



**MANAV RACHNA INTERNATIONAL INSTITUTE OF
RESEARCH AND STUDIES**

**(Deemed to be University under section 3 of the UGC Act,
1956)**

FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF NUTRITION AND DIETETICS

Curriculum Booklet

(B.Sc.- Nutrition and Dietetics)

Academic Session: 2022-25

FOREWORD

This is to certify that this booklet contains the entire Curriculum and Scheme of Examination of **Bachelor of Nutrition and Dietetics** being offered at **Faculty of Allied Health Sciences** of this University. This has been duly vetted and finally approved by the Academic Council of the University vide its **29th meeting** held on **05-07-2019** and **subsequently 34th meeting held on 08-09-2020** and changes, if any deemed appropriate, shall be duly incorporated after the necessary approval by the Academic Council.

This Curriculum and Scheme of Examination of **Bachelor of Nutrition and Dietetics** shall be implemented w.e.f. AY 2019-20.

Date:

Prof. (Dr.) Naresh Grover
Dean-Academics, MRIIRS

Preamble

Nutrition and health are two important parameters of wellbeing of a society, wherein a well-nourished, balanced, energized and disease free populace paves way for overall development of the nation. Thus, a healthy soul is a foundation of contented and gratified society. The advent of technological advancements in the field of food and allied areas, ease of access to varied variety of food has led to change in life style patterns, resulting into emergence of conventional and unconventional nutritional and health related issues. In order to address the issue pedantically, there is a need for specialized training in the area of Nutrition and Health encompassing technical know-how, in-depth knowledge of the subject so as to offer appropriate advice and services.

B.Sc Nutrition and Dietetics is a course based on a scientific and research based approach for understanding, envisaging and addressing the core of the subject to deal with the emerging health issues of the society. The specific objectives envisioned are in synchronization with PEOs following the core values of customer focus, integrity, innovation, social responsibility, and diversity along with a dedication to evidence-based research and practice. The curriculum is aimed at providing updated knowledge, technical skills and research aptitude to students.

The curriculum exhibits the requisite balance among the fundamental, core and elective subjects. This is to create a student talent pool that can serve the technological needs of the national global industry. Many courses are focused on global development needs such as Health, Fitness and Sports Nutrition, Statistics and Research methodology, Techniques of Scientific Writing and Capstone project etc. Also subjects like Clinical Internship/Industrial Training, Counseling Techniques in Nutrition, Public Health Nutrition, Therapeutic and Clinical Nutrition are offered to enhance the basic dietetics skills of national and regional needs.

The curriculum includes courses focusing on employability, entrepreneurship and skill development which map strongly with the POs defining demonstration of technical knowledge and engagement in independent and life-long learning. Examples of such courses are Nutrition: A Life cycle approach, Therapeutic and Clinical Nutrition, Institutional Catering Management, Techniques of Writing and Statistics, Research Methodology. and various lab courses based on numerous dimensions of computer applications.

Certain courses are meant to create awareness about the environment and sustainability and inculcate professional ethics, like Environmental Studies, Food Laws and Regulation, Maternal and Child Nutrition etc. Also various activities are organized to inculcate human values and respect for the other genders.

The objectives of all courses are well mapped with the PO defining demonstration of technical knowledge and engagement in independent and life-long learning. The curriculum offers core, ability enhancement courses and domain specific electives. To carve the skills of students open elective courses are also offered each semester. This course aims to develop a holistic and multidimensional understanding of the various topics. The syllabus covers basic aspects of nutrients, food science, nutrition, nutritional biochemistry

concerns in various stages of life cycle, food safety, food security as well as open a vast understanding of the current spectrum of malnutrition. This course aims to develop a holistic and multidimensional understanding of the various topics. The course also pays attention to holistic approach and offers various opportunities to students to participate and to complete 25xN point from Manav Rachna Life Skill Programme. Research project and industrial/clinical internship are the key highlights of programme which are based on current demands of industry and society.

The curriculum of the programme is updated and for that inputs have been included for industry experts, stake holders including student, parents and alumni of the department. Time to time feedback facility provides scope for improvement in curriculum as per the need of the hour. The subjects focusing on regional, national and global development, focusing on Entrepreneurship, Employability and Skill development and focusing on Professional ethics, Environment and sustainability, Gender Equality and Human values are enlisted in Appendix A, B and C respectively.

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VISION

The Department of Nutrition and Dietetics is committed to provide a central focus of research in nutrition science and also to enhance the quality of nutrition through integrated teaching and research.

MISSION

- To provide students with a scholastic programme that covers the breadth of knowledge in nutrition, provides opportunities for research, and offers practical experiences and training.
- To integrate the biological, behavioral, socioeconomic and environmental factors related to food and nutrient intakes and needs across the lifespan.
- To interpret and evaluate nutrition standards and analyze nutritional assessment data to make evidence-based decisions.
- To strengthen linkage with international organizations, government agencies, extension location in the field of nutrition and health.
- To use critical thinking skills to locate, interpret, and evaluate research findings and professional literature to explain implications and limitations.

ABOUT THE DEPARTMENT

Nutrition and Dietetics department was established in the year 2006 under Faculty of FIT (Faridabad Institute of Technology) which was later merged under Faculty of Applied Sciences. It is an integrated and a professional program preparing students to work in various disciplines of Nutritional Sciences, explore how it affects the health of the individual and the nation and also to discover how diet can be used in the treatment of communicable and non-communicable disease. It is a health-related career which involves translating the sciences of nutrition and food to promote good health. It is a vital and growing profession with ample career opportunities. The internship/training program with various hospitals, food industries, research labs, sports organizations etc provide opportunities to practice and master the core competencies to place its students in covetable jobs. The Master's program in this discipline, introduced in 2009 aims at developing research skills and abilities in nutritional issues of contemporary interest.

The highlights of this course at Faculty of Applied Science is focused on teaching, strong research and outreach in Clinical Nutrition, Sports Nutrition, Food Science and Technology, and Public Health Nutrition. The Department offers a plethora of Academic and Co-curricular activities at various platforms be it a school, community or corporate like NTPC, ONGC, IBM that shapes students' careers and make them distinct from others in their chosen field of specialization. The Programme has been designed to build and enhance skills of the students to meet industry requirements. The Department pays special attention to Industry-University Collaboration to leverage student's placements, Joint R&D Projects with various National and International Organizations.

Bachelor of Science (Nutrition and Dietetics)

Program Education Objectives:

PEO 1 Prepare qualified entry level professionals by providing expected domain knowledge.

PEO 2 Prepare a socially committed individual having high ethical values and empathy for the needs of society.

PEO 3 Graduates are trained to develop innovative ideas and teams work skills to accomplish a common goal.

PEO 4 Produce lifelong learner graduates to successfully meet the professional demands and challenges

Program Outcomes:

The learning outcomes-based curriculum framework is based on the premise that every student and graduate is unique. Each student or graduate has his/her own characteristics in terms of previous learning levels and experiences, life experiences, learning styles and approaches to future career-related actions. The quality, depth and breadth of the learning experiences made available to the students while at the higher education institutions help develop their characteristic attributes. The graduate attributes reflect disciplinary knowledge and understanding, generic skills, including global competencies that all students in different academic fields of study should acquire/attain and demonstrate.

Some of the characteristic attributes that a graduate should demonstrate are as follows:

PO1.Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2.Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3. Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

PO6. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

PO7. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Program Specific Outcomes:

PSO 1: Enable students to acquire scientific knowledge of basic sciences and principles of Nutrition and Dietetics.

PSO 2: Expressing a broad understanding of clinical nutrition, food science, sports nutrition, public health nutrition and its influence on human health and well- being.

PSO 3: Development of skills pertaining to critical analysis, entrepreneurship and communication for career development in the field of nutritional sciences.

PSO 4: Enhance practical knowledge in domain of Nutrition and Dietetics for its applications in industry and research.

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Mapping of PEOs with POs and PSOs

Articulation Matrix (Mapping is labeled as strongly with 3, moderately with 2 and low with 1)

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO-1	PSO-2	PSO-3	PSO-4
PEO-1	3	3	2	1	2	2	2	3	3	2	3
PEO-2	2	2	3	3	3	3	2	2	2	3	2
PEO-3	3	2	3	2	3	3	3	3	3	3	3
PEO-4	3	2	2	2	3	3	3	2	2	3	3

Semester and CBCS System

Credit based system of study and student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grade obtained by the student, grade point average is calculated

(a) Course credits assignment

Each course has a certain number of credits assigned to it depending upon its duration in periods for lecture, tutorial and laboratory/clinical practice in a week. A few courses/activities are without credit (s) and are referred to as Audit Pass Courses (APC) but are mandatory to pass as a partial fulfillment of award of degree.

(b) Earning of credits

At the end of every course, a letter "Grade" shall be awarded in each course for which a student has registered. On obtaining a minimum Pass Grade, student shall accumulate the course credits as Earned Credits. A student's performance shall be measured by the number of credits that he/she has earned and by the weighted grade point average. Grades obtained in the audit courses shall not be counted for computation of grade point average, however shall be mandatory to pass as a partial fulfillment of award of degree.

Choice Based Credit System

For Award of Degree of a programme B.Sc. Nutrition and Dietetics, he/she has to earn minimum 122 credits during the 3 year duration of the programme in 6 semesters.

The total credits required to be earned have been further classified under two baskets of courses: "Compulsory Courses Basket", and "Elective Courses Basket". The total 88 credits required to be earned under "Compulsory Courses Basket" and 34 credits under "Elective Courses Basket".

All courses under "Compulsory Courses Basket", are required to be qualified and cleared/pass by each and every students enrolled under the programme and are semester-wise listed in the study scheme along with credits assigned to each course.

Under Elective Courses Basket, there will be three types of courses:

- Semester-wise courses offered by the department itself
- Open/Inter-disciplinary courses offered at the Institute/University level notified from the office of Dean-Academics.
- Massive Open Online Courses (MOOCs) available on SWAYAM Platform or any other platform as recommended by UGC/AICTE and notified from the office of Dean-Academics.

Each course shall have credits assigned to it. Student shall be required to register courses every semester for as many courses/credits specified under "Elective Courses Basket" depending upon his/her interest, capability/pace of learning and availability of time slot (without any clash in time table) so as to earn all required total credits under the "Elective Courses Basket" during the entire programme duration.

However, for registration of courses (including courses under "Compulsory Courses Basket", "Elective Courses Basket" and Previous Semester Courses (wherein he/she was declared in-eligible on the basis of attendance or he/she could not clear the course within permissible given chances), if any the maximum limit in a semester shall be 30 credits.

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ANNEXURE I
(Deemed to be University under section 3 of the UGC Act 1956)
Study Scheme

PROGRAM: B.Sc (Nutrition and Dietetics) SEMESTER-I													
Course Type	Course Code	Course	Pre-requisite Course, if any		Periods/Week				Marks			Duration of Exam (Hrs)	Credits
			Title	Code	L	T	P	Total	Continuous Evaluation	End semester exam	Total		
COMPULSORY COURSES													
Core	BND-DS-101	Basics of Food and Nutrition			4	0	0	4	100	100	200	3	4
	BND-DS-151	Basics of Food and Nutrition(Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-102	Fundamentals of Biochemistry			4	0	0	4	100	100	200	3	4
	BND-DS-152	Fundamentals of Biochemistry (Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-103	Human Anatomy and Physiology-I			4	0	0	4	100	100	200	3	4
	BND-DS-153	Human Anatomy and Physiology-I (Practical)			0	0	2	2	50	50	100	2	1
Discipline Specific	BND-DS-104	Health, Food Hygiene & Sanitation											
	BND-DS-105	Life span Development			2	0	0	2	100	100	200	3	2
	BND-DS-106	Communication and Extension Education											
	BND-DS-154	Health, Food Hygiene & Sanitation(Practical)			0	0			50	50	100	2	1

	BND-DS-155	Life span Development (Practical)					2	2								
	BND-DS-156	Communication and Extension Education (Practical)														
TOTAL							14	0	8	2	2	600	600	1200	20	18

**Note: 1 Theory/Tutorial Hour = 1 credit, 2 Practical /Seminar Hours= 1 credit
Regarding Discipline Specific theory subjects, correspondent practical should be opted.**

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PROGRAM: B.Sc (Nutrition and Dietetics) SEMESTER-II													
Course Type	Course Code	Course	Pre-requisite Course, if any		Periods/Week				Marks			Duration of Exam (Hrs)	Credits
		Titl e	Cod e	L	T	P	Tot al	Co nti nu ou s Ev al ua ti on	En d se m es te r ex a m	Tota l			
COMPULSORY COURSES													
Value Added	CH-202B	Environmental Studies			3*	0	0	3	100	100	200	3	3*1
	BND-201	Manav Rachna Life Skills – I	Audit Pass Course										
Core	BND-DS-201	Biochemistry and Metabolism			3	0	0	3	100	100	200	3	3
	BND-DS-251	Biochemistry and Metabolism (Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-202	Nutrition: A Life cycle approach			3	0	0	3	100	100	200	3	3
	BND-DS-252	Nutrition: A Life cycle approach (Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-203	Human Anatomy and Physiology-II			3	0	0	3	100	100	200	3	3
	BND-DS-253	Human Anatomy and Physiology-II (Practical)			0	0	2	2	50	50	100	2	1
Discipline Specific	BND-DS-204	Food and Nutrition Labeling			2	0	0	2	100	100	200	3	2
	BND-DS-205	Food Laws & Regulation											
	BND-DS-254	Food and Nutrition Labeling (Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-255	Food Laws & Regulation (Practical)											

TOTAL	15	0	8	23	60 0	60 0	120 0	23	19
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**Note: 1 Theory/Tutorial Hour = 1 credit, 2 Practical /Seminar Hours= 1 credit . *1 is for the field work
Regarding Discipline Specific theory subjects, correspondent practical should be opted
Student has to complete 25xN point from Manav Rachna Life Skill Programme**

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PROGRAM: B.Sc (Nutrition and Dietetics) SEMESTER-III

Course Type	Course Code	Course	Pre-requisite Course, if any		Periods/Week				Marks			Duration of Exam (Hrs)	Credit
			Title	Code	L	T	P	Total	Continuous Evaluation	End semester exam	Total		
COMPULSORY COURSES													
Core	BND-DS-301	Fundamentals of Food Science			3	0	0	3	100	100	200	3	3
	BND-DS-351	Fundamentals of Food Science (Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-302	Community Health Nutrition			3	0	0	3	100	100	200	3	3
	BND-DS-352	Community Health Nutrition(Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-303	Health, Fitness and Sports Nutrition			3	0	0	3	100	100	200	3	3
	BND-DS-353	Health, Fitness and Sports Nutrition (Practical)			0	0	2	2	50	50	100	2	1
	RIC -300	Research and Innovation Catalyst-I			0	0	1	1	50	-	50	-	0.5
Discipline Specific I	BND-DS-304	Preventive Medicine and Promotive Health											
	BND-DS-305	Maternal, Child Health and Nutrition			2	0	0	2	100	100	200	3	2
	BND-DS-306	Food Packaging											
Discipline Specific II	BND-DS-307	Food Science and Technology			2	0	0	2	100	100	200	2	2
	BND-DS-308	Basics of Food Microbiology											
	BND-DS-357	Food Science and Technology (Pract)			0	0	2	2	50	50	100	2	1
	BND-DS-358	Basics of Food Microbiology (Practical)											
TOTAL					13	0	8	21	700	700	1400	22	17.5
ELECTIVE COURSES*													

BND-DS-309	Introduction to First Aid & Nursing			2	0	0	2	100	100	200	3	2
BND-DS-310	Introduction to Herbal Science			2	0	0	2	100	100	200	3	2

*** Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.**

***Note: 1 Theory/Tutorial Hour = 1 credit, 2 Practical /Seminar Hours= 1 credit,
Regarding Discipline Specific theory subjects, correspondent practical should be opted.***

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PROGRAM: B.Sc (Nutrition and Dietetics) SEMESTER-IV

Course Type	Course Code	Course	Pre-requisite Course, if any		Periods/Week				Marks			Duration of Exam (Hrs)	Credits
			Title	Code	L	T	P	Total	Cont in uo us Ev al ua ti o n	En d se m es ter ex a m	Total		
COMPULSORY COURSES													
Value Added	BND-401	Manav Rachna Life Skills – II	Audit Pass Course										
Core	BND-DS-401	Therapeutic and Clinical Nutrition			4	0	0	4	100	100	200	3	4
	BND-DS-451	Therapeutic and Clinical Nutrition (Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-402	Institutional Catering Management			2	0	0	2	100	100	200	3	2
	BND-DS-452	Institutional Catering Management (Practical)			0	0	2	2	50	50	100	2	1
	BND-DS-403	Instrumentation for Food Analysis			2	0	0	2	100	100	200	3	2
	BND-DS-453	Instrumentation for Food Analysis (Practical)			0	0	2	2	50	50	100	2	1
	RIC -400	Research and Innovation Catalyst-II			0	0	1	1	50	-	50	-	0.5
Discipline Specific	BND-DS-404	Counseling Techniques in Nutrition			2	0	0	2	100	100	200	3	3
	BND-DS-405	Public Health Nutrition											
	BND-DS-454	Counseling Techniques in Nutrition (Practical)			0	0	2	2	50	50	100	2	
	BND-DS-455	Public Health Nutrition (Practical)											
	BND-DS-406	Techniques of Scientific Writing			3	0	0	3	100	100	200	3	
TOTAL					14	0	8	22	700	700	1400	23	14.5
ELECTIVE COURSES*													

Discipline Specific	BND-DS-407	Indian Traditional Foods			2	0	0	2	10	10	200	3	2
	BND-DS-408	Human Health Psychology			2	0	0	2	10	10	200	3	2

*** Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.**

Note: 1 Theory/Tutorial Hour = 1 credit, 2 Practical /Seminar Hours= 1 credit

Regarding Discipline Specific theory subjects, correspondent practical should be opted.

