength of glass containers by thermal shock test; testing of strength of filled pouches by drop tester; packaging of powder foods and estimation of shelf-life; visit to a food packaging plant.

Suggested Readings

1. Robertson, G.L. 2016. Food Packaging: Principles and Practice, Third Edition. CRC Press.
2. Rui, M.S. Cruiz 2019.Food Packaging: Innovations and Shelf-life. CRC Press.
3. Robertson, G.L. 2009. Food Packaging and Shelf Life: A Practical Guide. Tailor and Francis. CRC Press.
4. Ruben, Hernandez, Susan, E. M., Selke, John Culter, John D. Culter. Plastics Packaging: Properties, Processing, Applications, and Regulations by FSSAI.

FN 204	INSTITUTIONAL FOOD SERVICE MANAGEMENT	3 (2+1)	SEM IV

Objectives

1. To enable them in planning, execution and control of the management of institutes with ease and profit.
2. To provide practical knowledge about keeping inventory of stocks, tool management and cost calculation.
3. To Proclaim work study, work simplification and its improvement in day to day life.

Theory

Introduction: classification of food service institutions, function, profit oriented, public health facility oriented; processing method: conventional system, fast food service systems; service of food: self-service, tray service, waiter-waitress service; floor planning and layout; characteristics of typical food service facilities; floor planning and layout for catering establishment; catering equipment: introduction, classification, factors involved in selection of equipment, factors involved in purchasing of equipment, use and care of major equipment; food preparation: introduction, principles of food preparation, characteristics of food, principles of food purchasing, methods of food purchasing, storage of foods; menu planning: definition of menu planning, principles of menu planning, types of menus; standardization of

recipe: definition of standardization of recipe, standard portion sizes, portioning equipment, portion control, use of left over foods; management: definition, principles of management, steps in effective management, techniques of effective management, tools of management; organization chart, work study, work simplification, work improvement; financial management: introduction, principles, costing, budgeting, accounting, food cost control methods, factors affecting food cost, labor cost, operating cost and overhead cost; personal management: introduction, personal management concepts, staff employment, employee benefit, methods of selection, orientation, training & development, supervision, motivation of employees.

Practical

Standardization of at least 2 recipes in each of the following category: cereal and cereal products, vegetables, fruits, meat, chicken and other fleshy foods, sugar and jaggery, milk and its products; pulses, nuts and oil seeds, sweet and savory dishes, snacks, traditional recipes; planning and preparation of menu for various occasions and to calculate amount of each food ingredients: birth day menu, *Holi* function menu, New year special menu, wedding menu, *Lohri* special menu, Christmas special menu; calculate food cost, labor cost, operating cost and overhead cost of a home-made dish, calculate gross profit percentage of establishment welfare/commercial/ transport catering, calculate break-even point any establishment welfare/commercial/ transport catering; table setting, maintenance of accounts and record keeping; visit to various food service institutions and observation of physical facilities; menu cards; serving style; table setting; number of personnel and their work schedule; hygiene and sanitary conditions; safety measures etc.; report writing and presentation.

Suggested Readings

1. Carpenter, R.P., Lyon, D.H. and Hasdell, T.A. 2002. Guidelines for Sensory Analysis in Food Product Development and Quality Control. 2nd Edition, Aspen Publishers Inc. New York.
2. Earle, M. and Earle, R.L. 2008. Case Studies in Food Product Development. Woodhead Publishing Limited and CRC Press, New York.
3. Moskowitz, H. R., Straus, T. and Saguy, S. 2009. An Integrated Approach to New Food Products Development. CRC Press, Boca Raton, Florida.
4. Puckett, R.P. 2012. Good Service Manual for Health Care Institutions. 4th Edition, John Wiley and Sons Inc. Hoboken, New Jersey.
5. Beckley, J.H., Herzog, L.J. and Foley, M.M. 2017. Accelerating New Food Product Design and Development. 2nd Edition, John Wiley and Sons Inc. Hoboken, New Jersey.
6. Sethi, M. 2018. Catering Management- An Integral Approach. 3rd Edition, New Age International, New Delhi.
7. Nancy, L.S. 2007. Catering Management. John Wiley and Sons.
8. Arora, R.S. 2012. Banquet and Catering Management. Abhijeet Publications.
9. Bhat, H. 2008. Hotel Management. Crescent Publishing Corporation.
10. Bhajwani, M. 2007. Food Service Management: Principles and Practice. Rajat publications, New Delhi.
11. https://www.ferrerofoodsservice.com
12. https://www.foodservicedirector.com
13. Vaclavik, V. 2018. Dimensions of Food. CRC Press.

FN 301	HUMAN PHYSIOLOGY	3 (3+0)	SEM V

Objectives

1. To acquire knowledge about human physiology, structure of different system and mechanism of human body.
2. To learn knowledge regarding organ system and Integration of the organ systems to maintain proper internal environment.

Theory

Physiological process: introduction, structural basis of human body– cells and their functions, structural basis of human body: tissues and their functions; skeletal system; joints; muscular system; function; nervous system: functions of brain, functions of spinal cord, nerve impulse reflexes; physiology of digestion, digestive enzymes and their functions, functions of liver, absorption from the intestine; composition and functions of blood; composition and functions of lymph; structure of heart and course of blood circulation, blood pressure and factors affecting blood pressure, pulse rate and heart sounds; intracellular and extracellular water compartments; mechanism of respiration, respiratory rates, volume and transport of gases; physiology of kidney; the location, secretions and function of various endocrine glands: pituitary, thyroid, parathyroid; the location, secretions and function of various endocrine glands: adrenal, testes, ovaries; the location, secretions and function of various endocrine glands: pancreas, placenta, pineal gland; male reproductive organs and their functions; female reproductive organs and their functions; pregnancy, changes in the mother, fertilization, development of foetus, lactation.

Suggested Readings

1. Best and Taylor. 1979. Physiological asis of medical practice. Tokyo, Igaku Shoin.
2. Chaterjee, C.C. 2012. Human Physiology Vol.I and Vol.II. CBS Publications.
3. Ganong, E.F. 1995. Review of Medica Physiology. Norwalk: Simon and Schuster
4. David, F., Stacia, B.M. and Charles, L.S. 1993. Human Physiology Foundations and Frontiers. 2nd Edn., Mosby Pub.
5. Donnersberger, A. BandScott, A.L. 2005. Laboratory Textbook of Anatomy and Physiology. 8th Edition, Jones and Bartlett Learning, Burlington, Massachusetts.
6. Hall, J.E. 2016. Gaytonand Hall Text Book of Medical Physiology. 13th Edition, Elsevier India.
7. Jain,A.K. 2009. Human Physiology for BD. 3rd Edition, Avichal Publishing Company, New Delhi.
8. Marieb, E.N. 2004. Human Anatomy and Physiology, 6th Edition. Pearson Education, Inc. London.
9. Waugh, A. and Grant, A. 2014. Rossand Wilson Anatomy and Physiology in Health and Illness. 6th Edition, Elsevier Ltd. Churchill Livinstone, London.

FN 302	FOOD HYGIENE AND SANITATION	1 (1+0)	SEM V

Objectives

1. To enable the students to know the significance of hygiene and sanitation in maintenance of health.
2. To learn the importance of maintaining personal and food hygiene

Theory

Concept, significance and interrelationship of health, hygiene and sanitation; principles of food hygiene; food safety hazards: chemical, physical, effect of food composition; beneficial and harmful microorganism in foods: an introduction; food hygiene: public health hazards due to contaminated foods; food borne infections and intoxication, symptoms, sources and modes of transmission and method of prevention and control; personal hygiene of food handler: characteristics of good health and hygienic habits to promote good health; toxins in foods: naturally occurring, external; effect of environmental pollution on food safety; waste disposal; water pollution, purification of water, quality criteria and standards of potable water.

Suggested Readings

1. Park, K. 2000. Text book of Preventive and Social Medicine- A Treatise on Community Health 16th ed. M/S Banarasidas Bhanot Publication, Jabalpur.
2. Bedi, Y.P. 1970. A Handbook of Hygiene and Public Health. Atma Ram and Sons Publication, New Delhi.
3. Frazier, W.C. and West Hoff, D. C. 1988. 4thed, Food Microbiology, Tata McGraw Hill Inc., New Delhi.
4. Jacob, M.1989. Safe Food Handling: A Training Guide for Managers of Food Service Establishment, WHO, Geneva.
5. Marriott, N. G. 1985. Principles of Food Sanitation AVI book, Van Nostrand Reinhold Publication, New York.
6. Gibney, M.J. Margetts, B.M., Kearney, J.M. and Arab, L. (eds) 2004. Public health Nutrition. The Nutrition Society Blackwell Science. Oxford.
7. Srivastava, A. 2013. Food hygiene and sanitation. Neha Publishers and Distributers.

FN 303	NUTRITIONAL BIOCHEMISTRY	3 (2+1)	SEM VI

Objectives

1. To understand the relationship of chemical and physiological functions of various specialized cells of the body to their roles in metabolism and nutrition.
2. To describe the major pathways of energy metabolism, how they are regulated, modified during different physiological states and their consequences.
3. To understand the biochemical aspects of nutrients and utilization of nutrients in the body.

Theory

Introduction, definition, historical development, relevance for community science; carbohydrates: definition, classification, structure, glycolysis, TCA cycle; lipids: definition, classification, structure, B-oxidation; protein and amino acids: definition classification, structure, path of entry of amino acids into metabolism, urea cycle; role of vitamins and minerals in metabolism; nucleic acid: nitrogenous base, nucleotides, DNA and RNA structure; enzymes: nature, classification, mechanism of enzyme action and factors affecting its inhibition, coenzymes and cofactors; brief orientation of biochemical energetic and biological oxidation; acid base balance.

Practical

Qualitative analysis of carbohydrates; qualitative analysis of amino acids; qualitative analysis of protein; determination of acid value, saponification value and iodine number; demonstration on estimation of nitrogen by Kjeldhal method; demonstration on estimation of fat by soxhlet method; determination of pH.

Suggested Readings

1. Conn, E.E. and Stump, P.K. 1976 / 2002. Outlines of Biochemistry. John Wiley and Sons, New Delhi.
2. Deb, A.C. 1996. Fundamentals of Biochemistry, New Central Book Agency Pvt. Ltd. Calcutta. w
3. Murray, R.A. Grammer, D.K. Mayes, P.A. and Rodwell, W. 1996. Harper's Biochemistry, Prentice Hall of India Pvt. Ltd, New Delhi.
4. Rao Ranganathan, K. 1975. Text book of Biochemistry. Prentice Hall of India Pvt. Ltd. , New Delhi.
5. Plummer, D.T, 1971. Introduction to Practical Biochemistry. Tata Mc-Graw Hill .

FN 304	HUMAN NUTRITION	3 (3+0)	SEM VI

Objectives

1. To equip the students with basic knowledge about macro and micro nutrients and role in human nutrition
2. To enable them to understand the rich sources, deficiency and toxicity of various nutrients

Theory

Historical development of nutrition; definitions of terms used in nutrition-nutrients, RDA, Daily Value, balanced diet, Food pyramid, My plate, glycemic index, glycemic load, food security, nutritional security, BMR, BMI, health, functional foods, phytochemicals, nutraceuticles, dietary supplements; energy: units, sources and requirements, fuel value of foods, methods of measuring energy value of foods, energy requirements of body, physical activity and thermogenic effects of foods, BMR and factors affecting methods of measuring BMR and measuring TEF; macronutrients: classification, functions, sources, requirements, digestion, absorption of carbohydrates; lipids: types, functions, sources, requirements, digestion, absorption

and health conditions associated with lipids; proteins: classification, functions, sources, requirements, digestion, absorption of proteins, classification and functions amino acids, health conditions associated with proteins; fibre: types, source and importance in human health; vitamins: classification, functions, sources, requirements, deficiency and toxicity of fat soluble vitamins- A, D, E & K and water soluble vitamins- C, B complex thiamine, riboflavin, niacin, folic acid, biotin, pyridoxine and cyanocobalamin; minerals: classification, functions, sources, requirements, deficiency and toxicity of macro minerals- calcium, phosphorous, magnesium, sodium, potassium, chloride, micro minerals- iron, iodine, fluorine, copper, zinc, factors affecting bioavailability of important minerals; water: functions, sources, distribution in body, water and electrolyte balance.

Suggested Readings

1. Srilakshmi, B. 2018. Nutrition Science, 6th edition, New Age International (P) Ltd Publishers, New Delhi.
2. ICMR-National Institute of Nutrition, 2020. Nutrient Requirement of Indians: A Report of the Expert Group, ICMR
3. Agarwal, A. and Udipi, S., 2014. Text Book of Human Nutrition. Jaypee Medical Publication, Delhi.
4. Sehgal, S. and Raghuvanshi, R.S., 2007. Text Book of Community Nutrition. ICAR Publication.
5. Gibney, M. J., Lanham-New, S. A., Cassidy A. and Voster, H. H., 2019. Introduction to Human Nutrition, 3rd edition, Wiley-Blackwell Publication
6. Mann, J. and Truswell, S. 2012. Essentials of Human Nutrition, 4th edition, Oxford University Press.

SKILL ENHANCEMENT COURSES

FN 102 (SEC I)	BISCUITS AND COOKIES	2 (0+2)	SEM I

Objectives

1. To enable students to learn the basics of producing biscuit and cookies.
2. To acquaint the students with newer technologies and machineries used in product development.
3. To impart knowledge about commercialization of biscuit and cookies.
4. To build confidence among students to start a new career in bakery.

Practical

Biscuits and cookies: role of ingredients; various types of biscuits and basic procedure in production; characteristic features of ingredients of cookies; quality assessment of raw ingredients used in cookies; type of cookies: sheeted type cookies making, bar type cookies making, piped type cookies making, dropped type cookies making, rolled type cookies making; types of biscuits: digestive biscuit, custard

cream, short bread, chocolate biscuit, rolled biscuits drop biscuit; biscuits and cookies: packaging, costing and financial management, licensing, marketing (open and digital) and commercialization; storage of biscuits and cookies: slightly cool, dry, dark place; project planning for financial assistance for a small-scale industry on biscuit and cookie making and writing report.

Suggested Readings

1. Mathuravalli, S.M.D. 2021.Handbook of Bakery and Confectionery. CRC Press
2. Biscuit baking: A review Divyasree, A., 2020. Uncan Manley Woodhead publishing,
3. Chakrabarty, M.M. 2003. Chemistry and Technology of Oils and Fats. Prentice Hall.
4. Dendy, D.A.V & Dobraszczyk BJ. 2001. Cereal and Cereal Products. Aspen.
5. Arora A.K. 2007.Food Service and Catering Management. APH Publishing Corporation, New Delhi.
6. Parvinder S. Bali, 2018. THEORY OF BAKERY. Oxford Publishing.
7. https://en.m.wikipedia.org/wiki/Biscuit ZE Martins, Trends in Food Science & Technology 67, 106-128, 2017.

FN 103 (SEC II)	BREADS AND BUNS	1 (0+1)	SEM I

Objectives

1. To enable students to learn the basics of producing breads and buns.
2. To acquaint the students with newer technologies and machineries used in product development.
3. To develop skills of students in making of breads and buns at professional level.
4. To impart knowledge about commercialization of breads and buns.
5. To build confidence among students to start a new career in bakery.

Practical

Breads and buns: role of ingredients, characteristic features of ingredients of breads and buns, quality assessment of raw ingredients used in breads and buns; breads and buns: basic procedure in production; various types of breads and buns: multigrain bread, pita bread, rye bread, sour dough, whole wheat bread, bread stick, banana bread; breads and buns- packaging, costing and financial management, licensing, marketing (open and digital) and commercialization; storage of breads and buns– slightly cool, dry, dark place; visit to breads and buns industry; project planning for financial assistance for a small-scale industry on breads and buns making and writing report.

Suggested Readings

1. Chakrabarty MM. 2003. Chemistry and Technology of Oils and Fats. Prentice Hall.
2. Dendy, D.A.V. and Dobraszczyk,B.J. 2001. Cereal and Cereal Products. Aspen.
3. Arora, A.K. 2007.Food Service and Catering Management. APH Publishing Corporation, New Delhi.
4. Parvinder, S. Bali, 2018. Theory of bakery. Oxford publishing

FN 105 (SEC III)	CAKES AND PASTRIES	2 (0+2)	SEM II

Objectives

1. To enable students to learn the basics of producing cake and pastry techniques.
2. To acquaint the students with newer technologies and machinery used in product development.
3. To impart knowledge about commercialization of cake and pastry.

Practical

Cake and pastry: role of ingredients, characteristics, making and mixing methods; role of ingredients in sponge goods; type of cakes: making of eggless sponge cake, fruit cake, pound cake, ganache, marbled cake and swiss roll; cake and pastry: packaging, costing and financial management; cake and pastry: licensing, marketing (open and digital) and commercialization; storage of cake and pastry: slightly cool, dry, dark place; visit to a cake and pastry industry; project planning for financial assistance for a small-scale industry on cake and pastry making and writing report.

Suggested Readings

1. Chakrabarty, M.M. 2003. Chemistry and Technology of Oils and Fats. Prentice Hall.
2. Dendy, D.A.V. & Dobraszczyk, B.J. 2001. Cereal and Cereal Products. Aspen.
3. Arora A.K. 2007.Food Service and Catering Management. APH Publishing Corporation, New Delhi.
4. Parvinder, S. Bali, 2018. Theory of Bakery. Oxford publishing.
5. Matz, Samuel A., Bakery Technology and Engineering, 1992, 3rd Edition, Chapman and Hall, London.
6. Cauvain, Stanley P, and Young, Linda S., "Technology of Bread Making, 2007, Springer
7. Edwards W.P." Science of bakery products, RSC, UK, 2007
8. Samuel, A. Matz. 1988. Equipment for Bakers, Pan Tech International Publication.

FN 106 (SEC IV)	CHOCOLATE MAKING	1 (0+1)	SEM II

Objectives

1. To enable students to learn the basics of producing chocolate making and packaging.
2. To acquaint the students with newer technologies and machineries used in product development.
3. To important knowledge about commercialization of chocolates.

Practical

Chocolate: basic formulation, preparation of types of chocolate like: basic chocolate, liquid filled chocolate, semi-sweet chocolate, bittersweet chocolate, dark chocolate; chocolate packaging; labelling; packaging material: plastic material, paper material,

aluminium material; packaging type: banding, foil packing, sleeve packing, twist packing; technique used in chocolate packaging process: foil wrapping, fold wrapping, coin wrapping, bar wrapping; sensory evaluation: direct method- (appearance, odor, flavor, taste, and texture), indirect method- (single sample test, triangle test, 9-point hedonic scale and the paired comparison test); consumer validation; costing and financial management; licensing; marketing (open and digital) and commercialization of chocolate; storage of chocolate: slightly cool, dry, dark place; shelf life of chocolate: parameters, type of deterioration, shelf-life dating, method to determine shelf life of chocolate: direct method, challenge test, accelerate shelf-life test; visit to chocolate industry; project planning for financial assistance for a small-scale industry on chocolate making and report writing.

Suggested Readings

1. Iuri Baptista, 2021. International Journal of Gastronomy and Food Science 24, 100340.
2. Sugar Confectionery manufacture-(Ed) E.B. Jackson, 2nd Edition, Blackie Academic and professional, Glasgow, 1995.
3. Edwards, W.P. 2007. Science of bakery products□, Published by The Royal Society of Chemistry, UK,2007
4. Maricel, E. Presilla. 2009. The New Taste of Chocolate, Revised: A Cultural & Natural History of Cacao with Recipes. Ten Speed Press; Revised edition (24 November 2009).

FN 202 (SEC V)	QUANTITY COOKERY	2 (0+2)	SEM III

Objectives

1. Students will learn to produce various food items in quantity, food safety, and hygiene.
2. Students will be able to learn menu planning, standardized recipes to be served to a large group of people, organizations.

Practical

Equipment and kitchen tools used in quantity cookery: receiving and storage equipment, production equipment, service equipment, cleaning equipment; kitchen organization; selection of raw material for quantity cookery; regional foods for festivals: snacks, sweets, gravies; menu planning and quantity production; food costing; food safety– food handling, hygiene; food waste management.

Suggested Readings

1. Bali, P.S. 2009.Food Production Operations. Ed. 1 and 2, Oxford Publication.
2. Bali, P.S. 2011. Quantity Food Production Operation. Oxford Publication.
3. Bali, P.S. 2012. Food production management. Oxford Publication.
4. Arora, K. 2011. Theory of cookery. Frank Brothers and Co. Pvt. Ltd., New Delhi

FN 203 (SEC VI)	TRADITIONAL INDIAN FOODS	1 (0+1)	SEM III

Objectives

1. To know the traditional food preparations of different regions of India.
2. To know the nutritive / therapeutic value of traditional Indian diets.

Practical

Survey of region specific traditional food products having therapeutic/medicinal values; calculation of nutritive value of traditional recipes and meals of the state; planning and preparation of characteristic recipes of different states; standardization of common recipes of North, East, South and West- Zone of the country; preparation of nutritionally significant foods for physiological conditions in India; preparation of festive food of the country.

Suggested Readings

1. West, B.B., Wood, L. Harger, V.F. and Shugart, G.S. 1997. Food Services in Institutions. John Wiley and Sons, New Delhi.
2. Peckham, G.C. 1995. Foundations of Food Preparations. Prentice Hall, New Jersey.
3. Crusius, V.C. 1984. Quantity Food Management. Surjeet Publications, Delhi

FN 205 (SEC VII)	FOOD PRESERVATION AND STORAGE-I	2 (0+2)	SEM IV

Objectives

1. To learn different methods of preservation and storage of various foods.
2. To know the factors affecting shelf life of preserved foods.

Practical

Market survey of raw and preserved foods; selection, purchase and storage of perishable, non -perishable and semi perishable foods for preservation; preservation by bacteriostatic methods:drying, dehydration, use of high temperature, sterilization, blanching, pasteurization, canning, ultra-heating; preparation of products of cereals and starches: papads- wheat, maize or other cereal grain, sago papad and other regional preparations; fryums, rolls and other snack items; preservation of products using pulses: papads- *mung* dal, *chana* dal, *urad* dal or other pulses, *badi*, *mungodi* etc. and other regional preparation; drying of fruits and vegetables: leafy vegetables- spinach, fenugreek leaves, coriander, bathua, other vegetables- peas, beans, tomatoes, lady fingers, cluster beans, bitter gourd etc., roots and tubers: potato chips, onion flakes; fruits: ber, grapes, raw mangoes, banana powder; sterilization, bottling, corking, blanching; preparation of products using natural preservatives: sugar, squashes - lemon, orange, grapes, guava, custard apple, *amla*, *ber*, *jamun*, mix fruits etc.; sugar syrups: lemon, orange, grapes, guava, rose, kewda etc. with use of low temperature, chilling, freezing, other recent methods in preservation; preparation of

products using natural preservatives sugar: squash, cordial, syrups, candies, jam, jellies, preserves, *murabba*; oil and salt, vinegar: pickles with and without oil, chutneys, other chemical preservatives: sauces, purees; storage of perishable, semi perishable and non-perishable foods; antimicrobial agents, biological agents, nonionizing and ionizing radiations in preservation of foods; hurdle technology; packaging and packaging material, labelling and costing of the products; visit of storage go downs –FCI and others.

Suggested Readings

1. Potter, N.N. 1996. Food Science. The AVI Publishing Company, Inc., Westport, Connecticut.
2. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y.1997. Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.
3. Vijay, K. 1999. Text book of Food, Storage and Preservation, Kalyani Publishers, New Dehi.
4. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
5. Jood, S. and Khetarpaul, N. 2002. Food Preservation. Geeta Somani Agrotech Publishing Academy, Udaipur.
6. Sivasankar, B. 2002. Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi.

FN 206 (SEC VIII)	FOOD PRESERVATION AND STORAGE II	1 (0+1)	SEM IV

Objectives

1. To learn the techniques of preservation and storage of fruit and vegetables.
2. To learn the prevention of contamination of food from damaging agents.

Practical

Preparation of jam, jellies, preserves, *murabba*, candies, marmalades; preservation by using oil, salt and vinegar, pickles with and without oil: mango, *amla*, lemon, green chilli, mix vegetables, fresh turmeric, garlic, gonda, carrot; pickles using other chemical preservatives: chutneys, purees; fermented pickles; ketchups and sauces; freezing of fruits and vegetables; concentration of fruit juices; hurdle technology; use of anti-microbial agents, food additives and preservatives; methods of storing preserved foods; prevention of food spoilage; packaging and packaging material; labelling and costing of the product; demonstration on bottling, pasteurization, canning, ultra- heating; demonstration on ionizing and non- ionizing irradiation in foods, ohmic heating; visit to food processing plant.

Suggested Readings

1. Kyzlink, V. 2003. Principal of food preservation, 2nd edition, Elsevier press.

2. J.M. Jay, D. Vanost and, Modern food microbiology, 7th addition, 2005
3. Potter, N.N. 1996. Food Science.The AVI Publishing Company, Inc., Westport, Connecticut.
4. Sehgal, S., Grewal, R.B., Kawatra, A. and Kaur, Y. 1997. Practical Aspects of Food Preservation. Directorate of Publications. Haryana Agricultural University, Hisar.
5. Vijay K., 1999. Text book of Food, Storage and Preservation, Kalyani Publishers, New Dehi.
6. Kalia, M. and Sood, S. 2010. Food Preservation and Processing. Revised Edition, Kalyani Publishers, New Delhi.
7. Jood, S. and Khetarpaul, N. 2002. Food Preservation. Geeta Somani Agrotech Publishing Academy, Udaipur.
8. Sivasankar, B. 2000. Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi.

ELECTIVE III: FOODS AND NUTRITION

FN 401	NORMAL AND THERAPEUTIC NUTRITION	3 (2+1)	SEM VII

Objectives

1. To acquire basic knowledge of nutrient requirements, recommended dietary allowances, and dietary modification under different physiological conditions and disease conditions.
2. To develop practical skills in planning and management of diets for the different age groups under normal/ physiological conditions keeping in mind the dietary guidelines and to modify the diet plans to suit the disease conditions.

Theory

Determination of nutritional requirements; basic principles of menu planning: factors affecting planning menus for individual and family and steps involved in meal planning; concept of calorie consumption unit; factors (physiological and psychological) affecting food requirements of individuals, families and different groups of people; classification of vegetarianism; importance of balanced diets, food exchange list, use of food exchange list in diet planning; introduction to normal nutrition: food, nutrient requirement and menu planning of adults (male and female of all activities level), pregnant women, lactating women, infants; breast feeding: advantages of breast feeding, breast feeding during illness, feeding of pre-term baby, feeding problems, weaning and complementary feeding; food and nutrient requirement of pre-school children, school-age children, adolescents; physiological and psychological changes and food and nutrient requirement during old age; introduction to therapeutic nutrition: definition, objectives and principles of therapeutic nutrition/ diet therapy; importance and modification of normal diet to therapeutic diets; therapeutic adaption: change in consistency, energy intake, nutrient, fiber, frequency of feeding and elimination of food; methods of feeding: enteral

feeding, parenteral feeding, advantages and disadvantages of these methods; routine hospital diet: clear liquid diet, liquid diet, semi-solid diet, soft diet, normal diet, bland diet, high and low calorie diet, high and low protein diet, high and low fiber diet, low cholesterol diet etc; aetiology, symptoms and dietary management in acute (typhoid and influenza) and chronic fever (tuberculosis and viral and auto immune diseases); allergy: causes, symptoms and diet management; aetiology, symptoms and dietary management in gastrointestinal disorders: diarrhoea, constipation, peptic ulcer, diverticular disease, inflammatory bowel disease, celiac disease, lactose intolerance etc. and other disorders; aetiology, symptoms and dietary management in liver diseases: fatty liver, hepatitis, jaundice, cirrhosis of liver; aetiology, symptoms and dietary management in cardiovascular disease, atherosclerosis and hypertension; aetiology, symptoms and dietary management in diabetes mellitus; aetiology, symptoms and dietary management in overweight and obesity and underweight; aetiology, symptoms and dietary management in renal disease: nephritis, nephrotic syndrome acute renal failure, chronic renal failure etc; aetiology, symptoms and dietary management in cancer.

Practical

Standardization of serving-size portions; planning, preparation and calculation of diets for different age groups: infancy, preschool age, school age, adolescent, adult, old age; planning, preparation and calculation of diets for pregnant and lactating women; planning, preparation and calculation of packed lunches, clear liquid diet, full fluid diet, soft diet, tube feeding diet, high calorie/ fiber diet etc; planning, preparation and calculation of diets for following diseased condition: diarrhoea, constipation, peptic ulcer, hepatitis, hypertension, atherosclerosis, diabetes, mellitus, overweight/ obesity.

Suggested Readings

1. Raghuvanshi, R.S. and Mittal, M. 2014. Food Nutrition and Diet Therapy. West vills Publication Delhi.
2. Agarwal, A and Udipi, S. 2014. Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
3. Antia,P. 1986. Clinical dietetics and nutrition. Oxford univ. Bombay
4. Srilakshmi, B. 1995. Dietetics. Newage international publishers, New Delhi.
5. Agarwal, A and Udipi, S. 2014. Text Book of Human Nutrition. Jaypee Medical Publication Delhi.
6. Antia,P. 1986. Clinical dietetics and nutrition. Oxford univ. Bombay
7. Srilakshmi, B. 1995. Dietetics. New Age international publishers, New Delhi.