Student has to complete 25xN point from Manav Rachna Life Skill Programme

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PROGRAM: B.Sc (Nutrition and Dietetics) SEMESTER-V

Course Type	Course Code	Course	Pre-requisite Course, if any		Periods/Week				Marks			Duration of Exam (Hrs)	Credits
			Title	Code	L	T	P	Total	Continuous Evaluation	End semester exam	Total		

COMPULSORY COURSES

Core	BND-DS-551	Capstone Project			0	0	10	10	100	100	200	3	5
	BND-DS-502	Statistics and Research methodology			3	0	0	3	100	100	200	3	3
	RIC -500	Research and Innovation Catalyst-III			0	0	2	1	50	-	50	-	1
Discipline Specific	BND-DS-503	Basics of Nutrition Epidemiology											
	BND-DS-504	Functional Foods			2	0	0	2	100	100	200	3	2
	BND-DS-505	Nutrition and Food Security											
TOTAL					5	0	10	15	300	300	600	9	11

ELECTIVE COURSES*

Discipline Specific	BND-DS-506	Health and Weight Management			2	0	0	2	100	100	200	3	2
	BND-DS-507	Food Marketing & Consumerism			2	0	0	2	100	100	200	3	2
	BND-DS-508	Hospital & Health Care Management			2	0	0	2	100	100	200	3	2

* Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.

**Note: 1 Theory/Tutorial Hour = 1 credit, 2 Practical /Seminar Hours= 1 credit
Regarding Discipline Specific theory subjects, correspondent practical should be opted.**

PROGRAM: B.Sc (Nutrition and Dietetics) SEMESTER-VI													
Course Type	Course Code	Course	Pre-requisite Course, if any		Periods/Week				Marks			Duration of Exam (Hrs)	Credits
			Title	Code	L	T	P	Code	Continuous Evaluation	End semester exam	Total		
COMPULSORY COURSES													
Value Added	BND-601	Manav Rachna Life Skills – III	Audit Pass Course										
Core	BND-DS-651	Clinical Internship / Industrial Training			0	0	16	16	100	100	200	3	8
Total					0	0	16	16	100	100	200	3	8

Note: 1 Theory/Tutorial Hour = 1 credit, 2 Practical /Seminar Hours= 1 credit
Regarding Discipline Specific theory subjects, correspondent practical should be opted.
Student has to complete 25xN point from Manav Rachna Life Skill Programme

Note: To earn total 122 credits, the student need to score 34 credits from open elective basket (Domain Specific, Interdisciplinary and Generic Elective) offered across the university. The students can choose from Open elective basket offered by the Department as well as offered by other Departments of the University.

FIRST SEMESTER

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BND-DS-101 Basics of Food and Nutrition (Theory)

Periods/week Credits
L: 4 T: 0 P: 0 4
Duration of Examination: 3 Hours

Max. Marks: 200
Continuous Evaluation: 100
End Semester Examination: 100

Course Type: Program Core

Course Outcomes: The Students will be able:

- BND-DS-101.1. To recognize the functions of food for healthy life.
- BND-DS-101.2. To Understand different aspects of nutrients
- BND-DS-101.3. To Formulate a balanced diet using different food groups and food pyramid
- BND-DS-101.4. To Utilize the latest trends of nutrition in development of nutritional product.

PART – A

UNIT 1:

- 1.1 Basic definitions used in the study of nutrition- food, nutrition, adequate nutrition, nutritional status, malnutrition, health, dietetics, immunity and infection, RDA, RDI, BMR
- 1.2 Functions of foods- Physiological, social, and psychological.

UNIT 2:

- 2.1 Concept of food groups, food pyramid.
- 2.2 Concept of Balance Diet
- 2.3 Classification of foods

UNIT 3:

- 3.1 Classification, Functions, RDA and Dietary Sources of carbohydrates
- 3.2 Classification, Functions, RDA and Dietary Sources of protein
- 3.3 Classification, Functions, RDA and Dietary Sources of fat

PART - B

UNIT 4:

- 4.1 Classification, Functions, RDA and Dietary Sources of vitamins
- 4.2 Classification, Functions, RDA and Dietary Sources of Minerals
- 4.3 Functions of water in the body.

UNIT 5:

- 5.1 Objectives of Cooking and Principles of cooking
- 5.2 Methods of cooking
- 5.3 Cooking losses and their conservation

UNIT 6:

- 6.1 Functional Foods-Antioxidants, Phytochemicals, Probiotics.
- 6.2 Organic foods
- 6.3 Convenience foods
- 6.4 Genetically modified foods
- 6.5 Textured foods
- 6.6 Nano foods

Reference Readings:

1. L. Buckingham 2012, Molecular diagnostics: fundamentals, methods and clinical applications. 2nd ed. Philadelphia: F.A. Davis.
2. M.S. Bamji, N.P Rao, V. Reddy, 1996, Textbook of Human Nutrition. (11th ed.). New Delhi (India): Oxford and IBH Publishing Co Pvt Ltd.
3. M. Swaminathan, 1974, Essentials of Foods and Nutrition. (1st ed.) Madras (India): Ganesh and co.
4. T. Longvah, R. Ananthan, K. Bhaskarachary and K. Venkaiah, 2017, Indian Food Composition Tables. Telangana, India: National Institute of Nutrition.
5. B. Srilakshmi, 2010, Food Science. (5th ed.). New Delhi: Age International Pvt Ltd.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-101)	PO1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-101.1	1	1	1	1	2	2	3	3	3	1	1
BND-DS-101.2	1	1	2	2	1	2	2	3	3	1	1
BND-DS-101.3	3	1	1	1	2	3	3	3	3	2	2
BND-DS-101.4	3	1	1	2	2	2	2	3	3	3	3

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BND-DS-151: Basics of Food and Nutrition (Practical)

Periods/week Credits

L: 0 T: 0 P: 2 1

Duration of Examination: 2 Hours

Max. Marks:100

Continuous Evaluation:50

End Semester Examination:50

Course Type: Program Core

Course Outcome: The Students will be able

BND-DS-151.1. To recall the working instruction in foods laboratory.

BND-DS-151.2. To understand the importance of weights and measures in nutritional cookery.

BND-DS-151.3. To calculate the nutritional value of basic recipes of each categories

BND-DS-151.4. To analyze the recipe on the basis of food groups and methods of cooking.

PRACTICALS

1. Working instructions, weights and measures and table setting.

2. Basic food preparation, understanding the principles involved, nutritional quality and portion size-based different food groups based on different methods of cooking.

- Beverages
- Soups
- Snacks
- Main Meal Dishes
- Salads
- Desserts

Reference Readings:

1. M.S.Bamji, , S.N.Rao, , V. Reddy, 1996. Textbook of Human Nutrition. (11th ed.). New Delhi (India): Oxford and IBH Publishing Co Pvt Ltd.
2. T. Longvah, R. Ananthan, K. Bhaskarachary and K. Venkaiah, 2017. Indian Food Composition Tables. Telangana, India: National Institute of Nutrition.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-151)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-151.1.	1	2	2	3	3	2	2	1	1	2	1
BND-DS-151.2.	2	1	1	3	1	1	2	2	1	2	2
BND-DS-151.3	3	1	1	2	1	1	2	3	3	1	2
BND-DS-151.4	3	1	1	2	3	2	2	3	3	3	3

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-102 Fundamentals of Biochemistry (Theory)

Periods/week Credits
L: 4 T: 0 P:0 4
Duration of Examination: 3 Hours

Max. Marks : 200
Continuous Evaluation: 100
End Semester Examination: 100

Course Type: Program Core

Course Outcomes: The students will be able to:

- BND-DS-102 .1. To understand the biochemical aspects of nutrition and health.
- BND-DS-102.2. To summarize the importance of macronutrients and micronutrients.
- BND-DS-102.3. To identify the fundamental biochemical principles and reactions in biochemical processes.
- BND-DS-102.4 To analyze delivery of nutrients and their utilization in human body.

PART – A

UNIT 1: Introduction to Biochemistry

- 1.1 Definitions, objectives and scope of biochemistry
- 1.2 Chemical constituents of life – Biomolecules and the cell
- 1.3 Inter-relationship between biochemistry and other biological sciences.

UNIT 2: Carbohydrates

- 2.1 Definition, introduction and classification of carbohydrates.
- 2.2 Structure, properties and reactions of Monosaccharide's- glucose, fructose, galactose.
- 2.3 Mutarotation, osazone formation, glycosides
- 2.4 Structure and properties of Disaccharides- maltose, lactose, sucrose.
- 2.5 Structure and properties of Polysaccharides- dextrin, starch, glycogen.
- 2.6 Biochemical role of carbohydrates in the body.

UNIT 3: Lipid

- 3.1 Definitions, classification and properties of Lipids
- 3.2 Definition, classification, and nomenclature of fatty acids.
- 3.3 Essential and non-essential fatty acids.
- 3.4 Biochemical role of lipids in the body.

PART - B

UNIT 4: Proteins

- 4.1 Definition, classification, structure and properties of amino acids.
- 4.2 Essential and non-essential amino acids.
- 4.3 Classification of protein based on solubility, shape, composition and Function
- 4.3 Structural organization of proteins.
- 4.4 Biochemical role of proteins in the body.

UNIT 5: Vitamins

- 5.1 Definition, classification and properties of vitamins.
- 5.2 Structure, dietary sources, RDA and biochemical role of Water soluble and fat soluble vitamins.

UNIT 6: Minerals

- 6.1 Definition, classification and properties of minerals.

6.2 Dietary sources, RDA and biochemical role of macro and micro minerals.

6.3 Biochemical role of Vitamins and minerals in the body.

Reference Readings:

1. R. Murray, V. Rodwell, D. Bender, K. Botham, P. Anthony, P. Weil and Kennelly, 2009, Harper's Illustrated Biochemistry, 28th Edition, McGraw Hill Company
2. A.L. Lehninger, D.L. Nelson, and M. M Cox, 2009, Principles of Biochemistry, (6th ed.), CBS Publisher and Distributors.
3. P. Sundararaj, and A. Siddhu, 2002, Qualitative tests and Quantitative Procedures in Biochemistry, (2nd ed.), New Delhi: A H Wheeler and Co Ltd.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-102)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-102.1	2	1	-	1	1	2	3	3	3	2	2
BND-DS-102.2	2	1	-	1	1	2	2	3	2	2	2
BND-DS-102.3	1	1	-	1	1	2	2	2	2	2	1
BND-DS-102.4	2	1	2	1	1	1	2	2	2	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-152: Fundamentals of Biochemistry (Practical)

Periods/week Credits
L: 0 T: 0 P: 2 1
Duration of Examination: 2 Hours

Max. Marks: 100
Continuous Evaluation: 50
End Semester Examination: 50

Course Type: Program Core

Course Outcomes: The Students will be able:

- BND-DS-152.1. To understand the proper handling of apparatus and chemicals.
- BND-DS-152.2. To summarize the importance of biochemical analysis in the field of nutritional sciences
- BND-DS-152.3. To acquire problem-solving skills and nurture professional attitudes.
- BND-DS-152.4. To analyze delivery of nutrients and their utilization in human body.

Practicals

1. Safe and systematic working in the Laboratory.
2. Preparation of routine and standard laboratory reagents.
3. Determination of strength of acid and alkali solution by Titration Method.
4. Principle, working use, care and maintenance of various instruments used in laboratory investigations.
5. Preparation of buffers and determination of their pH by use of laboratory indicators and pH meters.
6. Collection and storage of biological specimens- blood, urine faeces, etc.
7. Qualitative Analysis of Carbohydrates.
8. Qualitative Analysis of Proteins.
9. Qualitative analysis of normal and abnormal constituents of urine.

Reference Readings:

- 1) West and Todd., 1966, Textbook of biochemistry (4th ed.), Macmillan Publishing Company.
- 2) U. Satyanarayana and U. Chakrapani, 2009, Biochemistry, (4th ed.), Elsevier.
- 3) S.P. Singh, 2008, Viva in Biochemistry, (4th ed.), CBS Publishers.
- 4) S.K. Sawhney and R. Singh, 2014, Introductory Practical Biochemistry, (2nd ed.), Narsoha publishing house.
- 5) P. Sundararaj and A. Siddhu, 2002, Qualitative tests and Quantitative Procedures in Biochemistry, (2nd ed.), New Delhi: A H Wheeler and Co Ltd.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-152)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-152.1	1	1	1	2	2	2	2	3	3	1	3
BND-DS-152.2	1	1	1	2	3	1	3	3	3	3	3
BND-DS-152.3	3	1	1	2	1	1	2	3	3	3	3
BND-DS-152.4	3	1	1	1	2	1	1	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-103: Human Anatomy and Physiology-I (Theory)

Periods/week Credits
L: 4 T: 0 P:0 4
Duration of Examination: 3 Hours

Max. Marks : 200
Continuous Evaluation: 100
End Semester Examination: 100

Course Type: Program Core

Course Outcomes: The Students will be able to:

BND-DS-103.1. To describe the structural anatomy of various human body organs.

BND-DS-103.2. To associate the structural anatomy with functions of body organs

BND-DS-103.3. To analyze the reason behind the grounding of nutrition science in physiology.

BND-DS-103.4. To evaluate the effect of alterations in structure on the functions of organs

PART – A

UNIT 1: Introduction to Anatomy and Physiology

1.1 Introduction to Anatomical Terms and Organization of the Human Body

1.2 Cell: Structure and functions, movement of materials across plasma membrane.

1.3 Tissues definition, types, characteristics, classification, location, functions, and formation

UNIT 2: Digestive System

2.1 Structure of Alimentary tract and accessory organs of digestion.

2.2 Secretions and functions of salivary glands, stomach, liver, pancreas, gall bladder, small intestine, large intestine

2.3 Carbohydrate, lipid and protein- Digestion and absorption

2.4 Disorders of digestive system

UNIT 3: Blood & Blood Components

3.1 The Blood-microscopic structure, composition and functions

3.2 Structure, function & normal count: RBCs, WBCs and platelets.

3.3 Haemopoiesis

3.4 Blood grouping- ABO system and RH system

3.5 Mechanism of Clotting

3.6 Disorders of blood

PART - B

UNIT 4: Cardiovascular system

4.1 Heart Anatomy

4.2 Cardiac Muscle and Electrical Activity

4.3 Cardiac Cycle, cardiac output and heart sounds

4.4 Structure and Function of Blood Vessels

4.5 Circulation: pulmonary coronary, systemic and portal

4.6 ECG

4.7 Blood pressure (Maintenance and regulation, factors affecting BP)

4.8 Disorders of cardiovascular system

UNIT 5: Lymphatic system

- 5.1 Lymph (Formation, composition, functions, circulation),
- 5.2 Lymph node (structure and functions)
- 5.3 Spleen and its functions

Unit 6: Respiratory System

- 6.1 Anatomy of respiratory organs, muscles and their functions
- 6.2 Mechanism, physiology and regulation of respiration
- 6.3 Transport of gases
- 6.4 Respiratory volumes
- 6.5 Disorders of respiratory system

Reference Readings:

1. S. K. Chaudhari, 1998, Concise Medical Physiology, (3rd ed.), Calcutta: New Central Book Agency (P) Ltd.
2. W.F. Ganong, 1999, Review of Medical Physiology, (10th ed.), London: Prentice-Hall International.
3. A.C. Guyton, 1996, Textbook of Medical Physiology. Philadelphia (USA): W. B. Saunders Co., Philadelphia, USA.
4. A.K. Jain, 2001, Textbook of Physiology, New Delhi: Avichal Publishing Co.
5. I. Singh, B.D. Chaurasia, 1998, Human Anatomy, New Delhi: CBS Publisher and Distributors.
6. G.J. Tortora and S.R. Grabowski, 2005, Principals of Anatomy and Physiology, (8th Ed), New York :Harper Collins College Publishers.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO Statement (BND-DS-103)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-103.1.	1	1	1	1	2	2	2	3	3	1	2
BND-DS-103.2.	3	1	1	2	2	3	1	3	3	1	1
BND-DS-103.3.	3	1	1	1	2	2	2	3	3	1	1
BND-DS-103.4.	3	1	1	1	1	2	2	3	3	3	3

MRIR

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-153 Human Anatomy and Physiology-I (Practical)

Periods/week Credits
L: 0 T: 0 P:2 1
Duration of Examination: 2 Hours

Max. Marks : 100
Continuous Evaluation: 50
End Semester Examination : 50

Course Type: Program Core

Course Outcomes: The students will be able

- BND-DS-153.1. 1. To describe the principles of various physical parameters of human body.
- BND-DS-153.2. To understand the working of equipments and instruments used in physiology lab.
- BND-DS-153.3. To apply various parameters for diagnosis of illness.
- BND-DS-153.4 To analyze the results of lab investigations with nutritional deficiencies.

Practical:

1. Introduction to Microscope and Laboratory
2. Estimation of hemoglobin by Sahli's Method
3. Determination of total erythrocyte count (TRBC)
4. Determination of RBC indices (Blood standards)- MCV, MCH and MCHC
5. Determination of bleeding time (BT) and clotting time (CT)
6. Determination of blood groups (A,B,O and Rh system)
7. Study of anatomy of digestive system, heart and respiratory system through charts and models

Reference Readings:

1. A.R. Chaudhari, Textbook of Practical Physiology, Paras Publishers, New Delhi.
2. K. Garg, I. Bahel, and M. Kaul, A Textbook of Histology, CBS Publishers and Distributors, New Delhi.
3. R.K., Goyal, N.M. Patel and S.A. Shah, Practical Anatomy, Physiology and Biochemistry, B.S. Shah Prakashan, Ahmedabad.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record
Viva I & II
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO Statement (BND-DS-153)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-153.1	2	1	1	2	2	2	2	3	3	1	2
BND-DS-153.2	1	1	1	2	2	2	2	3	3	1	1
BND-DS-153.3	3	2	2	2	2	1	2	3	3	3	3
BND-DS-153.4	3	1	1	2	2	2	1	3	3	3	3

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-104: Health, Food Hygiene & Sanitation (Theory)

Periods/week Credits
L: 2 T: 0 P:0 2
Duration of Examination: 3 Hours

Max. Marks : 200
Continuous Evaluation : 100
End Semester Examination: 100

Course Type: Program Discipline specific

Course Outcomes: The students will be able:

- BND-DS-104.1. To understand food hygiene and sanitation practices in hospitals and food industries.
- BND-DS-104.2. To appraise and respond to food hygiene status at industrial level
- BND-DS-104.3. To demonstrate specialized technical knowledge
- BND-DS-104.4. To associate the role of safety practices in upliftment of public health standard.

PART – A

UNIT 1:

- 1.1 General principle of food hygiene,
- 1.2
- 1.3 Sanitation-meaning and importance
- 1.4 Hygiene in rural and urban areas in relation to food preparation, personal hygiene and food handling habits
- 1.5 Hygiene- Importance and application of personal hygiene.
- 1.6 Role of sanitation, general sanitary consideration and sanitary evaluation of food plants.

UNIT 2:

- 2.1 Place of sanitation in food plants
- 2.2 Sanitary aspects of building and equipment: Plant layout and design
- 2.3 Source of water, quality of water, water supply and its uses in food industries
- 2.4 Purification and disinfection of water preventing contamination of potable water supply

PART - B

UNIT 3:

- 3.1 Hygiene and Sanitation in food sector- General principles of food hygiene, general hygiene practices for commodities, equipment and work area, HACCP.
- 3.2 Safe and effective insect and pest control: Extraneous materials in foods, Principles of Insects and pest control.
- 3.3 Physical and chemical control. Effective control of micro-organisms: micro-organisms important in food sanitation, micro-organisms as indicator of sanitary quality.

UNIT 4:

- 4.1 Effective detergency and cleaning practices: Importance of cleaning technology, physical and chemical factors in cleaning
- 4.2 Classification and formulation of detergents and sanitizers
- 4.3 Cleaning practices
- 4.4 Sanitary aspects of waste disposal

Reference Readings:

1. W.C. Frazier and D.C. Westhoff, 1988, Food Microbiology, (4th ed), New York : McGrawHill.
2. G.J. Banwart, 1987, Basic Food Microbiology, (2nd ed), New Delhi: CBS Publishers.
3. D. Mcswane, R. Nancy, Rue, 2004, The Essentials of Food Safety and Sanitation, (4th ed.), New Delhi: Prentice Hall.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO Statement (BND-DS-104)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-104.1	3	3	2	3	3	3	3	2	3	2	3
BND-DS-104.2	3	2	2	3	3	3	3	2	3	2	3
BND-DS-104.3	3	3	2	3	3	3	3	2	3	2	3
BND-DS-104.4	3	1	1	1	2	1	1	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-105 Life Span Development (Theory)

Periods/week Credits
L: 2 T: 0 P:0 2
Duration of Examination: 3 Hours

Max. Marks : 200
Continuous Evaluation: 100
End Semester Examination: 100

Course Type: Program Discipline specific

Course Outcomes:

The Students will be able :

- BND-DS-105.1 . To develop the understanding of physiological process and care during pre-natal period.
- BND-DS-105.2. To interpret the development in all life stages according to scientific theories.
- BND-DS-105.3. To determine the optimum growth and development in the different stages of life.
- BND-DS-105.4. To relate this knowledge in nutrition & dietetics while planning diets.

PART – A

UNIT 1: Introduction to Human Development

- 1.1 Concepts, Principles, Growth and Development
- 1.2 Pre-natal period and Birth: Development, genetic and environmental factors, delivery and birth
- 1.3 The pregnant woman: care, nourishment, health and well-being, Cultural practices during pregnancy
- 1.4 Risk factors during prenatal period

UNIT 2: Theories of development

- 2.1 Theories that emphasize biological factors in development: Evolutionary theory, Psychosexual theory, Cognitive developmental theory
- 2.2 Theories that emphasize environmental factors in development: Learning theories, Information processing theory
- 2.3 Theories that emphasize the interaction of person and environment in development: Psychosocial theory, Socio cultural theory, Ecological system theory

PART - B

UNIT 3: Infancy & Childhood

- 3.1 Infancy: Physical and perceptual development
 - 3.1.1 Cognitive, social and emotional development
 - 3.1.2 Alternate forms of parenthood
 - 3.1.3 Play during infancy
- 3.2 Early and Middle Childhood
 - 3.2.1 Physical and motor development
 - 3.2.2 Cognitive development
 - 3.2.3 Social and Emotional development

UNIT 4: Adolescence and Adulthood

- 4.1 Physical development
- 4.2 Cognitive development
- 4.3 Social and Emotional development

Reference Readings:

1. J. W. Santrock, 2006, Child development, (2nd ed.), New York: McGraw Hill.

2. M. Swaminathan, 1998, The first five years: A critical perspective on early childhood care and education in India, (5th ed.), Sage publications.
3. Elizabeth, B. Hurlock, 2001., Child Development, (6th ed.), Tata McGraw Hill.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 mark.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-105)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-105.1	2	2	1	1	1	2	3	3	3	1	2
BND-DS-105.2	2	2	1	1	1	2	3	3	2	2	2
BND-DS-105.3	2	2	1	1	2	2	3	2	2	2	3
BND-DS-105.4	3	1	1	1	2	2	3	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-106 Communication and Extension Education (Theory)

Periods/week Credits

L: 2 T: 0 P: 0 2

Duration of Examination: 3 Hours

Max. Marks : 200

Continuous Evaluation:100

End Semester Exam: 100

Course Type: Program Discipline specific

Course Outcomes:

The Students will be able:

BND-DS-106.1. To understand the concepts of communication.

BND-DS-106.2. To justify the role of different methods of communication in nutritional welfare of society

BND-DS-106.3. To relate the role of extension educator in social and nutritional upliftment of society.

BND-DS-106.4. To utilize the knowledge of communication & extension education in daily practice.

PART A

Unit 1: Communication

- 1.1 Concept of communication
- 1.2 Functions of communication
- 1.3 Elements of communication process and their characteristics
- 1.4 Models of communication
- 1.5 Barriers to communication
- 1.6 Feedback in communication
- 1.6 Communicator- receiver relationship

Unit 2: Communication approach and audio visual aids

- 2.1 Communication and extension approach
- 2.2 Methods of community contact- meetings, discussions, demonstration, folksongs, drama, role play, seminars, training, fields trips, exhibition
- 2.3 Audiovisual aids- nature, characteristics and classification

PART B

Unit 3: Extension Education

- 3.1 Concept of Extension Education
- 3.2 Philosophy of Extension Education
- 3.3 Principles of Extension Education
- 3.4 Aims of Extension Education
- 3.5 Qualities of an Extension worker
- 3.6 Role of Extension worker
- 3.7 Extension worker as a Communicator

Unit 4: Role of extension education in development

- 4.1 Development aspects of Extension
- 4.2 Uniqueness in Extension Education Programme
- 4.3 Objective behind extension education programme
- 4.4 Application of Extension Education in Nutrition and Dietetics

Reference Readings:

1. D.K. Berlo, 1960, The Process of Communication, New York :Holt, Rinehart Winstone Inc.

2. O.P. Bhatnagar, 1988, Education and Communication for Development, New Delhi: IBH publishing Co. (P) Ltd.
3. D. Deshler, 1997, 'Evaluating Extension Programmes', In Swanson, B.E., et. al. (Ed.) Improving Agricultural Extension, Rome: FAO.
4. R. Bordoloi, 2008, 'Preparation of Action Plan for KVKs', In: Talukdar, R.K., et. al. (Ed.) Extension and Training Methodologies for KVK Functionaries, ICAR, New Delhi: ICAR & Jorhat: AAU.
5. B. Kumar and B.S. Hansra, 2000, Extension Education from Human Resource Development, New Delhi: Concept Publishing Company.
6. J.P. Leagans, 1961. Characteristics of teaching and learning in Extension Education New Delhi: Extension Education in Community Development, Directorate of Extension, Govt. of India.

***Instructions for External Evaluation:** Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each part A and part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-106)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-106.1	2	3	3	3	3	2	3	1	-	3	2
BND-DS-106.2	2	2	2	2	2	2	2	3	1	3	2
BND-DS-106.3	2	3	3	3	3	2	3	1	1	3	3
BND-DS-106.4	3	3	3	3	2	2	3	3	-	2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-154: Health, Food Hygiene & Sanitation (Practical)

Periods/week Credits

L:0 T:0 P:2 1

Duration of Examination: 2 Hours

Max. Marks : 100

Continuous Evaluation : 50

End Semester Exam: 50

Course Type: Program Discipline specific

Course Outcomes:

The students will be able:

BND-DS-154.1. To identify the major food-borne hazards (biological, physical, and chemical).

BND-DS-154.2. To understand the steps in the risk assessment of food-borne hazards.

BND-DS-154.3. To relate the impacts of food-borne hazards on food safety, environment and human health.

BND-DS-154.4. To assess the microbial quality of common food commodities.

Practical:

1. Assessment of Microbial quality of air
2. Assessment of Microbial quality of eating utensils
3. Assessment of Microbial load of palm/ fingers, nose secretions of workers E.Coli / Vibrio
4. Determination of micro-organisms as sanitary indicator ropiness/ moldiness of bread
5. Visit to restaurants/ local food industries and preparation of visit report on prevailing conditions of hygiene
6. Methods of pest control in food industries rodents / cockroaches

Reference Readings:

1. W.C. Frazier and D.C. Westhoff, 1988, Food Microbiology, 4th Ed. New york.
2. G.J. Banwart, 1987, Basic Food Microbiology, (2nd ed), New Delhi: CBS Publishers.
3. D. Mcswane, Nancy and, R. Rue, 2004, The Essentials of Food Safety and Sanitation, (4th ed.), Prentice Hall.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-154)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-154.1	1	1	3	1	2	3	3	3	3	1	3
BND-DS-154.2	3	1	1	2	3	3	3	3	3	2	3
BND-DS-154.3	2	2	3	3	3	3	3	3	3	2	3
BND-DS-154.4	2	1	2	3	3	3	3	3	3	2	3

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-155: Life Span Development (Practical)

Periods/week Credits

L:0 T:0 P: 2 1

Duration of Examination: 2 Hours

Max. Marks : 100

Continuous Evaluation: 50

End Semester Exam: 50

Course Type: Program Discipline specific

Course Outcomes:

The students will be able:

BND-DS-155.1. To explain the methods used to monitor the growth of a child.

BND-DS-155.2. To examine the level of growth (mental, physical and cognitive) at various life stages.

BND-DS-155.3. To utilize basic tools of research in the field of child development and nutrition.

BND-DS-155.4. To create the audio- visual aids to educate the society.

Practical:

1. Growth monitoring.
2. Anthropometric measurements of a child- Height, Weight, Body Circumferences etc.
3. Observation of food habits & food choices, lifestyle patterns of individuals in different stages of life (Neonate, Infancy, Early childhood, Late childhood, Adolescence, Young adulthood, Middle age, Late adulthood) with the help of checklist.
4. Study major tools of research in child study/ the field of human development i.e. Case study, Interview and Questionnaire.
5. Developing audio-visual programmes for parents / community

Reference Readings:

1. J. W. Santrock, 2006, Child development, (2nd ed.), New York: McGraw Hill.
2. M. Swaminathan, 1998, The first five years: A critical perspective on early childhood care and education in India, (5th ed.), Sage publications.
3. Elizabeth, B. Hurlock, 2001, Child Development, (6th ed.), Tata McGraw Hill.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-155)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-155.1	1	2	2	3	3	2	3	3	2	3	2
BND-DS-155.2	3	2	2	3	3	3	3	3	2	2	3
BND-DS-155.3	3	2	3	3	2	2	2	3	3	3	3
BND-DS-155.4	2	3	3	3	2	2	3	3	2	3	3

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MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-156 Communication and Extension Education (Practical)

Periods/week Credits

L:0 T:0 P: 2 1

Duration of Examination: 2 Hours

Max. Marks : 100

Continuous Evaluation: 50

End Semester Exam: 50

Course Type: Program Discipline specific

Course Outcomes:

The students will be able:

BND-DS-156.1. To develop various IEC material with regards to community development programme

BND-DS-156.2. To justify the role of different methods of communication in nutritional welfare of society

BND-DS-156.3. To design and formulate extension activities in community development.

BND-DS-156.4. To utilize the knowledge of extension education to impart information to the community.

PRACTICALS

1. Planning, preparation and presentation of various audio-visual aids (projected and non-projected aids) - through electronic media
Posters
Charts
Flip charts
Flash cards
Flannel graphs
Slide presentation
Script Writing
2. Planning , implementation and presentation of extension education activity in different communities

Reference Readings:

1. D.K. Berlo, 1960, The Process of Communication, New York :Holt, Rinehart Winstone Inc.
2. O.P. Bhatnagar, 1988, Education and Communication for Development, New Delhi: IBH publishing Co. (P) Ltd.
3. D. Deshler, 1997, 'Evaluating Extension Programmes', In Swanson, B.E., et. al. (Ed.) Improving Agricultural Extension, Rome: FAO.
4. R. Bordoloi, 2008, 'Preparation of Action Plan for KVKs', In: Talukdar, R.K., et. al. (Ed.) Extension and Training Methodologies for KVK Functionaries, ICAR, New Delhi: ICAR & Jorhat: AAU.
5. B. Kumar and B.S. Hansra, 2000, Extension Education from Human Resource Development, New Delhi: Concept Publishing Company.
6. J.P. Leagans, 1961, Characteristics of teaching and learning in Extension Education New Delhi: Extension Education in Community Development, Directorate of Extension, Govt. of India.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-156)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-156.1	2	3	3	3	2	2	3	1	1	2	3
BND-DS-156.2	2	2	2	2	2	2	2	3	1	3	2
BND-DS-156.3	3	3	3	2	1	1	2	1	2	3	3
BND-DS-156.4	2	3	3	3	3	2	2	1	1	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

CH-202B: ENVIRONMENTAL STUDIES

Periods/week Credits

L: 3 T: 0 3+1*

Duration of Examination: 3 Hrs

Max. Marks: 200

Continuous Evaluation: 100

End Semester Exam: 100

Prerequisite: The students should have the knowledge of environment, biodiversity, atmospheric pollution and importance of environmental studies. They should have the knowledge of causes and effects of disasters and various environmental problems.

Course Type: Program Core

Course Outcomes

CH-202B.1. The students will be able to determine whether equitable use of natural resources would be appropriate to conserve biodiversity and protection of environment.

CH-202B.2. The students will determine the reason behind the atmospheric pollution and global issues related to environment like natural disasters and will be able to compare the different acts for pollution control.

CH-202B.3. The students will be able illustrate major health issues of women and children will gain knowledge of Mortality and Mortality rate.

CH-202B.4. The students will be able to relate different ecosystems and energy flow in ecosystem.

CH-202B.5. The students will be able to practically evaluate different environment assests and ecosystems

PART- A

Unit 1 : Introduction to environmental studies

- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

Unit 2 : Ecosystems

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems :
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 3 : Natural Resources : Renewable and Non-renewable Resources

- Land resources and landuse change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit 4 : Biodiversity and Conservation

- Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity : Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

PART-B

Unit 5 : Environmental Pollution

- Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management : Control measures of urban and industrial waste.
- Pollution case studies.

Unit 6 : Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Unit 7 : Human Communities and the Environment

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management : floods, earthquake, cyclones and landslides.
- Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Unit 8: Chemistry for peaceful purposes

- The duality of chemistry: Chemistry for peaceful purposes versus Chemical Weapons
- Dual – use nature of toxic and precursor chemicals
- Weapons of mass destructions, disarmament

Unit 9 : Field work*

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

Reference Readings:

1. R. Carson, 2002, *Silent Spring*, Houghton Mifflin Harcourt.
2. M. Gadgil and R. Guha, 1993, *This Fissured Land: An Ecological History of India*, Univ. of California Press.
3. B. Gleeson and N. Low, (eds.) 1999, *Global Ethics and Environment*, London, Routledge.