FN 402	FOOD PRODUCT DEVELOPMENT AND FORMULATIONS	3 (2+1)	SEM VII

Objectives

1. To learn various aspects of product development and formulation related to production, quality evaluation.

2. To understand the principles of marketing, branding, positioning, viability, feasibility and other commercial aspects of food products.
3. To develop new products in practical situations and improve and innovate the existing food products.
4. To develop entrepreneurship skills in the area of Food Product Development & Formulations.

Theory

Concept of product development and food formulation, techniques used in forecasting new product's needs, new product ideas; infra-structural requirement & contributory role of various disciplines involved in products development; sequential steps of product development and food formulation; food ingredients; nutritional relevance: physical and chemical properties in relation to product formulation; nutritional changes due to processing; evaluation of sensory characteristics and consumer acceptance of products; consumer protection, nutrition labelling, food packaging, advertising and marketing and economics; improving success potential of new products, market exploration & acquisitions; quality controls procedures employed in product development; procedure for obtaining patents; legal aspects of product development.

Practical

Sensory evaluation techniques: recognition test, basic tastes, odour recognition, aroma perception; exercises with other senses, tactile and pressure, kinesthetic, temperature, pain, auditory and colour; threshold tests for basic tastes; difference tests, paired, triangle and duo trio tests, ranking test, descriptive tests: flavor profile and dilution flavor profile, scoring tests; project: product formulation and evaluation; visit to a food industry.

Suggested Readings

1. Sharma, A. 2018. Food Product Development. CBS, India.
2. Baker, R.C. 1988. Fundamentals of New Food Product Development (Developments in Food Science). Elsevier Science Ltd.
3. Prusa, K. and Gilbert, K. 2019. Food Product Development Lab Manual. Iowa State University, United States

FN 403	CLINICAL NUTRITION	2 (2+0)	SEM VII

Objectives

1. To understand basis of RDA derivation and use knowledge to understand individual variations and provide personalized nutrition.
2. To interpret clinical results and apply the findings in formulating therapeutic diet.
3. To understand rationale and use of nutraceuticals and functional foods.

Theory

Methods for estimating RDA: basic terminology in relation to nutritional requirements; methods for studying the nutrition requirements: population survey of

dietary intakes of nutrients, growth studies, depletion and repletion studies, nutrient balance studies, use of isotopically labelled nutrients, nutrient turnover, obligatory losses of nutrients; clinical results and their interpretation: interpretation of clinical testing of blood serum and urine with particular emphasis on their interpretation related to nutritional status and disease (PEM, liver, cardiovascular and renal disorders, diabetes mellitus, underweight, overweight and obesity); nutritional biomarkers; introduction to free radicals: free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, carbohydrates, nucleic acids, free radicals' theory of ageing, enzymatic and non-enzymatic antioxidant defence, synthetic antioxidants; nutraceuticals and dietary supplements: definitions of nutraceuticals, functional foods, dietary supplements; nutrigenomics; probiotics; prebiotics and postbiotics; interaction between nutrients, infections and drugs; nutraceutical factors in specific foods: classification of nutraceutical factors based on chemical nature and mechanism of action, occurrence and therapeutic uses of carotenoids (lycopene, lutein, zeaxanthene, astaxanthene), quinones (tocopherol), proteins and minerals (melatonin, glutathione, shilajit, carnitine), phenolics and polyphenolics (reservetrol, grapeseed extract, tea, pycnogenol, avenanthramides from oats, rutin, soy isoflavones, curcumin), sulphur compounds (clucosinates), essential fatty acids (fish oils, α- linolenic acid); dietary fibres and complex carbohydrates as functional food ingredients; regulatory issues of nutraceuticals and dietary supplements.

Suggested Readings

1. Baetge, E. E., Dhawan, A., and Prentice, A. M. (Eds.). 2016. Next Generation Nutritional Biomarkers to Guide Better Health Care: 84th Nestlé Nutrition Institute Workshop, Lausanne, September 2014. Karger Medical and Scientific Publishers.
2. Das, L., Bhaumik, E., Raychaudhuri, U., and Chakraborty, R. 2012. Role of nutraceuticals in human health. Journal of food science and technology, 49(2), 173-183.
3. Elia, M., Ljungqvist, O., Stratton, R.J. and Susan, A. L. (Eds.). 2013. Clinical Nutrition. Wiley, Germany.
4. Gupta, R. C., Lall, R., and Srivastava, A. (Eds.). 2021. Nutraceuticals: efficacy, safety and toxicity. Academic Press.
5. Mahan, L.K. and Escott-Stump, S. 2000. Krause's Food, Nutrition & Diet Therapy. 10th Edition,
6. W.B. Saunders Co., Pennsylvania.
7. Nutrient Requirement for Indians: Recommended Dietary Allowances and Estimated average requirements-2020. National Institute of Nutrition, India (nin.res.in)
8. Raghuvanshi, R.S. and Mittal, M. 2014. Food Nutrition and Diet Therapy. Westvills Publication Delhi.
9. Sobotka, L., & Forbes, A. (Eds.). 2019. Basics in clinical nutrition (Vol. 1, No. 5th). Galen.
10. Wildman, R. E., Wildman, R., and Wallace, T. C. 2016. Handbook of nutraceuticals and functional foods. CRC press.

FN 404	DIET AND NUTRITION COUNSELLING	2 (0+2)	SEM VII

Objectives

1. To develop the knowledge for understanding the concepts of diet, structural, compositional and nutritional importance of various diet
2. To develop the skills in communication, learn the counselling techniques, group process skills and behavior modification theories and develop the educational tools.

Practical

Communication to promote change: interviewing, counselling, behavioural modification, modifying cognitions, motivation; principles and theories of learning, planning learning, implementing and evaluating learning, group dynamics; delivery of oral presentations and workshops; planning, selecting and using media. counselling of patients suffering from various diseases: renal disorders, liver diseases, cardio-vascular diseases, diabetes, protein energy malnutrition, iron, vitamin A and iodine deficiency disorders; organizing counseling camps for specific diseases; case studies: selection of patients, clinical, nutritional and biochemical profile, recommending modified diet; project work, report writing and presentation.

Suggested Readings

1. Baetge, E. E., Dhawan, A., & Prentice, A. M. (Eds.). 2016. NextGeneration Nutritional Biomarkers to Guide Better Health Care: 84th Nestlé Nutrition Institute Workshop, Lausanne, September 2014. Karger Medical and Scientific Publishers.
2. Das, L., Bhaumik, E., Raychaudhuri, U., & Chakraborty, R. 2012. Role of nutraceuticals in human health. Journal of food science and technology, 49(2), 173-183.
3. Elia, M., Ljungqvist, O., Stratton, R.J. and Susan, A. L. (Eds.). 2013. Clinical Nutrition. Wiley, Germany.
4. Gupta, R. C., Lall, R., & Srivastava, A. (Eds.). 2021. Nutraceuticals: efficacy, safety and toxicity. Academic Press.
5. Mahan, L.K. and Escott-Stump, S. 2000. Krause's Food, Nutrition & Diet Therapy. 10th Edition, W.B. Saunders Co., Pennsylvania.
6. Nutrient Requirement for Indians: Recommended Dietary Allowances and Estimated average requirements-2020. National Institute of Nutrition, India (nin.res.in)
7. Raghuvanshi, R.S. and Mittal, M. 2014. Food Nutrition and Diet Therapy. Westvills Publication Delhi.
8. Sobotka, L., & Forbes, A. (Eds.). 2019. Basics in clinical nutrition (Vol. 1, No. 5th). Galen.
9. Wildman, R. E., Wildman, R., & Wallace, T. C. 2016. Handbook of nutraceuticals and functional foods. CRC press.

FN 405	SPORTS NUTRITION	2 (2+0)	SEM VII

Objectives

1. To learn the selection of the right balance of carbohydrates, proteins, and fats to provide energy and build or maintain muscles, designing diet plans, and use of nutritional supplements.
2. Understand the special nutritional requirements for physical activities related to sports and exercise
3. Apply the knowledge to improve the performance of sportspersons

Theory

Introduction, nutritional considerations for sports/ exercising person as compared to normal active person; energy substrate for activities of different intensity and duration, aerobic and anaerobic activities; fluid balance in sports and exercise; importance, symptoms and prevention of dehydration; sports drink, energy enhancers and other commercial sports food products; macro nutrients: carbohydrate as an energy source for sport and exercise, carbohydrate stores, fuel for aerobic and anaerobic metabolism, glycogen re-synthesis, CHO loading, CHO composition for pre exercise, during and recovery period; role of fat as an energy source for sports and exercise, fat stores, regulation of fat metabolism, factors affecting fat oxidation (intensity, duration, training status, CHO feeding), effect of fasting and fat ingestion; protein and amino acid requirements, factors affecting protein turnover, protein requirement and metabolism during endurance exercise, resistance exercise and recovery process; important micronutrients for exercise- B complex vitamin and specific minerals; exercise induced oxidative stress and role of antioxidants; chronic dieting and eating disorder; female athletic triad; sports anaemia; dietary supplements and ergogenic aids (nutritional, pharmacological and physiological), use of nutritional supplements in strength/power sports and team sports: use, effects, efficacy and safety− creatine monohydrate, sodium bicarbonates, nitrates – B alanine, caffeine, protein supplements, fat burners.

Suggested Readings

1. Jeukendrup, A., and Gleeson, M. 2010. Sport nutrition: an introduction to energy production and performance (No. Ed. 2). Human Kinetics.
2. McArdle, W. D., Katch, F. I., and Katch, V. L. 2009. Sports and exercise nutrition. Lippincott Williams & Wilkins.
3. Recommended Dietary Intakes for Indian Sportsman and Women. Satyanarayan, K; Nageshwar, Rao. C, Narsinga Rao, B.S. and Malhotra, M.S. 1985. Hyderabad, National Institute of Nutrition.
4. Banardot, Dan 2000. Nutrition for Serious Athletes. Human Kinetics
5. Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition. Edited by Judy A Driskell, Ira Wolinsky, CRC Press 2000.

FN 406	COMMUNITY NUTRITION AND EDUCATION	3 (2+1)	SEM VII

Objectives

1. To develop awareness of the students about the magnitude of nutritional problems and develop ability to assess the problems and devise nutrition education material for them.
2. To comprehend the importance and determinates of nourishment decision practices and apply standards of network appraisal and nourishment instruction to design the appraisal, execution observing and assessment of a focused in community nutrition intercession.

Theory

Malnutrition: definition and causes, PEM- marasmus, kwashiorkor and vicious cycle of malnutrition; assessment of nutritional status: clinical signs and symptoms, nutritional anthropometry, biochemical tests, biophysical tests and diet survey methods; major nutritional problems prevalent in India and the state of protein energy malnutrition, anaemia, vitamin A deficiency, iodine deficiency disorders, obesity, hypertension, atherosclerosis and diabetes mellitus; role of national programmes in improving nutritional status of the community: Integrated Child Development Service (ICDS), Supplementary Nutrition Program (SNP), Applied Nutrition Program (ANP), Mid-Day Meal Program (MDMP), Vitamin A Prophylaxis Program and Anaemia Prophylaxis Programme and role of national and international agencies in improving nutritional status of the community: Food and Agricultural Organization (FAO), World Health Organization (WHO), United Nations Children's Fund (UNICEF), UNDP, CARE and other Voluntary and Government Agencies; nutrition education-objectives, methods and principles.

Practical

Assessment of nutritional status of an individual/community using anthropometry and dietary survey: preparation of schedule, survey work, analysis of data, writing of report; visit to local health centre to identify clinical signs and symptoms of nutritional problems; identification of adulterants in common foods; visit to an ICDS block; development of audio visual aids: radio script, popular article, chart/posters, leaflets etc.; planning, implementation and evaluation of nutrition education for a target group.

Suggested Readings

1. Sehgal, S. and Raghuvanshi, R.S. 2007. Text Book of Community Nutrition. ICAR, New Delhi.
2. Bamji, S.M., Rao, P.N., and Reddy, V. 2003. Textbook of Human Nutrition. ord and IBH Publishing Co Pvt Ltd.
3. Swaminathan, M. (ed.) 1998. The First Five Years: A Critical Perspective on Early Childhood Care Education in India. Sage Publication. New Delhi.
4. Jelliffe, D.B. 1966. The assessment of the Nutritional stutus of the community, WHO Geneva.
5. Salil, S. and Rita, S.R. 2007. Textbook of community Nutrition ICAR publication, New Delhi.

HUMAN DEVELOPMENT AND FAMILY STUDIES

Course No.	Course Title	Credits	Semester
Core Courses			
HDFS 101	Infancy and Childhood	3 (2+1)	I
HDFS 102	Personality Development	2 (1+1)	I
HDFS 105	Theoretical Approaches to Parenting	2 (2+0)	II
HDFS 201	Early Childhood Education	3 (2+1)	III
HDFS 204	Theories and Practices in Early Childhood Education	2 (2+0)	IV
HDFS 301	Adolescent Development	3 (2+1)	V
HDFS 302	Adulthood and Old Age	2 (1+1)	V
HDFS 303	Marriage and Family Dynamics	3 (2+1)	VI
	Total Credits	**20 (14+6)**	
Skill Enhancement Courses			
Childhood Development and Assessment I			
HDFS 103 (SEC I)	Developmental Assessment-I (Infancy and Toddlerhood)	2 (0+2)	I
HDFS 104 (SEC II)	Developmental Assessment-II (Childhood and Adolescence)	1 (0+1)	I
Childhood Development and Assessment II			
HDFS 106 (SEC III)	Health Practices in Early Childhood	2 (0+2)	II
HDFS 107 (SEC IV)	Infant Stimulation Practices	1 (0+1)	II
Early Childhood Care and Education I			
HDFS 202 (SEC V)	Programme Planning and Execution in ECCE Centers	2 (0+2)	III
HDFS 203 (SEC VI)	Management of ECCE Centers	1 (0+1)	III
Early Childhood Care and Education II			
HDFS 205 (SEC VII)	Establishment of ECCE Centers	2 (0+2)	IV
HDFS 206 (SEC VIII)	Monitoring and Evaluation of ECCE Centers	1 (0+1)	IV
	Total Credits	**12 (0+12)**	
Elective IV: Human Development and Family Studies			
HDFS 401	Developmental Challenges in Children	3 (2+1)	VII
HDFS 402	Methods and Materials for Teaching Young Children	3 (1+2)	VII
HDFS 403	Computer Applications in ECCE	3 (1+2)	VII
HDFS 404	Guidance and Counselling	3 (2+1)	VII
HDFS 405	Parent Education and Community Welfare Programmes	3 (2+1)	VII
	Total Credits	**15 (8+7)**	
	Grand Total	**47 (22+25)**	

HDFS 101	INFANCY AND CHILDHOOD	3 (2+1)	SEM I

Objectives

1. To make students aware about the fundamental as well as overall development of the child from conception to late childhood
2. To understand human development and its significance and theories
3. To create awareness about the process of human growth and development
4. To identify the genetic and environmental influences on human life
5. To study the inter-relatedness of physical, cognitive, social, emotional and motor development

Theory

Human development: concept, stages, domains and its characteristics; growth and development: definition, determinants, principles; concept of heredity and environment; role of heredity and environment on development; perspectives on development: naturalism, environmentalism, maturational, need, ecological, ethological, cognitive, psycho-analytical, social (socio-cultural and social learning), language, behaviour, psycho-social, intelligence and moral reasoning; pre, peri and post natal development: stages, care during pregnancy, labour/ birth; early childhood (birth to eight years): physical, motor, cognitive, moral, social, emotional and language development of infancy, babyhood, preschool and early school years; late childhood (eight to fourteen years): physical, motor, cognitive, moral, social, emotional and language development; guidance to parents for promoting holistic development of children.

Practical

Observational visits to well-baby clinics to observe full term and preterm babies and observe/ record its characteristics**;** visit to early childhood centers**:** study physical, motor, social, emotional, intellectual, language, moral and personality development at different stages and prepare interpretive reports**;** collect and evaluate reports/article/news/other secondary data related to recent issues, trends and challenges of human development and write an analytical report**;** case study of individuals in different stages of development; infancy, early childhood, and late childhood; critical analysis of case study reports; preparation of resource file.

Suggested Readings

1. Bronfenbrenner, V. 1979. The Ecology of Human Development. Cambridge, Harvard Univ. Press.
2. Berk, E. L. 2013. Exploring Life Span Development. 3rd Ed. McGraw Hill, New York.
3. David, M.T., Garavan, L. and Dooley, M. 2012. Fundamentals of Human Resource Development. SAGE Publications Ltd.
4. Hall, Calvin, S. and Lindzey, G. 1978. Theories of Personality. John Wiley and Sons.
5. Harris, J. R. and Liebert, R. M. 1987. The Child. Prentice Hall, Inc.
6. Munsinger, H. 1971. Fundamentals of Child Development. Holt, Reinhart and Winston, Inc.
7. Papalia, D. E. and Olds, S W. 2008. Human Development. 11th Ed. McGraw Hill, New York.

HDFS 102	PERSONALITY DEVELOPMENT	2 (1+1)	SEM I

Objectives

1. To make students realize their potential strengths, cultivate their inter-personal skills and improve employability
2. To make students apply personality assessments to better understand themselves and others.

Theory

Personality: definition, nature and types; theories of personality: Hans Eysenck, Big five personality, Sigmund Freud, Erik Erikson; the humanistic approach: Maslow's self-actualization theory; shaping of personality; determinants of personality; Myers-Briggs typology indicator; locus of control and performance; Type A and Type B Behaviours; personality and organizational behaviour; perception and attributes and factors affecting perception; learning: meaning, definition, theories- B.F. Skinner and Ivan Pavlov, principles of learning, learning and organizational behavior, learning and training, learning feedback; attitude and values; intelligence: types of intelligence: theories of intelligence, measurements of intelligence, factors influencing intelligence, intelligence and organizational behaviour, emotional intelligence; motivation: theories and principles; teamwork and group dynamics.

Practical

Assessment of personality using various scales; learning styles and strategies; motivational needs; interpersonal communication; teamwork and team building; group dynamics; win-win game; conflict management; leadership styles; case studies on personality and organizational behavior.

Suggested readings

1. Allen, B. P. 2016. Personality Theories: Development, Growth, and Diversity. 6th Ed. Routledge.
2. Andrews and Sudhir 1988. How to Succeed at Interviews. 21st (rep.) New Delhi, Tata McGraw-Hill.
3. Berger, K. S. 2020. The developing person through the life span 1th Ed. Worth Publishers.
4. Berk, E. L. 2013. Exploring Life Span Development 3rd Ed. McGraw Hill, New York.
5. Cervone, D. and Pervin, L. A. 2019. Personality: Theory and Research 14th Ed. Wiley.
6. Feist, J., Feist, G. J. and Roberts, T. A. 2021. Theories of Personality. 10th Ed. McGraw-Hill Education.
7. Frankl, V. E. 2006. Man’s Search for Meaning (I. Lasch, Trans.; Beacon Press Ed.). Beacon Press. (Original work published 1946)
8. Heller and Robert 2002. Effective Leadership. Essential Manager Series. Dk Publishing.
9. Hindle and Tim 2003. Reducing Stress. Essential Manager Series. Dk Publishing.
10. Hurlock, E. B. 2001. Child Development. Tata McGraw-Hill Education, India.

11. Lucas and Stephen 2001. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill.
12. Mile, D. J, 2004. Power of Positive Thinking. Delhi. Rohan Book Company.
13. Papalia, D. E. and Olds, S. W. 2008. Human Development 11th Ed. McGraw Hill, New York.
14. Kumar, P. 2005. All about Self- Motivation. New Delhi. Goodwill Publishing House.
15. Santrock, J. 2012. Life Span Development. 14th Ed. McGraw Hill, New York.
16. Shaffer, D. R. 2009. Social and Personality Development. 6th Edition. Belmont, CA: Wadswor
17. Smith, B. 2004. Body Language. Delhi: Rohan Book Company.

HDFS 105	THEORETICAL APPROACHES TO PARENTING	2 (2+0)	SEM II

Objectives

1. To know the parenting roles and practices.
2. To know positive and maladaptive parenting
3. To know the effects of parenting style and practices on child developmental outcomes

Theory

Positive psychology; parenting style; parenting practices and parenting roles; parent-child transactions; influential factor; family orchestrated child experiences; information needs; biological, social and psychological theories: attachment theory approach, behavioristic approach, social learning approach, ecological systems approach, parental role theory approach, disciplinary theory, scaffolding approach (Vygotsky), self-determination approach, family systems theory approach.

Suggested Readings

1. Damon, W., Sigel, I. E. and Renninger, A., 1998. Handbook of Child Psychology, 5th Edition, John Wiley & Sons, Inc., New York.
2. Shonkoff, J. P and Meisels, S. J., 2009. Handbook of Early Childhood Intervention, 2nd Edition, Cambridge University Press, New York.
3. Carbonell, D. M., Reinherz, H. Z., Giaconia, R.M., Stashwicks, C.a., Paradis, A.D. Beardslee, White, J. M and Klien D. M 2008. Family Theories. 3rd Edition, Sage publications.

HDFS 201	EARLY CHILDHOOD EDUCATION	3 (2+1)	SEM III

Objectives

1. To orient the students about significance of ECE for accelerating holistic development of children
2. To enhance knowledge and skills of the students for planning programme and its execution in ECE centers

3. To sensitize students about significance of inclusive ECCE and also about involving parents and community in ECE programme

Theory

Early childhood education: history, meaning, characteristics and significance; national ECCE policy 2020; application of Western and Indian educational philosophies to early childhood education; recent trends and challenges in early childhood education; concept of learning- definition, essential features, key concepts (sensations, perception, imagination, attention and memory, remembering and forgetting, intelligence-reasoning and thinking, effortful control, problem solving, information processing and learning environment); motivation: definition, types, modes of motivation, relationship of motivation with learning and performance; performance evaluation: meaning of evaluation/testing, evaluation of student's performance; types of tests used in classroom evaluation; programme planning in ECE: steps, types and principles; play: theories, stages and importance; significance of play way method in ECE, activities to promote all round development of children in early childhood: cognitive, language, socio-emotional and motor development; role, qualities and responsibilities of an early childhood personnel, maintenance of registers and records; promotion of inclusive ECCE; involvement of parents and community in ECCE; guidance to parents on activities to promote child's learning/ early identification of learning problems.

Practical

Observation and recording of activities in ECE center; analyzing effect of reinforcement, motivation, discipline on learning; developing and conducting activities to promote all round development: gross and fine motor skills, cognitive skills, language skills, creativity and socio emotional skills; preparation of suitable creative/innovative teaching learning material used for preschool children; application of theories of classroom teaching; application of different methods of evaluating performance and interpretation.

Suggested Readings

1. Snow, C. E. and Hemel, S. B. V. 2008. Early Childhood Assessment: Why, What, and How by the National Research Council. The National Academies Press,
2. Early Childhood Care and Education (ECCE): Foundations of Learning NEP, 2020. Department of Elementary Education, NCERT, New Delhi
3. Early Childhood Care and Education, Senior Secondary Course, 376, National Institute of Open Schooling ISO9001: 2000 Certified (An autonomous organisation under MHRD, Govt. of India) A-24-25, Institutional Area, Sector-62, NOIDA-201309 (U.P.)
4. Website: www.nios.ac.in, Toll Free No: 18001809393
5. Eliason, C. and Jenkins, L. 1990. A Practicum Guide to Early Childhood Curriculum. 4th Edition, London: Merrill Publishing Company.

6. Grewal, J. C. 2000. Methods and Materials of Nursery Education, 4th edition revised, Delhi: Doaba House, Book Sellers & Publishers
7. Grewal, J. S. 1984. Early Childhood Education, Foundations & Practice, Agra: National Psychological Corporation, Modern Printers.
8. Human Development and Family studies, Unit III, NCERT, New Delhi,
9. http://ncert.nic.in/textbook/pdf/lehe107.pdf
10. Kostelnik, M. J., Soderman, A. K., and Whiren, A. P. 2007. Developmentally Appropriate Curriculum, Best Practces in Early Childhood Education, 4th Edition, 13-29. New Jersy: PEARSON, Merrill Printice Hall.
12. Mohanty, J., and Mohanty, B. 2000. Early Childhood Care and Education, New Delhi: Deepand Deep Publications Pvt. Ltd.
13. National Early Childhood Care and Education (ECCE) 2019. Curriculum framework, Ministry of Women and Child Development, The Preschool Curriculum, NCERT
15. UG Courses- Home Science - e-Krishi Shiksha, Early Childhood Development & Education
16. http://ecoursesonline.iasri.res.in/course/index.php?categoryid=100 1
17. UG Courses- Home Science - e-Krishi Shiksha, Organization and Management of ECCD
18. Programmes, http://ecoursesonline.iasri.res.in/course/index.php?categoryid=100
19. Sinclair, H. 2004. Standards for Early Childhood Programmes in Centre based Child Care. Govt. of New Found Land and Labrador. Dept. of Health and Community Services.

HDFS 204	THEORIES AND PRACTICES IN EARLY CHILDHOOD EDUCATION	2 (2+0)	SEM IV

Objectives

1. To understand the various theories of Early Childhood Education
2. To learn scientific practices in Early Childhood Education

Theory

Importance of theoretical perspectives in early childhood care and education; early childhood education practices: play– based, Montessori, Waldorf, Reggio- Emilia, religious schools, high scope, direct instruction, bank street approach; attachment theory of Bowlby and Ainsworth; ecological systems theory of Bronfenbrenner; theories of learning: classical conditioning, operant conditioning of Skinner, trial and error learning by Thorndike; social learning theory of Bandura; cognitive theory of Maria Montessori; cognitive development theory Jean Piaget; socio- cultural theory of Lev Vygotsky; multiple intelligences theory of Howard Gardner; Erickson's psychosocial development theory; disciplining children theories; parenting styles; Hoffman's disciplinary techniques; application of theories in classroom; challenging aspects of practice of theories in early childhood care and education.

Suggested Readings

1. Soni, R. 2015. Theme Based Early Childhood Care and Education Programme– A Resource Book. NCERT, New Delhi.
2. Wiltshire, M. 2010. Understanding the High Scope Approach, Early Years Education in Practice. Taylorand Francis.
3. Deiner, P. L. 2006. Inclusive Early Childhood Education. Cengage Learning Press.
4. Roopnarian, J. I. and James, E. J. 2008. Approaches to Early Childhood Education. Pearson Education, Atlantic.
5. Kaul, V. 1997. Early Childhood Education Programmes. NCERT, Delhi.

HDFS 301	ADOLESCENT DEVELOPMENT	3 (2+1)	SEM V

Objectives

1. To understand the ways in which physical, cognitive, social, emotional, and personality development interact in development of adolescent
2. To educate about the contemporary issues in adolescent development, challenges and issues

Theory

Adolescence and development: meaning, significance, characteristics and developmental tasks, significance of the stage; theoretical perspectives on adolescence: biological, psycho analytical, psycho-social, social, cognitive and cultural, lifespan perspective, learning perspective, humanistic perspective, ecological perspective, socio cultural perspective, and the positive youth development perspective; physical and sexual development in adolescence: physical transition from child to adult, puberty causes and changes, psychological impact of puberty, early and late maturation and its psychological implications, body image and its psychological implications; cognition during adolescence: theoretical perspectives on adolescent cognitive development, gender differences in mental abilities; socio-emotional development during adolescence: transition in emotions, heightened emotionality, common emotional patterns, coping mechanism, maturity and adjustment, early and late maturation and its psychological implications, socialization difficulties in social transition, social attitudes and behavior, influence of peers, conformity and self-assertiveness; identity development: Erikson's identity formation theory, Marcia’s statuses identity, identity diffusion, identity foreclosure, identity moratorium, self-concept; moral development during adolescence and value orientation; theoretical perspectives: mental health and resilience; life skills and their importance; challenges of adolescence sexuality, aggression, delinquency, understanding of AIDS, substance abuse, alcoholism, personality disorders, depression, suicide, eating disorders, health problems, psychological problems, social problems; dating and relationships; guidance and counseling for adolescents: need and importance; changing roles in family and society.

Practical

Survey on adolescent problems and conflicts, attitude towards sexuality/substance abuse; profile of behavioural problems through case study, gender issues of adolescence; adolescents future planning and orientation study through interviews; tests related to skills and abilities of adolescence: adolescence girl's empowerment scale, differential aptitude test, behaviour problem checklist (CBCL), problem solving ability test (PSAT), guidance need inventory, life style scale, anecdotal records.

Suggested Readings

1. Conger, J.J. 1977. Adolescence and Youth: Psychological Development in a Changing World. Harper and Row, New York
2. Berk, L.E. and Meyers, A.B. 2010. Infants, Children, and Adolescents. 7th Ed. Prentice Hall, PTR
3. Dandekar, K. 1996. The Elderly in India. Sage Publications, New Delhi.
4. Hayslip, B. and Panek, P. 1989. Adult Development and Aging. Harper & Row.
5. Newman, B. M and Newman, P. R. 2003. Development Through Life: A Psycho Social Approach. Cenhahe Learning Boston
6. Hazen, E. P., Goldstein, M. A., Goldstein, M. C. 2011. Mental Health Disorders in Adolescents: A Guide for Parents, Teachers, and Professionals. Rutgers University Press: New Brunswick, NJ.