4. P.H. Gleick, 1993, *Water in Crisis*, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ. Press.
5. G.J. Martha, G.K. Meffe and C.R. Carroll, 2006, *Principles of Conservation Biology*, Sunderland: Sinauer Associates.
6. R.E. Grumbine and M.K. Pandit, 2013, Threats from India's Himalaya dams. *Science*, 339: 36--37.
7. P. McCully, 1996, *Rivers no more: the environmental effects of dams*(pp. 29--64), Zed Books.
8. J.R. McNeill, 2000, *Something New Under the Sun: An Environmental History of the Twentieth Century*.
9. I.L. Pepper, C.P. Gerba and M.L. Brusseau, 2011, *Environmental and Pollution Science*. Academic Press.
10. M.N. Rao and A.K. Datta, 1987, *Waste Water Treatment*, Oxford and IBH Publishing Co. Pvt. Ltd.
11. P.H. Raven, D.M. Hassenzahl and L.R. Berg, 2012, *Environment*, 8th edition, John Wiley & Sons.
12. A. Rosencranz, S. Divan, and M. L. Noble, 2001, *Environmental law and policy in India, Tripathi 1992*.
13. R. Sengupta, 2003, *Ecology and economics: An approach to sustainable development*, OUP.
14. J.S. Singh, S.P. Singh and S.R. Gupta, 2014, *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
15. N.S. Sodhi, L. Gibson and P.H. Raven, (eds). 2013, *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
16. V. Thapar, 1998, *Land of the Tiger: A Natural History of the Indian Subcontinent*.
17. E. O. Wilson, 2006, *The Creation: An appeal to save life on earth*. New York: Norton.
18. World Commission on Environment and Development, 1987, *Our Common Future*. Oxford University Press.

Instructions for paper setting /End Semester Examination: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B. Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	20 marks
Sessional- II	20 marks
Attendance	10 marks
Field work and report writing	50 marks

Assessment Tools:

Assignment/Tutorials
 Sessional tests
 Surprise questions during lectures/Class Performance
 Term end examination

Course Articulation Matrix

CO Statement (CH-202B)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
CH-202B.1	2	1	1	2	3	2	2	3	1	-	1
CH-202B.2	3	1	1	3	3	3	2	3	1	-	1
CH-202B.3	1	1	1	-	2	-	2	3	1	-	1
CH-202B.4	2	1	1	2	2	2	2	3	1	-	1
CH-202B.5	2	1	1	2	3	2	2	3	1	-	1

MRIRRS

SECOND SEMESTER

MRIRK

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-201: Biochemistry and Metabolism (Theory)

Periods/week Credits
L: 3 T: 0 P: 0 3
Duration of Examination: 3 Hours

Max. Marks : 200
Continuous Evaluation: 100
End Semester Exam: 100

Course Type: Program Core

Course Outcomes:

The student will be able:

BND-DS-201.1. To recall various metabolic reactions occurring in the body.

BND-DS-201.2. To understand mechanisms adopted by the human body for regulation of metabolic pathways.

BND-DS-201.3. To critically relate to the field of Nutrition.

BND-DS-201.4. To utilize the knowledge for the betterment of human health.

PART – A

UNIT 1 Enzymes

- 1.1 Definition Nomenclature and Classification
- 1.2 Chemical nature of enzymes and coenzymes
- 1.3 Mode of action of enzymes
- 1.4 Factors affecting enzyme activity
- 1.5 Enzyme inhibition

UNIT 2: Metabolism of Carbohydrates

- 2.1 Glycolysis
- 2.2 Citric Acid Cycle
- 2.3 Metabolism of glycogen-Glycogenesis and Glycogenolysis
- 2.4 Gluconeogenesis

UNIT 3: Metabolism of Proteins

- 1.1 Transamination
- 1.2 Deamination
- 1.3 Urea cycle and its significance

PART - B

UNIT 4: Metabolism of Lipids

- 4.1 β - oxidation of fatty acids
- 4.2 Ketone bodies and ketogenesis
- 4.3 Cholesterol & its biochemical importance

UNIT 5: Nucleic acids and genetic code of metabolism

- 5.1 Purines and Pyrimidines
- 5.2 DNA and RNA-Structure and functions
- 5.3 Genetic Code and Protein biosynthesis.

UNIT 6:

6.1 Fundamentals of epigenetics

6.2 Fundamentals of nutrigenomics

Reference Readings:

1. Harper's Illustrated Biochemistry, 2011, 28th Edition, Mc Graw Hill.
2. A.L. Lehninger, D.L. Nelson, and M.M. Cox, 2009, Principles of Biochemistry, 6th Edition, CBS Publisher and Distributors.
3. P. Sundararaj and A. Siddhu, 2002, Qualitative tests and Quantitative Procedures in Biochemistry, A H Wheeler and Co Ltd, Second Edition, Wheeler, New Delhi.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-201)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-201.1	1	1	1	1	1	2	2	3	3	3	3
BND-DS-201.2	1	1	1	1	1	2	2	3	3	3	3
BND-DS-201.3	3	2	1	2	2	3	2	3	3	3	3
BND-DS-201.4	3	1	1	2	3	3	3	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-251 Biochemistry and Metabolism (Practical)

Periods/week Credits
L: 0 T: 0 P: 2 1
Duration of Examination: 2 Hours

Max. Marks : 100
Continuous Evaluation: 50
End Semester Exam: 50

Course Type: Program Core

Course Outcomes:

The student will be able to:

BND-DS-251.1. To understand biochemical methods used for the analysis of food and biological samples.

BND-DS-251.2. To perform biochemical analysis with accuracy and reproducibility.

BND-DS-251.3. To demonstrate skills to be used in various diagnostic labs.

BND-DS-251.4. To utilize the practical information in research related to biochemical analysis.

Practical:

1. Quantitative Analysis of Blood Glucose
2. Quantitative analysis of normal and abnormal constituents of urine.
3. Complete analysis of Lipid Profile.
4. Liver function tests.
5. Kidney function tests.

Reference Readings:

1. Harper's Illustrated Biochemistry, 2011, 28th Edition, Mc Graw Hill.
2. A.L. Lehninger, D.L. Nelson, and M.M. Cox, 2009, Principles of Biochemistry, 6th Edition, CBS Publisher and Distributors.
3. P. Sundararaj and A. Siddhu, 2002, Qualitative tests and Quantitative Procedures in Biochemistry, A H Wheeler and Co Ltd, Second Edition, Wheeler, New Delhi.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-251)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-251.1	2	2	1	1	2	3	3	2	2	2	2
BND-DS-251.2	3	1	1	2	3	3	2	2	2	3	3
BND-DS-251.3	1	1	3	2	3	3	3	2	2	3	3
BND-DS-251.4	3	2	2	2	3	3	3	3	2	3	3

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-202: Nutrition: A Life cycle approach (Theory)

Periods/week Credits

L: 3 T: 0 P: 0 3

Max. Marks : 200

Continuous Evaluation : 100

End Semester Exam: 100

Duration of Examination: 3 Hours

Course Type: Program Core

Course Outcomes: The students will be able:

BND-DS-202.1. To understand the physiological changes occurring at different stages of life

BND-DS-202.2. To analyze different nutritional needs of an individual throughout the lifecycle

BND-DS-202.3. To illustrate the dietary modification according to person's nutritional requirement and income group.

BND-DS-202.4. To develop a suitable diet/meal plan for individuals.

PART – A

Unit 1- Nutritional and food requirements for Infants:

1.1 Growth and development during Infancy

1.2 Nutritional Requirements.

1.3 Food Pattern

1.4 Weaning Foods

1.5 BFHI, BPNI

Unit 2- Nutritional and food requirements in childhood (Pre-school, school going children) and adolescents:

2.1 Growth and development pattern

2.2 Nutritional Requirements.

2.3 Meal Pattern

2.4 Food Habits

2.5 Packed Lunches

Unit 3- Nutritional Requirements for Adults:

3.1 Nutritional Requirements of reference Indian man and woman.

3.2 Low cost balanced diets.

PART – B

Unit 4-Nutrition in Pregnancy:

4.1 Physiological Changes

4.2 Complications of pregnancy and management and importance of antenatal care.

4.3 Nutritional Requirements.

4.4 Meal Pattern

Unit 5- Nutrition in Lactation

5.1 Physiological Change

5.2 Human milk composition and factors affecting breastfeeding.

5.3 Nutritional Requirements.

- 5.4 Meal Pattern
- 5.5 Exclusive Breastfeeding

Unit 6-Nutrition for Elderly:

- 6.1 Process of Aging.
- 6.2 Nutritional Requirements.
- 6.3 Meal Pattern
- 6.4 Nutrition related problems of Old Age.

Reference Readings:

- 1) M.S. Bamji, N.P. Rao and V. Reddy, 1996, Textbook of Human Nutrition, 11th Ed. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- 2) M. Swami Nathan, 1974, Essentials of Foods and Nutrition, 1st Ed., Ganesh and co.
- 3) Wadlow and Ingel's, 2012, Perspectives of Nutrition, 9th Ed., McGraw-Hill Education
- 4) Nutritive Value of Indian Foods, NIN, ICMR

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

- Assignment/Tutorials
- Sessional tests
- Surprise questions during lectures/Class Performance
- Term end examination

Course Articulation Matrix:

CO Statement (BND-DS-201)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-202.1	2	1	1	2	1	2	2	3	3	2	2
BND-DS-202.2	3	2	1	1	1	2	2	3	3	2	2
BND-DS-202.3	3	1	1	2	2	2	2	3	3	3	3
BND-DS-202.4	3	1	1	2	3	3	3	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-252 Nutrition: A Life cycle approach (Practical)

Periods/week Credits

L: 0 T:0 P:2 1

Max. Marks :100

Continuous Evaluation : 50

End Semester Exam: 50

Duration of Examination: 2 Hours

Course Type: Program Core

Course Outcomes: The students will be able:

BND-DS-252.1 To memorize the practical aspects of meal planning

BND-DS-252.2 To understand the seasonal variation of food items.

BND-DS-252.3 To develop nutritionally adequate balance diets for various age groups.

BND-DS-252.4 To calculate the cost of different diets.

Practicals

1. Fundamentals of meal planning.
2. Food Survey for understanding the seasonal availability, price and study of nutrition labeling on selected foods.
3. Planning and preparation of adequate diets using the Food Exchange System to suit different socio economic groups and regions for:
 - Adults
 - Pregnant and Nursing mothers.
 - Infant
 - Preschool children
 - School children
 - Adolescents
 - Elderly

Reference Readings:

- 1) M.S. Bamji, N.P. Rao and V. Reddy, 1996, Textbook of Human Nutrition, 11th Ed. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- 2) M. Swami Nathan, 1974, Essentials of Foods and Nutrition, 1st Ed., Ganesh and co.
- 3) Wadlow and Ingel's, 2012, Perspectives of Nutrition, 9th Ed., McGraw-Hill Education
- 4) Nutritive Value of Indian Foods, NIN, ICMR.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-252)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-252.1	2	2	2	2	2	2	2	3	2	2	2
BND-DS-252.2	2	2	2	2	2	2	2	3	3	2	3
BND-DS-252.3	3	2	2	2	3	2	3	3	3	3	3
BND-DS-252.4	3	2	3	3	2	3	2	1	1	2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-203: Human Anatomy and Physiology-II (Theory)

Periods/week Credits
L: 3 T: 0 P: 0 3
Duration of Examination: 3 Hours

Max. Marks : 200
Continuous Evaluation:100
End Semester Exam:100

Course Type: Program Core

Course Outcomes: Students will be able to:

BND-DS-203.1. To understand the structural anatomy of various human body organs.

BND-DS-203.2. To relate the structural anatomy with functions of body organs

BND-DS-203.3. To analyze the reason behind the grounding of nutrition science in physiology.

BND-DS-203.4. To evaluate the effect of alterations in structure on the functions of organs

PART – A

UNIT 1: Nervous System

- 2.1 Anatomy and physiology of various parts of brain(cerebellum, pons, medulla oblongata, thalamus, hypothalamus and functional area of cerebrum)
- 2.2 Spinal cord (structure and reflexes), cranial nerves (Names and functions)
- 2.3 Classification of nervous system
- 2.4 Autonomous nervous system (sympathetic and parasympathetic)
- 2.5 Neurotransmission
- 2.6 Sense Organs-eye and ear

UNIT 2: Muscular & Skeletal System

- 6.1 Bone Classification and Structure, Axial & Appendicular skeleton
- 6.2 Bone Formation and Development
- 6.3 Exercise, Nutrition and Bone Tissue
- 6.4 Types, structure of muscles
- 6.5 Joints-classification and structure

UNIT 3: Endocrine System

- 1.1 Anatomy and physiology of hormones of Pituitary, Pancreas, Thyroid, Parathyroid, thymus, Adrenal glands, gonads (testis and ovary)
- 1.2 Disorders of endocrine system

PART - B

UNIT 4: Urinary System

- 4.1 Structure and physiology of the organs of urinary system: Kidney, Ureter, Urinary bladder, Urethra
- 4.2 Structure of nephrons
- 4.3 Formation of urine
- 4.4 Body Fluids and Fluid Compartments, Acid base balance, electrolyte and water balance, Renin-angiotensin system,
- 4.5 Physiology of micturation
- 4.6 Disorders of urinary system

UNIT 5: Reproductive System

- 5.1 Anatomy and Physiology of various parts of males and female reproductive system
- 5.2 Spermatogenesis and oogenesis
- 5.3 Physiology of menstruation

5.4 Disorders of reproductive system

UNIT 6 Sports Physiology

- 6.1 Muscles in exercise
- 6.2 Respiration in exercise
- 6.3 CVS in exercise
- 6.4 Body heat in exercise
- 6.5 Body fluid and salts in exercise

Reference Readings:

1. S.K. Chaudhari, 1998, Concise Medical Physiology, 3rd Ed., New Central Book Agency (P) Ltd., Calcutta.
2. W.F. Ganong, 1999, Review of Medical Physiology, 10th Ed., Prentice-Hall International, London.
3. A.C. Guyton, 1996, Textbook of Medical Physiology, W. B. Saunders Co., Philadelphia, USA.
4. A.K. Jain, 2001, Textbook of Physiology, Avichal Publishing Co., New Delhi.
5. I. Singh and B.D. Chaurasia, 1998, Human Anatomy, CBS and Distributors, New Delhi.
6. G.J. Tortora and S.R. Grabowski, 2005, Publisher Principals of Anatomy and Physiology, 8th Ed., Harper Collins College Publishers, New York.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix:

CO Statement (BND-DS-203)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-203.1	3	1	1	1	2	1	2	3	2	2	1
BND-DS-203.2	3	2	1	2	2	2	2	3	3	2	2
BND-DS-203.3	3	1	1	2	1	1	2	3	3	2	2
BND-DS-203.4	3	1	1	1	1	2	2	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-253: Human Anatomy and Physiology-II (Practical)

Periods/week

Credits

Max. Marks : 100

L: 0 T: 0 P: 2

1

Continuous Evaluation : 50

End Semester Exam: 50

Duration of Examination: 2 Hours

Course Type: Program Core

Course Outcome:

The students will be able:

BND-DS-253.1. To recall the cells of human body microscopically.

BND-DS-253.2. To Identify different bones of human skeletal system in terms of their location in human body.

BND-DS-253.3. To Understand the role of human joints in body movements.

BND-DS-253.4. To Relate characteristics, components and functions of various systems of the body and the effect of nutrition and disease on them

Practical:

1. Histology- Study of permanent slides of organs and tissues
2. Osteology- Study of appendicular skeleton
3. Osteology- study of axial skeleton
4. Study of joints
5. Study of following systems with the help of models and charts (Digestive system, Cardiovascular system, Lymphatic system, Respiratory system, Urinary system, Endocrine system, Reproductive system, Nervous system, Sense organs)

Reference Readings:

1. S.K. Chaudhari, 1998, Concise Medical Physiology, 3rd Ed., New Central Book Agency (P) Ltd., Calcutta.
2. W.F. Ganong, 1999, Review of Medical Physiology, 10th Ed., Prentice-Hall International, London.
3. A.C. Guyton, 1996, Textbook of Medical Physiology, W. B. Saunders Co., Philadelphia, USA.
4. A.K. Jain, 2001, Textbook of Physiology, Avichal Publishing Co., New Delhi.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix:

CO Statement (BND-DS-253)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-253.1	1	1	1	1	2	2	2	3	2	2	2
BND-DS-253.2	1	1	1	1	1	2	2	3	3	1	1
BND-DS-253.3	1	1	1	1	1	1	2	3	3	1	1
BND-DS-253.4	3	1	1	1	2	2	2	3	3	3	3

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-204: Food and Nutrition Labeling (Theory)

Periods/week Credits

L: 2 T: 0 P: 0 2

Duration of Examination: 3 Hours

Max. Marks : 200

Continuous Evaluation : 100

End Semester Exam: 100

Course Type: Program Discipline specific

Course Outcomes:

The students will be able:

BND-DS-204.1. To Understand the nutritional labeling of packaged foods as per statutory bodies.

BND-DS-204.2. To Interpret the nutritional labels of commonly consumed foods.

BND-DS-204.3. To Apply the knowledge in designing their nutritional labels for new products developed.

BND-DS-204.4. To Categorize food labels as per Indian & International laws.

PART A

Unit 1 Food and Nutrition Labeling

1.1 A brief history of food and nutrition labeling

1.2 Definitions of Labeling and related glossary terms

Unit 2 Labeling Requirements

2.1 Requirements of Labeling

2.2 Interpretation of information on food labels/Clean Labels

2.3 Understanding labeling rules and regulations

2.4 Understanding labeling symbols

PART B

Unit 3

3.1 Requirement of imported foods (EIC, APEDA)

3.2 Requirement of pre- packaged food labelling

Unit 4 Claims

4.1 General principles for making claims on pre-packaged foods

4.2 Nutritional and health claims

4.3 Principles for making nutritional and health claims on pre-packaged foods

4.4 Specific conditions for making nutritional claim including nutrient content and comparative claims

4.5 Specific conditions for making health claim

4.6 Claims related to dietary guidelines or healthy diets

4.7 Regulatory authorities/bodies- FSSAI, BIS, CODEX

Reference Readings:

1. H. Potter, 1995, Food Science, 5th Edition, New Age International Ltd.
2. B. Srilakshmi, 2007, Food Science, 5th Edition, New Age International Ltd.
3. A.S. Bawa, P.S. Raju and O.P. Chauhan (Editor), 2013, Food Science, New India Publishing Agency.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-204)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-204.1	2	1	1	3	3	3	3	1	2	1	2
BND-DS-204.2	2	1	1	3	3	3	2	2	2	1	2
BND-DS-204.3	3	2	2	2	2	3	3	3	3	3	3
BND-DS-204.4	1	1	2	3	3	3	3	2	2	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-254: Food and Nutrition Labeling (Practical)

Periods/week Credits

L: 0 T: 0 P: 2 1

Duration of Examination: 2 Hours

Max.Marks : 100

Continuous Evaluation: 50

End Semester Exam: 50

Course Type: Program Discipline specific

Course Outcomes

The students will be able:

BND-DS-254.1. To Interpret food labels of different categories of food products available in the market.

BND-DS-254.2. To Compare & contrast between different food labels

BND-DS-254.3. To Demonstrate the design of a food label for a new product developed.

BND-DS-254.4. To Calculate & predict the design of a food label.

Practical

1. Study of different food products on the basis of requirements of labeling, nutrition requirement, claims etc under the following category:
 - Cereal and cereal products
 - Pulse and pulse products
 - Fats and Oils
 - Vegetables and fruits
 - Nuts
 - Meat and Meat products
 - Milk and milk products
2. Evaluate different food products on the basis of guidelines of pre-packaged foods/Processed Foods.
3. Interpretation of food labels and symbols.
4. Prepare a project on any one category of food product claiming for any specific disease condition.

Reference Readings:

1. H. Potter, 1995, Food Science, 5th Edition, New Age International Ltd.
2. B. Srilakshmi, 2007, Food Science, 5th Edition, New Age International Ltd.
3. Food Safety and Standards Authority of India- Manual 2011.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-254)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-254.1	2	1	1	3	3	3	3	2	1	1	1
BND-DS-254.2	3	1	1	3	3	3	3	2	2	1	1
BND-DS-254.3	3	2	2	3	3	3	3	3	3	3	3
BND-DS-254.4	3	2	2	3	3	3	3	1	2	3	3

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-205: Food Laws and Regulation (Theory)

Periods/week Credits
L: 2 T: 0 P: 0 2

Max. Marks : 200
Continuous Evaluation: 100
End Semester Exam: 100

Duration of Examination: 3 Hours

Course Type: Program Discipline specific

Course Outcomes:

The students will be able:

- BND-DS-205.1. To Understand different National & International Food laws.
- BND-DS-205.2 To Associate importance of Food laws.
- BND-DS-205.3. To Relate the role of safety & sanitation in food safety.
- BND-DS-205.4. To Determine food adulterants in various food commodities.

PART-A

Unit 1: Introduction to Food Laws and Standards

- 1.1 Historical Perspectives of Food Laws
 - Mandatory Food Laws
 - Voluntary food Laws
- 1.2 Regulation of food safety and food laws with respect to India

Unit 2: Food Laws and Acts:

- 2.1 Food Safety and Standards (FSS)- Rules and regulation, 2011
- 2.2 Agricultural Produce Act, 1937 (Grading and Marketing), AGMARK
- 2.3 Sugar Control Order
- 2.4 Export (Quality Control & Inspection), Act, 1963 and Rules
- 2.5 Bureau of Indian Standards.
- 2.6 Legal Metrology

PART-B

Unit 3: Role of International regulatory agencies

- 3.1 CODEX Alimentarius Commission
- International organization for standards- WTO, CODEX, EFSA, USFDA-FSMA (2018)
- 3.2 ISO and its standards for food quality and safety [ISO 9000 series, ISO 22000, ISO 15161, ISO 14000, FSMA 22000 (2015)]

Unit 4 Food Quality and Safety

- 4.1 Introduction of Food contamination.
- 4.2 Historical Food legislation in India; NABL- FSSAI
- 4.3 Export inspection council laboratory, Central grain analysis laboratory

Reference Readings:

1. Food Safety and Standards Authority of India- Manual 2011.
2. Codex Alimentarius Commission- Procedural Manual, World Health Organization and Food and Agricultural Organization, 2018.
3. W.A. Gould and R.W. Gould, 1998, Total Quality Assurance for the Food Industries. 1st Ed. CTI Publications Inc. Baltimore.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-205)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-205.1	1	1	2	3	3	3	3	1	2	3	1
BND-DS-205.2	3	2	2	3	3	3	3	2	2	3	3
BND-DS-205.3	3	1	1	3	3	3	1	1	2	3	3
BND-DS-205.4	3	1	1	3	3	2	1	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-255: Food Laws and Regulation (Practical)

Periods/week Credits

L: 0 T: 0 P: 2 1

Max. Marks : 100

Continuous Evaluation: 50

End Semester Exam: 50

Duration of Examination: 2 Hours

Course Type: Program Discipline specific

Course Outcomes The students will be able:

BND-DS-255.1 To Analyse various adulterants in various food groups.

BND-DS-255.2. To Describe the information efficiently & effectively within appropriate ethical & legal limits.

BND-DS-255.3. To Examine the common adulterants in food samples.

BND-DS-255.4. To Illustrate the importance of food adulterants & their ill effect.

PRACTICALS

1. Testing of Milk and milk products:

a) Adulteration of Milk Physical Tests: Detergent Test, Filter Test, Flow Test

b) Chemical Tests:

- Detection of starch in Milk,
- Detection of cane sugar in Milk,
- Test for Buffaloes Milk in Cow's Milk,
- Detection of Presence of Foreign Fat in Milk
- Detection of added colours in Milk,
- Detection of skim milk power in milk,
- Detect the presence of added carbonates and bicarbonates in milk,
- Detection of Added Urea in Milk
- Detection of Ammonium Compounds in Milk

2. Collection of 5 different food samples from food guide and analyzing food adulterants and toxic constituents present in them.

Reference Readings:

1. Manual of methods of analysis of foods- milk and milk products. Food safety and standards authority of India, Ministry of health and family welfare government of India New Delhi 2015.
2. N.N Potter and J.H. Hotchkiss, "Food Science", CBS Publishers and Distributors, New Delhi
3. Y. Pomeraz and C.E., MeLoari, 1996, Food Analysis: Theory and Practice, 2nd Ed, CBS publishers and Distributor, New Delhi.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-255)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-255.1	2	1	1	2	3	3	1	3	3	2	1
BND-DS-255.2	3	1	1	2	3	2	3	3	3	3	3
BND-DS-255.3	2	1	1	2	3	3	1	2	2	3	3
BND-DS-255.4	3	1	1	2	2	2	3	3	3	3	3

THIRD SEMESTER

MRIPRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-301 Fundamental of Food Science (Theory)

Periods/week

Credits

Max. Marks: 200

L: 3 T: 0 P: 0

3

Continuous Evaluation: 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course Type: Program Core

Course Outcomes: Students will be able:

BND-DS-301.1: To understand the chemical reactions and physical changes that occurs during the production, processing, storage and handling of foods and their applications.

BND-DS-301.2: To know the physical and chemical properties of food constituents.

BND-DS-301.3: To understand the recent advances and researches in the field.

BND-DS-301.4: To analyze the effects of reactions on the quality and safety of food.

PART A

Unit 1 Cereal & Pulse Products

1.1 Definition, scope of food science

1.1 Cereal grains: structure of cereal grains.

1.2 Composition and nutritive value of cereals and pulses.

1.3 Coarse Cereal/nutria cereals and pulse: products and by products.

1.4 Browning and its type.

1.5 Cereal chemistry: amylose, amylopectin, sols, gels and foams.

1.6 Effect of heat: dextrinization, gelatinization, retrogradation of starch, syneresis, germination, malting.

Unit 2 Vegetable and Fruits

2.1 Definition, structure, classification, composition and nutritive value.

2.2 Plant pigments and effect of pH and temperature on them.

2.3 Post- Harvest changes in Fruits and vegetables

2.4 Prevention of enzymatic browning

Unit 3 Sugars and their products

3.1 Classification – Mono, di, and polysaccharides

3.2 Functional properties of sugar

3.2 Sugar related products and their characteristics.

3.3 Solubility and crystallization of sugars.

PART B

Unit 4 Milk and their products

4.1 Composition and nutritive value of milk.

4.2 Flow chart of milk processing.

4.3 Processing of milk: Types of pasteurization (HTST, LTLT AND UHT) and homogenization.

4.4 Types of market milk.

Unit 5 Meat, Fish and Poultry

- 5.1 Meat- Definition of carcass, concept of red meat and white meat, composition and nutritive value of meat, and marbling.
- 5.2 Fish- Classification of fish (fresh water and marine), aquaculture, composition and nutritive value of fish, characteristics of fresh fish, spoilage of fish- microbiological, physiological, biochemical.
- 5.3 Poultry- Structure of hen's egg, composition and nutritive value, egg proteins, characteristics of fresh egg, deterioration of egg quality, difference between broiler and layers.

Unit 6 Fats and Oils

- 6.1 Introduction, classification, fats/oils- types, nutritive value, composition.
- 6.2 Hydrogenation, inter-esterification and trans-fat.
- 6.3 Rancidity in fats and its prevention

Reference Reading:

1. N.N. Potter and H.H. Joseph, 2007, Food Sciences, 5th Edition, Chapman and hall Publications, New York.
2. B. Srilakshmi, 2007, Food Science, 4th Edition, New Age International Ltd.
3. A.S. Bawa, P.S. Raju and O.P. Chauhan, 2013, Food Science, 1st Edition, New India Publishing agency.
4. S. Roday, 2011, Food Science, 2nd Edition, Oxford publication.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO Statement (BND-DS-301)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-301.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-301.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-301.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-301.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-351: Fundamental of Food Science (Practical)

Periods/week	Credits	Max. Marks: 100
L: 0 T: 0 P: 2	1	Continuous Evaluation: 50
Duration of Examination: 3 Hours		End Semester Examination: 50

Course Type: Program Core

Course Outcomes: Students will be able:

BND-DS-351.1: To understand the chemical reactions and physical changes that occurs during the production, processing, storage and handling of foods and their applications.

BND-DS-351.2: To analyse the physical and chemical properties of food constituents.

BND-DS-351.3: To corelate the recent advances and researches in lab.

BND-DS-351.4: To see the effects of reactions on the quality and safety of food.

PRACTICALS

1. Microscopic structure of cereal starches
2. Gelatinization properties of starches
3. Effect of varying the proportions of acid, sugar, temperature, pectin and cooking time on formation of guava jelly
4. Browning in fruits and vegetables
5. Effect of heat on sugar solutions and their behavior corresponding to cold water and thread tests
6. Crystallization of sugars through preparation of fondant and *Shakapara*.
7. Effect of heat and acid on milk proteins
8. Determination of smoking points of fat and oils

Reference Readings:

1. U. Raina, S. Kashyap, V. Narula, S. Thomas, V.S. Suvira, S. Chopra, 2010, Basic Food Preparation: A Complete Manual, 4th Edition, Orient Black Swan Ltd.
2. M. Sethi, and E. Rao, 2011. Food Science (Experiments and Applications), 2nd Edition, CBS Publishers & Distributers Pvt. Ltd.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-351)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-351.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-351.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-351.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-351.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-302 Community Health Nutrition (Theory)

Periods/week

Credits

Max. Marks: 200

L: 3 T: 0 P: 0

3

Continuous Evaluation: 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course Type: Program Core

Course Outcomes: Students will be able :

BND-DS-302.1.To understand the prevalence of nutritional problems in India.

BND-DS-302.2.To develop the skills in planning, executing and evaluating nutrition projects in the community.

BND-DS-302.3. To familiarize with various approaches to nutrition and health interventions, programmes and policies.

BND-DS-302.4. To understand the national and international contributor towards national improvement in alleviating nutrition problems.

PART-A

Unit 1: Concept of community nutrition

1.1 Community Nutrition: Definition and factors affecting

1.2 Human Development Index

1.3 Community organization,

1.4 Role of community nutritionist

Unit 2: Strategies for improving nutrition and health status of the community

2.1 Appropriate interventions involving different sectors: Food, Health and Education

2.2 Health care

2.3 Primary health care

2.4 The health system in India

Unit 3: National Health Policy & Programmes

3.1 National health policy

3.2 Health programme in India: Communicable & Non-Communicable Diseases Programmes

PART-B

Unit 4: National Nutrition Policy & Programmes

4.1 Introduction, aims and role of NNP

4.2 Nutrition policy instrument of NNP • Direct short term Interventions • Indirect policy Instrument.

4.3 Nutrition Programmes: Integrated Child Development Services (ICDS) Scheme, Mid day Meal Programme, (MDMP), National programmes for prevention of Anaemia, Vitamin A deficiency, Iodine Deficiency Disorders, vitamin D zinc and other recent programs

Unit 5: Food and Nutrition Security

5.1 Concept, components, determinants and approaches

5.2 National Food Security Act, 2013

5.3 Role of National and International organizations: ICMR, ICAR, NIN, CFTRI, FAO/WHO, UNICEF, NNMB/NFHS

Unit 6: Community Nutrition Programme Planning

6.1 Introduction, Types of Need

6.2 Identification of problems & Needs

6.3 Planning the programme & projects

6.4 Evaluation of programs

Reference Readings:

1. R.S. Gibson, 2005, Principles of Nutritional Assessment, 2nd ed., Oxford University Press.
2. World Health Organization, 2006, WHO Child growth standards: Length/height for age, weight for age, weight for length, weight for height and body mass index, Available at <http://www.who.int>.
3. D.B. Jelliffe, 1966, The Assessment of the Nutritional Status of the Community, WHO Monograph, World Health Organization, Geneva.
4. K. Park, 2017, Park's Textbook of Preventive and Social Medicine, 24th Edition, Jabalpur M/s. Banarsidas Bhanot.
5. A. Wadhwa, and S. Sharma, 2003, Nutrition in the community, 5th Edition, Elite Publishing House Pvt . Ltd., New Delhi.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO Statement (BND-DS-302)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-302.1	2	3	3	2	1	2	3	2	2	3	3
BND-DS-302.2	2	2	2	2	3	3	2	1	2	3	2
BND-DS-302.3	1	1	2	1	3	2	1	2	3	3	3
BND-DS-302.4	1	3	3	2	2	1	2	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-352 Community Health Nutrition (Practical)

Periods/week

Credits

Max. Marks: 100

L: 0 T: 0 P: 2

1

Continuous Evaluation: 50

Duration of Examination: 2 Hours

End Semester Examination: 50

Course Type: Program Core

Course Outcomes: Students will be able:

BND-DS-352.1. To undertake community based projects for assessment and enhancement of nutritional knowledge.

BND-DS--352.2. To critical appraise existing intervention and programmes in the government and voluntary sector and suggestion to improve the same.

BND-DS--352.3. To develop new teaching aids in the field of nutrition education.

BND-DS--352.4. To appreciate the National and International contributor towards national improvement in alleviating nutrition problems.

Practical:

1. Development of ICT for nutrition education,
2. Planning, imparting and evaluation of nutrition education programme for a target group: Analyzing data & writing report.
3. Visit to the ongoing two National nutrition programme.

Reference Readings:

1. R.S. Gibson, 2005, Principles of Nutritional Assessment, 2nd ed., Oxford University Press.
2. World Health Organization, 2006, WHO Child growth standards: Length/height for age, weight for age, weight for length, weight for height and body mass index, Available at <http://www.who.int>.
3. D.B. Jelliffe, 1966, The Assessment of the Nutritional Status of the Community, WHO Monograph, World Health Organization, Geneva.
4. K. Park, 2017, Park's Textbook of Preventive and Social Medicine,. 24th Edition, Jabalpur M/s. Banarsidas Bhanot.
5. A. Wadhwa, and S. Sharma, 2003, Nutrition in the community, 5th Edition, Elite Publishing House Pvt . Ltd., New Delhi.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-352)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-352-1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-352-2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-352-3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-352-4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-303: Health, Fitness and Sports (Theory)

Periods/week Credits
L: 3 T: 0 P: 0 3
Duration of Examination: 3 Hours

Max. Marks: 200
Continuous Evaluation: 100
End Semester Examination: 100

Course Type: Program Core

Course Outcomes: Student will be able to:

BND-DS-303.1: To understand the role of Nutrition in sports and fitness.