HDFS 302	ADULTHOOD AND OLD AGE	2 (1+1)	SEM V

Objectives

1. To acquaint students regarding the developmental areas of adults and its theoretical orientation
2. To develop understanding of changes and adjustments in adulthood and old age

Theory

Emerging adulthood: importance, stages, characteristics and conflicts; adulthood: meaning, characteristics, stages and developmental tasks, principles of adult development and aging; theoretical and ecological perspectives of adult development: psychosocial theory, peck elaboration of Erickson, Levinson's theory, Sheehy's adult transition, Erikson's psychosocial theory, identity process theory, activity theory, socio-emotional selectivity theory; theoretical perspectives in adult development: bio-psychosocial perspective, ecological perspective, life course perspective, Klaus Riegel's dimensions of development theory; antecedent influences for growth and development during adulthood: physical, motor , social-emotional, cognitive personality, language characteristics of early, middle and late adulthood development, happiness and satisfaction, life style choices, marriage and family transitions , career, theories of career choice, job satisfaction; adjustments during adulthood: menopausal adjustments, empty nest, career changes, retirement, leisure; health during adulthood and prevention of chronic diseases, physical and neuro cognitive disorders; old age:

demography; theories of biological aging, care during old age; antecedent influences for developmental changes during old age; adjustment to death, widowhood; dying and bereavement; counseling for adults and the aged: need and importance.

Practical

Administering of adulthood scales on personality; preparation of interview schedule for adults on life satisfaction; interviews on career satisfaction; interviews on dual role burden for women; case study on health condition; FGDs on ageing problems; content analysis of films, books on adulthood conflicts and resolutions; visits to institution of aged and their evaluation, record writing and presentation.

Suggested Readings

1. Dacey, J. S. and Travers, J. F. 2002. Human Development- Across the Lifespan. McGraw Hill, Boston.
2. Dandekar, K. 1996. The Elderly in India. Sage Publications, New Delhi.
3. Hayslip, B. and Panek, P. 1989. Adult Development and Aging. Harper & Row.
4. Hurlock, E. B. 2003. Developmental Psychology- A Life Span Approach. Tata McGraw Hill, New Delhi.
5. Kail, R. V. and Cavanaugh, J. C. 2004. Human Development- A Life-Span View. Thomson-Wadsworth, United States.

HDFS 303	MARRIAGE AND FAMILY DYNAMICS	3 (2+1)	SEM VI

Objectives

1. To provide the knowledge about the dynamics of Contemporary marriage and family system in India
2. To understand Family stress and crisis
3. To empower the students by providing them knowledge about the laws and Acts related to marriage and Family life
4. To develop an understanding about the need and importance of family life education, sex education and family planning
5. To prepare the students to work as Marriage and Family Counselor

Theory

Marriage: definition, philosophy, past and present concept of Hindu marriage, goals and functions of marriage, characteristic features of Hindu, Muslim and Christian marriage; types and forms of marriage in India (ancient and prevalent forms); readiness for marriage: definition, meaning, importance, areas of readiness for marriage; identifying characteristics of readiness for marriage; mate selection; meaning of mate selection; model/method of mate selection - field of mate selection, ways of mate selection in tribal India, factors responsible for wrong mate selection, guidelines for mate selection, factors influencing mate selection and desirable qualities in mate, trends in mate selection; newspaper ads for marriages; online matrimonial sites: their use and problems and prospects; dating, courtship and engagement; meaning and objectives, importance of engagement; wedding: definition

meaning and purpose of wedding ceremonies rituals and ceremonies of marriage in different religions of India; marital roles and behavior: definition; importance and concept of marital roles (marriage as status and role transition) changing gender roles: factors responsible for change in gender roles, role conflict; marital adjustment and success: definition, areas, types of marital relations and adjustment, factors influencing marital adjustment, marital adjustment over the family life cycle, obstacles in marital adjustment, improving marital adjustment, marital adjustment techniques, general technique of resolving differences; marital success and criteria of marital success; marital dissolution: definition, types of marital dissolution, voluntary and involuntary, causes of marital dissolution, separation distress and factors effecting it; divorce: factors responsible for divorce, consequences of divorce on spouse and children, factors responsible for an increase in the rate of marital dissolution, factors responsible for refraining from divorce after marriage failure, social process of marital failure and divorce, children's response to divorce, children as weapon against divorce; adjustment to divorce: alternatives to marriage, **s**inglehood, heterosexual cohabitation/consensual union, homosexual union, reasons behind it and merits and demerits.

Family: meaning, definition and characteristics of family functions; forms/types of family; family structure and relationship in India; pattern of changes in family structure and relationships in India; impact of globalization, industrialization, technological advancement and immigration on family structure and functions; family (education and employment of women) and extra familial factors (technology, peer group, society) responsible for the change and consequences of these changes on the family life and society; family life cycle: definition, stages of family life cycle, importance of studying family life cycle; developmental tasks: developmental tasks of stages of family life cycle; role expectation of different family members at different stages of family life cycle; forms of families: typical and alternative forms of families, characteristics of single parent families, female headed families, single child families, childless families, adoptive families, dual earner families, reasons behind alternative form of family and their merits and demerits; family **s**tress: definition, types/categories of stressors, variables affecting family/response to stress, Hill's ABCX mode/theory of family stress, causes of family stress, effects/impact of family stress, manifestations/recognizing symptoms of family stress, stress coping strategies, correlates of family stress, family crisis: definition, characteristics, stages of crisis, effect of crisis and adjustment to crisis factors which affect meeting the crisis, general things to do in times of crisis, marriage laws and acts: dowry, adoption, divorce and inheritance in India; education for parenthood and family planning, family life education: concept, definition; objectives of family life education, role of family and related agencies in family life education; family planning: meaning, objectives, importance and methods; family counseling: objectives and importance, fundamentals of premarital, marital and family counseling.

Practical

Study of motives of marriage and trends in mate selection; study of characteristics of nuclear, joint, atypical and alternative forms of families; study of marital roles and

adjustments; study of changing roles and relationship in marriage and family system across family life cycle; study of family crisis and coping strategies in families; visit to marriage bureau and family counseling centers; interviewing, assessment and developing case studies on people undergoing premarital, marital and family stress; reviews of books and films on marital relationships, conflicts and coping.

Suggested Readings

1. Adams, B. N. 1980. The family: A Sociological Interpretation. Chicago: Rand McNally College Publishing Company.
2. Ahuja, R. 2005. Indian social system. New Delhi: Rawat publication.
3. Atkinson, B. J. 2005. Emotional Intelligence in Couple Therapy. NY Norton
4. Benokraitis, V. N. 2014. Marriage and families. Delhi: Pearson Publication.
5. Brownman, A. H. 1970. Marriage for Mordens.MacGaw-Hills Inc..U.S.A
6. Gottman, J, M. 2004 (Ed). The Marriage Clinic Casebook N.Y.: Norton (0-609-60809-0)
7. Gottman, J. M. (1999). The Marriage Clinic: A scientifically based marital therapy. N.Y.: Norton
8. Gottman, J, M. and DeClair, J. 2001. The Relationship Cure. N.Y. Crown (0-609-60809-6)
9. Gupta, G. R. 2001. Family and Social Change in Morden India,Oxford University Press Kolkata India.
10. Gurman, A. S. and Jacobson N. S. 2002 (Eds.). Clinical Handbook of Couple Therapy, Third Edition, Newyork Guilford Sixth Dean Draft Report 98
11. Gurman, A. S. and Jacobson N. S. 2002 (Eds.). Clinical Handbook of Couple Therapy, Third Edition, Newyork Guilford
12. Kapadia, K. M. 1966. Marriage and Family in India. Kolkata: Oxford University Press.
13. Kumar, R. 2000. Violence against women. New Delhi: Anmol Publication Pvt. Limited.
14. Kurigan, G. 1974. A Family in India A Religious View the Huge Mountain
15. Landis J. T. and Landis, M. G. 1966. Building A Successful Marriage Printice Hall, Inc Engelwood Cliff, New jersey

SKILL ENHANCEMENT COURSES

HDFS 103 (SEC I)	**DEVELOPMENTAL ASSESSMENT I (INFANCY AND TODDLERHOOD)**	**2 (0+2)**	**SEM I**

Objectives

1. To learn about the various standard tools & techniques for assessing development of Infants and toddlers
2. To learn to administer the standard tools to assess the development of new born, infants and toddlers

3. To learn about the ethical issues in assessing children on various areas of development
4. To create awareness about challenges in developmental assessment of young children

Practical

Orientation on screening and developmental assessment of children for various developments through different tools and techniques: exploring existing areas, purpose of use of tests and techniques and classification; criteria for selection and use of test reliability and validity and wide acceptability; approaches and tools in developmental screening; trends and challenges in developmental assessment of young children; advantages and abuses of testing and tests; orientation on formal and informal measures in assessment; special considerations and ethical issues in assessing various areas of developments of new born, infants, toddlers; conducting tests and report writing for each test neonatal assessment: APGAR and gestational age, neonatal behavioral assessment scale (NBAS); infant and toddlerhood assessment: anthropometric measurements and national and international standards, developmental screening test- Bayley's scale of infant, Pramila Pathak's mental and motor growth of Indian babies, Vineland social maturity scale.

Suggested Readings

1. Anastasi, A. 1997. Psychological Testing.7th Ed. Pearson publishers
2. Losardo, A. 2011. Alternative approaches to assessing young children. 2nd Ed. Brooker publishing
3. Minds, L. 2014. Assessing young children. 5thed. Pearson publication.
4. Manuals of the Respective Tests Development (BSID)/latest version, Pramila Pathak's Mental and Motor Growth of Indian babies, Vineland social Maturity scale

HDFS 104 (SEC II)	DEVELOPMENTAL ASSESSMENT II (CHILDHOOD AND ADOLESCENCE)	1 (0+1)	SEM I

Objectives

1. To learn about the various standard tools & techniques for assessing development of children
2. To learn to administer the standard tools to assess the development of children
3. To learn about the ethical issues in assessing children on various areas of development
4. To create awareness about challenges in developmental assessment of children

Practical

Special considerations and ethical issues in assessing various areas of developments of pre-schoolers, pre-primary school children, primary school children, middle school children and secondary/higher secondary school children; conducting tests and report writing for each test: screening and assessment of preschool and pre-primary school children- Stanford Binet intelligence scale, Wechsler scale of intelligence for preschool

and primary school children, Vineland adaptive behavior scale, DAS II, Pea body picture vocabulary test or similar test; ecological assessment of preschool and pre-primary school children: HOME Inventory; screening and assessment of primary school children: parent child relationship scale (latest test), Wechsler intelligence scale for children, learning disability tests- diagnostic test of reading disorder; screening and assessment of middle school children- children's self-concept scale, anxiety scale, Thematic Apperception Test (TAT), Children's Apperception Test (CAT), general well-being scale; screening and assessment of secondary /higher secondary school children: emotional intelligence scale- /emotional maturity scale; case studies; presentation of reports; counselling parents on developmental deviations observed.

Suggested Readings

1. Anastasi, A. 1997. Psychological testing.7th Ed. Pearson publishers
2. Losardo, A. 2011. Alternative approaches to assessing young children. 2nd Ed. Brooker publishing
3. Minds, L. 2014. Assessing young children. 5th Ed. Pearson publication.
4. Manuals of the respective tests.

HDFS 106 (SEC III)	HEALTH PRACTICES IN EARLY CHILDHOOD	2 (0+2)	SEM II

Objectives

1. To learn about the importance of health and factors affecting health
2. To promote health and hygiene in children
3. To reduce and prevent the incidence of underdevelopment and diseases in young children

Practical

Importance of child's health; factors affecting child health; important child health indicators: NMR, IMR, CMR (under 5 years); heath care practices during neonatal stage, infancy and childhood period; nutrition and health; heath assessment techniques in children; ECE centres and child's health; integration of heath care with educational and social services; identification of common health problems in children; planning and organizing parent/community health education program; review of health programs and policy, digital addiction and child health; eating disorders and child health; health care practices in rural/urban/tribal families; case study of preschool child; studying health care practices in children; report writing and presentation; recommendation to parents/caregivers/health care professionals and ECE educators.

Suggested Readings

1. Santrock, J. W. 2011. Life span Development. 12th Ed. Mc Graw Hill Education, India.
2. Hurlock, E. B. 1978. Child Development. 6th Ed. Tata Mc graw hill education, India.
3. Dutt. S. Understanding children. Anmol Publications pvt.ltd.

4. Nandha, V. K. 2002. Priniciples of Child Development. Anmol publications. Pvt. ltd.
5. Mazar, J.E. 2017. Learning and Behaviour. 8th Ed. Rantiledge publications.
6. Papalia, D. E., Olds, S.W. and Feldman, R. D. 2004. Human Development. 9th Ed. Mc Graw Hill Education, India.
7. National Center on Health, Behavioral Health, and Safety 888-227-5125 health @ ecetta.info Page 25 of 25.
8. Charles Nechtem Associates. 202.1 EAP: 800-531-0200.
9. https://childcareta.acf.hhs.gov
10. https://www.who.int/health-Topic/child-health.
11. www.ruralhealthinfo.org/toolkits/child-health/1/overview.
12. www.ashaweb.org/wp-content/uploads/2014/08/Childhood-Obesity-Prevention-Strategies-for-RuralCommunities.pdf.

HDFS 107 (SEC IV)	INFANT STIMULATION PRACTICES	1 (0+1)	SEM II

Objectives

1. To understand the need for providing stimulation to infants
2. To learn the skills of providing stimulation

Practical

Stimulation for growth and development of neonate: sensation and perception, newborns at risk-preterm, low birth weight, respiratory distress syndrome; stimulation for physical development during toddlerhood: muscle control, motor skills; stimulatory learning environments at home and early childhood child care and education centers; current and conventional practices of stimulatory learning; innovative ideas for planning and execution of customized programs/activities for infants.

Suggested Readings

1. Kail, R. V. and Cavaraugh, J. C. 2004. Human Development- A Life Span View.
2. Santrock, J. W. 2006. Life Span Development. McGraw Hill.
3. Santrock, J. 2014. Lifespan Development. Mc.Graw Hill
4. Steinberg, L., Bornstein, M. H., Vandell, D. L., and Rook, K. S. 2011. Lifespan Development. USA: Wadsworth.
5. Boyd, D. and Bee, H. 2011. Lifespan Development. Pearson.

HDFS 202 (SEC V)	PROGRAMME PLANNING AND EXECUTION IN ECCE CENTERS	2 (0+2)	SEM III

Objectives

1. To gain practical experience of the planning of all aspects of different early childhood care and education centers

2. To develop skills for understanding developmental needs of young children belonging to early childhood years
3. To develop skills for planning and management of early childhood care and education programmes
4. To provide practical experience in operating an early childhood education centre in urban and rural areas

Practical

Understanding principles of programme planning: planning long and short term programme for various early childhood care and education centers, issues and goals of curriculum planning, principles of effective programme planning; importance of developmentally appropriate planning: observing and recording developmental characteristics of children in various early childhood care and education settings; preparing developmentally appropriate activities for: physical development, fine and large muscle coordination, cognitive stimulation, creative expression, language development, socio emotional interaction, pre reading and pre writing, foundations for numeracy, environmental awareness, science experiences, body movements, developing self-care, care of surroundings, effective use of material, mapping of material; developing classroom teaching learning accessories: activities for parent and community involvement, execution of all activities through practice teaching different age groups of children; conducting activities with parents and community; submitting records of observation of children's activities, parent and community activities.

Suggested Readings

1. Brophy, J. E., Good, T. I. and Nedler, S. E. 1975. Teaching in the Preschool. Harper Row publisher, New York
2. Day, B.1983. Early Childhood Education: Creative learning activities Macmilla Publishing Co., Inc. New York
3. Frost J. and Lan Kissinger J. B. 1976. The Young Child and the Educative Process. Holt, Rinechort and Winston, New York
4. Grewal, J. S. 1984. Early Childhood Education: Foundations and Practice. National Psychological Corporation, Agra.
5. Leeper, S. H, Skipper, D. S and Witherspoon, R. L. 1979. Good schools for young children Macmillan Publishing Co., Inc. New York.
6. Morrison, G.S. 1998. Early Childhood Education Today. 7th Edition, Merril, an imprint of Prentice Hall, Upper Saddle River, New Jersey Columbus, Ohio.
7. Robert, V. and Kail 2019. Children and their Development. Pearson India Education Services Pvt. Ltd, Uttar Pradesh, India.
8. Aparajita and Chowhary, R. 2016. Development Care and Education of Pre-School Children Discovery Publishing House, New Delhi
9. Swaminath, M. and Daniel, P. 2019. Play Activities for Child development. National Book Trust, India
10. Sararwathi, T.S., Menon, S. and Madan, A. 2021. Childhood in India. Routledge Toylr & Francis Group New York
11. Green, C. 2000. Beyond Toddlerdom, Vermilion Landon
12. Johnsons, 2004. Your Baby & Toddler DK & Penguin Company, London

HDFS 203 (SEC VI)	MANAGEMENT OF ECCE CENTERS	1 (0+1)	SEM III

Objectives

1. To gain practical experience in monitoring the different early childhood care and education centres
2. To develop skills for management of early childhood care and education programmes
3. To provide practical experience in monitoring an early childhood education centre in urban and rural areas

Practical

Principles of management; theories of management: benefits of using management theories, the seven theories- scientific management theory, principles of administrative management theory, bureaucratic management theory, human relations theory, systems management theory, contingency management theory and theory of X (authoritarian) and Y (participative); motivation: Maslow's theory, McClleland theory, McGregor's Theory X and Theory Y, Herzberg's two-factor theory, goal setting- Locke and Latham goal setting principles, essential elements in goal setting; framing administrative policies for ECCE center: elements in administrative policies, conducting mock interviews for selection of various staff members, and framing criteria for their selection, budget provisions for various ECCE centres- short term and long budget term planning, cost of operation, expenditure on equipment, salaries and other benefits to staff, maintenance of daily, weekly and monthly accounts, preparing a plan to meet emergencies.

Suggested Readings

1. Brophy, J. E., Good, T. I. and Nedler, S. E. 1975. Teaching in the Preschool. Harper Row publisher, New York
2. Day, B. 1983. Early Childhood Education: Creative Learning Activities Macmillan Publishing Co., Inc. New York.
3. Evans, B. E., Shurb, B. and Weinsten, M. 1971. Day care. Beacon Press, New York.
4. Frost J. and Kissinger, J. B. 1976. The Young Child and the Educative Process. Holt, Rinechort and Winston, New York
5. Grewal, J. S. 1984. Early Childhood Education: Foundations and Practice. National Psychological Corporation, Agra.
6. Leeper, S. H, Skipper, D. S and Witherspoon, R. L. 1979. Good Schools for Young Children. Macmillan Publishing Co., Inc. New York. Sixth Dean Draft Report 81
7. Morrison, G. S. 1998. Early Childhood Education today. 7th edition, Merril, an imprint of Prentice Hall, Upper Saddle River, New Jersey Columbus, Ohio.
8. Murlidharan, R. and Banerji, V. 1991. A Guide for Nursery School Teachers, National Council of Educational Research and Training, New Delhi.
9. Mohanty, J. and Mohanty, B. 2007. Early childhood care and education. Deep and Deep publications Pvt. Ltd., New Delhi.

10. Sinha, A. 2005. Manual of Early Childhood Education, Print Palace, Agra.
11. Taraporevala, R. and Chhugani, N. 2002. Early Childhood Years- Handbook for parents and teachers. English Edition Publishers, Mumbai.
12. Kuppuswamy, B. 1990. Child Behaviour and Development. Konark Publishers Pvt. Ltd. New Delhi.
13. Singh, B. 1997. Preschool Education. APH publishing Corporation, New Delhi.
14. Swaminathan, M. 1991. Play Activities for Young Children, P.S. press Service, Pvt. Ltd, New delhi.
15. Seefeldt, C. and Barbour, N. 1994. Early Childhood Education – An introduction Maxwell Macmillion, Canada.

HDFS 205 (SEC VII)	ESTABLISHMENT OF ECCE CENTERS	2 (0+2)	SEM IV

Objectives

1. To gain practical experience in establishing different early childhood care and education centres
2. To learn about registration of ECCE centres

Practical

Project planning: concept, need, characteristics and functions; ethical considerations in project planning; types of child care and education programmes; objectives and services of different programmes; need assessment: method and significance of need assessment; funding agencies; budget planning and accounts: short term and long term budget planning; staffing and supervision; legal and regulatory processes at national and international level; registration and licensing; infrastructure development: location, indoor and outdoor space requirements; setting up the physical environment and facilities; physical facilities ECCE centers: basic requirements, class room arrangements, care facilities, facilities for different budgets; format for submission of proposal for physical facilities; setting the learning environment; classroom arrangements; equipment procurements; short term and long term programme planning and evaluation; preparing a project proposal; need assessment in different settings for various programmes; selection of locale and clientele; layout planning for different programmes in rural and urban settings; manpower, finance, infrastructure facilities and cost benefit analysis as input sources; visit to various funding agencies like banks, cooperatives and other agencies and reporting about schemes and facilities offered by these agencies; exploring current government programmes to support self-employment under various schemes; report writing.

Suggested Readings

1. Evans B.E., Shurb B and Weinsten M. 1971. Day Care. Beacon Press, New York.
2. Mohanty J and Mohanty B. 2000. Early Childhood Care and Education, Deep and Deep Publications Pvt. Ltd., New Delhi
3. Murlidharan R and Banerji V. 1969. A Guide for Nursery School Teachers, National Council of Education Research and Training, New Delhi.

4. Dockett, S., Arthur, L., Farmer, S., Beecher, B. and Death, E. 2017. Programming and Planning in Early Childhood Settings, Cengage Australia.
5. Roopnarine, J. and Johnson, J.E. 2015. Approaches to Early Childhood Education, 5th Edition, Pearson India.
6. NAEYC (National Association for the Education of Young Children). 2022. Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth Through Age 8. 4th Ed. Washington, DC: NAEYC.

HDFS 206 (SEC VIII)	MONITORING AND EVALUATION OF ECCE CENTERS	1 (0+1)	SEM IV

Objectives

1. To learn to monitor the ECCE programme
2. To learn about the regulations of standards for Quality of ECCE centre

Practical

Concept of quality and minimum regulations in early childhood education; important factors to consider in quality; four dimensions in quality assessment: the society, the child, the teacher and the learning context; concept of evaluation and monitoring: definition, monitoring and evaluation of budget distribution for ECCE activities, monitoring admissions of children, monitoring and evaluation of lesson plans, monitoring and evaluation of classroom practices, monitoring and evaluation of children's assessment, monitoring and evaluation of staff supervision and performance; characteristics of ideal child care supervisors and teachers, their qualifications and training; monitoring and evaluation of adult and child spaces and their arrangements and utilization; monitoring and evaluation of service activities such as cleanliness, feeding, health care; monitoring, use and evaluation of teaching-learning equipment and material; monitoring and evaluation of record keeping; national and international organizations working for ECCE.

Suggested Readings

1. Mohanty, J. and Mohanty, B. 2000. Early Childhood Care and Education, Deep and Deep Publications Pvt. Ltd., New Delhi
2. Murlidharan, R. and Banerji, V. 1969. A Guide for Nursery School Teachers, National Council of Education Research and Training, New Delhi.
3. Dockett, S., Arthur, L., Farmer, S., Beecher B. and Death, E. 2017. Programming and Planning in Early Childhood Settings, Cengage Australia.
4. Roopnarine, J. and Johnson, J. E. 2015. Approaches to Early Childhood Education, 5th Edition, Pearson India.
5. NAEYC (National Association for the Education of Young Children). 2022. Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth Through Age 8. 4th Ed. Washington, DC: NAEYC.

ELECTIVE IV: HUMAN DEVELOPMENT AND FAMILY STUDIES

HDFS 401	DEVELOPMENTAL CHALLENGES IN CHILDREN	3 (2+1)	SEM VII

Objectives

1. To identify children with developmental challenges through early screening and assessment
2. To raise public awareness and foster positive attitudes towards individuals with developmental challenges
3. To promote inclusive education by creating awareness about the benefits of mainstreaming
4. To educate families, caregivers, and educators about the rights of children with developmental challenges
5. To provide knowledge and training on effective intervention strategies and available welfare services

Theory

Developmental challenges: definition, classification and types; identification of 'At Risk' children; special needs and special education: definition, terminologies, history, current trends and issues in special education, need and objectives, NEP/NPE (2020), the programme of action relating to special education, Legislation and litigations of special education; labelling: definition and its effects; mainstreaming: definition, models of mainstreaming, problems in implementing mainstreaming, effect of mainstreaming on children with special needs; intellectual disabilities: definition, classification, identification, diagnosis, prevalence, causes and measurement/ assessment of intellectually challenged, their psychological and behavioral characteristics and educational considerations for intellectually challenged children, instructional methodology, managing child in school; learning disabilities: definition, types, prevalence, causes and measurement of LD, psychological and behavioural characteristics of LD children, educational considerations for LD children, managing child in school; communication disorders: definition, speech production, speech disorders, language disorders, multiple disorders (disorders associated with cerebral palsy, hearing impairment, cleft palate or cleft lip, MR, ED and LD), prevalence, causes of CD, identification, psychological and behavioural characteristics of CD children, educational considerations for CD children, managing child in school; auditory impairment: definition, anatomy and physiology of ear, classification, prevalence, causes, measurement of AI children, psychological and behavioural characteristics of AI children, educational considerations for AI children, managing child in school; visual impairment : anatomy and physiology of eye, definition, classification, prevalence, identification, causes and measurement of VI children, psychological and behavioural characteristics of VI children, educational considerations for VI children, aids and equipment, managing child in school; physically challenged: definition, classification, prevalence, musculoskeletal conditions, congenital malformations, accidents, diseases and other conditions, psychological and behavioural characteristics of PC children, educational

considerations for PC children, managing child in school; neurological impairments: convulsive disorder- causes, types, diagnosis, treatment, characteristics, managing child in school, cerebral palsy- definition, types, causes, diagnosis, treatment and managerial provisions, educational provisions for the children with cerebral palsy, autism- definition, diagnosis and identification, assessment, causes, characteristics; emotional disorders: definition, classification, prevalence, causes and identification of ED, psychological and behavioural characteristics of ED children, educational considerations for ED children, managing child in school; giftedness: definition, prevalence, origins of giftedness, screening and identification of giftedness, psychological and behavioural characteristics of gifted children, attitudes towards gifted children, educational considerations for gifted children, managing child in school; rights and provisions for children with special needs in India; constitutional provisions and protection for differently abled children in India; general provisions for persons with developmental challenges; intervention: concept, methods, steps and process, intervention strategies for children with special needs, role of professionals, need and importance of family centered intervention- family counseling for children with special needs.

Practical

Observational visits to institutes/case studies of children with special needs; identification of children with special needs in the local community; developing educational material on identification of children with special needs; organizing educational programmes for families of children with special needs; planning, recreational and vocational activities for children with special needs; presentation of case study reports.

Suggested Readings

1. Achenbach, T.M. 1982. Developmental Psychopathology. 2nd Ed. John Wiley, New York.
2. Berdine, W.H. and Blackhurst, A.E. 1985. An Introduction to Special Education. 2nd Ed. Harper Collins, Lexington.
3. Hallahan, D.P. and Kauffman, J. M. 1991. Introduction to Exceptional Children. 5th Ed. Allyn and Bacon, Boston.
4. Hegarty, S. 2002. Education and Children with Special Need. Sage publication. New Delhi.
5. Kar, C. 2008. Exceptional Children: Their Psychology and Education. Sterling Publishers Pvt. Ltd. New Delhi.
6. Loring, J. and Burn, G. (Eds.). 1978. Integration of handicapped children in society. Routledge and Kegan Paul, London.
7. Prasad, J. and Prakash, R. 1996. Education of Handicapped Children, Problems and Solution. Kanishka publication distribution. New Delhi.
8. Philip, M. and Duckworth, D. 1985. Children with Disabilities and their Families: A Review of Research. Berks: NFER-NELSON Publishing Co., Windsor.
9. Rozario, J. and Karanth, P. 2003. Learning Disability in India. Sage publication. New Delhi.

10. Singh, A. N. 2003. Enabling the Differently able: Concepts, Education and Community. Sipra publications, Delhi.
11. Taylor, R.L. and Sternberg, L. Exceptional children: Integrating research and teaching. Springer Study Edition, Springer- Verlag. New York.
12. Tinberger, N. and Tinberger, E.A. 1983. Autistic children: New hope for a cure. Allen and Unwin, London.
13. Werner, D. 1994. Disabled Village Children (Indian edition). Voluntary Health Association of India, New Delhi.

HDFS 402	METHODS AND MATERIALS FOR TEACHING YOUNG CHILDREN	3 (1+2)	SEM VII

Objectives

1. Identification of use of different creative materials
2. Exploring different methods for use in the classroom
3. Hands on practice of use of methods and materials
4. Developing resource files on methods and materials for regular use in classrooms

Theory

Orientation on different methods and materials used for teaching young children; children's literature: definition, importance and different kinds of literature appropriate for young children; story telling: definition, types and different techniques for effective storytelling; teacher led story telling methods; children led story telling methods: role play, singing, using masks; creativity: definition, types, characteristics of creative children; art & craft activities: painting, drawing, paper craft, collage, modelling, printing and sand art; use of raw material; natural material in art and creative work; creative expression in young children: identification of different types of creative expressions, developing rhymes with music and movements appropriate for young children; puppets: importance and types- finger, stick, sting, glove and shadow in child development; building blocks and their innovative uses; importance of music and use of music & musical instruments for young children; innovative class room arrangements; bringing nature into the classroom; guest appearances in classroom; use of films, documentaries in teaching concepts; resource file: importance and usefulness; educating parents/teachers on use of learning materials for young children.

Practical

Use different methods and indigenous/creative materials for teaching young children; survey and reporting of available different kinds of literature appropriate for infancy through early childhood; reporting on different kinds of literature appropriate for infants and preschool children; visit to organizations and children's libraries for development of literature; practicing different techniques of storytelling and analyzing effectiveness; developing stories appropriate for young children; developing stories on folk tale; developing moral stories; developing stories related to epics; identification of different types of creative expressions in young children; planning and implementing activities to promote creative expressions among young

children through a variety of media (rhymes, drama, role play and story); preparation of art file appropriate for young children; preparation of: paper craft, painting file, drawing file, murals, printing and collage, resource books teaching daily life concepts; preparation of different types of puppets and scripting for short puppet show and creative dramas; preparation of different puppets: finger/stick, string/ hand, shadow; preparation of collage, murals and models appropriate for infancy through early childhood; art activities (painting, tearing, cutting, pasting and collage, murals, modeling, printing blocks, sand and mud, water); practicing musical activities: use of music, voice modulation and sound effects; preparation of resource file and teaching materials for young children; evaluation of materials for teaching young children; organizing an exhibition for parents of young children.

Suggested Readings

1. Blackie, Pamela. 1972. Drama. Macmillan, London.
2. Contractor, M. 1984. Creative Drama and Puppetry in Education. National Book Trust of India, Delhi.
3. Currell, D. 1985. The Complete Book of Puppet. A and C. Black, London.
4. Garretson, R. 1966. Music in Childhood Education. Meredith Publishing Company, New York.
5. Hendrick, J. 1980. Total Learning for the Whole Child. The C V Mosby, St. Louis.
6. Kaul, V. 1991. Early Childhood Education Programme. NCERT, New Delhi.
7. Kaul, V. and Bhatnagar, R. 1992. Early Childhood Education: A Trainer's Handbook, NCERT, New Delhi.
8. Lacper, S., Witherspoon, R. and Day, B. 1984. Good Schools for Young Children. Mac Millan, New York.
9. Maxim, G. 1985. The Very Young. Wadsworth Publishing Company, Belmount, California.
10. Murlidharan, R. and Asthana, S. 1991. Stimulation Activities for Young Children. NCERT, New Delhi.
11. Robinson, H. 1983. Exploring Teaching. Allyn and Bacon, London.
12. Swaminathan, M. 1984. Play Activities for Young Children, UNICEF, New Delhi

HDFS 403	COMPUTER APPLICATIONS IN ECCE	3 (1+2)	SEM VII

Objectives

1. To help students develop the skills needed to succeed in the 21st century.
2. To strengthen students' digital literacy, including skills in using information, media, and ICT tools

Theory

Introduction to computer; windows operating system; ms word; power point program; excel programme; data management skills; internet usage; web based resources; ICT tools in classroom teaching; introduction to multimedia; basics of graphic design; use of digital technology; definition of digital images; colour theory and basics; digital imaging in multimedia and animation; use of design elements in digital layouts; scanning/capturing images: masking and colour adjustments, editing images, cutting

and morphing; work in different media: drawing, collage, and painting; working with visual images: 3D modeling, 3D shading; animation: making videos with animation; editing videos; software available for preschool programme; integrating technology into ecce classroom: issues and challenges; developing and maintaining digital records for ecce; using digital media to support early learning; digital tools for learning, creating, and thinking; developmentally appropriate strategies for early childhood educators; effects of using computer applications for teaching and learning.

Practical

Create word document; prepare a broacher to advertise preschool program; power point presentation on parent education program; design flyer for conducting workshop; prepare a sample record of student information; prepare a sample record of stock; prepare sample record of fee payment particular; prepare evaluation report of student; prepare evaluation report of teachers; google form for feedback; create an animated story; digital lesson on alphabet; develop a video on any concept; you tube rhymes; 3D modeling on animals; graphics for numerical skill development in children; create a story of animals with visual effect; develop a simple science experiment on a digital platform; animated cartoons; develop two animated characters for the concept introduction.

Suggested Readings

1. Albarkati, A. M. and Arabia, S. 2016.The Application of Computer in Education System and its Significance to Teaching and Learning, International Journal of Computer Applications (0975 –8887) 134(9).
2. Ajibade, A. 2006. Effects of Interactive Instructional Compact Disc Package on the Performance of English Language Learners in Schools of Science in Osun State. Unpublished Ph. D. Dissertation, Faculty of Education, Obafemi Awolowo University, Ile-Ife.
3. Mahin, L. 2004. PowerPoint pedagogy. Business Communication Quarterly, 67, 219-222.
4. Adekemi, A. A. 2001. Introduction to Computer Education. An Unpublished Monograph, Obafemi Awolowo University, Ile-Ife.
5. Paje, Y. M., Rogayan, D. V. and Dantic, M. J. P. 2021. Teachers' utilization of computer-based technology in science instruction. International Journal of Technology in Education and Science (IJTES), 5(3), 427-446. https://doi.org/10.46328/ijtes.261
6. Chible, H. 2021. Computer Applications.
7. Software for Preschool Programme that the department has to purchase
8. https://sourceforge.net/software/child-care/india/
9. https://educase.io/daycare-management-software/

HDFS 404	GUIDANCE AND COUNSELLING	3 (2+1)	SEM VII

Objectives

1. To orient about different techniques of counseling and guidance for different problems /areas

2. To learn about essential skills of family counseling and child guidance
3. To understand various needs of children and families for counseling and guidance services

Theory

Guidance: concept, need, nature, scope, goals and essentials, characteristics, principles and assumptions, techniques, challenges, history; guidance services in India; foundations/bases for guidance: philosophical, psychological, socio-cultural; types/areas of guidance: educational guidance, vocational guidance, personal–social guidance/group guidance; guiding children: infants and toddlers, pre-schoolers, school age; guidance for adolescents: career and vocational guidance.

Counseling: meaning, purpose, goals and objectives, scope, history, characteristics, principles, levels, classification; thrust areas of counseling; life span stages and counseling; functions of counseling; different types of counseling techniques; theories to counselling: psychoanalytic theory, roger's self theory, trait theory, field theory, choice theory, behavioural learning theory, family systems theory; approaches to counselling: psychoanalytical approach- psychotherapy/psychoanalytic therapy, transactional analysis therapy; behaviouristic approach: behaviour therapy, rational emotive behaviour therapy (REBT), cognitive behaviour therapy (CBT); humanistic approach: client centered therapy, Gestalt therapy, existential therapy and other contemporary therapies: Adlerian therapy, reality therapy, family systems therapy, feminist therapy; counselling: process, aspects, dimensions, stages; effective strategies in counselling; counseling skills: meaning, categories; premarital counselling: concept, process, techniques; marital counseling: couple counseling process and techniques; family counseling: concept and its evolution, aims and objectives, types, process; tools and techniques of assessment in counseling – standardised and non standardised techniques; modern/current trends in counseling; roles, characteristics or qualities of a counselor; limitations of counseling; ethical issues and dilemmas in counseling.

Practical

Visit to child guidance institutions: CGC; visit to family guidance and counseling institutions: family court/ women protection cell/domestic violence cell; visit to a career or vocational counseling center; review on various aspects of guidance and counselling; studying problems and issues in children/adolescents (educational, psycho-social, emotional and personality related); demonstration on techniques of guidance by the trained professional; simulation exercises on guidance for children/ adolescents; developing guidance programme for the identified children/ adolescents; executing guidance programme on the identified children/adolescents; presenting reports on guidance programme conducted; identifying families with problems and conducting case studies; demonstration on counseling techniques by the certified counsellor; simulation exercises on counselling sessions; developing counseling sessions for the identified families; play therapy/REBT/CBT; executing counseling session; presenting reports on counseling session conducted; developing resource files on guidance and counseling services for families.

Suggested Readings

1. Asha, K. K. 2008. Guidance and Counseling. Dorling Kindersly (India) Pvt. Ltd, New Delhi. Pp 142-144.
2. Chauhan, S. S. 2001. Principles & techniques of counseling. Vikas publishing house Pvt. Ltd. New Delhi. 17-19.
3. Cooper, S. 2005. Counseling, Inception, Implementation & Evaluation. Infinity Books, New Delhi.
4. Corney, G. 2017. Counseling and psychotherapy, 10th Edition, CENGAGE learning.
5. Crow, L. D., and Crow, A. 2008. An introduction to guidance. Surjeet Publications, Delhi.
6. Elizabeth, R.W and Peterson, L. E. 2000. The Counseling Process, 6th Edition. Printice Hall Inc. U.S.A. 52-63.
7. Geldard, K. and Geldard, D. 2002. Counseling Children - A Practical Introduction. Sage Publications, New Delhi. 3-17.
8. Geldard, K. and Geldard, D. 2002. Counseling Adolescents, Sage Publications., New Delhi.
9. Hildebrand. V. 1985. Guiding Young Children. IV Edition, Mac. Millan Publishing Company, New York Srivastava, K.K. (2003). Principles of guidance & counseling. Kanishka Publishers, New Delhi. 1-14.
10. Indira, M. 2000. Guidance & Counseling. Authors Press, New Delhi. 1-10.
11. Jones, R.N. 2000. Introduction to Counseling skills, Sage Publications, New Delhi.
12. Nayak, A.K. (200). Guidance & counseling. APH Publishing corporation, New Delhi.
13. Narayana Rao, S. 1997. Counseling & Guidance. New Delhi: Tata Mc. Graw-Hill Publishing company Ltd. Pp 226-227.
14. Richard, N.J. 2003. Basic Counseling Skills", A Helper's manual, Sage south Asia, 141- 146.
15. Sharma, R.N. and Sharma R. 2004. Guidance and Counseling in India. Atlantic Publishers and Distributors, New Delhi.
16. Vasantha, R. P. 2001. Counseling Psychology. Authors Press, New Delhi, 1-8.
17. Untitled-4 (drbrambedkarcollege.ac.in)
18. Untitled-4 (egyankosh.ac.in)
19. https://www.researchgate.net/publication/325844296_counseling_ approaches

HDFS 405	PARENT EDUCATION AND COMMUNITY WELFARE PROGRAMMES	3 (2+1)	SEM VII

Objectives

1. To develop skills and build confidence to educate the parents
2. To enhance skills in developing intervention programmes for different vulnerable/disadvantaged groups of the community.
3. To facilitate the students to work directly for the welfare of local community

Theory

Community welfare: meaning, need and importance of parent education; theories of community education and its relevance to today's community; social role Valorization theory; understanding recent issues and challenges of parent education and community welfare; studying various methods of parent education; Wisconsin's components of community education; need assessment: its importance, need assessment of parents, and vulnerable groups of the community; programme planning and implementation, for parent and community education; national (govt. & non govt.) community welfare programmes: child and family welfare programmes, constitutional provisions for children, act and legislation relating to protection and welfare of children, act for developmentally challenged, legislations pertaining to parents, women, youth, other gender and elderly; appraisal of existing welfare programmes and their utility in the community; ongoing income generating policies and programmes, gender mainstreaming programmes and policies, reservations, concessions and special facilities of government of India for vulnerable groups of the community related to health, education, employment, industries and agriculture; international, national & regional policies and programmes (govt. & non govt.) for vulnerable groups, family and community; identification of organizational structure/implementing agencies at different levels; role of NGO's in community development; corporate social responsibilities: meaning, role of government in corporate sector and role of the institution (corporate) in community development.

Practical

Visits to various government, non-government organizations and corporate sectors working for the welfare of the parents, children and community, finding out role and challenges, report presentation; visit to local community to conduct parent and community needs assessment, identify vulnerable parents, families with problems and to conduct case studies, report presentation; identification of areas and issues for parent education, developing parent education programmes- planning, preparation (creating whatsapp group, making online flyer) conducting, and evaluating parent education programmes, report presentation; awareness/capacity building programmes with the help of change agent of community development/ organizations (anganwadi worker, asha worker, mohila shakti kendra, KVK, FPC, ATMA, APART etc.) to orient community people to the procedure for obtaining different government/ non-government services (how, where, when, whom to apply); orientation to the use of social platforms, report presentation; observation of/ participation in community development programmes (GoanSobha, health camp etc.), find out the missing link and develop a road map for a specific community (tribal areas, tea garden areas, slum areas etc.) for overall development and establishing linkages with different government/non-government agencies for welfare of that specific community, report presentation.

Suggested Readings

1. Epstein, L.J. 2010. School, Family and Community Partnership: Preparing Educators and Improving School, Westview press.

2. Tett, L. 2006. Community Education: Lifelong Learning and Social Inclusion (Policy and Practice in Education). Dunedin Academic Press.
3. Cempbell, D. 2003. Group Parent Education: Promoting Parents Learning and Support. Sage publication.
4. NIPCCD. 1994. Child in India: A statistical profile. NIPCCD, New Delhi.
5. Randhawa, M. S. 1991. The Rural and Urban Aged. National Book Organization, Unit IX, New Delhi. Y Saraswathi, S. 1991. Youth in India. ICSSR, Govt. of India, New Delhi.
6. TISS 1994. Enhancing the role of family as agency for social and economic development. TISS Bombay. Vol. II, Part II.
7. UNICEF. 1990. Children and women in India: A situation analysis. Unit VI, VII.
8. Marasimhan, S. 2001. Employment of Women. Sage publication. New Delhi.
9. Boraian, P. M. 2008. Employment of Rural Women. Concept publishing company. New Delhi.

RESOURCE MANAGEMENT AND CONSUMER SCIENCE

Course No.	Course Title	Credits	Semester
Core Courses			
RMCS 101	Fundamentals of Art and Design	2 (1+1)	I
RMCS 104	Fundamentals of Ergonomics	2 (1+1)	II
RMCS 201	Computer Aided Interior Designing I	3 (1+2)	III
RMCS 204	Housing and Space Management	3 (2+1)	IV
RMCS 301	Consumer Education	3 (1+2)	V
RMCS 302	Principles of Management	2 (2+0)	V
RMCS 303	Computer Aided Interior Designing II	3 (0+3)	VI
	Total Credits	**18 (8+10)**	
Skill Enhancement Courses			
Event Management and Housekeeping I			
RMCS 102 (SEC I)	Floral Art and Design I	2 (0+2)	I
RMCS 103 (SEC II)	Housekeeping and Service Management I	1 (0+1)	I
Event Management and Housekeeping II			
RMCS 105 (SEC III)	Event Planning and Management	2 (0+2)	II
RMCS 106 (SEC IV)	Housekeeping and Service Management II	1 (0+1)	II
Interior Design and Decoration I			
RMCS 202 (SEC V)	Floral Art and Design II	2 (0+2)	III
RMCS 203 (SEC VI)	Interior Designing and Decoration I	1 (0+1)	III
Interior Design and Decoration II			
RMCS 205 (SEC VII)	Interior Accessories and Furnishings	2 (0+2)	IV
RMCS 206 (SEC VIII)	Interior Designing and Decoration II	1 (0+1)	IV
	Total Credits	**12 (0+12)**	
Elective V: Resource Management and Consumer Science			
RMCS 401	Residential and Commercial Space Design	3 (1+2)	VII
RMCS 402	Colour and Lighting in Interiors	3 (2+1)	VII
RMCS 403	Tourism and Hospitality Management	3 (1+2)	VII
RMCS 404	Financial Management and Consumer Behaviour	3 (2+1)	VII
RMCS 405	Work Space and Product Design	3 (1+2)	VII
	Total Credits	**15 (7+8)**	
	Grand Total	**45 (15+30)**	

RMCS 101	FUNDAMENTALS OF ART AND DESIGN	2 (1+1)	SEM I

Objective

1. To make the students aware of the fundamentals of art and design and develop skills in designing functional and decorative interiors.
2. To help students gain knowledge of-
   - Element of art and principles of design,
   - Colour-its importance, characteristics and applications in interior Furniture and furniture arrangement.
   - Types of floor and floor finishes
   - Types of windows, functional and decorative window treatments.
   - Types and placement of accessories.
   - Importance and types of home lighting

Theory

Introduction and objectives of interior decoration; design- definition, types, features and requirements; elements of art and their importance in interior decoration: line, form, colour, texture, pattern; principles of design and their application to enrich the interiors: harmony, proportion, rhythm, emphasis, balance; colour: sources of colour, colour theories, properties of colour, emotional effect of colour, colour schemes, colour plans for interiors; furniture: types of furniture, materials and finishes of furniture, factors affecting the selection of furniture, care and maintenance of furniture, furniture arrangement; walls: classification, types of building wall, exterior and interior wall finishes; floor: importance, types of floor & floor covering, selection, care and maintenance of floor covering; ceilings: types, materials and functions; doors, windows and ventilators: importance and types, functional and decorative window treatments, curtain and draperies, top treatments of windows- pelmets, valances, swags & tails, hardware for curtains, blinds, factors considered in selection of curtain and draperies; lighting: importance, types of lighting and its application.

Practical

Learning elements of art and principles of design; development of motif and design through art principles; colour- colour schemes, values and intensity scale, colour wheel; furniture-care and arrangement of furniture; accessories: preparation and placements of accessories; window treatment: preparation of soft window treatment; study of lighting fixtures; market survey-different types of wall and floor coverings; types of flower arrangement, learning different types of table setting, napkin folding.

Suggested Readings

1. Kasu, A. A. 2005. An introduction to Art, Craft, Science, Technique & Profession of Interior design. 3rd Ed. Ashish Book Center.
2. Parimalam, P., Andal A. and Premalatha, M.R. 2008. A Textbook of interior Decoration. Satish Serial Publishing House.
3. Seetharaman, P. 2019. Interior Design and Decoration (1st Ed). CBS publishers and distributors. New Delhi.
4. Dodsworth, S. and Stephen, A. 2019. The Fundamentals of interior design (2nd Ed). Bloomsbury Visual Arts.

RMCS 104	FUNDAMENTALS OF ERGONOMICS	2 (1+1)	SEM II

Objectives

1. To acquaint the students with the fundamentals of ergonomics.
2. To acquaint the students in gaining knowledge on importance of ergonomics and learn how the body is used while performing different activities
3. To develop skill among students in onsite evaluation of ill effects of ergonomics risk factors.

Theory

Introduction of ergonomics: definition, history of ergonomics, significance and scope of ergonomics; domains of ergonomics; work physiology and fatigue; systems of human body: muscle system, neuromuscular system, muscle contraction and muscle movement; human compatibility factors: anthropometry and anthropometric data, principles in the application of anthropometric data; physical fitness; work posture; fatigue- major body weights; MMS (Man-Machine System); Manual Material Handling (MMH)

Practical

Study of anthropometric measurements: understanding different anthropometric data and terminologies and its usages; on-site postural studies; determination of physical fitness.

Suggested Readings

1. Bridger, RS. 1995. Introduction to Ergonomics (1st Ed). McGraw Hill Inc. US.
2. Dalela, S. and Dalela. 1999. Textbook of Work Study and Ergonomics, Standard Publisher Distributer.
3. Grandgean, E. 1973. Ergonomics of the Home. Taylor & Francis.
4. IanGaler. 1989. Applied Ergonomics Handbook. Butterworths & Co
5. Panero, J. and Zelnik, M. 1911. Human Dimension and Interior Space. Whitney Library of Design.
6. Singh, S. 2007. Ergonomic Interventions for Health and Productivity. Himanshu Publication.

RMCS 201	COMPUTER AIDED INTERIOR DESIGNING I	3 (1+2)	SEM III

Objectives

This course aims to help the students

1. To get oriented with use of AutoCAD software
2. To understand various draw and edit commands in AutoCAD software
3. To draw the furniture templates through AutoCAD
4. To draw the structural building features through AutoCAD
5. To develop conceptual drawings through AutoCAD

Theory

Introduction to AutoCAD: drawing templates, dialogue boxes - toolbar, difference between paper drawing and CAD drawing; AutoCAD co-ordinate system: absolute and relative, methods of using tools in AutoCAD; introduction to 2D drawing tools: line, polyline, polygon, rectangle, ellipse; introduction to modify tools: copy, mirror, offset, array, move, rotate, scale, stretch, extend, trim, break, chamfer, fillet; adding text to drawings, text styles; dimension tools and styles, methods of adding dimensions to drawings; blocks and inserts, methods of inserting drawings.

Practical

Orientation about AutoCAD software through demo mode: opening the software, opening the document and setting up to start drawing; use of AutoCAD co-ordinate system: relative and absolute; demo of using basic drawing tools: line, polyline, polygon, rectangle, ellipse; demo of use of modify tools: copy, mirror, offset, rotate, trim, extend, chamfer, filter, array, move, break; developing different 2-D features in drawings through AutoCAD: door, windows, furniture templates, stairs; adding text to drawings, text styles.

Suggested Readings

1. Beverly L. Kirk Patrick and James M. Kirkpatrick, 2000. Auto CAD for Interior Design and Space Planning using Auto CAD 2000. Peach pit press
2. Cheryl R. Shrock and Steve Heather, 2019, AutoCAD Pocket Reference, 8th edition, Best Seller Publication.
3. Dean Muccio, 2020, A. Ibrahim Zeid & R. Sivasubramanyan, 2009. CAD/CAM: Theory and Practice, Special Indian edition, McGraw Hill Education.
4. Elise, Moss, 2019, AutoCAD 2020 Fundamentals, SDC Publications.
5. Fiorell, Joseph A. C., CAD for Interiors Basics. John Wiley and Sons Inc. https://www.flipkart.com/cad-interiors-basics/p/itmczz9jmywztxuf. AutoCAD 2021 for the Interior Designer. SDC Publications.

RMCS 202	HOUSING AND SPACE MANAGEMENT	3 (2+1)	SEM IV

Objectives

By the end of the course, the student must be able to:

1. Recognize a family's needs in relation to housing and gain knowledge on housing issues and building services.
2. Gain practical knowledge in designing space for different family needs.
3. Learn the basics of architectural symbols and plans.
4. To learn about the efficient arrangement of space in interiors.
5. To learn to develop the house plans including furniture.

Theory

Housing: importance, characteristics and effects of insufficient housing; housing needs at different stages of family life cycle; housing problems in India: rural and urban housing; housing legislation and regulations in India; building codes; Floor

Space Index (FSI/FAR), factors to be considered in the selection of family housing; selection of site; advantages and disadvantages of renting and owning a house; types of house plans: floor plan, site-plan, cross-sectional plan, perspective plan, elevation plan and landscape plan; principles of house planning: orientation and aspect, privacy, grouping, roominess, prospect, flexibility, circulation, sanitation, furniture requirement and practical considerations; space management based on functional areas, space management and interior types based on functional needs: interiors for youth/ elderly/ other special needs; construction techniques for safety: damp proofing, fire proofing, termite proofing, sound proofing, security features; housing standards: technology in housing, advanced technology in housing construction, low cost building technologies, low cost building materials.

Practical

Learning and comprehending architectural symbols; lettering design and techniques: planning space arrangement for different room/areas in the home; different types of kitchens: designing for special needs; planning space saving storage solutions for various rooms /uses; drawing of house plans: EWS, LIG, MIG, HIG, rural; electrical wiring and fixtures, plumbing and water supply; house plan for renovation according to needs of residents; market survey to study the available building materials in the local market.

Suggested Readings

1. Agan, T. 1968. The House: Its Plan & Use. Oxford and IBH Publishing Co., New Delhi.
2. Agarwala, S.C. 2013. Architecture and Town Planning, Dhanpat Rai & Co, N. Delhi
3. Arora and Bindra, Building Construction. 2010. Dhanpat Rai & Co. N. Delhi 2014th Edition.
4. Cherunilam, F. and Heggade, O.D. 1987. Housing in India. Mumbai: Himalaya Publishing Bombay.
5. Dutt, D.R., 2008 How best to plan and build your home, Pustak Mahal, Delhi
6. Dorothy, Stepat-Devan, Kathryn Camp Logan, Darlene M. Kness, Laura Szekely. Macmillan Publishing Co., Inc, New York.
7. Faulkner, R. and Faulkner, S.1975. Inside Today's Home. New York: Halt. Rinehart and Winston 4th Edition.
8. Mathur, G.C. 1993. Low Cost Housing in Developing Countries. New Delhi: Mohan Primlani, Oxford and IBH Publishing Company.
9. Punmia B.C. (1993) Building Construction, Laxmi Publications, N. Delhi

RMCS 301	CONSUMER EDUCATION	3 (1+2)	SEM V

Objectives

This course aims to help the students:

1. To create awareness on the importance of consumer education and management at individual and family levels
2. To understand the financial level sat banking, crediting etc. by the consumer

3. To create awareness among the consumers about their problems, rights, responsibilities and food adulteration and durable goods.
4. Identification of food adulterants,
5. Learning about the calculations of income tax, cost of credit, instalment buying etc.
6. Practical applications of consumer redressal forum

Theory

Consumer: definition, types, characteristics of Indian consumers; consumer problems and vulnerability at market place; consumer rights and responsibilities; guidelines for good buying: durable and nondurable goods, house/apartments; consumer service providers; consumer movement in India; Consumer Protection Act and its constituent Acts in consumer welfare; consumer welfare organizations; consumer redressal forum; e-consumerism.

Practical

Understanding and identification of consumer problems related to weights and measures, ATM and credit cards, banking services; collection and detection of food samples for adulteration: spices, milk & milk products, ghee & oils, rice & pulses; reviewing of misleading, advertisements through print media, reviewing of misleading advertisements through electronic media; evaluation of consumer products; visit to consumer protection organizations; review of case studies of consumer disputes redressed; planning for exhibits on consumer education, preparation of exhibits for consumer education, organizing exhibition for consumer education and e-consumerism.

Suggested Readings

1. Rice, N. and Tucker. 1976. Management in Family Finance John Wiley and Sons, New York
2. Seetharaman, P., and Sethi M. 2002. Consumerism Strategies and Tactics CBS Publishers and Distributors New Delhi
3. Verghese, M, Ogale, N. N. and Srinivasan, K. 1997. Home Management, New Delhi: New Age International
4. Lawoenie, M. 1986. The Complete Interior Decorator. Chartwell House (1st Edition).
5. Himachalam, 1998. Consumer protection and Law. New Delhi: APH Publishing Corporation
6. Clarke, J., Newman, J. Nicksmith., Vidler, E. and West Marland, L. 2007. Creating Consumers New Delhi-Sage Publications
7. Majumdar, R. 2010. Consumer Behaviour: Insights from Indian Market. New Delhi: PHI Learning Private Limited
8. Eastwood, D. B. 1997. The micro Economics of Consumer Behaviour Houston: Dame Publications, INC.

RMCS 302	PRINCIPLES OF MANAGEMENT	2 (2+0)	SEM V1

Objectives

The course aims to help students-

1. To understand the nature of management
2. To know about the process of management
3. To study the systems approach to management

Theory

Management: concept, nature, importance, management as a profession, universality of management, professionalism of management in India, tasks of a professional manager; functions of management, management skills, process of management: planning- importance, types, characteristics and techniques, barriers to effective planning, organizing- meaning and importance, characteristics and techniques, controlling- definition, concept, importance, phases and factors, evaluating- definition, need and types of evaluation; systems approach to management: conceptual framework of management, systems approach, sub-systems and interactions with other systems; family: the managerial unit, the environment surrounding the family, management and changes in environment; origin, classification and role of motivation in management, motivating factors of management: values- concept, significance, characteristics, sources, classification, development of value pattern, goals- concept, classification, SMART goal setting, strategies for achieving SMART goals, standards- concept, classification; standard of living, inter-relatedness of values, goals and standards; resources: definition, meaning and importance, types, characteristics, factors affecting their use and guidelines, role of resources in management, conservation of resources, management of household resources; time: tools and process of time management, time plan and steps in making time plan, factors affecting time use, GANTT chart; energy: types and sources of energy; decision making process: concept, importance, scope, types, steps and factors affecting decision making; communication: process, types of communication, barriers of communication.

Suggested Readings

1. Gupta, R.S., Sharma, B.D. and Bhalla, N.S. 1997. Principles and Practice of Management. Kalyani Publishers, New Delhi.
2. Mullick, P. 1997. Handbook for homemakers. Kalyani Publishers, New Delhi.
3. Gupta, S., Garg, N. and Aggarwal, A. 1993. Textbook of Home Management, Hygiene and Physiology. Kalyani Publishers, New Delhi.
4. Kaur, H. and Macneil, C. 1994. Theory and Practice of Home management. Surjeet Publications, New Delhi.
5. Nickell, P. and Dorsey, J.M. 1959. Management in Family Living. Wiley Eastern Private Ltd., New Delhi.
6. Shakul, M. and Gandotra, V. 2006. Home Management and Family Finance. Dominant Publishers, New Delhi.
7. Varghese, M.A., Ogale, M.N. and Srinivasan, K. 1996. New Age International (P) Limited, New Delhi.

RMCS 303	COMPUTER AIDED INTERIOR DESIGNING II	3 (0+3)	SEM VI

Objectives

The course aims to help students-

1. To draw the room plans for various activities
2. To draw the floor plans with different square foot areas
3. To add the interior details in developed drawings

Practical

Developing a simple bubble diagram and schematic diagrams of various residential zones through CAD: cooking, dining, living, rest areas, entrance, operative zone, service zone; drawing the floor plans of various rooms through CAD drawing: kitchen, dining room, bedroom, living room; drawing the conceptual floor plans with different square foot area; dimensioning the floor plans, adding text to floor plan, adding furniture to floor plan; drawing elevations of different types of residential buildings through CAD; creating 3-D Models of structural features using viewport, creating varietal effect through hatching technique in CAD; use of rendering techniques in interiors through CAD; developing conceptual drawing of small residential project, printing and plotting a drawing

Suggested Readings

1. CADArtifex.2016.
2. AutoCAD 2017: A Power Guide for Beginners and Intermediate, 2nd Edition, Create Space Independent Publishing Platform
3. Cline, L. 2014. Sketch Up for Interior Design:3D Visualizing, Designing, & Space Planning, 1st Edition, Wiley Secondary Reading
4. Fane. B. 2016. AutoCAD for Dummies, 17th Edition, for Dummies
5. Chopra, A. and Huehls.R.2017.Sketch Up for Dummies (For Dummies (Computer/Tech))1st Edition, For Dummies
6. Obermeier. B. and Ted Padova.T.2016. Photoshop Elements15 for Dummies1st Edition, For Dummies
7. Onstott.S. 2010. Enhancing Architectural Drawings and Models with Photoshop, 2ndEdition, Sybex
8. Tondreau, B. 2011. Layout Essentials:100 Design Principles for Using Grids (Design Essentials)1st Edition, Rockport Publishers
9. Ching, F.D.K. 2015. Architectural graphics 6th Edition. Wiley

SKILL ENHANCEMENT COURSES

RMCS 102 (SEC I)	FLORAL ART AND DESIGN I	2 (0+2)	SEM I

Objectives

By the end of the course, the student must be able to:

1. Understand how to use fundamental techniques for creating floral designs.
2. Develop floral designs according to the occasion such as weddings, birthdays,

parties, funerals etc. as each having specific flower arrangement patterns.