BND-DS-303.2: To determine the basic nutritional requirements of a sportsperson during competitions.

BND-DS-303.3: To classify the physiological basis of fuel mobilization during exercise.

BND-DS-303.4: To relate the various alternative systems for Health and Fitness.

Part A

Unit 1 Health, Fitness and Nutrition

- 1.1 Definition, components and assessment criteria of age specific fitness and health status.
- 1.2 Holistic approach to the management of fitness and health.
- 1.3 Effect of specific nutrients on physical fitness.
- 1.4 Nutrition, exercise, physical fitness and health inter-relationship.

Unit 2 Carbohydrates and Exercise

- 2.1 Mobilization of carbohydrates, proteins, fats during exercise.
- 2.2 Importance of carbohydrate loads.

Unit 3 Nutrition for Sports Person

- 3.1 Nutritional Requirements of Sportspersons, Pre-game and Post game meals.
- 3.2 Water and Electrolyte: Losses and their replenishments during exercise and sport events and effect of dehydration.

Part B

Unit 4 Body Composition Analysis in Sports Person

- 4.1 Kinanthropometry
- 4.2 Composition of Human Body for sports person
- 4.3 Estimation of body fat among athletic groups
- 4.4 Somatotyping– Ectomorph, mesomorph and endomorph, their specific characteristics

Unit 5 Ergogenic aids

- 5.1 Dietary Supplements
- 5.2 Sports drink – Importance, Composition and types

Unit 6 Alternative systems for health and fitness

- 6.1 Yoga and Meditation
- 6.2 Spiritual Health Chakras – Location of chakras and consciousness, Ayurveda, Naturopathy
- 6.3 Gunas, satvic food, tamsic food and Rajsic food.
- 6.4 Sports injury

Reference Readings:

1. E.N. Whitney and S.R. Rolfes, 2004, Understanding Nutrition, 10th Edition, Wadsworth Publishing.
2. W. Ira, 1997, Nutrition in Exercise and Sports, 3rd Edition, CRC press publishing.
3. J. Parizkova, 2017, Nutrition, Physical activity and health in early life, 2nd Edition, CRC press publishing.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-303)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-303.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-303.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-303.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-303.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-353: Health, Fitness and Sports (Practical)

Periods/week

Credits

Max. Marks: 100

L: 0 T: 0 P: 2

1

Continuous Evaluation: 50

Duration of Examination: 2 Hours

End Semester Examination: 50

Course Type: Program Core

Course Outcomes:

BND-DS-353.1. To understand the role of nutrition in Sports.

BND-DS-353.2. To compare various dietary supplements available in market

BND-DS-353.3. To evaluate various types of sports drinks

BND-DS-353.4. To design meals according to the nutritional requirements of a sportsperson during competition

PRACTICAL:

1.To conduct a market survey on different types of supplements and Sports Drinks available in the market.

2.To develop sports drink for pre, during and post-game sessions.

3.To conduct a dietary survey of sportsperson and evaluate it as per nutritional guidelines given for sportspersons.

4.To conduct two case studies on sportspersons with special reference to pre game and post game meals.

Reference Readings:

1. E.N. Whitney and S.R. Rolfes, 2004, Understanding Nutrition, 10th Edition, Wadsworth Publishing.
2. W. Ira, 1997, Nutrition in Exercise and Sports, 3rd Edition, CRC press publishing.
3. J. Parizkova, 2017, Nutrition, Physical activity and health in early life, 2nd Edition, CRC press publishing.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-353)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-353.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-353.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-353.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-353.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

RIC-300: Research and Innovation Catalyst-I

Periods/week	Credits	Max. Marks	: 50
P: 1	0.5	Continuous Evaluation:	50

Course Type: Core

Course Outcomes: The students will be able

- RIC-300.1. To understand the importance of Research
- RIC-300.2. To be in a position to describe the process and the procedure to carry out research
- RIC-300.3. To understand the research documentation that includes, journals, conferences etc.
- RIC-300.4. To understand and adopt the ethical practice that are to be followed in the research activities
- RIC-300.5. To comprehend the benefits obtained by means of systematic research
- RIC-300.6. To adapt working with group members

Unit 1: What is Research?

- 1.1 Capturing the current research trend
- 1.2 Insight about scientific research performed by renowned experts in the related field
- 1.3 Exploration and excavation of in-house and commercially available facilities
- 1.4 Model design about framing the research question – A motivational Approach
- 1.5 Do's and Don'ts pertaining to research

Unit 2: Insight about Scientific Documentation

- 2.1 Different types of Journals/Conferences
- 2.2 Different components of a research paper
- 2.3 Indexing of Journals
- 2.4 Parameters involved in publication
- 2.5 Scientific/technical writing and ethical practice

Unit 3: Understanding the Literature Survey (LS)

- 3.1 Finding research papers related to a topic
- 3.2 Understanding the different aspects of Literature search
- 3.3 Usage of different sources like Google scholar, WoS, PubMed, Scopus, ABDC, EBSCO etc.
- 3.4 Exploration of online library-Deepdyve for research papers
- 3.5 Usage of scholarly networking sites like Research Gate, Mendeley, Academia.edu etc.
- 3.6 Demo sessions on the usage of above mentioned sources

Unit 4: Implementation of Process

- 4.1 Understanding and selection of the research domain
- 4.2 Finding out the specific research problem in the relevant research area
- 4.3 Seeking information through published work w.r.t the problem
- 4.4 Reading & categorizing the downloaded/referred papers and structuring of the idea

Unit 5: Report Writing and Presentation skill Development

- 5.1 Report making on the surveyed literature to cater the basic idea of the author
- 5.2 Compiling and analyzing the published results to justify and understand the proposed ideas

5.3 Usage of MS-PowerPoint and other technical resources for the presentation

5.4 Development of presentation skills and group addressing

Course Articulation Matrix:

CO Statement (RIC-300)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4
RIC-300.1	-	2	-	-	-	3	3	-	-	2	2
RIC-300.2	3	2	1	1	-	2	3	1	-	2	2
RIC-300.3	3	1	1	1	-	-	3	-	-	1	2
RIC-300.4	-	2	1	1	3	-	3	-	1	-	2
RIC-300.5	2	2	-	1	-	2	3	-	-	2	2
RIC-300.6	-	3	3	2	3	-	3	-	--	1	2

'3' or 'More' Substantial/High Correlation, '2' Moderate/Medium Correlation, '1' Slightly/Low Correlation, 'Blank' No Correlation

Evaluation Criteria: The following evaluation parameters shall be considered for internal assessment by both research coordinators and faculty coordinator or research mentors:-

S. No:	Parameters	Description	Marks		
1.	Attendance	Percentage of classes attended by the students	5	5	
2.	Continuous Performance	Group participation and response of the students to a given task:	15		
		Judge individual student in the group			5
		Meeting timelines as per lesson / activity plan			10
3.	Literature Review	Student interaction with faculty mentors	3	10	
		Relevance of the topic	2		
		Usage of Scientific Literature Databases. e.g., Scopus/ Web of Science/ etc.	1		
		Scientific/Technical writing	2		
		Number of relevant papers referred for the given topic	2		
4.	PPT & Report	Report structure and Slide sequence	5	20	
		Contribution of individual group member towards the presentation and report	5		
		Reference listing	5		
		Plagiarism/Authenticity of the report	5		
Max. Marks			50	50	

References:

1. <http://nptel.ac.in/courses/121106007/>
2. <http://public.wsu.edu/~taflinge/research.html>

BOOKS:

1. E. Harman and I. Montagnes, (Ed.), (1997), The thesis and the book, New Delhi: Vistaar.
2. L.F. Locke and others, (1987), Proposals that work: A guide for planning dissertations.
3. C.J. Mullins, (1997), A guide to writing and publishing in social and behavioral.
4. R.J. Stenberg, (1991), The psychologist's companion: A guide to scientific writing for sciences. New York : John Wiley & Sons students & researchers, Cambridge: CUP.

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-304: Preventive Medicine and Promotive Health (Theory)

Periods/week

Credits

Max. Marks: 200

L: 2 T: 0 P: 0

2

Continuous Evaluation: 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course type: Discipline Specific I

Course Outcomes: Students will be able:

BND-DS-304.1. To understand the concept of prevention and control of health and disease

BND-DS-304.2. To analyze the evidence base causes and prevention of non-communicable diseases

BND-DS-304.3. To evaluate the causative and preventable factors leading to communicable diseases

BND-DS-304.4. To apply knowledge and critical skills necessary for the implementation of food and nutrition services in professional settings.

PART A

Unit 1 Concept of Health and Disease

1.1 Definition of Health

1.2 Dimensions of Health

1.3 Concept of Wellbeing

1.4 Determinants of Health

1.5 Health Development and Indicators of Health

1.6 Concept of Disease and Causation

1.7 Natural History of Disease

Unit 2 Concept of Prevention

2.1 Levels of Prevention

2.2 Modes of Intervention

2.3 Changing pattern of Disease

2.4 Concept of Epidemiology

PART B

Unit 3 Preventive Medicines: Communicable Diseases

General principles of prevention and control of communicable disease:

3.1 Respiratory Infection: Chickenpox, Measles, Diphtheria

3.2 Intestinal Infections: Poliomyelitis, Cholera

3.3 Arthropod-borne Infections: Malaria

Unit 4 Preventive Medicine: Non-Communicable disease

General principles of prevention and control of non-communicable disease:

4.1 Coronary Heart Disease

4.2 Diabetes Mellitus

4.3 Obesity

4.4 Cancer

4.5 Accidents and Injuries

Reference Readings:

1. K. Park, 2007, Park's Textbook of Preventive & Social Medicine, 19th ed., Jabalpur: Banarsidas Bhanot Publishers.
2. M.C. Gupta, B.K. Mahajan, 2003, Text Book of Preventive and Social Medicine, 3rd Edition, Jaypee Brothers Medical Publishers.
3. G.N. Prabhakara, 2002, The Short Textbook of Preventive and Social Medicine, 1st Edition, J.P. Brothers Medical Publishers Ltd.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Course Articulation Matrix

CO Statement (BND-DS-304)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-304.1	3	3	2	2	3	2	1	2	2	2	3
BND-DS-304.2	2	1	2	1	1	1	2	1	1	2	2
BND-DS-304.3	2	1	2	2	3	2	1	2	2	3	3
BND-DS-304.4	2	2	2	2	1	2	2	1	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BN&D-DS-305: Maternal & Child Health and Nutrition (Theory)

Periods/week

Credits

Max. Marks: 200

L: 2 T:0 P:0

2

Continuous Evaluation: 100

Duration of Examination: 3 hrs

End Semester Examination: 100

Course Type: Discipline Specific I

Course Outcomes: The Students will be able:

BND-DS-305.1. To know the current status of maternal and child nutrition in India

BND-DS-305.2. To understand different factors affecting maternal and child health

BND-DS-305.3. To assess the role of nutrition during pregnancy, lactation and infancy.

BND-DS-305.4. To analyze the role of different organizations working for the welfare of maternal and child health sector.

PART-A

Unit 1: Prenatal and postnatal nutrition

- 1.1 Nutritional aspect of embryogenesis
- 1.2 Factors affecting outcome of pregnancy
- 1.3 Physiological changes during prenatal and postnatal period
- 1.4 Current scenario of maternal and child nutrition

Unit 2: Nutrition and physiological changes during lactation

- 2.1 Nutrition in lactation–Physiological and psychological implication of lactation
- 2.2 Impact of nutrition on efficiency of milk production
- 2.3 Nutrient and food requirement during lactation
- 2.4 Impact of lactation on the growth, development and health of infants

PART-B

Unit 3: Guidelines of infant feeding

- 3.1 Recent guidelines in infant feeding and complementary feeding
- 3.2 Feeding of premature babies
- 3.3 Role of Breastfeeding Promotion Network of India (BPNI) in promotion of breast feeding in India
- 3.4 Importance of world breast feeding week
- 3.5 HIV and breast feeding
- 3.6 Drug abuse and breast feeding

Unit 4: Nutrition during childhood

- 4.1 Nutritional problems and requirements of preschool and school going children
- 4.2 Growth and development of children
- 4.3 Growth monitoring using growth charts
- 4.4 Programme and policies to improve maternal and child health in India

Reference Readings:

1. S.M. Bamji, P.N. Rao and V. Reddy, 2003, Text book on human nutrition, 2nd Edition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 535.
2. F. Falkner and J.M. Tanner, 1986, Human Growth - Postnatal Growth Neurobiology, 2nd Edition, Springer.
3. D.E.M. Francis, 1986, Nutrition in the Life Span, John Wiley & Sons, NNMB Reports
4. H.P.S. Sachdeva and P. Choudhary, 1994, Nutrition in Children, Cambridge Press.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-305)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-305.1	1	1	1	1	2	2	3	3	3	1	1
BND-DS-305.2	1	1	2	2	1	2	2	3	3	1	1
BND-DS-305.3	3	1	1	1	2	3	3	3	3	2	2
BND-DS-305.4	3	1	1	2	2	2	2	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-306: Food Packaging (Theory)

Periods/week

Credits

Max. Marks: 200

L: 2

2

Continuous Evaluation: 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course Type: Discipline Specific I

Course Outcomes: Student will be able:

BND-DS-306.1. To study the various packaging laws related to food in India.

BND-DS-306.2. To understand the insight on various uses of food packaging.

BND-DS-306.3. To choose the appropriate packaging material for different type of foods.

BND-DS-306.4 To describe the comprehensive overview of the scientific and technical aspects of food packaging.

PART A

Unit 1 Introduction to Food Packaging

1.1 Definition, classification, Difference between package and packaging material.

1.2 Types of packaging material- natural and manmade, compostable and non compostable packaging.

1.3 Functions of packaging.

Unit 2 Packaging Materials

2.1 Materials used for packaging- Rigid, semi-rigid and flexible type.

2.2 Paper and paper-based materials, corrugated fiber board (cfb).

2.3 Plastics, types of plastics, lamination, biodegradable plastics, edible packaging and bio-composites.

2.4 Metals: Tinplate, components of tinplate, tin free can (tfc), types of can, metallic films, lacquers.

2.5 Glass: Composition, properties.

PART B

Unit 3 Packaging System

3.1 Bottling machines, cartoning systems, seal and shrink packaging machine; form, fill and sealing machine.

3.2 Vacuum, controlled and modified atmosphere packaging systems; aseptic packaging systems; retort packaging, active and intelligent packaging and smart packaging

Unit 4 Packaging Laws

4.1 Printing of packages, barcodes & other marking.

4.2 Labeling laws- National and International.

4.3 Package test

Reference Readings:

1. S. Stainley and R.C. Griffin, 1980, Principles of Food Packaging, 2nd Edition, AVI Publishers Co. Westport.
2. F.A. Paine, H.Y. Paine and L. Hill, 1983, A Hand Book of Food Packaging, 2nd Edition, Balckie Sons Ltd., London.
3. S. Sacharows, 1976, Handbook of Packaging Materials, 2nd Edition, AVI Publishers Co., Westport.
4. N.T. Croshy, 1981, Food Packaging Materials, Applied Science Pub., Ltd., London.
5. F.A. Paine, 1977, The Packaging Media, 1st Edition, Blackie and Sons Ltd., London.
6. NIIR Board of Consultants Engineers, 2012, Food Packaging Technology Hand Book, 2nd Edition, NIIR Project Consultancy Services.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
 Sessional tests
 Surprise questions during lectures/Class Performance
 Term end examination

Course Articulation Matrix

CO Statement (BND-DS-305)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-306.1	2	3	1	3	2	2	2	1	1	2	2
BND-DS-306.2	3	2	2	2	2	2	3	2	2	2	2
BND-DS-306.3	3	2	1	1	2	2	2	2	2	3	3
BND-DS-306.4	2	3	1	2	2	2	2	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-307: Food Science and Technology (Theory)

Periods/week

L: 2 T:0 P:0

Duration of Examination: 2 Hours

Credits

2

Max. Marks: 200

Continuous Evaluation: 100

End Semester Examination: 100

Course Type: Discipline Specific II

Course Outcomes: The student will be able:

BND-DS-307.1. To understand the basic principles of processing techniques used for various Food Group.

BND-DS-307.2. To describe the production, storage and handling of various foods.

BND-DS-307.3. To learn the recent advances and research in the field of processing.

BND-DS-307.4. To orient the students towards potential use of various by-products of food industry.

PART A

Unit 1-Cereal Technology

- 1.1 Harvesting-post harvest losses of cereal grains
- 1.2 Storage and Handling of Cereals
- 1.3 Chemical changes in the grains during Storage
- 1.4 Agents causing spoilage and prevention of losses
- 1.5 Agencies in India concerned with grain Storage
- 1.6 Processing of cereals
- 1.7 Food dispersions: Characteristics, Sols, Gels, Colloidal Sols, stabilization of colloidal system, Syneresis, Emulsions, Emulsifying Agent, Food Foams.