3. Create popular forms of flower art such as flower carpet and stage decoration, flower painting, garlands, bouquets and flower show, drying flowers, Driftwood Craft, Potpourri.
4. Get awareness about Ikebana flower arrangements, indoor plants and Bonsai Culture to convey through symbolism on how nature and art relate to daily living.
5. Study and analyze floral art creations

Practical

Practice on applying elements and principles of design in floral art; selection and preparation of plant and other floral art; practicing techniques and tools, rules, styles and colour schemes in flower arrangement and floral craft; creating theme or idea in floral art; applying preservation techniques of flowers/foliage: developing basic shapes and practicing different styles of flower arrangements; developing theme boards, designing backgrounds and floral décor suitable to the occasion; developing designs for garland, flower bouquet, potpourri, flower painting and carpets etc.; preparation of permanent/dry floral arrangement/driftwood craft; visit to shows and gardens to acquire basic knowledge about bonsai techniques and indoor gardening; visit to a florist store to understand the basic procedures for selection and care of flower and plant materials; developing theme boards for stage decoration - visit to different occasions to evaluate commercial stage decoration ideas, organizing shows/ exhibitions for sale of flower craft.

Suggested Readings

1. Akinseye, A. and Akisanya, S. 2016. The Art of Floral and Event Design. Kesh Luxury Group, Chicago.
2. Benzakein, E., Chai, J and Jorgensen, J. 2020 .Floret Farm's-A Year in Flowers: Designing Gorgeous Arrangements for Every Season. Chronicle Books LLC, San Francisco.
3. Caballero, Roberto. 2012. Decorating with Flowers: A Stunning Ideas Book for all Occasions. Tuttle Publishing, United States.
4. Dupon, Olivier. 2014. Art Flowers: Contemporary Floral Designs and Installations. Potter Style Publishers, Australia.
5. Jan, Hall and Waterkeyn, S. 1994. The Art of Flower Arranging. Smith mark Publishers.
6. Judith Black lock. 2016. Buying and Arranging Cut Flowers - The Essential A - Z Guide. Flower Press; Spl. Edition, United Kingdom.
7. Putnam, D & Putnam. 2021. Flower Colour Theory. Phaidon Press Ltd., London, United Kingdom.
8. Rachel, S. 2017. The Flower Book: Let the Beauty of Each Bloom Speak for Itself. Dorling Kindersley Limited, London, United Kingdom.
9. Nagatsuka, S. 2021. Modern Japanese Ikebana: Elegant Flower Arrangements for Your Home (Contains 42 Projects). Tuttle Publishing, United Kingdom.
10. Patel Ellis, S. 2022. The Modern Gardener: A Practical Guide To House Plants, Herbs and Container Gardening. Harper Collins Publishers, New York.

RMCS 103 (SEC II)	HOUSEKEEPING AND SERVICE MANAGEMENT I	1 (0+1)	SEM I

Objectives

1. To provide an overview of the key issues of housekeeping and maintenance management.
2. To understand the theoretical and practical knowledge that constitutes the work of housekeeping
3. To illustrate the complexities and demands of working in the industry through the scope of housekeeping
4. Provide the student with the competencies to function professionally within the housekeeping department.

Practical

Types of lodging establishments; Organizational chart: duties and responsibilities of housekeeping employees, communication techniques and skill; handling of clients: handling complaints and emergencies; accommodation operation: co-ordination between front office, maintenance and security departments; table setting and different types of bed making; napkins folding, table etiquettes; cleaning equipment: selection and care of equipment; use and care material required by the house keeping department, cleaning methods; placement of flower arrangements and other decorative items; pest control and eradication, reporting accidents, safety procedures at the workplace, and use of protective equipment.

Suggested Readings

1. Robinson, M. 2004. Housekeeping Picador, USA.
2. Casado, M. 2000. Housekeeping Management. New York: John Wiley and Sons, Inc.
3. Martin, R. 1998. Professional Management of Housekeeping Operations. (3rded.). New York: John Wiley and Sons, Inc.
4. Kappa, M., Nitschke, A. and Schappert, P. 1995 Housekeeping Management. NewYork: Educational Institute of the American Hotel and Motel Association.

RMCS 105 (SEC III)	EVENT PLANNING AND MANAGEMENT	2 (0+2)	SEM II

Objectives

By the end of the course, the student must be able to:

1. To understand event planning and management, its scope and significance.
2. To know about the stages and domains of event management.
3. To understand the process of planning and management

Practical

Developing a SWOT analysis of identifying and conducting an event; identify various corporate events; identifying and develop a schedule for anyone event for a college event, the med celebration, festival; develop a plan for budget/sponsors/

fundraising /marketing strategies for the identified events; listing of fundamentals of corporate hospitality; study event specifications of celebrity events and award ceremonies, destination weddings; establish a plan for risk assessment and management within the event laws and administration and health and safety requirements; plan an event for themed celebration, festival, record outcome of events and evaluate the event through SWOT analysis, report on the success and weakness of the events.

Suggested Readings

1. Berridge, G. 2006. Event Design & Experience. Oxford: Butter Worth-Heinemann.
2. Bowdin, G., McDonnell, I., Allen, J., O'Toole, W. 2010. Events Management 3rd edition. Oxford: Butterworth - Heinemann.
3. Getz, D. 2007. Event Studies: Theory, Research and Policy for Planned Events. Oxford: Butterworth - Heinemann.
4. Goldblatt, J. 2010. Special Events: A New Generation & the Next Frontier. New York: Wiley.
5. Judy Allen. 2009. Event Planning Ethics and Etiquette: A Principled Approach to the Business of Special Event Management, Wiley (first published 2003)
6. Gera, V. 2012. Event Management & Planning. Atlantic Publishers & Distributors.

RMCS 106 (SEC IV)	HOUSEKEEPING AND SERVICE MANAGEMENT II	1 (0+1)	SEM II

Objectives

By the end of the course, the student must be able to:

1. Understand role and responsibility of housekeeping department
2. Discuss relationship of housekeeping with other departments
3. Demonstrate an understanding of housekeeping basic planning activity and its organization.
4. Understand and analyze housekeeping standards together with safety and security aspects
5. Demonstrate the creativity on housekeeping standards and trends.

Practical

Understanding the role of housekeeping and its relationship with other departments; housekeeping department and its role and responsibility; housekeeping organization chart; positions and job descriptions in housekeeping department; developing a schedule outlining the housekeeping department and their roles and responsibility in various types of organizations; developing a housekeeping organization chart with positions and job descriptions in housekeeping department in various types of organizations; different types and importance of keys: section key, master key, floor key and grand master key, key of executive officers and public areas and computerized key; understanding the role of housekeeping and its relationship with other departments: front office, food and beverage, engineering departments; planning and organizing housekeeping department; planning the work in

housekeeping department: area inventory, frequency schedule; performance standard, productivity standard, supply and equipment inventory level; housekeeping standards/trends housekeeping standard building, standard set up; human resource and training employees in housekeeping, staffing and training employees, motivating employees.

Suggested Readings

1. Casado, M. 2000. Housekeeping Management. New York: John Wiley & Sons, Inc.
2. Martin, R. 1998. Professional Management of Housekeeping Operations. (3rd ed.). New York: John Wiley & Sons, Inc.
3. Kappa, M., Nitschke, A. and Schappert, P. 1995. Housekeeping Management. New York: Educational Institute of the American Hotel & Motel Association.

RMCS 202 (SEC V)	FLORAL ART AND DESIGN II	2 (0+2)	SEM III

Objectives

This course aims to help the students:

1. To get oriented with modern and world over most popular techniques of floral craft.
2. To understand aesthetics of Ikebana, Drift wood and Bonsai culture
3. To develop conceptual indoor landscaping designs for official, industrial, commercial and residential areas.
4. To study dry flower technologies for developing long lasting floral craft.
5. Get awareness about Ikebana flower arrangements, indoor plants and Bonsai Culture convey through symbolism on how nature and art relate to daily living.

Practical

Elements and colour theory in floral designing; Learning basic Ikebana techniques: practice on concept and styles of classic ikebana flower arrangements such as Rikka, Nageire Bana, Seika, Moribana, Jiyūka; study of various indoor landscaping-plant scaping or interior scaping, greenery ideas to reimagine a professional space - office/hotel, retail, hospital or lobby, indoor plan maintenance work study; designing various types of indoor landscape gardening such as living walls/vertical gardens, table garden dish or bowl garden, green garden, stone scaping, holy scape, floating, water scape and cost estimation of indoor garden designing; dry flower technology: method of drying flowers and foliage, freeze drying, glycerin drying (glycerining), microwave/oven drying, water drying, embedding oven drying, air drying, sun drying, press drying, skeletonizing, potpourri, sulphuring and bleaching techniques, cost estimation of dry flower techniques: learning styling techniques of bonsai, bonsai aesthetics, bonsai, care and culture of miniature trees; designing useful and decorative driftwood articles; Indian traditional ideas of floral decoration for floor, wall, windows and doors.

Suggested Readings

1. Kubo, K. 2006. Keiko's Ikebana: A Contemporary Approach to the Traditional Japanese Art of Flower Arranging North Clarendon: Tuttle Publishing, North Clarendon, USA.
2. Steere, W. C. 1972. Flower Arrangement: The Ikebana Way. Madison Square Press, Chicago, USA.
3. Conder, J.1899.The Floral Art of Japan. Kelly & Walsh Ltd., Tokyo.
4. Averill, M. 1913. Japanese Flower Arrangement. John Lane Company, New York.
5. Lesniewicz, P.1996. Bonsaiin Your Home. Sterling Publishing Company, New York.
6. Gaines, R.L.1977. Interior Plant scaping. Architectural Record Books, New York.
7. Scrivens, S.1980. Interior Planting in Large Buildings. The Architectural Press, London.
8. Adams, P.D. 1981.The Art of Bonsai. Ward, Lock & Co., London.
9. Douthitt, J. 2001. Bonsai: The Art of Living Sculpture. Rizzoli International Publications Inc., New York.
10. Shofunotomo. 1982. The Essentials of Bonsai. Timber Press, Oregon.

RMCS 203 (SEC VI)	INTERIOR DESIGNING AND DECORATION I	1 (0+1)	SEM III

Objectives

This course aims to help the students

1. To understand the concept of elements and principles of design.
2. To understand basic principles of illumination and application of natural lighting in interiors.
3. To impart knowledge on working and managing of interior design as professional practice.

Practical

Application of elements and principles of design; colour concept: application, style and colour scheme in different areas, colour scheme for problematic area and its cost estimation; curtains and draperies, types of curtain material and hardware's, and it's costing; developing basic plans for problematic areas and creating new plans with accessories and furnishing and interior designing concepts; lighting: application and principles, types of light fixture, use of lights and lamps, lighting plan for problematic area.

Suggested Readings

1. Ch'ing, Francis and D.K., Cork, B. 2004. Interior Design Illustrated, Wiley Publications, New Jersey.
2. Christine M. Piotrowski. 2016. Designing Commercial Interiors, John Willey Publishers, 3rd edition,.
3. Patrice, D. and Scott, T. 2000. Curtains, Draperies and Shades, Lane, Menlo Park, California.
4. Faulkner, S. and Faulkner, R.N. 1968. Inside Today's Home, Holt, Rinehart and

Amp; Winston.
5. Gordon, G. 2015. Interior Lighting for Designers,5th edition, Wiley Publishers.
6. Singh, G. 2017. Building materials, Standard Publishers Distributors, Delhi.
7. Dechiara, J., Panero, J. and Zelnik, M. 2011. Time Saver Standards for Interior Design & Space Planning, Mc Graw Hill, London.
8. Dechiara, J. and Panero, J. 2011. Standards for Interior Design & Space Planning, McGraw Hill Professional.
9. Mitton, M. and Nystuen, C. 2016. Residential Interior Design-A Guide to Planning Spaces, Wiley Publication, 3rd edition
10. Shiers, D. 2017. Miles Keeping, Sustainable Building Design: Principles and Practice, Wiley Blackwell,1st edition,.
11. Pratap, R.M. 2012. Interior Design Principles and Practice, Standard Publications, Delhi,.
12. Seetharam, P. and Pannu, P. 2009. Interior Design and Decoration, CBS,1st edition, New Delhi.

RMCS 205 (SEC VII)	INTERIOR ACCESSORIES AND FURNISHINGS	2 (0+2)	SEM IV

Objectives

By the end of the course, the student must be able to:

1. Identify different types of accessories and furnishings used in interiors, along with their use and features.
2. Design and develop furnishings for different areas in the interiors.
3. Design and develop accessories used for decorating interiors.
4. Understand how accessory and furnishing designing can be taken up as an entrepreneurial activity.

Practical

Identifying different accessories, their use, placement, and features; market survey to study the design features and financial aspects of different interior accessories; understanding the application of art elements and design principles for designing accessories; exploring and selecting different art media for designing and developing a functional/decorative accessory: mud/clay/paper/glass/fabric/wood/MDF/ painting/ printing ; designing and preparation of accessories suitable for different types of staircases, table decoration, floor decoration; interior landscaping: exploring its importance and different plants used in interiors; applying vastu shastra in selection and placement of accessories; identifying different furnishings, their use, placement, suitable materials and features; market survey to study the design features and financial aspects of different interior furnishings; understanding the application of art elements and design principles for designing furnishings for residential and commercial spaces; exploring Indian handicrafts, paintings, embroideries, printing techniques etc. and application of feasible techniques in designing accessories and furnishings, cost estimation, sale of products and self-evaluation.

Suggested Readings

1. Erin T. Gates. 2014. Elements of Style: Designing a Home & a Life. Simon & Schuster, New York, USA.
2. Massey, A. 2020. Interior Design Since 1900: Fourth Edition. Thames and Hudson, London, UK.
3. Jaity, J. 2012. Crafts Atlas of India: Special Edition. Niyogi Books, New Delhi, India.
4. Chopra, T. 2006. Exotic Indian Interiors. Prakash Books India Pvt. Ltd, New Delhi, India.
5. Wilson, H. 2001. India: Decoration - Interior - Design. Watson-Guptill Publishers, New York, USA.

RMCS 206 (SEC VIII)	INTERIOR DESIGNING AND DECORATION II	1 (0+1)	SEM IV

Objectives

By the end of the course, the student must be able to:

1. To understand the concept of wall and floor treatment.
2. To understand basic principles of acoustical insulation to interior spaces.
3. To impart knowledge on working and managing of interior design as professional practice.

Practical

Creating theme or idea in floor treatments and wall treatments; planning of floor and floor coverings, floor treatments, its type and cost estimation; planning of wall and wall treatment, its types and cost estimation of permanent and low cost temporary treatments; materials and accessories used for interior designing and decoration; indoor landscaping: types, treatments according to space, problematic areas and cost estimation; flower arrangements; AutoCAD for interiors, planning for different areas; visit to different residential and commercial areas, building to study about idea and materials used for interior designing and decoration.

Suggested Readings

1. Claffey, B. 2017. Indoor Green: Living with Plants. Thames and Hudson, 1st edition.
2. Ch'ing, F. D. K. & Cork, B. 2004. Interior Design Illustrated. Wiley Publications, New Jersey.
3. Piotrowski, C. M. 2016. Designing Commercial Interiors. John Willey Publishers, 3rd edition.
4. Faulkner S. & Faulkner R. N. 1968. Inside Today's Home. Holt, Rinehart and amp; Winston.
5. Drpic, I.D. 1988. Sketching and Rendering of Interior Space. Watson-Guptill.
6. Dechiara, J., Panero, J. & Zelnik, M. 2011. Time Saver Standards for Interior design and Space Planning. McGraw Hill, London,.
7. Dechiara, J. and Panero, J. 2011. Standards for Interior Design and Space Planning. McGraw Hill Professional.
8. Cremer, L. 2016. Principles and Application of Room Acoustics. Peninsula Publishing.

9. Mitton, M. & Nystuen, C. 2016. Residential Interior Design - A Guide to Planning Spaces. Wiley Publication, 3rd edition.
10. Shiers, D. 2017. Sustainable Building Design: Principles and Practice, Wiley Blackwell, 1st edition,.
11. Pratap, R. M. 2012. Interior Design Principles and Practice. Standard Publications, Delhi.
12. Seetharam, P. & Pannu, P. 2009. Interior Design and Decoration. CBS, 1st edition, New Delhi, 2009.

ELECTIVE V: RESOURCE MANGEMENT AND CONSUMER SCIENCE

RMCS 401	RESIDENTIAL AND COMMERCIAL SPACE DESIGN	3 (1+2)	SEM VII

Objectives

1. Gain knowledge in designing space for family living
2. Get exposure to design and decorate residential spaces
3. Gain managerial skills and handle space efficiently for multiple functions
4. Study building Codes, fire safety and barrier -free designs as essential components of laying out interior space
5. Learn use of presentation boards to assist clients in visualizing the design project.

Theory

Residential and commercial buildings: types and characteristics; factors influencing building design approaches to planning residential and commercial spaces; steps in design process; understanding on building bye laws and standards; design and space organization analysis of independent houses and apartments of different income groups; estimation of cost of fittings, fixtures, furniture, lighting and materials for residential and commercial interiors; study of commercial interiors for business establishments, hotels/restaurants, hospitals, educational buildings, public service buildings; specifications writing, tenders and contracts.

Practical

Develop conceptual drawings and floor plans for various income groups; develop layouts of furniture, lighting, electrical and plumbing for various income groups; practical applications of design and space organization of apartments and flats and analysis; cost estimation for designing interiors of various income groups. planning of ergonomic work layout for a small project (1000 sq. ft.); planning of ergonomic work layout for hills areas and commercial areas; evolving interior decoration details with material sample for the small project; presentation of the detailed work done for large commercial projects.

Suggested Readings

1. Fundamentals of Building Orientation and Green Building features. Fourth edition. October 2015. Published by Indian Railways Institute of Civil Engineering, Pune.
2. Model Building Bye-Laws, 2016. Ministry of Urban Development, Government of India.
3. National Building Code of India 2016. Volume 1. Published by Bureau of Indian Standards, New Delhi.
4. Indian Standard - Recommendations for Basic requirements of Educational Buildings. 2006. Published by the Indian Standards Institute, New Delhi.
5. S. Renuka & Mahalakshmi V. Reddy. 2009. Housing and Space Management. Published by the Project Director, Directorate of Information, and publications of Agriculture (DIPA), ICAR, New Delhi.
6. James, Ambrose. 1997. Building Construction – Interior systems. Published by S. K. Jain for CBS Publishers and Distributors, New Delhi.
7. De Chiara, J., Panero, J. & Zelnik M. 1991. Time-Saver Standards in Interior Design and Space Planning.
8. Sam, Kubba. 2003. Space Planning for Commercial and Residential Interiors. McGraw – Hill Professional, New York.
9. Lynn M. Jones & Phyllis S. Allen. 2009. Beginnings of Interior Environments. 10th Edition. Pearson Education Inc., New Jersey.
10. Mark Karlen. Space Planning Basics. 2009. Space Planning Basics. Third Edition. John Wiley and Sons Inc., New Jersey.
11. Evelyn Knowles & Kay, Millet Boehr. 2014. A comprehensive guide for selecting interior

RMCS 402	COLOUR AND LIGHTING IN INTERIORS	3 (2+1)	SEM VII

Objectives

This course aims to help students

1. To acquaint with various aspects of color and lighting.
2. To understand the theories and qualities of colour.
3. To study uses and applications of different colours.
4. To understand various aspects of colour in vision.
5. To get awareness about different sources of light and benefits of effective lighting.
6. To enrich the students with knowledge about right placement of lighting fixtures.
7. To study the amount of light needed for different activities.

Theory

Importance of colour and light in interior environment: a brief history of colour as an interior design element; physics of light, physiology of vision, properties of colour - hue, value and intensity, harmony, mixing and colour interactions; factors to consider while choosing colour schemes for buildings; visual tricks: use and application of colour in interiors of residential and non - residential buildings; suitable colour schemes for residential, commercial, public, educational and religious building

interiors; importance and sources of lighting; cultural and social aspects of lighting; properties of lighting: reflection, absorption, transmission and diffusion; types of lighting: decorative aspects of lighting; lighting requirements for household activities; lighting requirements in commercial buildings; measurement of light and its units; types of lamps, their characteristics and suitability to various rooms; types of lighting based on direction of use, place of use, purpose and portability; lighting controls: lighting luminaires/fixtures; factors affecting the quantity of illumination in a room - method of calculating lighting requirements for various rooms; lighting for outdoor living and gardens; colour rendition; use of colour and lighting in architecture; use of colour and lighting in problematic areas: disguise and camouflage; lighting different spaces in the interiors; important lighting terms; importance of controlling luminance; eco - friendly lighting benefits and ideas; need for quality in the selection of colours and lighting in the built environment.

Practical

Study the types of colour schemes in residential interiors; study of types of lamps and lighting used in residential interiors; planning colour schemes for residential interiors, group discussion on use of colour and lighting in interiors; study of types of colour schemes in commercial interiors; study of types of lamps and lighting used in commercial interiors; presentation on use of colour and lighting in commercial interiors; suggesting suitable colour schemes for commercial buildings and its cost estimation; group discussion on suitable colour schemes for residential and commercial buildings; suggesting suitable colour schemes for commercial buildings and its cost estimation; group discussion on suitable colour schemes for residential and commercial buildings, suggesting suitable lighting fixtures for residential buildings and its cost estimation; drawings to show the effect of different types of lighting in interior spaces; lighting calculations for interior spaces using different methods cavity method and point to point method; suggesting suitable lighting fixtures for commercial buildings and its cost estimation; group discussion on suitable lighting fixtures for residential and commercial buildings; prepare a colour and lighting plan for problematic areas like space below stair case and estimate the cost; prepare a colour and lighting plan for problematic areas like, irregular shape rooms or narrow areas and estimate the cost; market survey to understand the available safety and emergency lighting systems and presentation of report.

Suggested Readings

1. Gross light J. 1984. Effective use of Daylight and Electric Lighting In Residential And Commercial Spaces. Practice Hall, New Jersey.
2. Itten, J. 1970. The Elements of Colour. Van Nostrand Reinhold Company, New York.
3. Nielson, K.J. and Taylor, D.A. 1990. Interiors: An Introduction. Wm. C. Brown Publishers, IA, USA.
4. Nissen LuAnn, Faulkner R & Faulkner S. 1994. Inside Today’s Home. Harcourt

Brace College Publishers, New York.
5. Seetharaman, P. and Pannu, P. 2005. Interior Design and Decoration. CBS Publishers and Distributors, New Delhi.
6. Zelanski, P. & Fisher, M.P. 1999. Colour. Prentice Hall, New Jersey.

RMCS 403	TOURISM AND HOSPITALITY MANAGEMENT	3 (1+2)	SEM VII

Objectives

The course aims to help the students to gain a basic knowledge of:

1. Skills associated with problem solving, creative and critical thinking; related to tourism industry.
2. Applying the concepts and skills necessary to achieve guest satisfaction.
3. Demonstrating knowledge of multi-cultural perspectives to meet the needs of the guests and employees.
4. Leading with the knowledge that the foundation of tourism and hospitality is based on the respect for the host culture with the responsibility to perpetuate unique values, traditions and practices of that place.
5. Demonstrating ability to perform basic and supervisory level job functions in hotel and restaurant careers.

Theory

Tourism management: introduction to tourism, growth and development of modern tourism, tourism in India, heritage/cultural, pilgrimage tourism, medical, hot spots and culinary tourism, business and cruise tourism, eco-tourism/rural tourism; emergence of eco-tourism/rural tourism: concept and definitions, growth and development issues in eco-tourism; travel agency and tour operation and logistics (airlines operation and ticketing. ships cruise services) business in India, emerging trends of tourism, impacts of tourism, ethics issues in tourism; introduction to hospitality management: basic management principles- planning, organizing, staffing, leading, controlling with specific reference to hospitality. hotel hierarchy: gm, departmental heads, supervisors, operational employees soft skills in hospitality; personal development, motivation, communication techniques and skills; hostess training services offered to guests such as food and accommodation services and personal services; front office management: maintenance of front office records, housekeeping services, cleaning and linen services, bed making; accommodation operations: role of accommodation operations in hospitality; public areas: maintenance and decoration.

Practical

Study of all the activities of a tourism office and report; planning for a tour: heritage, eco, wildlife, pilgrimage, medical etc.; planning for accommodation operations; preparation of a tour package; visit to different tourist spots; planning layouts of front office of different institutions; mock sessions on front office handling; mock sessions on communication techniques and skill; mock sessions on handling complaints and emergencies; mock sessions on handling various types of clients; practical sessions

on hostess training, services offered; practical sessions on housekeeping services; report writing.

Suggested Readings

1. Dharmarajan S. and R. Seth, Tourism in India - Trends and Issues, Har Anand Publications Pvt. Ltd., New Delhi, First edition.
2. Gupta S., World Tourism in New Millennium, ABD Publishers, Jaipur, First edition.
3. Kamra, K.K. and M. Chand. 2006. Basics of Tourism - Theory, Operation and Practice, Kanishka Publishers, New Delhi, First Edition,.
4. Maken D., Strategies & Planning in Tourism and Industry, Adhyayan Publishers and Distributors, Delhi, First edition.
5. Puri M. and G. Chand. 2006. Tourism Management, Pragun Publications, New Delhi, First Edition.
6. Roday S., Biwal, A. and Joshi, V. 2009. Tourism Operations and Management, Oxford University Press Publication, New Delhi, First edition.
7. Sharma R.B., World Tourism in 21st Century, Alfa Publications, New Delhi, First edition.

RMCS 404	FINANCIAL MANAGEMENT AND CONSUMER BEHAVIOUR	3 (2+1)	SEM VII

Objectives

1. To develop understanding of concepts of income and expenditure among families.
2. To provide skills and techniques requisite to tackle consumer problems and management of finance and consumer education.
3. To enhance knowledge on consumer behavior and issues and e-tailing concepts.

Theory

importance of financial management; income concepts: circular flow of income, the wheel of wealth, factors affecting fluctuations in income, depreciation in money value: inflation, deflation, consumer price index; financial planning: steps of successful financial planning, financial spending plan; budget: types, steps, advantages and disadvantages; credit and credit instruments; saving and investment; taxation; consumerism and consumer protection: consumer rights and responsibilities, Consumer Protection Act 2019, other important govt. laws/acts for protecting consumers; consumer courts: redress mechanism; consumer protection councils; advertising standards council of India; standards and standardization and legislative measures for regulating quality; role of govt. and NGOs for consumer protection and welfare; consumer issues and challenges; consumer behaviour: defining consumer behaviour, meaning and importance of consumer behaviour; consumer decision making: determinants and consumer choices, impact of technology on consumer choices and economic wellbeing, factors affecting consumer behaviour; social, cultural and group influences on consumer behavior, individual determinants,

motivation and personality on consumer behaviour; environmental influences on consumer behaviour; e -consumer behaviour: e - marketing/e - consumerism/e-business/e-tailing; digital marketing: techniques and strategies. trends in marketing with respect to consumer behaviour.

Practical

Conducting survey on few families to study various sources of family income, drawing income profiles, and studying their methods of handling money income; planning budgets for families with different income groups; exercise on calculation of consumer price index; preparing educational aids on consumer rights and responsibilities; exercise on filing a consumer complaint in consumer forum; collecting/studying fraudulent advertisements on print and electronic media and reporting about them; collecting different products with standardization marks. collecting product labels and studying labeling details; market survey to study weights and measures practices by vegetable sellers, cloth sellers, ration shops, petrol pumps, LPG cylinders etc. and making a report; visit to consumer forum; carryout a short study (may be using google forms) to study consumer behaviour components in buying any product; reporting and presentation; explore problems/cheating in e-shopping.

Suggested Readings

1. Albert, E. Waugh. 1987. Principles of Economics. McGraw Hill Book Company, Inc. New York.
2. Bhatt, R. 2010. Consumer Behaviour. Common Wealth Publishers Pvt. Ltd.
3. Dewett, K. K. & Navalur M. H. 2006. Modern Economic Theory. S Chand Publications. New Delhi.
4. Gross, Grandall & Knoll. 1980. Management for Modern Families (3rd Ed.). Prentice–Hall, Inc. Englewood Cliffs, New Jersey.
5. Kaur, Surinder, Lekhi, R. K. & Singh, Joginde. 1997. Consumer Economics. Kalyani Publishers, New Delhi.
6. Khan, Martin, 2011. Consumer Behaviour & Advertising Management. New Age International (P) Limited Publishers.
7. Nickel & Dorsey. 1976. Management in Family Living (4th ed.) Willey Eastern Limited, New Delhi.
8. Rice, Nickel & Tucker. 1976. Management in Family Living (5th ed.). John Wiley and Sons, Inc. New York, London.
9. Sharma, S. & Kumar D. 200). Advertising, Planning, Implementation and Control. Mangal Deep Publication.
10. Shukul, M. & Gandotra V. 200). Home Management & Family Finance, Dominant Publishers & Distributors, New Delhi.
11. Seetharaman P & Sethi M. 2001. Consumerism. Strategies and Tactics. CBS.
12. Das, S. N. 1973. An Introduction to Economic Theory. Premier Publisher, New Delhi.
13. Swanson, Bettye B. 1983. Introduction to Home Management. Macmillan Publishing Co. Inc., New York.

RMCS 405	WORK SPACE AND PRODUCT DESIGN	3 (1+2)	SEM VII

Objectives

The course aims to help students:

1. In developing skills in space designing for different activities
2. In understanding the importance of space designing to avoid work related health hazards.
3. In developing skills in designing workspace for residential, commercial and industrial units.
4. In developing skills in design consideration in product development
5. Familiarizing with product design & product manufacturing terminologies.
6. Understanding how to use users in product design cycle
7. How to evaluate the products in the consumer market from usability perspective.

Theory

Body mechanics; functional design of workspace: concept of functional design, centre concept, design and arrangement of different work centers, designing of work surface, storage and work accessories/appliances; lighting/furniture requirements for different activities; hazards of ill designed workstations; functional designing of workspace for physically handicapped and elderly population; design concepts: design definition, design terminologies (user - centered design, user -friendly design, accessible design, universal design, usability, etc.); design process; design sustainability: ergonomic factors in design, user interface, use of design elements for ease of operation of a product; quality control and standardization of product, and product certification; design consideration for accessible products; work, worker and workplace interrelationship.

Practical

Evaluation of existing workstation in a residential product; understanding the selected consumer products through guidelines given by manufacturers; evaluation of selected product to find out the ease of operation; ideation of design concepts.

Suggested Readings

1. Marcelo, M. Soares. 2021. Design Methodology for production designing for Human-centered approach, CRC Press.
2. Marcelo, M. Soares. 2021. Handbook of usability & User experience research and case studies, CRC Press.
3. Waldemar, Karwowski., Ann Szopa., Marcelo M. & Soares. 2021. Standards and guidelines in Human factors and Ergonomics, CRC Press
4. Bootheroyd, G, Dewhurst P & Knight, W. 2002. Product Design for Manufacture and Assembly. CRC Press.
5. Frey, D. 1998. AutoCAD 14. BPB Publ.
6. Ron, H. 2000. Using AutoCAD 2000. Special Ed. Prentice Hall of India.
7. Sharma, D. D. 2000. Total Quality Management. Sultan Chand & Sons.
8. Dalela, S. & Saurabh. 1999. Textbook of Work Study and Ergonomics, Standard Publ.
9. Grandgean, E. 1978. Ergonomics of the Home. Taylor & Francis.

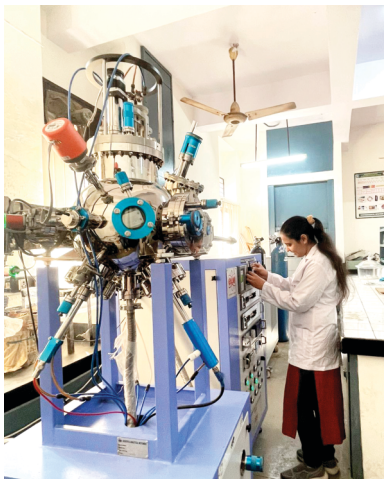
10. Ian, Galer. 1982. Applied Ergonomics Handbook. Butterworths & Co.
11. Panero, J. & Zelnik M. 1979. Human Dimension and Interior Space. Whitney Library of Design.
12. Singh, S. 2007. Ergonomics Interventions for Health and Productivity. Himanshu Publication.

CS 499	**RURAL AGRICULTURAL WORK EXPERIENCE (RAWE) AND INDUSTRIAL ATTACHMENT IN COMMUNITY SCIENCE (IACS) (To be conducted jointly by Dept. of ATS, EECM, FN, HDFS and RMCS)**	**20**	**SEM VIII**

Orientation and basic training (1week): introduction, objectives and modus operandi of Rural Agricultural Work Experience (RAWE); briefing about general Community Science messages and developing questionnaire for need assessment and evaluation of RAWE programme; RAWE through placement with families (4 weeks): rapport building among farm women and interns, conducting survey of village, family and personal profile, need assessment, organizing skill trainings and demonstrations on income generating activities/ appropriate technology related to Apparel and Textile Science, Extension Education and Communication Management, Foods and Nutrition, Human Development and Family Studies and Resource Management and Consumer Science and its implication at mass level; organizing village fair, exhibition and competitions; preparation and presentation of report on RAWE; In-plant/ Industrial Attachment (3 months): placement of interns with industry, study of structure, functioning, objective, ethics and mandates of the industry; understand various materials, machines, processes, products and their applications; selecting department/area of work according to one's interest and capabilities; getting training and expertise in the selected area; understand the scope, functions and job responsibilities in various departments of an organization; presentation and evaluation of report on the basis of punctuality, enthusiasm, conduct, leadership qualities, sincerity and devotion displayed by the interns; report preparation and presentation (1 week).

COLLEGE OF BASIC SCIENCES & HUMANITIES


National Science Day-2025
Harnessing Science for a Self-Reliant and Sustainable Viksit Bharat-2047
Keynote Speaker
Dr. Devinder Kumar
Chief Guest
Prof. B. R. Kamboj
Vice-Chancellor




WESTERN SYDNEY
UNIVERSITY

COLLEGE OF BASIC SCIENCES & HUMANITIES

SUPPORTING COURSES FOR B.SC. (HONS.) AGRICULTURE, B.SC. (HONS.) AGRIBUSINESS MANAGEMENT, B.SC. (HONS.) COMMUNITY SCIENCE, B.F.Sc., B.TECH (AGRICULTURAL ENGINEERING) AND B.TECH. BIOTECHNOLOGY

Course No.	Course Title	Credits	Semester
	Biochemistry		
BIOCHEM 202	Basic Biochemistry (For B.Tech. Biotechnology)	4 (3+1)	IV
BIOCHEM 302	Essentials of Plant Biochemistry (For B.Sc. (Hons.) Agriculture)	3 (2+1)	VI
	Total Credits	**7 (5+2)**	
	Botany and Plant Physiology		
BIO 101	Introductory Biology (Need based) (For B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Agribusiness Management)	1 (1+0) NG	I
BIO 103	Basic Biology (For B.Tech. Biotechnology)	2 (2+0)	I
PL PHY 201	Fundamentals of Crop Physiology (For B.Sc. (Hons.) Agriculture and B.Tech. Biotechnology)	3 (2+1)	Agri.: V Biotech: III
	Total Credits	**5 (4+1)**	
	Chemistry		
CHEM 201	Engineering Chemistry (For B. Tech. (Agricultural Engineering)	3 (2+1)	III
	Total Credits	**3 (2+1)**	
	Computer Section		
COMP 101 (SEC I)	Computer Applications in Agriculture (For B.Sc. (Hons.) Agribusiness Management)	2 (0+2)	I
COMP 202 (VAC)	Agricultural Informatics and Artificial Intelligence (For B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness Management, B.Sc. (Hons.) Community Science, B.F.Sc. and B.Tech. Biotechnology)	3 (2+1)	Agri: III AM: III CS: IV FS: IV Biotech: IV
	Total Credits	**5 (2+3)**	
	Languages and Haryanavi Culture		
ENG 101 (AEC)	Communication Skills (For B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness Management, B.Sc. (Hons.) Community Science, B.F.Sc., B.Tech. (Agricultural Engineering) and B.Tech. Biotechnology)	2 (1+1)	Agri: I AM: I FS: I Biotech: I CS: II AE: II

ENG 301 (AEC)	Human Values and Personality Development (For B. Tech. Agricultural Engineering)	2 (1+1)	V
	Total Credits	**4 (2+2)**	
Mathematics and Statistics			
MATH 101	Introductory Mathematics (Need based) (For B.Sc. (Hons.) Agriculture & B.Sc. (Hons.) Agribusiness Management)	1 (1+0) NG	I
MATH 103	Basic Mathematics (For B.Tech. Biotechnology)	2 (2+0)	I
MATH 201	Engineering Mathematics I (For B. Tech. Agricultural Engineering)	3 (3+0)	III
MATH 203	Biomathematics (For B.Tech. Biotechnology)	2 (2+0)	III
MATH 202	Engineering Mathematics II (For B. Tech. Agricultural Engineering)	3 (3+0)	IV
STAT 301	Biostatistics (For B.Tech. Biotechnology)	2 (1+1)	VI
STAT 302	Basic and Applied Agril Statistics (For B.Sc. (Hons.) Agriculture)	3 (2+1)	VI
STAT 401	Agricultural Statistics and Data Analysis (for B. Tech. Agricultural Engineering)	2 (1+1)	VII
STAT 402	Statistical Methods (For B.Sc. (Hons.) Community Science)	2 (1+1)	VII
	Total Credits	**19 (15+4)**	
Microbiology			
MICRO 101 (SEC II)	Production Technology for Bio-agents and Bio-fertilizers (For B.Sc. (Hons.) Agribusiness Management)	2 (0+2)	I
MICRO 102	Elementary Microbiology (For B.Tech. Biotechnology)	2 (1+1)	II
MICRO 302	Agricultural Microbiology and Phyto-remediation (For B.Sc. (Hons.) Agriculture)	2 (1+1)	VI
	Total Credits	**6 (2+4)**	
Physics			
PHY 203	Engineering Physics (For B. Tech. Agricultural Engineering)	3 (2+1)	III
	Total Credits	**3 (2+1)**	
Sociology			
SOC 101	Rural Sociology and Educational Psychology (For B.Sc. (H) Agriculture)	2 (2+0)	I
SOC 201	Rural Sociology (For B.Sc. (Hons.) Community Science)	2 (2+0)	III
SOC 202	Human Ethics (For B.Tech. Biotechnology)	1 (1+0)	IV
	Total Credits	**5 (5+0)**	

COURSE CONTENTS: DEAPRTMENT-WISE
BIOCHEMISTRY

Course No.	Course Title	Credits	Semester
BIOCHEM 202	Basic Biochemistry (For B.Tech. Biotechnology)	4 (3+1)	IV
BIOCHEM 302	Essentials of Plant Biochemistry (For B.Sc. (Hons.) Agriculture)	3 (2+1)	VI
	Total Credits	**7 (5+2)**	

BIOCHEM 202	BASIC BIOCHEMISTRY (For B.Tech. Biotechnology)	4 (3+1)	SEM IV

Objectives

1. To study the structure and functions of biomolecules of living organisms
2. To study metabolism and bioenergetics
3. To study secondary metabolites and their applications

Theory

Introduction and importance. Acids, bases and buffers of living systems. Biomolecules: carbohydrates, lipids, proteins and nucleic acids – structure, functions and properties, Vitamins and animal hormones.

Bioenergetics. Metabolism – basic concept: glycolysis, citric acid cycle, gluconeogenesis, HMP pathway, oxidative phosphorylation, fatty acid oxidation; ketone bodies.

Overview & significance of secondary metabolites: alkaloids, phenolics and their applications in food and pharmaceutical industries. Role of phytohormones: Auxin, Gibberellins, Cytokinin, Ethylene and Abscisic acid.

Practical

Qualitative tests for carbohydrates, amino acids, proteins and lipids. Extraction and characterization of lipids by TLC. Determination of acid, iodine and saponification values of oil. Extraction, quantitative estimation and separation of sugars by paper chromatography.

Suggested Readings

1. Nelson DL and Cox MM, 2017, Lehninger principles of biochemistry, 7th edn, W. H. Freeman.
2. Satyanarayana U and Chakrapani U, 2021, Essentials of Biochemistry, Elsevier.

BIOCHEM 302	ESSENTIALS OF PLANT BIOCHEMISTRY (For B.Sc. (Hons.) Agriculture)	3 (2+1)	SEM VI

Objectives

To impart the fundamental knowledge on structure and function of cellular components, biomolecules and the biological processes in plants

Theory

Biochemistry − Introduction and importance, Properties of water, pH and buffer, plant cell and its components. Bio-molecules − Structure, classification, properties and function of carbohydrates, amino acids, proteins, lipids and nucleic acids. Vitamins − physiological and metabolic role. Enzymes: General properties; Classification; Mechanism of action; Michaelis and Menten and Line Weaver Burk equation and plots; Introduction to allosteric enzymes, use of enzymes. Metabolic energy and its generation − Metabolism − Basic concepts, Glycolysis, Citric acid Cycle, Pentose phosphate pathway, oxidative phosphorylation, Fatty acid oxidation. Biosynthetic Pathways −Photosynthesis, Gluconeogenesis, nitrogen fixation, fatty acid and starch formation. Regulation of metabolic pathways. Secondary metabolites, Terpenoids, Alkaloids, Phenolic and their applications in food and pharmaceutical industries.

Practical

Preparation of standard solutions and reagents, Determination of pH, Qualitative tests of carbohydrates and amino acids, Quantitative estimation of soluble sugars and starch, Estimation of protein by Kjeldhal method and Lowry’ s method, Preparation of mineral solution from ash, Estimation of fat by Soxhlet method, Determination of acid value, saponification value and iodine number, Estimation of ascorbic acid, Qualitative/quantitative tests of secondary metabolites.

Suggested Readings

1. Nelson and Cox. 2008. Lehninger Principles of Biochemistry. Fourth/Fifth edition. Freeman (Can be downloaded)
2. Conn, Stumpf, Bruening and Doi. 2006. Outlines of Biochemistry. Fifth Edition. Wiley
3. Horton, Moran, Rawn, Scrimgeour, Perry. 2011. Principles of Biochemistry. Fifth Edition. Pearson/Prentice Hall (Can be downloaded)
4. Heldt. 2005. Plant Biochemistry. Elsevier (Can be downloaded)
5. Goodwin and Mercer. 2005. Introduction to Plant Biochemistry. 2nd edition. CBS.

BOTANY AND PLANT PHYSIOLOGY

Course No.	Course Title	Credits	Semester
BIO 101	Introductory Biology (need based) (For B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Agribusiness Management)	1 (1+0) NG	I
BIO 103	Basic Biology (For B.Tech. Biotechnology)	2 (2+0)	I
PL PHY 201	Fundamentals of Crop Physiology (For B.Sc. (Hons.) Agriculture and B.Tech. Biotechnology)	3 (2+1)	Agri.: V Biotech: III
	Total Credits	**5 (4+1)**	

BIO 101	INTRODUCTORY BIOLOGY (NEED BASED) NON-GRADIAL (For B.Sc. (Hons.) Agriculture & B.Sc. (Hons.) Agribusiness)	1 (1+0) NG	SEM I

Objectives

To impart the basics of plant cell and structure of flowers to non-biology background students.

Theory

Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division. Morphology and anatomy of flowering plants. Seed and seed germination. Plant systematics viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

Suggested Readings

1. Biology- Text Book of class XI, NCERT, New Delhi
2. Biology- Text Book of class XII, NCERT, New Delhi

BIO 103	BASIC BIOLOGY (For B.Tech. Biotechnology)	2 (2+0)	SEM I

Objectives

1. To study the basic taxonomy and classification of plants
2. To study the features of the plant kingdom and morphology
3. To study the internal structure of plants
4. To study cells and biomolecules
5. To study the animal kingdom and nomenclature
6. To study the organisation of mammalian systems

Theory

The plant kingdom and features of each group. Morphology, modifications and functions of root, stem, leaf, flower and inflorescence. Pollination and fertilisation. Fruit types. Structure of dicot and monocot seeds, and seed germination.

Cell structure. DNA, chromosomes and genes. Cell and tissue types. Internal structure of root, stem and leaf.

Plant taxonomy, systems of classification. Characteristics and economic importance of Poaceae, Brassicaceae, Fabaceae, Malvaceae, Rutaceae, Rosaceae, Asteraceae and Solanaceae families.

Introduction to Zoology. Structure and functions of the cell and cell organelles. The difference between prokaryotic and eukaryotic cells. Structure and function of biomolecules. Types of simple and compound tissues.

Binomial nomenclature. Classification and general survey of the animal kingdom. Functional organisation of various systems of a mammal: digestive, circulatory, respiratory, excretory, nervous and reproductive. Laws of inheritance. Multiple allelism - blood groups. Genetic disorders in human and their inheritance.

Suggested Readings

1. Bendre AM and Kumar A, 1999, Textbook of Practical Botany. Vol. 2, 7th edn, Rastogi Publications.
2. Bendre AM and Pande PC, 2009, Introduction to Botany, Rastogi publications.
3. Bhatia K.N. and Tyagi M.P. 2020 Elementary Biology. A Truemen publication
4. David M Hillis; H Craig Heller; Sally D Hacker; David W Hall; David E Sadava. 2020. Life: the science of biology, 12th edn, Sunderland publication. eBook
5. Dutta AC, 1995, A Class Book of Botany, 16th edn, Oxford University Press.
6. NCERT 2021. Biology of Class XI. NCERT, India.
7. Pande PC and Jain DK, 2022, A textbook of Botany, Angiosperm. S. Chand publications.
8. Bhatia KN and Tyagi MP, 2020, Elementary Biology, A Truemen Publication.
9. Chopra G and Dhami PS, 2021, A Textbook of Biology, Pradeep Publications.
10. David MH, Craig HH, Sally DH, David WH and David ES, 2020, Life: the science of biology, 12th Ed, Sunderland Publication.
11. NCERT, 2022, Biology of Class XI, 2022-23. NCERT, India.

PL PHY 201	**FUNDAMENTALS OF CROP PHYSIOLOGY (For B.Sc. (Hons.) Agriculture and B.Tech. Biotechnology)**	**3 (2+1)**	**SEM Agri.: V Biotech: III**

Objectives

To explain about the basic physiological process of plant viz. plant cell and water relations, mineral nutrition, carbon metabolism, reproductive physiology and plant growth and development

Theory

Definitions of plant physiology and crop physiology; Importance of crop physiology; Relationship of crop physiology with other branches of crop science; Diffusion and osmosis; Physiological roles of water to crop plants; Definition of water potential and components of water potential; Water absorption by plants: Concept of active and passive absorption; Water loss by plants: Types of water loss: transpiration, stomatal physiology and guttation; Water use efficiency; Essential and beneficial elements; Passive and active transport of mineral element; Functions of essential elements; Criteria of essentiality of nutrients; Correction measures for nutrient deficiency symptoms; Foliar nutrition and root feeding − significance; Aeroponics Imbibition; Field capacity, permanent wilting point and available soil moisture; Apoplast, symplast and transmembrane, Ascent of sap − theories and mechanism; Soil-plant-atmospheric continuum. Significance of transpiration. Stomatal opening and closing mechanisms. Definition of Cavitation and embolism. Antitranspirants - types and examples. Hydroponics and sand culture. Overview of plant cell - organelle and their functions. Brief outline of: Photosynthetic apparatus, pigment system, quantum requirement and quantum yield; Structure of chloroplast, Examples of different photosynthetic pigments (chlorophyll, carotenoids, phycobilins etc.), Difference between chlorophyll a and chlorophyll b, Structure of chlorophyll a and chlorophyll b, Short discussion on quantum requirement and quantum yield, Red drop and Emerson enhancement effect, Pigment system I and II.

Introduction to light reaction of photosynthesis, Light absorption by photosynthetic pigments and transfer of energy. Source of O2 during photosynthesis: Hill reaction; Brief introduction to cyclic and non-cyclic photo-phosphorylation: production of assimilatory powers; Introduction to C3, C4 and CAM pathways: Calvin Cycle, Hatch and Slack Cycle, CAM Cycle; Significance of these pathways (concept of photorespiration, absence of photorespiration in C4 plant: Productivity of C4 plant, CAM: an adaptive mechanism); Factors affecting photosynthesis (light, temperature, CO2, O2 etc.). Outline of the process of respiration: Definition and importance, Glycolysis, Kreb Cycle and ETC, Factors affecting respiration (O2, temperature, CO2 etc.). Terminologies / Definitions: Growth, Development and Differentiation. Measurement of plant growth (fresh weight, dry weight, linear dimension, area etc.). Introduction to CGR, RGR, NAR etc. Photoperiodism: Photoperiodic Classification of plants: Short Day Plant, Long Day Plant, Day Neutral plant etc. Introduction to Photoperiodic induction site of photo-inductive perception, Role of Phytochrome Introduction to Vernalization (What is vernalization, devernalization etc.), Meaning, classification (seasonal, sequential etc), relation with abscission. Physiological and biochemical changes during senescence, Abscission and its significance, Concept of stay green, Hormonal regulation of senescence. Terminologies / Definitions: Plant hormone, Plant growth regulators (PGR), Plant growth inhibitor. Recognized classes of PGR (Auxins, Gibberellins, Cytokinins, Ethylene and Abscisic acid) and their major physiological roles, Agricultural uses of PGRs (IBA, NAA, 2, 4 −D, GAs, Kinetin etc).

Practical

Study on structure and distribution of stomata; Demonstration of imbibition, osmosis, plasmolysis, estimation of water potential, relative water content; Tissue test for mineral nutrients, identification of nutrient deficiency and toxicity symptoms in plant; Identification of nutrients by hydroponics; Estimation of photosynthetic pigments, rate of photosynthesis, respiration and transpiration; Plant growth analysis; Study on senescence and abscission, hormonal regulation of senescence; Demonstration of the effects of different PGRs on plants, Leaf anatomy of C3 and C4 plants.

Suggested Readings

1. Devlin's Exercises in Plant Physiology by Robert Devlin, Francis H. Witham and David F. Blaydes
2. Fundamentals of Plant Physiology by Lincoln Taiz, Eduardo Zeiger, Ian Max Molle and Angus Murphy
3. Plant Physiology by Robert M. Devlin and Francis H. Witham
4. Plant Physiology by Lincoln Taiz and Eduardo Zeiger
5. Plant Physiology by Frank B. Salisbury and Cleon W. Ross

CHEMISTRY

Course No.	Course Title	Credits	Semester
CHEM 201	Engineering Chemistry (For B. Tech. Agricultural Engineering)	3 (2+1)	III
	Total Credits	**3 (2+1)**	

CHEM 201	ENGINEERING CHEMISTRY (For B. Tech. Agricultural Engineering)	3 (2+1)	SEM III

Objectives

To make the students acquainted with applications of chemistry in engineering and different chemical processes in agricultural and food engineering

Theory

Phase rule**:** Phase, component, degree of freedom, application to one component system, viz. water system, sulphur system, two component system, viz. pb-Ag system, desilverisation of Pb.

Colloids**:** Classification, properties like optical activity-Tyndall effect, Brownian movement, electrical properties –electrophoresis.

Corrosion**:** causes, types and methods of prevention- proper designing. Cathodic protection using pure metal and metal alloys, use of inhibitors.

Water**:** Temporary and permanent hardness, disadvantages of hard water, scale and sludge formation of boilers, boiler corrosion.

Basic idea on thermo-gravimetric analysis, polarographic analysis, nuclear radiation, detectors and analytical applications of radio-active materials, discovery of isotopes and new elements, release of atomic energy, radio-active tracer and carbon dating.

Fuels**:** Classifications, calorific value and its determination by bomb calorimeter.

Principles of food chemistry**:** Lipids, proteins, carbohydrates and their classifications, vitamins and their importance.

Enzymes and co-enzymes important in food processing and storage, their use in manufacturing of ethanol and acetic acid by fermentation method.

Introduction to food preservatives, definition, types natural and artificial preservative and its use, colouring and flavouring reagents of foods.

Lubricants**:** Classifications, properties-viscosity, flash point and fire point mechanism, thick film, thin film and extreme pressure, neutralization point, saponification number and mechanical stability.

Polymers**:** Type of polymerization with examples (addition, free radical); Different properties of polymers chemical resistance, crystallinity. Effect of heat on polymers, general use, molecular weight determination.

Introduction to IR spectroscopy**:** Basic principles of spectroscopy, Beer-Lambarts law, types of vibration, symmetric, asymmetric vibration and it type, absorbances of different functional group in IR.

Practical

To separate colored components by using Paper Chromatography.To determine of temporary and permanent hardness of water by EDTA method; To study the different types of fuels and compare their characteristics; To study different types of foods and their ingredients; Determination of alkalinity in the given water sample; Determination of available chlorine in bleaching powder; To estimate chloride in water sample; To estimate dissolved oxygen in water sample; Determination of viscosity of lubricant by REDWOOD Viscometer; To determine flash and fire point of an oil by PENSKY MARTEN's flash point apparatus; To determine λ max and verification of Beer-Lambert law.

Suggested Readings

1. Bahl, B. S., Bahl, A. and Tuli, B. D. 2007. *Essentials of Physical Chemistry*. S. Chand and Co. Ltd, Delhi.
2. Finar, I. L. 2002. *Organic Chemistry*. Vol I and II. Pearson.
3. Glasstone, S. *Elements of Physical Chemistry*. The Macmillan Company of India Limited.
4. Jain and Jain. 2016. *Engineering Chemistry*. Dhanpat Rai Publication.
5. Jain, P. L. and Jain, M. 1994. *Engineering Chemistry*. Dhanpat Rai publishing company Pvt. Ltd, Delhi.
6. Morrison, R. T., Boyd, R. N. and Bhattacharjee, S. K. 2010. *Organic Chemistry*. Pearson.
7. Sharam, Y. R. 2013. *Elementary Organic Spectroscopy*. S Chand.

COMPUTER SECTION

Course No.	Course Title	Credits	Semester
COMP 101 (SEC I)	Computer Applications in Agriculture (For B.Sc. (Hons.) Agribusiness Management)	2 (0+2)	I
COMP 202 (VAC)	Agricultural Informatics and Artificial Intelligence (For B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness Management, B.Sc. (Hons.) Community Science, B.F.Sc. and B.Tech. Biotechnology)	3 (2+1)	Agri: III AM: III CS: IV FS :IV Biotech: IV
	Total Credits	**5 (2+3)**	

COMP 101 (SEC I)	**COMPUTER APPLICATIONS IN AGRICULTURE (For B.Sc. (Hons.) Agribusiness Management)**	**2 (0+2)**	**SEM I**

Objectives

1. To understand the role of computer applications in modern agricultural practices.
2. To learn to use agricultural software and tools for data analysis, modeling, and decision- making.
3. To explore the application of Geographic Information Systems (GIS) and remote sensing in precision agriculture.
4. To develop skills in utilizing technology to optimize farm management, improve productivity, and reduce environmental impact.

Practical

Working with MS-DOS/Windows. Database concept and type. Database design. Data entry operation. Word processing: MS Office. Database management program. Use of electronic spreadsheet and graphics. Statistical and mathematical functions. Advanced statistical analysis Toolpak in MS Excel. Use of SPSS/SAS statistical packages. Basics of computer networking – LAN, SAN, Network topologies, Internet and Intranet – Basics of Email – Exposure to web browsing (structure of URL), Types of websites – Internet service provider – using internet news. Application of Geographic Information System (GIS) and remote sensing in agriculture

Suggested Readings

1. Computers in Agriculture: Fundamentals and Applications (Hardcover – 20 October 2016) by Sharma Manish, Anil Bhatt
2. Computer Applications in Agriculture By William Otto Rasmussen.
3. Computer Applications in Agriculture and Agribusiness (Paperback – Import, 1 June 1994) by Michael E. Newman (Author).

COMP 202 (VAC)	**AGRICULTURAL INFORMATICS AND ARTIFICIAL INTELLIGENCE (For B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness Management, B.Sc. (Hons.) Community Science, B.F.Sc. and B.Tech. Biotechnology)**	**3 (2+1)**	**SEM Agri: III AM: III CS: IV FS: IV Biotech: IV**

Objectives

1. To acquaint student with the basics of computer applications in agriculture, multimedia, database management, application of mobile app and decision-making processes, etc.
2. To provide basic knowledge of computer with applications in Agriculture
3. To make students familiar with Agricultural-Informatics, its components and applications in agriculture

Theory

Introduction to Computers, Anatomy of Computers, Memory Concepts, Units of Memory, Operating System: Definition and types, Applications of MS-Office for creating, Editing and Formatting a document, Data presentation, Tabulation and graph creation, Statistical analysis, Mathematical expressions, Database, concepts and types, creating data base, Uses of DBMS in Agriculture. Internet and World Wide Web (WWW): Concepts and components.

Computer programming: General concepts, Introduction general programming concepts. Concepts and standard input/output operations. e-Agriculture, Concepts, design and development, Application of innovative ways to use information and communication technologies (IT) in Agriculture. Computer Models in Agriculture: Statistical, weather analysis and crop simulation models, concepts, inputs-outputs files, limitation, advantages and application of models for understanding plant processes, sensitivity, verification, calibration and validation, IT applications for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management. Smartphone mobile apps in agriculture for farm advice: Market price, post-harvest management etc. Geospatial technology: Concepts, techniques, components and uses for generating valuable agri-information. Decision support systems: Concepts, components and applications in Agriculture. Agriculture Expert System, Soil Information Systems etc., for supporting farm decisions. Preparation of contingent crop planning and crop calendars using IT tools. Digital India and schemes to promote digitalization of agriculture in India.

Introduction to artificial intelligence, background and applications, Turing test. Control strategies, Breadth-first search, Depth-first search, Heuristics search techniques: Best-first search, A* algorithm, IoT and Big Data; Use of AI in agriculture for autonomous crop management, and health, monitoring livestock health, intelligent pesticide application, yield mapping and predictive analysis, automatic weeding and harvesting, sorting of produce, and other food processing applications; Concepts of smart agriculture, use of AI in food and nutrition science etc.