Unit 2-Legume Technology

- 2.1 Important legumes grown in India,
- 2.2 Processing of Legumes (Decortications, germination, fermentation, agglomeration)
- 2.3 Methods of cooking legumes
- 2.4 Toxic factors in legumes
- 2.5 Effect of processing on nutrient composition and quality
- 2.6 New improved technologies of legume processing

Unit 3-Oilseed Technology

- 3.1 Introduction to various types of Oilseed
- 3.2 Oilseed grown in India
- 3.3 Processing of Oils
- 3.4 Special treatments for edible oils
- 3.5 Processed products from Oils

PART - B

Unit 4-Dairy Technology

- 4.1 Cooperative dairying in India
- 4.2 Processing of milk
- 4.3 Manufacture of milk products
- 4.4 By-product utilization

Unit 5-Fruit and Vegetable Technology

- 4.1 Structure of Fruits and Vegetables
- 4.2 Ripening of fruits

- 4.3 Spoilage of fruits and vegetables
- 4.4 Control of post harvest diseases
- 4.5 Storage of Fruits and Vegetable
- 4.6 Fruit juice concentrates and powders

Unit 6-Packaging Technology

- 6.1 Packaging Material
- 6.2 Types of packaging
- 6.3 Effects of packaging on the nutritive value of foods
- 6.4 Packaging of bakery products
- 6.5 Packaging of fruits and vegetables

Reference Readings:

1. S. Roday, 2011, Food Science, 1st Edition, Oxford publication.
2. N.L. Kent, 1993, Technology of Cereals, 4th Edition, Pergamon Press.
3. V.M. Olson, G.A. Shemwell and S. Pasch, 1998, Egg and Poultry Meat Processing, 9th Edition, VCH P, New York.
4. Winton and Winton, 1991, Techniques of Food Analysis, 1st Edition, Allied Scientific Publishers.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

- Assignment/Tutorials
- Sessional tests
- Surprise questions during lectures/Class Performance
- Term end examination

Course Articulation Matrix

CO Statement (BND-DS-307)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-307.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-307.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-307.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-307.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-357: Food Science and Technology (Practical)

Periods/week	Credits	Max. Marks: 100
L:0 T:0 P: 2	1	Continuous Evaluation: 50
Duration of Examination: 2 Hours		End Semester Examination: 50

Course Type: Discipline Specific II

Course Outcomes: Students will be able:

BND-DS-357.1. To identify changes in the chemical and physical properties of food during production and processing of food.

BND-DS-357.2. To explain various principles during cooking and storage of food and their applications.

BND-DS-357.3. To familiarize with the recent advances in packaging of foods.

BND-DS-357.4. To develop understanding of the practical knowledge of various processing techniques in food industry.

PRACTICALS

1. To study the shelf life of different cereal products.
2. To study the processing of pulses (germination and fermentation).
3. Determination of pH of different foods using pH meter.
4. To assess the various factors affecting the production of paneer and curd.
5. To perform blanching of different plant foods.
6. To survey various packaging materials available in market.

Reference Readings:

1. U. Raina, S. Kashyap, V. Narula, S. Thomas, V.S. Suvira, S. Chopra, 2010, Basic Food Preparation: A Complete Manual, 4th Edition, Orient Black Swan Ltd.
3. M. Sethi and E. Rao, 2011, Food Science (Experiments and Applications), 2nd Edition, CBS Publishers & Distributors Pvt. Ltd.
4. S. Ranganna, 1986, Handbook of Analysis and Quality Control for Fruits and Vegetable Products, 2nd Edition, TMH Education Pvt. Ltd.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-357)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-357.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-357.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-357.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-357.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-308: Basics of Food Microbiology (Theory)

Periods/week

Credits

Max. Marks: 200

L: 2 T: 0 P:0

2

Continuous Evaluation: 100

Duration of Examination: 2 Hours

End Semester Examination: 100

Course Type: Discipline Specific II

Course Outcome:

The students will be able:

BND-DS-308.1: To describe the morphological structure of micro organisms.

BND-DS-308.2: To explain various microbes responsible for the welfare and spoilage of food.

BND-DS-308.3: To understand the basic mechanisms of cell degeneration, cell death and repair and be able to correlate structural and functional alterations.

BND-DS-308.4: To familiarize with the recent advances and researches in the field.

PART - A

Unit 1- Introduction to Microbiology and Microbial Diversity

1.1 Microbial taxonomy

1.2 Prokaryotic and Eukaryotic cells

1.3 Morphology and Cell Structure of major Groups of Microorganisms; e.g. Bacteria; Fungi; Algae.

Unit 2 - Microbial Growth and Metabolism

2.1 Bacterial Growth curve and Generation time

2.2 Growth- Measurement of growth and Factors affecting growth

2.3 Synchronous batch and continuous culture

2.4 Intrinsic And Extrinsic Parameters of Foods That Affect Microbial Growth

Unit 3: Microorganisms in Human Welfare

3.1 Importance of microbes in Food Preservation

3.3 Probiotics, prebiotics and symbiotic

3.2 Single cell proteins.

PART - B

Unit 4 - Food Spoilage

4.1 Food spoilage- definition and concept

4.2 Sources of contamination and microorganisms involved in spoilages of various foods: Milk, Bread, Canned food, Vegetables and fruits, Fruit juices, Meat, Eggs and Fish.

Unit 5 - Food Preservation

5.1 Concept of preservation

5.2 Techniques of preservation - Chemical preservation, Irradiation preservation, Freezing, Drying and High temperature food preservation

Unit 6 - Fermented Foods and Related Products of Fermentation

6.1 Fermentation- Definitions and types

6.2 Microbes helpful in fermentation in food industry

6.3 Dairy products (cheese and yoghurt)- LAB and its uses,

6.4 Traditional Indian fermented foods (including bread, beer, wine, etc.)And their health benefits.

Reference Reading:

1. G.J. Banwart, 1987, Basic Food Microbiology, 2nd Edition, CBS Publishers and Distributors.
2. W.C. Frazier and D.C. Westoff, 1998, Food Microbiology, 4th edition, Tata Mc Graw Hill. Publishing Co. Ltd.
3. J. Garbutt, 1997, Essentials of Food Microbiology, 2nd Edition, Arnold London.
4. J.M. Jay, D.A. Loessner and J. Martin, 2005, Modern Food Microbiology, 7th edition, Springer.
5. M.J. Pelczar, E.C.S. Chan and N. Krieg, 1993, Microbiology, 5th edition, Tata. McGraw-Hill Publishing Co. Ltd.
6. L.M. Prescott, Harley, J.P. and Klein, D.A. 2008. Microbiology, 6th edition, WMC Brown Publishers.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
 Sessional tests
 Surprise questions during lectures/Class Performance
 Term end examination

Course Articulation Matrix

CO Statement (BND-DS-308)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-308.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-308.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-308.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-308.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-358: Basics of Food Microbiology (Practical)

Periods/week

Credits

Max. Marks: 100

L:0 P: 2 T:0

1

Continuous Evaluation: 50

Duration of Examination: 2 Hours

End Semester Examination: 50

Course Type: Discipline Specific II

Course Outcome:The student will be able to:

BND-DS- 358.1: To identify the equipments and basic labs practices to be followed in microbiology lab.

BND-DS- 358.2: To understand the latest procedures adopted in various food operations.

BND-DS- 358.3: To microbiologically analyze the various food stuffs for quality and safety.

BND-DS- 358: 4To learn the procedures used in microbiological analysis of food samples.

Practical

1. Introduction to basic laboratory practices and equipment – compound Microscope, autoclave, Laminar air flow, incubator and colony counter
2. Identification of common bacteria and fungi through permanent slides.
3. Preparation and sterilization of broth and nutrient agar media, autoclaving, pour plating, streaking, swab method.
4. Staining of bacteria: Gram's staining and Zeihl Nelson Staining.
5. Demonstration of IMViC Tests.
6. Microbiological analysis of milk- raw, boiled and pasteurized- MBRT Test.

Reference Readings:

1. G.J. Banwart, 1987, Basic Food Microbiology, 2nd Edition, CBS Publishers and Distributors.
2. W.C. Frazier and D.C. Westoff, 1998, Food Microbiology, 4th ed, Tata Mc Graw Hill. Publishing Co. Ltd.
3. J. Garbutt, 1997, Essentials of Food Microbiology, 2nd Edition, Arnold London.
4. J.M. Jay, D.A. Loessner and J. Martin, 2005, Modern Food Microbiology, 7th ed, Springer.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-358)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-358.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-358.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-358.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-358.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-309: Introduction to First Aid & Nursing (Theory)

Periods/week Credits
L: 2 T: 0 P: 0 2
Duration of Examination: 3 Hours

Max. Marks: 200
Continuous Evaluation: 100
End Semester Examination: 100

Course Type: Discipline Specific Elective

Course Outcomes: Students will be able:

- BND-DS-309.1. To gain knowledge about giving first aid to patients in emergencies.
- BND-DS-309.2. To gain knowledge about giving nursing care to patients in emergencies.
- BND-DS-309.3. To understand principles of nursing
- BND-DS-309.4. To develop interpersonal relationship with clients

PART A

Unit 1 Principles of first aid

- 1.1 General principles of first aid
- 1.2 Importance of First-Aid
- 1.3 Medico legal aspects of emergency medical care
- 1.4 First aid kit
- 1.5 Community Emergencies

Unit 2 Management of emergencies

- 2.1 Artificial respiration
- 2.2 Bleeding and its control
- 2.3 Snakes & animal bites
- 2.4 Electric shocks

PART B

Unit 3 Nursing care

- 3.1 Basic nursing
- 3.2 Nursing care of patient/client
- 3.3 Basic Nursing care and needs of a patient
- 3.4 Assessment of patient
- 3.5 Therapeutic nursing care

Unit 4 Bed making and nursing

- 4.1 Bed making: Prone, lateral dorsal, dorsal recumbent, fowler's position and comfort measures
- 4.2 Aid to rest & sleeps
- 4.3 Transfers: Basic turns, Lifting patients up in the bed : transferring from bed to wheelchair and Transferring from bed to stretcher

Reference Readings:

1. A. Sister and Nancy, 2004, Principles of Nursing, 3rd edition, Eastern Ltd. New Delhi - 19.
2. A.J. Brigade, 2008, First Aid, 2nd edition, John Ambulance Brigade Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO Statement (BND-DS-309)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-309.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-309.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-309.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-309.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-310: Introduction to Herbal Science

Periods/week
L: 2 T: 0 P: 0

Credits
2

Max. Marks: 200
Continuous Evaluation: 100
End Semester Examination: 100

Duration of Examination: 3 Hours

Course Type: Discipline Specific Elective

Course Outcomes: The student will be able:

- BND-DS-310.1. To describe both broad knowledge and in-depth relation of herbs and nutrition.
- BND-DS-310.2. To categorise herbs based on properties/usage.
- BND-DS-310.3. To identify the role of different herbs in day to day life.
- BND-DS-310.4. To create new foods by using herbs for home health care.

PART A

Unit-1: Introduction to herbs

- 1.1 Introduction and History
- 1.2 History of Herbs
- 1.3 Classification of herbs
- 1.4 Role of the herbs in day -to-day life.

Unit-2: Benefits of herbs

- 2.1 Beneficial aspects of herbal plants as food. Study of some common plants which are used as medicine -- Calotropis gigantea, Centella asiatica, Cissus quadrangularis, Rosa centifolia, Piper betel, Ocimum sanctum, Azadirachta indica, Curcuma longa, Zingiber officinalis Lawsonia inermis
- 2.2 Herb Gardening-How to grow herbs
- 2.3 Indoor and Outdoor herb gardening

PART B

UNIT-3: Herbs and culinary aspects

- 3.1 Culinary herbs
- 3.2 The nutritional value of herbs
- 3.3 Beneficial use of herbs as a food supplement

UNIT-4: Herbs and health

- 4.1 Herbal remedies -herbal first aid , home remedies-for common cold, fever, headaches, migraines and digestive disorders, ear, eye, mouth and throat infections.
- 4.2 Skin care and herbal products for skin care .Hair care and skin/scalp herbal remedies.

Reference Readings:

1. Sairam, 1999, Home Remedies, 5th Edition, T.V. Penguin books, Delhi.
2. R. Bentley and H. Trimen, 1880, Medicinal Plant, 2nd Edition, J and A Churchill:London.
3. P.K. Warriar and V.P.K. Nambiar, 1997, Indian Medicinal Plants, 5th Edition, Longman O. Pvt Ltd, Chennai.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Course Articulation Matrix

CO Statement (BND-DS-310)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-310.1	3	3	2	3	3	3	3	2	3	2	3
BND-DS-310.2	3	2	2	3	2	3	3	2	3	2	3
BND-DS-310.3	3	2	2	3	3	3	2	2	3	2	3
BND-DS-310.4	3	1	1	1	2	1	1	3	3	3	3

FOURTH SEMESTER

MRIPS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-401: Therapeutic and Clinical Nutrition

Periods/week	Credits	Max. Marks : 200
L: 4 T:0 P:0	4	Continuous Evaluation : 100
Duration of Examination: 3 Hours		End Semester Examination : 100

Course Type: Program Core

Course Outcomes: The students will be able:

BND-DS-401.1 To understand the patho-physiology of various acute and chronic diseases and patient's needs.

BND-DS-401.2 To apply the principle of dietary modifications.

BND-DS-401.3 To execute the dietary and nutritional modifications according to the diseased condition.

BND-DS-401.4 . To create a suitable nutritional management/diet plan for patients of various diseases.

PART A

Unit 1 Principles of Nutrition Care

- 1.1 Nutrition Care Process
- 1.2 Therapeutic Adaptation of the normal diet.
- 1.3 Progressive Diets- Full Fluid, Clear fluid, Soft and regular diet
- 1.4 Methods of feeding patients: Enteral and parenteral
- 1.5 Importance of Therapeutic nutrition and the role of Dietitians in hospital and community.

Unit 2 Patho-physiology, etiology, clinical features and nutritional management of GI Tract Disorders

- 2.1 Diarrhea
- 2.2 Constipation
- 2.3 Peptic Ulcer
- 2.4 Lactose Intolerance
- 2.5 Celiac Disease
- 2.6 Hepatitis

Unit 3 Patho-physiology, etiology, clinical features and nutritional management of Infections and fever

- 3.1 Infections : HIV and others
- 3.2 Fibril Disorders: Typhoid, Tuberculosis

PART B

Unit 4 Patho-physiology, etiology, clinical features and nutritional management of obesity/underweight and eating disorder

- 4.1 Obesity and underweight.
- 4.2 Eating Disorders:
 - a) Anorexia Nervosa
 - b) Bulimia

Unit 5 Patho-physiology, etiology, clinical features and nutritional management of Cardiovascular and metabolic disorder

- 5.1 Hypertension
- 5.2 Atherosclerosis

5.3 Diabetes Mellitus: Type I and II

Unit 6 Patho-physiology, etiology, clinical features and nutritional management of Kidney Diseases

- 6.1 Renal Calculi
- 6.2 Glomerulonephritis
- 6.3 Nephrotic Syndrome

Reference Readings:

1. K. Khanna, S. Gupta, R. Seth, S. J. Passi, R. Mahna, S. Puri, 2016, Textbook of Nutrition and Dietetics, 2nd Edition, Phoenix Publishing House Pvt Ltd.
2. L.K Mahan and S.S. Escott, 2000, Krause's Food Nutrition and Diet Therapy, 11th edition, W.B Saunders Ltd.
3. M.E. Shils, J. Olson and M. Shike, 2013, Modern Nutrition in Health and Diseases, 10th Edition, KM Varghese Company, Bombay.
4. S.R. Williams, 2001, Basic Nutrition and Diet Therapy, 11th edition, Times Mirror Mosby College Publishing.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO Statement (BND-DS-401)	PO 1	PO 2	PO 3	PO4	PO 5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-401.1	3	3	3	2	1	2	3	2	2	3	3
BND-DS-401.2	3	2	1	2	2	3	2	1	2	3	2
BND-DS-401.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-401.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-451 Therapeutic and Clinical Nutrition (Practical)

Periods/week Credits

L: 0 T: 0 P: 2

1

Duration of Examination: 2 Hours

Max. Marks:100

Continuous Evaluation: 50

End Semester Examination: 50

Course Type: Program Core

Course Outcome: The students will be able

BND-DS-451.1. To understand the importance of Good laboratory practice (GLPs) of foods laboratory.

BND-DS-451.2. To understand the importance of weights and measures in nutritional cookery.