Practical

Study of computer components, accessories, practice of important DoS Commands, Introduction of different operating systems such as Windows, Unix/Linux, creating files and folders, File Management .Use of MS-Word and MS Power-point for creating, editing and presenting a scientific documents, MS-EXCEL-Creating a spreadsheet, Use of statistical tools, Writing expressions, Creating graphs, Analysis of scientific data, MS-ACCESS: Creating Database, preparing queries and reports, Demonstration of Agri- information system, Introduction to World Wide Web (WWW) and its components, Introduction of programming languages such as Visual Basic, Java, Fortran, C, C++, Hands on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/Crop Syst/ Wofost, Preparation of inputs file for CSM and study of model outputs, computation of water and nutrient requirements of crop using CSM and IT tools, Use of smartphones and other devices in agro-advisory and dissemination of market information, Introduction of Geospatial technology, AR/ VR demonstration, Preparation of contingent crop planning, India Digital Ecosystem of Agriculture (IDEA).

Suggested Readings

1. Concepts and Techniques of Programming in C by Dhabal Prasad Sethi and Manoranjan, Wiley India.
2. Fundamentals of Computer by V. Rajaroman.
3. Introduction to Information Technology by Pearson.
4. Introduction to Database Management System by C. J. Date.
5. Introductory Agri-Informatics by Mahapatra, Subrat K et al, Jain Brothers Publication.

LANGUAGES AND HARYANAVI CULTURE

Course No.	Course Title	Credits	Semester
ENG 101 (AEC)	Communication Skills (For B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness, B.Sc. (Hons.) Community Science, B.F.Sc., B.Tech. (Agricultural Engineering) and B.Tech. Biotechnology)	2 (1+1)	Agri: I AM: I FS: I Biotech: I CS: II AE: II
ENG 301	Human Values and Personality Development (for B. Tech. Agriculture Engineering)	2 (1+1)	V
	Total Credits	**4 (2+2)**	

ENG 101 (AEC)	**COMMUNICATION SKILLS (For B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Agribusiness Mangement, B.Sc. (Hons.) Community Science, B.F.Sc., B.Tech. Agricultural Engineering and B.Tech. Biotechnology)**	**2 (1+1)**	**SEM** **Agri: I** **AM: I** **FS: I** **Biotech: I** **CS: II** **AE: II**

Objectives

To acquire competence in oral, written and non-verbal communication, develop strong personal and professional communication and demonstrate positive group communication.

Theory

Communication Process**:** The magic of effective communication; Building self-esteem and overcoming fears; Concept, nature and significance of communication process; Meaning, types and models of communication; Verbal and non-verbal communication; Linguistic and non-linguistic barriers to communication and reasons behind communication gap/ miscommunication.

Basic Communication Skills: Listening, Speaking, Reading and Writing Skills; Precis writing/ Abstracting/Summarizing; Style of technical communication Curriculum vitae/resume writing; Innovative methods to enhance vocabulary, analogy questions.

Structural and Functional Grammar**:** Sentence structure, modifiers, connecting words and verbal; phrases and clauses; Case: subjective case, possessive case; objective case; Correct usage of nouns, pronouns and antecedents, adjectives, adverbs and articles; Agreement of verb with the subject: tense, mood, voice; Writing effective sentences; Basic sentence faults;

Practical

Listening and note taking; Writing skills: precis writing, summarizing and abstracting; Reading and comprehension (written and oral) of general and technical articles; Micro-presentations and Impromptu Presentations: Feedback on presentations; Stage manners: grooming, body language, voice modulation, speed;

Group discussions; Public speaking exercises; vocabulary building exercises; Interview Techniques; organization of events.

Suggested Readings

1. Allport, G. W.1937. Personality: A Psychological Interpretation. Holt, New York.
2. Brown Michele and Gyles Brandreth. 1994. How to Interview and be Interviewed. Sheldon Press, London.
3. Carnegie Dale. 1997. The Quick and Easy Way to Effective Speaking. Pocket Books, New York.
4. Francis Peter S J. 2012. Soft Skills and Professional Communication. Tata McGraw Hill, New Delhi.
5. Kumar S and Pushpa Lata. 2011. Communication Skills. Oxford University Press.
6. Neuliep James W. 2003. Intercultural Communication A Contextual Approach. Houghton Mifflin Co Boston.
7. Pease, Allan. 1998. Body Language. Sudha Publications, Delhi.
8. Raman M and Singh P. 2000. Business Communication. Oxford University Press.
9. Seely J. 2013. Oxford Guide to Effective Writing and Speaking. Oxford University Press.
10. Thomson A J and Martinet A V. 1977. A Practical English Grammar. Oxford University

ENG 301	**HUMAN VALUES AND PERSONALITY DEVELOPMENT (For B. Tech. Agricultural Engineering)**	**2 (1+1)**	**SEM V**

Objectives

1. To make students realize their potential strengths, cultivate their inter-personal skills and improve employability
2. Development of a holistic perspective based on self- exploration about themselves (human being), family, society and nature/existence.
3. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
4. Strengthening of self-reflection.
5. Development of commitment and courage to act.

Theory

Personality definition, Nature of personality, theories of personality and its types. The humanistic approach - Maslow's self-actualization theory, shaping of personality, determinants of personality, Type A and Type B Behaviours, personality and Organizational Behaviour. Technical Writing: Reports & its types, Letters & its types. Foundations of individual behaviour and factors influencing individual behaviour, Models of individual behaviour, Perception and attributes and factors affecting perception. Learning: Meaning and definition, theories and principles of learning,

Learning and organizational behaviour, Learning and training, learning feedback. Speaking on given topics.

Attitude and values, Intelligence- types of Intelligence, theories of intelligence, measurements of intelligence, factors influencing intelligence, intelligence and Organizational behaviour, emotional intelligence. Motivation- theories and principles, Teamwork and group dynamics. Comprehension Passages (General & Technical articles).

Practical

Learning Styles and Strategies, Motivational needs, Interpersonal Communication, Teamwork and team building, Group Dynamics, Win-win game, Conflict Management, Leadership styles, Case studies on Personality and Organizational Behaviour. Introduction to Phonetics and spoken English, Phonemic symbols, Syllable, Word Accent.

Suggested Readings

1. Andrews, Sudhir. 1988. How to Succeed at Interviews. Tata McGraw-Hill.
2. Heller, Robert. 2002. Effective Leadership. Essential Manager series. Dk Publishing.
3. Hindle, Tim. 2003. Reducing Stress. Essential Manager series. Dk Publishing.
4. Lucas, Stephen. 2001. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill.
5. Mile, D.J. 2004. Power of Positive Thinking. Delhi. Rohan Book Company.
6. Kumar, Pravesh. 2005. All about Self- Motivation. New Delhi. Goodwill Publishing House.
7. Smith, B. 2004. Body Language. Delhi: Rohan Book Company.
8. Shaffer, D. R. 2009. Social and Personality Development (6th Edition). Belmont, CA: Wadswor.
9. Human Values and Professional Ethics by R R Gaur, R Sangal, G P
10. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
11. The Story of Stuff (Book).
12. Rediscovering India - by Dharampal
13. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
14. India Wins Freedom - Maulana Abdul Kalam Azad
15. Vivekananda - Romain Rolland (English)

MATHEMATICS AND STATISTICS

Course No.	Course Title	Credits	Semester
MATH 101	Introductory Mathematics (Need based) (For B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Agribusiness Management)	1 (1+0) NG	I
MATH 103	Basic Mathematics (For B.Tech. Biotechnology)	2 (2+0)	I
MATH 201	Engineering Mathematics I (For B. Tech. Agricultural Engineering)	3 (3+0)	III
MATH 203	Biomathematics (For B.Tech. Biotechnology)	2 (2+0)	III
MATH 202	Engineering Mathematics II (For B. Tech. Agricultural Engineering)	3 (3+0)	IV
STAT 301	Biostatistics (For B.Tech. Biotechnology)	2 (1+1)	VI
STAT 302	Basic and Applied Agril Statistics (For B.Sc. (Hons.) Agriculture)	3 (2+1)	VI
STAT 401	Agricultural Statistics and Data Analysis (For B. Tech. Agricultural Engineering)	2 (1+1)	VII
STAT 402	Statistical Methods (For B.Sc. (Hons.) Community Science)	2 (1+1)	VII
	Total Credits	**19 (15+4)**	

MATH 101	INTRODUCTORY MATHEMATICS (Need Based) (For B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Agribusiness Management)	1 (1+0) NG	SEM I

Objectives

To make the students acquainted with the basic mathematics applied in agriculture and their applications

Theory

Algebra: Progressions- Arithmetic, Geometric and Harmonic Progressions. Matrices: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3rd order by adjoint method, Properties of determinants up to 3rd order and their evaluation.

Differential Calculus: Definition - Differentiation of function using first principle, Derivatives of sum, difference, product and quotient of two functions, Methods, Increasing and Decreasing Functions. Application of Differentiation- Growth rate, Average Cost, and Marginal cost, Marginal Cost, Marginal Revenue. Partial

differentiation: Homogeneous function, Euler's theorem, Maxima and Minima of the functions of the form y = f (x) and y = f (x1, x2).

Integral Calculus: Integration -Definite and Indefinite Integrals-Methods- Integration by substitution, Integration by parts. Area under simple well-known curves.

Mathematical Models: Agricultural systems - Mathematical models - classification of mathematical models- Fitting of Linear, quadratic and exponential models to experimental data.

Suggested Readings

1. NCERT, 2012, Mathematics of Class XII, NCERT, India.
2. Sharma RD, 2014, Mathematics of Class XII, Dhanpat Rai Publisher.
3. Narayan, S. 2004. *Differential Calculus*. S. Chand and Co. Ltd. New Delhi.
4. Narayan, S. 2004. *Integral Calculus*. S. Chand and Co. Ltd. New Delhi.

MATH 103	**BASIC MATHEMATICS (For B.Tech. Biotechnology)**	**2 (2+0)**	**SEM I**

Objectives

1. To study the basic principles and functions in mathematics, like limits and continuity
2. To study differentiation and integration
3. To study matrices and determinants

Theory

Functions: Defination, types of functions. Limit: Introduction, left-handed and right-handed limits, general rules for calculating limits, Standard limits. Continuity: Definition of continuity, continuity of algebraic functions, continuity of trigonometric and exponential functions. Types of discontinuity

Differentiation: Differentiation by the first principle, sum, difference, product and quotient formulae, differentiation using the chain rule, differentiation of functions in parametric and implicit form, logarithmic differentiation, geometrical interpretation of derivative. Successive differentiation, geometrical interpretation of derivative, maxima and minima, tangent and normal.

Integration: Integration of simple functions, Integration by substitution, integration by partial fractions, integration by parts, integration by trigonometric substitution.

Matrices and Determinants: Definition of matrix, addition, subtraction and multiplication, inverse of matrix. Properties of determinants Solution of linear equations by Cramer's rule and the inverse of a matrix.

Suggested Readings

1. NCERT, 2012, Mathematics of Class XII, NCERT, India.
2. Sharma RD, 2014, Mathematics of Class XII, Dhanpat Rai Publisher.

MATH 201	ENGINEERING MATHEMATICS I (For B. Tech. Agricultural Engineering)	3 (3+0)	SEM III

Objectives

To make the students acquainted with the basic mathematics, including calculus, Matrices and complex analysis applied in engineering and their applications in solving engineering problems

Theory

Differential calculus: Functions of two or more variables, Taylor's and Maclaurin's expansions, Maxima and minima.

Integral calculus: Double integrals, change of order of integration, triple integrals, application of double and triple integrals to find area and volume.

Vector calculus: Scalar and vector point functions, vector differential operator Del, gradient of scalar point function, divergent and curl of vector point function and their physical interpretations, line, surface and volume integrals, Green's, Stock's and Divergence theorem (without proofs).

Fourier series: Periodic functions, Euler's formulae, functions having arbitrary period, even and odd functions, half-range series expansion, series expansion of functions with finite discontinuity.

Complex Analysis: Functions of a complex variable, limit, continuity and analytic function, Cauchy-Reimann equations, harmonic functions.

Matrices: Elementary transformations, Gauss elimination, Gauss-Jordan method to find the inverse of a matrix. rank of a matrix, solution of linear equations, Eigen values and Eigen vectors, Cayley-Hamilton Theorem-its use to find the inverse of a matrix, linear transformation, diagonalization of matrices.

Suggested Readings

1. Grewal, B. S. 2004. Higher Engineering Mathematics. Khanna Publishers Delhi.
2. Narayan, S. 2004. A Text Book of Vector. S. Chand and Co. Ltd. New Delhi.
3. Narayan, S. 2004. Differential Calculus. S. Chand and Co. Ltd. New Delhi.
4. Narayan, S. 2004. Integral Calculus. S. Chand and Co. Ltd. New Delhi.

MATH 203	BIOMATHEMATICS (For B.Tech. Biotechnology)	2 (2+0)	SEM III

Objectives

1. To study the basic theories of mathematics
2. To study factor reduction and eigenvalues
3. To study the applications of biomathematics

Theory

Rolle's theorem, Lagrange's theorem, Taylor's and Maclaurin's series. Partial differentiation, Euler's theorem on homogeneous functions, and change of variable. Jacobian, maxima and minima of two or more than two variables, Elementary transformations, Rank of matrix, Echelon form, Solution of system of linear

equations, eigenvalues and eigenvectors of a matrix. Reduction formulae, definite integrals and their properties, Area under simple, well known curves.

Solution of ordinary differential equation of first degree and first order and their application for the determination of the volume of blood and drug distribution. Epidemic models, simultaneous differential equation of first order and their applications to predator models. Linear differential equations of higher order and their applications to the simple biological problem. Numerical methods for solving algebraic and transcendental equations.

Suggested Readings

1. Grewal BS, 2013, Higher Engineering Mathematics, Khanna Publishers.
2. Rastogi SK, 2008, Biomathematics, Krishna Prakashan Media Pvt. Ltd.
3. Srivastava AC and Srivastava PK, 2011, Engineering Mathematics, Vol. I, PHI Learning Pvt. Ltd.
4. Srivastava AC and Srivastava PK, 2011, Engineering Mathematics, Vol.III, PHI Learning Pvt. Ltd.

MATH 202	ENGINEERING MATHEMATICS II (For B. Tech. Agricultural Engineering)	3 (3+0)	SEM IV

Objectives

To make the students acquainted with the application of various advanced mathematics such as differential equations, Laplace transform and applications of numerical methods in engineering.

Theory

Ordinary Differential Equations: First order differential equations, exact and reducible to exact form by integrating factors, linear differential equation and Bernoulli's equation, equations of first order and higher degree, Clairaut's equation. Higher order differential equations: Methods of finding complementary functions and particular integrals, methods of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients.

Partial Differential Equations: Partial derivative and total derivative, homogeneous functions and Euler's theorem. Formation of PDE, higher order linear PDE with constant coefficients, solution of non-linear PDE, Charpit's method.

Laplace Transform: rules for Laplace transform and inverse Laplace transform, applications to find solutions of ordinary and simultaneous differential equations.

Numerical Methods: Finite difference operators and their relationship, factorial notation. Newton's forward and backward interpolation formula, Newton's divide difference interpolation and Lagrange's interpolation formula, numerical differentiation and integration rule, numerical solutions of ODE by Taylor's series, Euler's and modified Euler's method, Runge-Kutta method of order four.

Suggested Readings

1. Grewal, B S. 2004. Higher Engineering Mathematics. Khanna Publishers Delhi.
2. Narayan, S. 2004. A Text Book of Vector. S. Chand and Co. Ltd., New Delhi.
3. Narayan, S. 2004. Differential Calculus. S. Chand and Co. Ltd., New Delhi.
4. Narayan, S. 2004. Integral Calculus. S. Chand and Co. Ltd. New Delhi.
5. Ramana, B. V. 2008. Engineering Mathematics. Tata McGraw-Hill, New Delhi.

STAT 301	BIOSTATISTICS (For B.Tech. Biotechnology)	2 (1+1)	SEM VI

Objectives

1. To study the variables and descriptive statistics
2. To study various distributions
3. To study experimental data analysis and interpretation

Theory

Random variables: expected value and its variance; probability distribution of random variables; conditional probability; Bayes' theorem and its applications; introduction to uniform, binomial, Poisson, normal, exponential, and gamma probability distributions.

Random mating populations, Hardy-Weinberg Law. Introduction to Poisson process and Markov chains. Transition probability matrix, n-step transition probabilities, steady state. Random walk models. Sensitivity and specificity. Positive and negative predictive values.

Chi-square test: testing heterogeneity, use in the genetic experiment, detection of linkage, linkage ratios and their estimation. Analysis of variance. One-way and two-way classification with interaction. Analysis of covariance. Incomplete block designs. Estimation and significance of genotypic and phenotypic variation.

Practical

Expected value and variance of discrete and continuous distributions. Uniform, binomial, Poisson, normal, exponential and gamma probability distributions. Hardy-Weinberg Law. Construction of the transition probability matrix in Markov Chains. Calculation of sensitivity and specificity. Positive and negative predictive values. Detection and linkage using chi-square test; one-way and two-way analysis of variance. Analysis of covariance. Incomplete block designs. Estimation of heritability.

Suggested Readings

1. Gupta SC, Kapoor VK, 2007, Fundamentals of applied statistics, 4th edn, S Chand and Sons.
2. Kaps M and Lamberson WR, 2017, Biostatistics for Animal Science, 3rd edn, CABI.
3. Triola MM, Triola MF and Roy J, 2017, Biostatistics for the Biological and Health Sciences, 2nd edn, Pearson.

STAT 302	BASIC AND APPLIED AGRIL STATISTICS (For B.Sc. (Hons.) Agriculture)	3 (2+1)	SEM VI

Objectives

To provide an idea on statistical concepts of both descriptive and inference Statistics which will be useful to do statistical analysis

Theory

Introduction to Statistics and its Applications in Agriculture: Types of Data. Scales of measurements of Data. Summarization of Data. Classification of Data. Frequency Distribution. Methods of Classification. Definition of Grouped and Ungrouped Data. Definition of Class Interval (formula for determining the no. of class interval), Width of CI, Class Limits (Boundaries), Mid Points. Types of Frequency Distribution. Diagrammatic Presentation of Data. Bar Diagrams −Simple, Multiple, Sub-divided and Percentage Bar Diagrams. Pie-diagram. Graphical Presentation of Data − Histogram, Frequency Polygon and Ogives.

Measures of Central Tendency: Requisites for an Ideal Measure of Central Tendency. Different Types of Measure. Arithmetic Mean− Definition, Properties, Merits, Demerits and Uses. A.M. (examples) for Grouped and Ungrouped Data. Step-deviation Method. Weighted Mean. Definition of Geometric Mean and Harmonic Mean. Relationship between A.M., G.M. and H.M. Median-Definition, Merits, Demerits and Uses. Graphical Location of Median. Mode- Definition, Merits, Demerits and Uses. Graphical Location of Mode. Relationship between Mean, Median and Mode.

Measures of Dispersion: Characteristics for an Ideal Measure of Dispersion. Different Types of Measures of Dispersions. Definition of Range, Interquartile Range, Quartile Deviation and Mean Deviation. Standard Deviation- Definition, Properties. S.D. and Variance for Grouped and Ungrouped Data. Variance of Combined Series. Co-efficient of Dispersions. Co-efficient of Variation.

Measures of Skewness and Kurtosis: Definition of Symmetrical Distribution. Definition of Skewness, Measures of Skewness. Definition of Kurtosis. Measure of Kurtosis. Relationship between Mean, Median and Mode for Symmetrical and Skewed Distribution.

Probability Theory and Normal Distribution: Introduction to Probability. Basic Terminologies. Classical Probability-Definition and Limitations. Empirical Probability- Definition and Limitations. Axiomatic Probability.

Addition and Multiplication Theorem (without proof): Conditional Probability. Independent Events. Simple Problems based on Probability. Definition of Random Variable. Discrete and Continuous Random Variable. Normal Distribution-Definition, Prob. Distribution, Mean and Variance. Assumptions of Normal Distribution. Normal Probability Curve. Correlation and Regression. Definition of Correlation. Scatter Diagram. Karl Pearson's Coefficient of Correlation. Types of Correlation Coefficient. Properties of Correlation Coefficient. Definition of Linear Regression. Regression Equations. Regression Coefficients. Properties of Regression Coefficients. Tests of Significance. Definition. Null and Alternative Hypothesis. Type

I and Type II Error. Critical Region and Level of Significance. One Tailed and Two Tailed Tests. Test Statistic. One Sample, Two Sample and Paired t-test with Examples: F-test for Variance. ANOVA and Experimental Designs. Definition of ANOVA. Assignable and Non assignable Factors. Analysis of One-way Classified Data. Basic Examples of Experimental Designs. Terminologies. Completely Randomized Design (CRD). Sampling Theory. Introduction. Definition of Population, Sample, Parameter and Statistic. Sampling Vs Complete Enumeration. Sampling Methods. Simple Random Sampling with Replacement and without Replacement. Use of Random Number Table.

Practical

Diagrammatic and Graphical representation of data. Calculation of A.M., Median and Mode (Ungrouped and Grouped data). Calculation of S.D. and C.V. (Ungrouped and Grouped data). Correlation and Regression analysis. Application of t-test (one sample, two sample independent and dependent). Analysis of variance one-way classification. CRD. Selection of random sample using simple random sampling.

Suggested Readings

1. Fundamentals of Statistics by D. N. Elhance, Kitab Mahal Publishers.
2. Fundamentals of Applied Statistics by S.C. Gupta and V. K. Kapoor, Sultan Chand and Sons.
3. Basic Statistics by B. L. Agarwal, New Age International Publishers.
4. Agricultural Statistics by S.P. Singh and R.P.S. Verma, Rama Publishing House.
5. Agriculture and Applied Statistics-I by P.K. Sahu, Kalyani Publishers.
6. Agriculture and Applied Statistics-II by P. K. Sahu and A. K. Das, Kalyani Publishers.

STAT 401	**AGRICULTURAL STATISTICS AND DATA ANALYSIS (For B. Tech. Agricultural Engineering)**	**2 (1+1)**	**SEM VII**

Objectives

To make the students acquainted with important statistical data analysis tools and application of these for research in agricultural engineering

Theory

Introduction to statistics: Definition, advantages and limitations; Data- types of data, quantitative and qualitative; variable - discrete and continuous; Frequency distribution table: construction of frequency distribution table (inclusive and exclusive)- number of classes, length of class, tally marks, frequency, class midpoint, cumulative frequencies, frequency curves, graphs and charts. Measures of central tendency: Definition, characteristics of ideal average, different measures; arithmetic mean, median, mode, geometric mean and harmonic mean for grouped and ungrouped data, merits and demerits; Measures of dispersion: definition, different measures (absolute and relative); range, quartile deviation, mean deviation, standard deviation (SD), variance and coefficient of variation. Probability: Definition and

concept of probability; Random variable: concept of random variable and expectation; Simple linear correlation: concept, definition, types and its properties; Simple linear regression: concept, definition and its properties; Normal distribution: definition, density function, curve, properties, standard normal distribution (SND), properties including area under the curve (without proof); Binomial distribution: definition, density function and properties; Poisson distribution: definition, density function and properties; Introduction to sampling: definition of statistical population, sample, random sampling, parameter, statistic, sampling distribution, concept of standard error of mean. Testing of hypothesis – hypothesis, null hypothesis, types of hypotheses, level of significance, degrees of freedom – statistical errors; Large Sample test (Z-test), small sample t-test (one tailed, two tailed and paired tests); Testing of significance through variance (F-test), Chi-square test: goodness of fit and testing of independence of attributes (2 × 2 contingency table)

Practical

Construction of frequency distribution tables and frequency curves; Computation of arithmetic mean, median and mode for un-grouped and grouped data; Computation of harmonic and geometric mean; Computation of standard deviation (SD); Variance and coefficient of variation for un-grouped and grouped data; Computation of skewness, kurtosis; Standard normal distribution test for single sample mean (population SD known and unknown); SND test for two samples means (population SD known and unknown); Computation of binomial distribution; Computation of Poisson distribution; Calculation of correlation coefficient and its testing; Calculation of regression coefficient, regression line; Student's t-test for single sample mean; t-test for two samples means; Paired t test; F– test for equality for two sample variance test; Computation of Chi-square test: goodness of fit and testing of independence of attributes (2 × 2 contingency table) and m × n.

Suggested Readings

1. Agrawal, B. L. 1991. Basic Statistics. Wiley Eastern Ltd. New Age International Ltd.
2. Chandel, S. R. S. 1999. A Handbook of Agricultural Statistics. Achal Prakasan Mandir, Kanpur
3. Gupta, S. C. and Kapoor, V. K. 1970. Fundamentals of Mathematical Statistics. Sultan Chand & Sons. Gupta, S. C. and Kapoor, V. K. 2019. Fundamental Applied Statistics. Sultan Chand & Sons.
4. Nageswara Rao, G. 2007. Statistics for Agricultural Sciences. BS Publications.
5. Rangaswamy, R. 2018. A Text Book of Agricultural Statistics. New Age Int. Publications Ltd.

STAT 402	**STATISTICAL METHODS (For B.Sc. (Hons.) Community Science)**	**2 (1+1)**	**SEM VII**

Objectives

To develop understanding among students about sampling and data analysis techniques, methods of data analysis using various statistics.

Theory

Introduction to statistics and its applications in agriculture, graphical representation of data, measures of central tendency. Dispersion and their merits and demerits. Probability and distribution: definition of probability, addition and multiplication theorem (without proof). Simple problems based on probability. Binomial and Poisson Distributions. Correlation and regression: definition of correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation, Spearman correlation coefficient and their properties. Linear Regression Equations. Introduction to Test of Significance, One sample; two sample test t for Means, Chi-Square Test of Independence of Attributes in 2 ×2 Contingency Table. Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample. Introduction to various statistical packages.

Practical

Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Dispersion (Ungrouped Data). Measures of Dispersion (Grouped Data). Moments, Measures of Skewness & Kurtosis (Ungrouped Data). Moments, Measures of Skewness & Kurtosis (Grouped Data). Correlation & Regression Analysis. Application of One Sample t-test. Application of Two Sample Fisher's test. Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for 2 ×2 contingency table. Selection of random sample using Simple Random Sampling. Use of software packages.

Suggested Readings

1. Agarwal, B. L. 2006. Basic Statistics. New Age International Publisher.
2. Gupta SC. 2006. *Fundamentals of Statistics.* Himalaya Publ. House.
3. Panse VG & Sukhatme PV. 1985. *Statistical Methods for Agricultural Workers.* ICAR. Rao GN. 2007. *Statistics for Agricultural Science.* Oxford & IBH.
4. Snedecor GW & Cochran WG. 1968. *Statistical Methods.* Oxford & IBH.
5. Sprent P. 1993. Applied Non-parametric Statistical Methods. 2nd Ed. Chapman & Hall.
6. Sukthame & Ashok C. 1984. *Sampling Theories and Surveys with Application.* 3rd Ed. ICAR.
7. Wetherill GB. 1982. Elementary Statistical Methods. Chapman & Hall.
8. William S. Cleveland (1994) The Elements of Graphing Data, 2ndEd., Chapman & Hall

MICROBIOLOGY

Course No.	Course Title	Credits	Semester
MICRO 101 (SEC II)	Production Technology for Bio-agents and Bio-fertilizers (For B.Sc. (Hons.) Agribusiness Management)	2 (0+2)	I
MICRO 102	Elementary Microbiology (For B.Tech. Biotechnology)	2 (1+1)	II
MICRO 302	Agricultural Microbiology and Phyto-remediation (For B.Sc. (Hons.) Agriculture)	2 (1+1)	VI
	Total Credits	**6 (2+4)**	

MICRO 101 (SEC II)	**PRODUCTION TECHNOLOGY FOR BIO-AGENTS & BIO-FERTILIZERS (For B.Sc. (Hons.) Agribusiness Management)**	**2 (0+2)**	**SEM I**

Objectives

1. To understand the principles and methods of producing bio-agents and bio-fertilizers.
2. To learn techniques for mass production and formulation of beneficial microorganisms.
3. To explore the role of bio-agents and bio-fertilizers in sustainable agriculture and soil health management.
4. To develop skills to integrate bio-agents and bio-fertilizers into crop production systems for enhanced yield and reduced environmental impact.

Practical

Agricultural Microbiology: Relevance of Biofertilizer in Agriculture. Types of Biofertilizers [(a) Nitrogen fixers: Rhizobium, Azotobacter, Azospirillum, Glucano acetobacter, Cyanobacteria and Azolla; (b) P-solubilizers: PSB, PSF; (c) K-solubilizers; (d) Zn-solubilizers; (e) P-mobilizers: AM fungi; (f) Development of consortia]. Mass Production Techniques [(a) Carrier based; (b) Liquid Biofertilizers]. Methods of application. Quality Control (Standards as per FCO (1985) amended in 2009).

Suggested Readings

1. Atlas Bartha. Microbial Ecology - Fundamentals and Application. Pearson (Fourth edn).
2. Bhoopander Giri, Ram Prasad et al. Biofertilizers for Sustainable Agriculture and Environment (Soil Biology Book 55).
3. Bikas R. Pati and Santi M. Mandal. Recent Trends in Biofertilizers.
4. Eiri Board. Handbook of Biofertilizers and Vermiculture. 1 January 2009.

5. Himadri Panda. Complete Technology Book on Biofertilizer and Organic Farming.
6. J. Nicklin, K. Graeme-Cook, T. Paget and R. Killington. Instant Notes in Microbiology. Viva.
7. M K Rai. Handbook of Microbial Biofertilizers.
8. Mark S. Coyne. Soil Microbiology - An Exploratory Approach. Delmar Publishers-2004
9. Michael Madigan, John Martinko, David Stahl and David Clark. Brock-Biology of Microorganisms. Pearson (Thirteen Edition).

MICRO 102	ELEMENTARY MICROBIOLOGY (For B.Tech. Biotechnology)	2 (1+1)	SEM II

Objectives

To study the-

1. History of microbiology and major groups of eukaryotes and prokaryotes
2. Preservation methods and repositories
3. Bacterial growth and metabolism
4. Applications of microbes

Theory

History of microbiology and its applied areas. Microorganisms and their role in health and the environment. Control and prevention measures against microorganisms/ diseases. Introduction to eukaryotic and prokaryotic cells. Major groups of eukaryotes: fungi, algae and protozoa. Major groups of prokaryotes: bacteria, archaea, rickettsia and chlamydia. Preservation of microorganisms and microbial repositories at the national and international levels.

Bacterial growth. Metabolism in bacteria, ATP generation, chemoautotrophy, photoautotrophy, respiration, and fermentation. Viruses, Bacteriophages, structure and properties, lytic and lysogenic cycles, viroids, and prions. Role of microorganisms in nutrient recycling (Biogeochemical cycles)

Beneficial microorganisms in agriculture, biofertilisers, and microbial pesticides. Microbes in composting and biodegradation. Microbiology of water and food.

Practical

Microscope and other instruments in a microbiological laboratory. Media preparation, sterilisation and aseptic methods for isolation, identification, preservation and storage. Identification of bacteria by staining methods. Purification of microorganisms by streak plate method. Enumeration of bacteria by pour plate and spread plate methods. Micrometry.

Suggested Readings

1. Woolverton CJ, Sherwood LM, and Willey JM, 2016, Prescott's Microbiology, McGraw-Hill Education.

MICRO 302	AGRICULTURAL MICROBIOLOGY AND PHYTO-REMEDIATION (For B.Sc. (Hons.) Agriculture)	2 (1+1)	SEM VI

Objectives

1. To get an introduction to microbiology with specific focus on its significance in agriculture science
2. To get acquainted with the bacterial structure and the function of the different bacterial components
3. To get highlights on different fields of microbiology
4. To get highlights on the bioremediation of polluted soils using microbial mediators and phytoremediation
5. To get a concept of biological control and the role of biopesticides in plant disease management.

Theory

Introduction to Microbiology: Definition, applied areas of Microbiology and Importance of Microbiology. History of Microbiology: Discovery of microscope, spontaneous generation theory, Germ theory of diseases, Immunization, fermentation, and origin of life**.** Bacteria: cell structure, nutritional classification of bacteria, growth. Bacterial genetics: Genetic recombination- transformation, conjugation and transduction, genetic engineering. Soil Microbiology: Nutrient mineralization and transformation**,** Air Microbiology: Phyllosphere microflora, Phylloplane microflora, microflora of floral parts etc. Food Microbiology: Microbial spoilage and principles of food preservations, Food poisoning**.** Water Microbiology: Types of water, water microorganisms, and microbial analysis of water e.g. coliform test, Purification of water. Industrial Microbiology: Microbial products, Biodegradation, Biogas production, Biodegradable plastics etc. Biological control: Microbial biopesticides for plant disease management Concepts of rhizosphere microbiology- Rhizodeposits - biochemical nature, release mechanism in rhizosphere, function, Carbon flow in rhizosphere, Rhizosphere microbiomeresidents and their roles. Potential of plant growth promoting rhizobacteria (PGPR) and endophytes on soil health and sustainability**.** Bioremediation of polluted soils using microbial mediators**.** Phytoremediation of polluted soils**.**

Practical

Study of the microscope; Acquaintance with laboratory material and equipment; Microscopic observation of different groups of microorganisms: moulds & yeasts; Direct staining of bacteria by crystal violet; Negative or indirect staining of bacteria by nigrosin; Gram staining of bacteria; Study of phyllosphere and rhizosphere microflora; Measurement of microbial growth; Preparation of culture media; Isolation and purification of rhizospheric microbes; Isolation and purification of N-fixers; Isolation and purification of Nutrient solubilizers; Isolation and purification of Endophytes.

Suggested Readings

1. Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. 2002. Microbiology. 5th Edition, Tata McGraw-Hill, New Delhi.
2. Rangaswami, G. and Bagyaraj, D. J. 2005. Agricultural Microbiology. Prentice-Hall of India Pvt. Ltd., New Delhi.
3. Mukherjee, N. and Ghosh, T. 2004. Agricultural Microbiology. Kalyani Publishers, Calcutta
4. Dubey, H.C. 2007. A Textbook of Fungi, Bacteria and Viruses. Vikas Publishing House Ltd., New Delhi − 10014
5. Salyers, A. A. and Whitt, D. D. 2001. Microbiology: diversity, disease, and the environment. Fitzgerald Science Press, Inc.
6. Prescott, L. M. 2002. Microbiology 5th Edition. McGraw-Hill Inc, US

PHYSICS

Course No.	Course Title	Credits	Semester
PHY 203	Engineering Physics (For B. Tech. Agricultural Engineering)	3 (2+1)	III
	Total Credits	**3 (2+1)**	

PHY 203	ENGINEERING PHYSICS (For B. Tech. Agricultural Engineering)	3 (2+1)	SEM III

Objectives

To make the students acquainted with applications of physics in engineering and different physical processes in agricultural engineering

Theory

Unit-I: Magnetism : Dia, para and ferro-magnetism- classification; Langevin theory of dia, and para magnetism, adiabatic demagnetization, Weiss molecular field theory and ferromagnetism, Curie-Weiss law.

Unit-II: Introduction to quantum mechanics : Wave particles duality, photoelectric effect, de-Broglie concept, uncertainty principle, wave function, time dependent and time independent Schrodinger equation.

Unit-III: Spectroscopy : Qualitative explanation of Zeeman effect, Stark effect and Paschen back effect, Raman spectroscopy.

Unit-IV: Solid state physics : Statement of Bloch function, bands in solids, distinction between metals, insulators and semi-conductors; Semiconductors: intrinsic and extrinsic semi-conductors, donors and acceptor levels, law of mass action, determination of energy gap in semi-conductors, Hall effect; Superconductivity: super conductivity, critical magnetic field, Meissner effect, Type I and II superconductors, isotope effect, London equations, BCS Theory, Josephsons effect, DC and AC squids, introduction to high Tc superconductors.

Unit-V: LASERS and MASERS : Spontaneous and stimulated emission, Einstein A & B coefficients, population inversion, Ruby lasers, He-Ne laser and semiconductor laser; Masers.

Unit-VI: Optical fibre and Illumination : Optical fibre**:** Physical structure, basic theory, type of modes, characteristics of optical fibre and applications.

Illumination**:** Laws of illumination, luminous flux, luminous intensity, candle power and brightness.

Practical

To verify law of transverse vibrations along a string using electrical tuning fork; To study hysteresis loss of magnetic materials; To demonstrate the Meissner effect; To measure the transition temperature of a high; temperature superconductor; Determine dielectric constant of material using De Sautys bridge; Study the variation of magnetic field with distance along the axis of a current carrying circular coil and to determine the radius of the coil; Determine the energy band gap in a semi-conductor

using a p-n junction diode; Determine the low resistance using Carey Foster bridge without calibrating the bridge wire.

Suggested Readings

1. Avadhanulu M N. 2013. An Introduction to Lasers theory and applications. S. Chand Publication
2. Chattopadhyay D and Rakshit P C. 2011. Electricity and Magnetism. S. Chand
3. Ghatak A K and Lokanathan S. 2022. Quantum Mechanics, Theory and Application. Trinity Press.
4. Griffiths D J and Schroeter 2018. Introduction to Quantum Mechanics. Cambridge University Press.
5. Khandelwal D P. 1985. A laboratory Manual of Physics. Vani Publications.
6. Kittel C. 2005. Introduction to Solid State Physics. Wiley Eastern Pvt. Ltd.
7. Mani H S and Mehta G K. 2022. Modern Physics. Affiliated East-West Press.
8. Omar M A. 2002. Elementary Solid State Physics. Pearson.
9. Prakash S. 2011. Optics. Pragati Prakashan, Meerut.
10. Saraf B and Khandelwal D P. 1982. Physics through Experiments, Vol. I & II. Vikas Publication, New Delhi.
11. Subramanyam N, Lal B and Avadhanulu M N. 2012. A Text book of Optics. S. Chand.
12. Taneja, S.P. 2004. Modern Physics for Engineers, R. Chand & CO, New Delhi.

SOCIOLOGY

Course No.	Course Title	Credits	Semester
SOC 101	Rural Sociology and Educational Psychology (For B.Sc. (Hons.) Agriculture)	2(2+0)	I
SOC 201	Rural Sociology (For B.Sc. (Hons.) Community Science)	2 (2+0)	III
SOC 202	Human Ethics (For B.Tech. Biotechnology)	1 (1+0)	IV
	Total Credits	**5 (5+0)**	

SOC 101	RURAL SOCIOLOGY AND EDUCATIONAL PSYCHOLOGY (For B.Sc. (Hons.) Agriculture)	2 (2+0)	SEM I

Objectives

Provide knowledge on concept and importance of sociology and rural sociology as well as the relationship with Extension Education

Theory

Sociology and rural sociology: Meaning, definition, scope, importance of rural sociology in Agricultural Extension, and interrelationship between rural sociology and Agricultural Extension. Extension Education and Agricultural Extension: Meaning, definition, scope, and importance. Indian Rural Society: important characteristics, differences and relationship between rural and urban societies. Social Groups: Meaning, definition, classification, factors considered information and organization of groups, motivation in group formation and role of social groups in Agricultural Extension.

Social Stratification: Meaning, definition, functions, basis for stratification, forms of social stratification- characteristics and- differences between class and caste system. Cultural concepts: culture, customs, folkways, mores, taboos, rituals. Traditions: Meaning, definition and their role in Agricultural Extension. Social Values and Attitudes: Meaning, definition, types and role of social values and attitudes in agricultural Extension. Social Institutions: Meaning, definition, major institutions in rural society, functions, and their role in agricultural Extension. Social Organizations: Meaning, definition, types of organizations and role of social organizations in agricultural Extension. Social Control: Meaning, definition, need of social control and means of social control. Social change: Meaning, definition, nature of social change, dimensions of social change and factors of social change. Leadership: Meaning, definition, classification, roles of leader, different methods of selection of professional and lay leaders. Training of Leaders: Meaning, definition, methods of training, Advantages and limitations in use of local leaders in Agricultural Extension, Psychology and educational psychology: Meaning, definition, scope, and importance of educational psychology in Agricultural Extension. Intelligence: Meaning, definition, types, factors affecting intelligence and importance of intelligence in Agricultural Extension. Personality: Meaning, definition, types, factors influencing

the personality and role of personality in agricultural Extension. Teaching: Learning process: Meaning and definition of teaching, learning, learning experience and learning situation, elements of learning situation and its characteristics. Principles of learning and their implication of teaching.

Suggested Readings

1. A. R. Desai -Rural Sociology in India
2. Dahama O. P. and Bhatnagar, O. P. - Education and Communication for Development
3. J.B. Chitambar -Introductory Rural Sociology
4. M.B. Ghorpade- Essential of psychology
5. C.N. Shankar Rao – Sociology: Principles of Sociology with an Introduction to Sociological Thought. S Chand and Company Ltd. New Delhi.
6. Prepared You Tube videos
7. R Velusamy Textbook on Rural Sociology and Educational Psychology
8. Ray, G. L. -Extension Communication and Management
9. Sandhu A. S. -Textbook on Agricultural Communication
10. Web Materials

SOC 201	**RURAL SOCIOLOGY** **(For B.Sc. (Hons.) Community Science)**	**2 (2+0)**	**SEM III**

Objectives

1. To develop understanding about sociological concepts with special reference to rural community.
2. To understand approaches to rural planning and status of rural women

Theory

Sociology and Rural sociology – Meaning and significance; Difference between rural and urban community; Indian rural social stratification: Caste & Class- Concept, characteristics and difference, Change in social stratification and implementation of constitutional provisions; Indian rural institutions: Social- Family and marriage (Nature, forms and changes), Economic- Jajmani system and division of labour, Political- Panchayati Raj; Religion: Functional significance of beliefs, traditions and customs; Rural poverty: Meaning, types and causes; Rural social change: Concept, process and factors of transformation; Planned social change- Approaches to rural planning, improvement and transformation; Status of women in rural India and their role in rural and agricultural development.

Suggested Readings

1. Chitambar, J.B. (1973). Introductory rural sociology. New York, John Wilex and Sons.
2. Desai, A.R. (1978). Rural sociology in India. Bombay, Popular Prakashan, 5th Rev.ed.
3. Doshi,S.L. (2007). Rural sociology. Delhi Rawat Publishers.
4. Jayapalan, N. (2002). Rural sociology. New Delhi, Altanic Publishers.
5. Sharma, K.L. (1997). Rural society in India. Delhi, Rawat Publishers

SOC 202	HUMAN ETHICS (For B.Tech. Biotechnology)	1 (1+0)	SEM IV

Objectives

1. To study the meaning and concepts of human behaviour
2. To study human ethical values
3. To study spirituality and attitude
4. To study the methods of stress management

Theory

Universal human aspirations, happiness, and prosperity. Human values and ethics: concept, definition, significance, and sources. Fundamental values: right conduct, peace, truth, love, and non-violence. Ethics: professional, environmental, and ICT. Sensitisation towards others, particularly senior citizens, the developmentally challenged, and gender.

Spirituality, positive attitude and scientific temper. Teamwork and volunteering. Rights and responsibilities. Road safety, Human relations, and family harmony. Modern challenges and value conflict. Sensitization against drug abuse and other social evils. Developing personal code of conduct (SWOT Analysis). Management of anger and stress.

Suggested Readings

1. Gaur RR, Sangal R and Bagaria GP, 2011, A Foundation Course in Human Values and Professional Ethics, Excel Books.
2. Mathur SS, 2010, Education for Values, Environment and Human Rights, RSA International.
3. Sharma RA, 2011, Human Values and Education -Axiology, Inculcation and Research, R. Lall Book Depot.
4. Sharma RP and Sharma M, 2011, Value Education and Professional Ethics, Kanishka Publishers.
5. Srivastava S, 2011, Human Values and Professional Ethics, S K Kataria and Sons.
6. Srivastava S, 2011, Environmental Science, S K Kataria and Sons.
7. Tripathi, A. N., 2009, Human Values, New Age International (P) Ltd, Publishers.

CENTRE OF FOOD SCIENCE AND TECHNOLOGY

Course No.	Course Title	Credits	Semester
FST 301	Food Science and Processing (For B.Tech. Biotechnology)	3 (2+1)	VI
FST 401	Food Safety and Standards (For B.Sc. (Hons.) Agriculture)	4 (3+1)	VII
FST 402	Food Science and Nutrition (For B.Sc. (Hons.) Agriculture)	4 (3+1)	VII
	Total Credits	**11 (8+3)**	

FST 301	**FOOD SCIENCE AND PROCESSING (For B.Tech. Biotechnology)**	**3 (2+1)**	**SEM VI**

Objectives

1. To study food and nutrition for good health
2. To study food spoilage, processing and preservation
3. To study the methods of assessing physical and chemical qualities

Theory

Food and nutrition; Food production and consumption trends in India; Food groups and concept of balanced diet, RDA, biotoxins, antinutritional factors and secondary metabolites; Major deficiencies of calories, proteins, vitamins and micronutrients; Causes of food spoilage; Principles of processing and preservation of food by heat, low temperature, drying and dehydration, chemicals and fermentation; Preservation through ultraviolet and ionizing radiations; Postharvest handing and processing technology of fruits, vegetables, cereals, oilseeds, milk, meat and poultry; Food safety, adulteration, HACCP and Indian food laws; Status of food industry in India.

Practical

Physical and chemical quality assessment of cereals, fruits, vegetables, egg, meat and poultry; Value added products from cereals, millets, fruits, vegetables, milk, egg and meat; Visit to local processing units.

Suggested Readings

1. Gopalan, C., Rama Sastri, B.V. and Bala Subramanian, S.C. (2005). *Nutritive Value of Indian Foods*. NIN, ICMR, Hyderabad.
2. ICAR. (2013). *Handbook of Agricultural Engineering*. ICAR Publications, New Delhi
3. Manay, S. & Shadaksharaswamy, M. (2020). *Foods Facts and Principles*. New Age International Publishers.
4. Srivastava, R.P. and Kumar, S. (2019). *Fruit and Vegetable Preservation-Principles and Practices*, CBS Publishers.
5. www.fassi.gov.in

FST 401	FOOD SAFETY AND STANDARDS (For B.Sc. (Hons.) Agriculture)	4 (3+1)	SEM VII

Objectives

1. To know hazards and understand to protect food from contamination
2. To understand the need for food safety systems
3. To use the scientific approach and practices towards safety

Theory

Food safety: definition, importance and factors affecting food safety; recent concerns- new and emerging pathogens, recent outbreaks; hazards- types (physical, chemical, biological), sources of contamination, management of hazards/contaminations- need and control of parameters: temperature, production design, packaging and food storage; hygiene and sanitation- personal hygiene, food establishments and surface sanitation; pest and rodent control; water- hygiene and quality standards; waste disposal; food safety measures: food safety management systems- basic concepts, components, need and newer approaches to food safety; risk analysis; PRPs- GHPs, GMPs, SSOPs, etc.; HACCP and TQM; GFSI; Food laws and standards: Indian food regulatory regime- FSSA; global scenario- CAC, WTO, SPS, TBT, etc.; other laws and standards related to food- ISO series; Indian and International standards for food products; product labelling and nutritional labelling, organic foods.

Practical

Quality attributes of raw and processed foods, water quality analysis; assessment of surface sanitation by swab/rinse method; personal hygiene; process flow for food establishment; GHP and GMP in a food factory; FSMS: hazard identification and risk analysis; OPRPs. development of HACCP plan; understand the ISO 22000; organizational structure of FSSAI and CAC; design a label for food product.

Suggested Readings

1. Deshpande, H.W. & Katke, S.D. 2021. Food Quality, Assurance and Certification.
2. Fernandes, C. *Safe Food Handling: HACCP Booklet for Food Handlers*, Notion Press.
3. Fortin, N.D. 2009. Food Regulation. John Wiley & Sons, New Jersey.
4. Khatekar, D. & Sarkate, N. 2023. *Handbook of Food Safety*, Step Up Academy.
5. Mathur, P. 2018. *Food Safety and Quality Control*, The Orient Blackswan.
6. Sherikar, A.T., Bachhil, V.N. & Thapliyal, D.C. 2013. *Textbook of Elements of Veterinary Public Health*. ICAR.

FST 402	FOOD SCIENCE AND NUTRITION (For B.Sc. (Hons.) Agriculture)	4 (3+1)	SEM VII

Objectives

To impart knowledge on the biochemical aspects of various nutrients and its interactions in food during processing, storage and deterioration

Theory

Introduction on fundamentals of food science and human nutrition; food- sources and its functions; basic food groups; concept of balanced diets; nutritional requirements and recommended daily allowances (RDA); malnutrition- over and under nutrition and nutritional disorders; water in foods, properties and water activity; major food constituents-carbohydrates, proteins, fats- sources, classification, functions, physico-chemical and nutritional characteristics; effect of processing; digestion, absorption, transport and metabolism in human system; vitamins and minerals- classification, dietary sources, functions, deficiency diseases and effect of processing; anti-nutritional factors; postharvest storage and losses during processing; food spoilage; enzymes in food industry; food additives.

Practical

Standard solutions and buffers; TSS; pH; acidity; water activity; proximate analysis of foods; calorific value of foods, estimation of vitamins, phenols, flavonoids, carotenoids, anti-nutrients in food stuff

Suggested Readings

1. De Man, J.M. 1976. *Principles of Food Chemistry*. AVI.
2. Gibney M.J., Lanham-New S.A., Cassidy, A. & Voster, H.H. (ed.) 2009. *Introduction to Human Nutrition*. Wiley-Blackwell
3. Gopalan, C., Rama Sastri, B.V. & Bala Subramanian, S.C. 2021. *Nutritive Value of Indian Foods*, NIN, ICMR, Hyderabad.
4. Kumar, D. 2019. *Food Science and Nutrition*, Random Publications.
5. Manay, N.S. & Shadaksharaswamy, M. 2020. *Foods Facts and Principles*, New Age International Publishers.
6. Mudambi, R.S. & Rao, S. 1985. *Food Science*, Wiley Eastern Ltd.
7. Rekhi, T. and Yadav, H. 2014. *Fundamentals of Food and Nutrition*. Elite Publishing House.
8. Swaminathan, M. 1999. *Essentials of Foods and Nutrition*, Vol. I. The Bangalore Printing and Publishing Co. Ltd., Bangalore.
9. Trueman, P. 2007. *Nutritional Biochemistry*, MJP Publishers

DIRECTORATE OF STUDENTS' WELFARE


Chaudhary Charan Singh Haryana Agricultural University, Hisar
NATIONAL SERVICE SCHEME
NATIONAL INTEGRATION CAMP
October 23-29, 2024
Youth for my Bharat
Dr. M.L. Khichar
Prof. B.R. Kamboj
Sh. Randhir Panihar
M.L.A., NALWA
Dr. Dinesh Kumar
State NSS Officer


Chaudhary Charan Singh Haryana Agricultural University, Hisar
NATIONAL SERVICE SCHEME


3 HAR BN NCC HISAR

DIRECTORATE OF STUDENTS' WELFARE

Course No.	Course Title	Credits	Semester
NCC I/ NSS I (AEC)	National Cadet Corps I/ National Service Scheme I	2 (0+2)	I
NCC II/ NSS II (AEC)	National Cadet Corps II/ National Service Scheme II	2 (0+2)	II
CCA 102	Co-curricular Activity	1 (0+1) NG	II
CCA 201 (AEC)	Physical Education, First Aid, Yoga Practices and Cultural Activities	2 (0+2)	III
NCC III/ NSS III	National Cadet Corps III/ National Service Scheme III	2 (0+2) NG	III
CCA 202	Co-curricular Activity	1 (0+1) NG	IV
NCC IV/ NSS IV	National Cadet Corps IV/ National Service Scheme IV	2 (0+2) NG	V
	Total Credits	**6 (0+6)**	

NCC I/ NSS I (AEC)	NATIONAL CADET CORPS I/ NATIONAL SERVICE SCHEME I	2 (0+2)	SEM I

National Cadet Corps (NCC I)

Objectives

1. To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizen.
2. To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

Practical/ Awareness programmes

- Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.
- Drill- aim, general words of command, attention, stands at ease, stand easy and turning.
- Sizing, numbering, forming in three ranks, open and close order march, and dressing.
- Saluting at the halt, getting on parade, dismissing, and falling out.
- Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear. Turning on the march and wheeling. Saluting on the march.
- Marking time, forward march, and halt. Changing step, formation of squad and squad drill.
- Command and control, organization, badges of rank, honors, and awards
- Nation Building- cultural heritage, religions, traditions, and customs of India. National integration. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizens. Leadership traits, types of leadership. Character/ personality development. Civil defense organization, types of emergencies, firefighting, protection. Maintenance of essential services, disaster management, aid during development projects.

- Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning.
- Structure and function of human body, diet and exercise, hygiene and sanitation. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health. Adventure activities. Basic principles of ecology, environmental conservation, pollution and its control.

As per government guidelines, for getting B and C certificate in NCC, minimum years of requirement is 2 and 3 years, respectively along with 1-2 annual camps.

National Service Scheme (NSS I)

Objective

1. Evoking social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skilful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

Practical/ Awareness programmes

- Orientation: history, objectives, principles, symbol, badge; regular programs under NSS
- Organizational structure of NSS, Code of conduct for NSS volunteers, points to be considered by NSS volunteers' awareness about health.
- NSS program activities: Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analyzing guiding financial patterns of scheme, youth program/ schemes of GOI, coordination with different agencies and maintenance of diary. Understanding youth. Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change.
- Community mobilization: Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilization involving youth-adult partnership. Social harmony and national integration.
- Indian history and culture, role of youth in nation building, conflict resolution and peacebuilding. Volunteerism and shramdaan. Indian tradition of volunteerism, its need, importance, motivation, and constraints; shaman as part of volunteerism.
- Citizenship, constitution, and human rights: Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information. Family and society. Concept of family, community (PRIs and other community-based organizations) and society.

A student enrolled in NSS course should put in at least 60 hours of social work in different activities in a semester other than five regular one-day camp in a year and one special camp for duration of 7 days at any semester break period in the two years. Different activities will include orientation lectures and practical works. Activities directed by the Central and State Government have to be performed by all the volunteers of NSS as per direction.

NCC II/ NSS II (AEC)	NATIONAL CADET CORPS II/ NATIONAL SERVICE SCHEME II	2 (0+2)	SEM II

National Cadet Corps (NCC II)

Objective

1. To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizen.
2. To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation.

Practical/ Awareness programmes

- Arms Drill-Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms. Shoulder from the order and vice-versa, present from the order and vice-versa. Saluting at the shoulder at the halt and on the march. Short/ long trail from the order and vice- versa. Guard mounting, guard of honor, Platoon/Coy Drill.
- Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning, and sight setting. Loading, cocking, and unloading. The lying position and holding.
- Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing. Characteristics of Carbine and LMG.
- Introduction to map, scales, and conventional signs. Topographical forms and technical terms.
- The grid system. Relief, contours, and gradients. Cardinal points and finding north. Types of bearings and use of service protractor. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map. Knots and lashings, Camouflage and concealment, Explosives and IEDs.
- Field defenses obstacles, mines and mine lying. Bridging, waterman ship. Field water supplies, tracks and their construction. Judging distance. Description of ground and indication of landmarks. Recognition and description of target. Observation and concealment. Field signals. Section formations. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill. Types of communication, media, latest trends and developments.

National Service Scheme (NSS II)

Objective

1. To evoke social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skillful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

Practical/ Awareness programmes

- Importance and role of youth leadership
- Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership, Life competencies
- Definition and importance of life competencies, problem-solving and decision-making interpersonal communication. Youth development programs
- Development of youth programs and policy at the national level, state level and voluntary sector; youth-focused and youth-led organizations
- Health, hygiene and sanitation. Definition needs and scope of health education; role of food, nutrition, safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programs and reproductive health. Youth health, lifestyle, HIV AIDS and first aid. Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid. Youth and yoga. History, philosophy, concept, myths, and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method.

CCA 201 (AEC)	**PHYSICAL EDUCATION, FIRST AID, YOGA PRACTICES AND CULTURAL ACTIVITIES**	**2 (0+2)**	**SEM III**

Objectives

1. To make the students aware about Physical Education, First Aid and Yoga Practices
2. To disseminate the knowledge and skill how to perform physical training, perform first aid and increase stamina and general wellbeing through yoga

Practical

Physical education; Training and Coaching - Meaning and Concept; Methods of Training; aerobic and aerobic exercises; Calisthenics, weight training, circuit training, interval training, Fartlek training; Effects of Exercise on Muscular, Respiratory, Circulatory and Digestive systems; Balanced Diet and Nutrition: Effects of Diet on Performance; Physiological changes due to ageing and role of regular exercise on ageing process; Personality, its dimensions and types; Role of sports in personality development; Motivation and Achievements in Sports; Learning and Theories of learning; Adolescent Problems and its Management; Posture; Postural Deformities; Exercises for good posture.

Yoga; History of Yog, Types of Yog, Introduction to Yog,

- Asanas (Definition and Importance) Padmasan,san, Vajrajasan, Shashankasan, Pashchimotasan, Ushtrasan, Tadasan, Padhastasan, Ardhchandrasan, Bhujangasan, Utanpadasan, Sarvangasan, Parvatasan, Patangasan, Shishupalanasan – left leg-right leg, Pavanmuktasan, Halasan, Sarpasan, Ardhdhanurasan, Sawasan
- Suryanamskar Pranayama (Definition and Importance) Omkar, Suryabhedan, Chandrabhedan, AnulomVilom, Shitali, Shitkari, Bhastrika, Bhramari
- Meditation (Definition and Importance), Yogic Kriyas (Kapalbhati), Tratak, Jalneti and Tribandh

- Mudras (Definition and Importance) Gyanmudra, Dhyanmudra, Vayumudra, Akashmudra, Pruthvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanmudra
- Role of yoga in sports
- Teaching of Asanas – demonstration, practice, correction and practice.

History of sports and ancient games, Governance of sports in India; Important national sporting events; Awards in Sports; History, latest rules, measurements of playfield, specifications of equipment, skill, technique, style and coaching of major games (Cricket, football, table Tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho) and Athletics Need and requirement of first aid. First Aid equipment and upkeep. First aid Techniques, First aid related with Respiratory system. First aid related with Heart, Blood and Circulation. First aid related with Wounds and Injuries. First aid related with Bones, Joints Muscle related injuries. First aid related with Nervous system and Unconsciousness. First aid related with Gastrointestinal Tract. First aid related with Skin, Burns. First aid related with Poisoning. First aid related with Bites and Stings. First aid related with Sense organs, Handling and transport of injured traumatized persons. Sports injuries and their treatments.

Music- Importance of Music in life, rhythm in music, role of music in personality development, naad, swar, shruti, alankar, gamak, vadi-samvadi, in music. Importance of expression, Dance and Meditation.

Dramatics- History and theory of theatre. Acting, directing, stage design craft of script and dialogue

Haryana Folk Lore and Culture- Society and Folk Lore, Historical context, folk music in different regions, instruments used in Haryana Folk Lore, Singing style of different folk gharanas.

COMMITTEE FOR FINALISATION OF UG COURSE CURRICULUM