BND-DS-451.3. To plan and create suitable therapeutic diets based on patient needs for various diseases/disorders

BND-DS-451.4. To develop skills to prepare special therapeutic / health food

Practicals

- Planning of general hospital diet.
- Planning, calculation and preparing diets for different disorders:
 - 1) Diarrhea/constipation.
 - 2) Hepatitis
 - 3) Hypertension/Atherosclerosis.
 - 4) Diabetes: Type I and II
 - 5) Fevers – Typhoid/Tuberculosis
 - 6) Weight Management: Overweight
 - 7) Renal Calculi

Reference Readings:

1. K. Khanna, S. Gupta, R. Seth, S.J. Passi, R., Mahna and S. Puri, 2016, Textbook of Nutrition and Dietetics, 2nd Edition, Phoenix Publishing House Pvt Ltd.
2. L.K. Mahan and S.S. Escott, 2000, Krause's Food Nutrition and Diet Therapy, 11th edition, W.B Saunders Ltd.
3. M.E. Shils, J. Olson and M. Shike, 2013, Modern Nutrition in Health and Diseases, 10th Edition, KM Varghese Company, Bombay.
4. S.R. Williams, 2001, Basic Nutrition and Diet Therapy, 11th edition, Times Mirror Mosby College Publishing.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-451)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-451.1.	3	3	3	2	1	2	3	2	2	3	3
BND-DS-451.2.	3	2	1	2	2	3	2	1	2	3	2
BND-DS-451.3	2	1	2	1	3	2	1	2	3	3	3
BND-DS-451.4	2	3	3	2	2	1	1	2	2	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-402: Institutional Catering Management (Theory)

Periods/week	Credits	Max. Marks:	200
L: 2 T: 0 P: 0	2	Continuous Evaluation:	100
Duration of Examination: 3 Hours		End Semester Examination:	100

Course type: Programme Core

Course Outcomes: The students will be able

BND-DS-402.1 To identify the process of planning, organizing, in the management of human, material and financial resources.

BND-DS-402.2 To understand the principles underlying the preparation and service of quality food.

BND-DS-402.3 To use the skills of menu planning for quality and quantity preparation.

BND-DS-402.4. To plan menu for any food service institution

PART A

Unit 1 Introduction to Institutional Catering Management

- 1.1 Development of catering institutions
- 1.2 Philosophy, principles and functions of management
- 1.3 Approaches and tools of management
- 1.4 Management of resources

Unit 2 Planning and Organization

- 2.1 Kitchen spaces
- 2.2 Storage spaces
- 2.3 Service areas

PART B

Unit 3 Food Management

- 3.1 Food purchasing and inventory management
- 3.2 Menu planning
- 3.3 Food service

Unit 4 Hygiene Sanitation and Safety

- 4.1 Hygiene and sanitation
- 4.2 Food safety and security

Reference Readings

1. M. Sethi, 1993, Catering Management: An Integrated Approach, 2nd Edition, Wiley Publication.
2. M. Sethi, 1993, Institutional Food Management, 2nd Edition, Wiley Publication.
3. B.B. West and L. Wood, 1988, Food Service in Institutions, 6th Edition, Palacio June Macmillan Publication Company, New York.

***Instructions for paper setting:** Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Course Articulation Matrix

CO Statement (BND-DS-402)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-402.1	-	-	3	1	-	-	1	3	2	-	-
BND-DS-402.2	1	-	-	2	1	-	2	3	3	-	2
BND-DS-402.3	2	-	1	2	-	-	3	3	2	-	2
BND-DS-402.4	3		1	1	1	-	2	-	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-452: Institutional Catering Management (Practical)

Periods/week	Credits	Max. Marks: 100
L: 0 T: 0 P: 2	1	Continuous Evaluation: 50
Duration of Examination: 2 Hours		End Semester Examination: 50

Course type: Programme Core

Course Outcomes: The students will be able:

BND-DS-452.1 To identify the process of planning, organizing, in the management of human, material and financial resources.

BND-DS-452.2 To understand the principles underlying the preparation and service of quality food.

BND-DS-452.3 To use the skills of menu planning for quality and quantity preparation.

BND-DS-452.4. To plan menu for any food service institution

Practicals

- 1) Standardization of recipes: Planning and Preparation of Recipes, Modification in Basic recipes, preparation of standard recipe
- 2) Planning and preparation for school lunch, hostels.
- 3) Meals for special occasions, birthday party.
- 4) Visits to hotels, restaurants, hospital, and canteen.

Reference Readings:

1. B.B. West and L. Wood, 1988, Food Service in Institutions, 6th Edition, Palacio June Macmillan Publication Company, New York.
2. M. Sethi, 1993, Catering Management: An Integrated Approach, 2nd Edition, Wiley Publication.
3. G. Desseler, 2000, Personnel Management: Modern Concepts and Techniques, 8th Edition, Prentice Hall, New Jersey.
4. J. Keiser and E. Kaillo, 2009, Controlling and Analysis of Cost in Food Service Operations, 9th Edition, Wiley & Sons, New York.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-452)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-452.1	-	-	3	1	-	-	1	3	2	-	-
BND-DS-452.2	1	-	-	2	1	-	2	3	3	-	2
BND-DS-452.3	2	-	1	2	-	-	3	3	2	-	2
BND-DS-452.4	3		1	1	1	-	2	-	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-403: Instrumentation for Food Analysis (Theory)

Periods/week	Credits	Max. Marks:	200
L: 2 T: 0 P: 0	2	Continuous Evaluation:100	
Duration of Examination: 3 Hours		End Semester Examination:	100

Course Type: Programme Core

Course Outcomes- The students will be able:

BND-DS-403.1. To understand the principles involved in analytical techniques in food analysis.

BND-DS-403.2. To use appropriate techniques for analysis of food products.

BND-DS-403.3. To analyze the use of different techniques for food analysis based on the current food standards and regulations

BND-DS-403.4. To understand the food safety standards

PART A

Unit 1 Introduction to food analysis

1.3 Food standards and regulations

1.4 Sampling techniques

1.5 Preservation of samples

Unit 2 Physicochemical and Biochemical Methods of Analysis

2.1 Determination of moisture, ash content, fiber, protein, carbohydrates, fat, vitamins and minerals in different food samples

2.2 Color measurement in food samples

2.3 Differential Scanning Calorimetry

PART B

Unit 3 Spectrometric methods

Principle of working and application of:

3.1 Atomic Absorption Spectrometry

3.2 Atomic Emission Spectrometry

3.3 Infrared Spectrometry

3.4 Inductively coupled plasma-Atomic Emission spectroscopy

3.5 Flame photometry

Unit 4 Separation techniques

1.1 Gas solid Chromatography

1.2 High performance liquid chromatography

1.3 Ion exchange chromatography

1.4 Column chromatography

1.5 Gel permeation chromatography

1.6 Electrophoresis

Reference Readings:

1. J.R.J. Pare and J.M.R Belanger, 1997, Instrumental Methods in Food Analysis, 1st Edition, Elsevier Publications.
2. D.W. Gruenwedel and J.R. Whitaker, 1984, Food Analysis Principles and techniques, Volumes 1 to 8, Marcel Dekker, Inc., New York.
3. A.L. Winton, 1999, Techniques of food analysis, Allied Science, Official methods of analysis, Association of official analytical chemist USA.
4. C.S. James, 1998, Analytical chemistry of foods, 2nd Edition, Blackic Acad, UK.
5. O.R. Fennema, 1976, Principles of Food Science: Part-I Food Chemistry, 4th Edition, Marcel Dekker, New York.
6. L.W. Aurand and A.E. Woods, 1973, Food Chemistry, 13th Edition, AVI, Westport.
7. Y. Pomeraz and C.E. MeLoari, 2016, Food Analysis: Theory and Practice, 3rd Edition, CBS Publishers and Distributor, New Delhi, India.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-403)	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-403.1	3	3	2	1	1	1	3	2	1	1
BND-DS-403.2	3	2	3	2	2	2	3	1	1	1
BND-DS-403.3	3	1	2	2	2	2	3	1	1	1
BND-DS-403.4	3	1	2	2	2	2	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-453: Instrumentation for Food Analysis (Practical)

Periods/week

Credits

Max Marks: 100

L: 0 T: 0 P: 2

1

Continuous Evaluation: 50

Duration of Examination: 2Hours

End Semester Exam: 50

Course Type: Programme Core

Course Outcomes: The students will be able:

BND-DS-453.1. To understand the guidelines for working in a laboratory setting

BND-DS-453.2. To demonstrate analytical skills for determining the nutritional composition of food products

BND-DS-453.3. To analyze the use of different techniques for food analysis in association with the current food standards and regulations

BND-DS-453.4. To understand the food safety standards

Practical:

1. Working guidelines for good laboratory practices.
2. Determination of moisture content in a food sample.
3. Determination of ash content of a food sample.
4. Determination of fiber content of a food sample.
5. Estimation of vitamin C content in a food sample using titration.
6. Estimation of colour in a food sample using spectrophotometer.
7. Separation of proteins in a food sample using electrophoresis.
8. Determination of chlorophyll content in a food sample using paper chromatography.

Reference Readings:

1. O.R. Fennema, 1976, Principles of Food Science: Part-I Food Chemistry, 4th Edition, Marcel Dekker, New York.
2. L.W. Aurand and A.E. Woods, 1973, Food Chemistry, 13th Edition, AVI, Westport.
3. Y. Pomeraz and C.E. MeLoari, 2016, Food Analysis: Theory and Practice, 3rd Edition, CBS Publishers and Distributor, New Delhi, India.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-453)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-453.1	3	3	2	2	2	2	1	3	2	2	1
BND-DS-453.2	3	3	2	2	2	1	1	3	2	1	1
BND-DS-453.3	3	2	3	2	2	2	1	2	1	1	1
BND-DS-453.4	3	2	3	2	2	2	1	2	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

RIC-400: Research and Innovation Catalyst-II

Periods/week Credits
P: 1 0.5

Max. Marks : 50
Continuous Evaluation: 50

Pre-requisites: Research and Innovation Catalyst-I

Course Type: Programme Core

Course Outcomes: The students will be able

- RIC-400.1. To critically evaluate the work done by various researchers relevant to the research topic
- RIC-400.2. To integrate the relevant theory and practices followed in a logical way and draw appropriate Conclusions
- RIC-400.3. To understand the research methodologies/approaches/techniques used in the literature
- RIC-400.4. To structure and organize the collected information or findings through an appropriate abstract, headings, reference citations and smooth transitions between sections
- RIC-400.5. To learn the structuring of the paper in the form of Power Point Presentation
- RIC-400.6. To adapt working with group members

Unit 1: Literature Survey (LS)

- 1.1 Collection of research papers related to previously identified gap/problem
- 1.2 Comprehend and arrange the literature based on the idea framed
- 1.3 Presenting the collected data and inferring it with the further scope of expansion

Unit 2: Structuring of Review Paper

- 2.1 Analysis of different approach/methodology adopted by various researchers
- 2.2 Listing out the components of the paper wrt the problem
- 2.3 Identification of suitable Journal or Conference
- 2.4 Formatting/Styling the paper according to the respective template

Unit 3: Presenting the findings

- 3.1 Structuring and preparation of PPT
- 3.2 Mock presentation
- 3.3 Review on presentation skills and content delivered both
- 3.4 Incorporating the review comments in the slides

Evaluation Criteria: The following evaluation parameters shall be considered for internal assessment by both research coordinators and faculty coordinator or research mentors:-

S. No.	Parameters	Description	(Marks)	
1.	Attendance	• Percentage of classes attended by the students	5	5

2.	Continuous Performance	Group participation and response of the students to a given task: <ul style="list-style-type: none"> • Judge individual student in the group • Meeting timelines as per lesson plan 	5 10	15
3.	Literature Survey	<ul style="list-style-type: none"> • Usage of Scientific Literature Databases. e.g., Scopus/ Web of Science/ etc. • Number of relevant papers referred for the given topic • Summarizing the referred paper • Plagiarism/Authenticity • Reference listing 	2 4 4 3 2	15
4.	Structuring and presentation	<ul style="list-style-type: none"> • Paper structuring and presentation • Group presentation with individual contribution • Target journal, Impact factor/ Topic centered Journal • Students response towards comments by research/faculty mentors 	7 2 1 5	15

References:

1. <http://www.sciencedirect.com/>
2. <https://www.ncbi.nlm.nih.gov/pubmed>
3. <https://www.elsevier.com/books-and-journals>
4. <https://www.plos.org/>
5. <https://www.deepdyve.com/>
6. <http://ieeexplore.ieee.org/Xplore/home.jsp>
7. <https://www.researchgate.net/>
8. <https://www.science.gov/>
9. <https://scholar.google.co.in/>

BOOKS

1. E. Harman and I. Montagnes (Ed.) (1997), The thesis and the book, Now Delhi: Vistaar.
2. L.F. Locke and others (1987), Proposals that work: A guide for planning dissertations.
3. C.J. Mullins, (1997), A guide to writing and publishing in social and behavioral.
4. R.J. Stenberg, (1991), The psychologist's companion: A guide to scientific writing for sciences. New York : John Wiley & Sons students & researchers, Cambridge: CUP.

Course Articulation Matrix:

CO Statement (RIC-400)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4
RIC-400.1	3	2	-	1	2	-	3	-	-	2	2
RIC-400.2	3	-	1	-	3	-	3	1	--	2	2
RIC-400.3	2	-	1	1	-	2	3	-	-	1	2
RIC-400.4	2	2	1	1	2	2	3	-	1	-	2
RIC-400.5	2	2	2	-	-	2	3	-	-	2	2
RIC-400.6	-	3	3	2	3	-	3	--	-	1	2

'3' or 'More' Substantial/High Correlation, '2' Moderate/Medium Correlation, '1' Slightly/Low Correlation, 'Blank' No Correlation

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-404: Counseling Techniques in Nutrition (Theory)

Periods/week	Credits	Max. Marks : 200
L: 2 T:0 P:0	2	Continuous Evaluation: 100
Duration of Examination: 3 Hours		End semester examination : 100

Course type- Discipline specific

Course outcome- The student will be able

BND-DS-404.1 To understand the concept of counseling and dietary advice.

BND-DS-404.2 To acquire skill required for effective nutrition counseling

BND-DS-404.3 To analyze teaching aids for the purpose of counseling

BND-DS-404.4 To learn to store data and analyze it for the counseling

PART A

Unit 1 Practical consideration in giving dietary advice and counseling -

- 1.1 Factors affecting individual food choice.
- 1.2 Communication of dietary advice
- 1.3 Consideration of behavior modification
- 1.4 Importance of Motivation.

Unit 2 Counseling Techniques

- 2.1 Introduction to nutrition counseling
- 2.2 Responsibilities of the nutrition counselor
- 2.3 Practitioner v/s client managed care
- 2.4 Conceptualizing entrepreneur skills and behavior
- 2.5 Communication and negotiation skills.

PART B

Unit 3 Counseling for Different Physiological Stages

- 3.1 Teaching aids used by dietitians- charts, leaflets, posters etc.,
- 3.2 Preparation of teaching material for infants, children, adolescents, adults and elderly
Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis, cancer.

Unit 4 Counseling for Different disorders

Preparation of teaching material for:

- 4.1 Digestive disorders,
- 4.2 Hypertension
- 4.3 Diabetes
- 4.4 Atherosclerosis
- 4.5 Hepatitis
- 4.6 Cirrhosis
- 4.7 Cancer.

Reference Readings:

1. M.S. Bamji, K. Krishnaswamy and G.N.V. Brahmam, 2009, Textbook of Human Nutrition, 3rd Edition, Oxford & IBH Publishing Co Pvt Ltd.
2. K. Khanna, S. Gupta, R. Seth, S.J. Passi, R. Mahna and S. Puri, 2016, Textbook of Nutrition and Dietetics, 2nd Edition, Phoenix Publishing House Pvt Ltd.
3. L.K. Mahan and S.S. Escott, 2008, Krause's Food & Nutrition Therapy, 12th Edition, Saunders-Elsevier.
4. N. Stacy, 2009, William's Basic Nutrition and Diet Therapy, 13th edition, Elsevier Mosby.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-404)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-404.1	3	3	2	2	2	2	1	3	2	2	1
BND-DS-404.2	3	3	2	2	2	1	1	3	2	1	1
BND-DS-404.3	3	2	3	2	2	2	1	2	1	1	1
BND-DS-404.4	3	2	3	2	2	2	1	2	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BN&D-DS-405 Public Health Nutrition (Theory)

Periods/week	Credits	Max. Marks : 200
L: 0 T:0 P:2	2	Continuous Evaluation: 100
Duration of Examination: 3 Hours		End semester examination :100

Course Type: Discipline Specific

Course Outcomes: The Students will be able

BN&D-DS-405 1. To interpret and use nutrition recommendations made by individuals and organizations at the local and national level.

BN&D-DS-405 2. To evaluate the current epidemiological literature on the relationships between nutrition, health and diseases.

BN&D-DS-405 3. To develop nutritional assessments for identifying and monitoring malnutrition and hunger in individuals and communities.

BN&D-DS-405 4. To develop intervention (prevention) programs that will have an impact on the nutritional status of a community.

BN&D-DS-405 5. To assess, monitor and evaluate the impact of public health programs.

PART A

Unit 1 Public Health Nutrition

- 1.1 Aim, scope and content of Public Health Nutrition.
- 1.2 Role of Public Health Nutritionist in National development.
- 1.3 National Health Care Delivery System - Health care of the community, Health care systems.
- 1.4 Definition and determinants of health

Unit 2 Nutrition Assessment in Community

- 2.1 Details of methods of assessment
- 2.2 Rapid Assessment procedure: focus group discussions, in- depth interviews, mapping to study health behaviour, food habits and dietary patterns.

PART B

UNIT 3: Public Health Aspects of Under nutrition- Etiology, public health implications, preventive strategies

- 3.1 PEM/CED
- 3.2 Vitamin A deficiency
- 3.3 Nutritional Anemias
- 3.4 Iodine Deficiency Disorders
- 3.5 Vitamin D deficiency and Osteoporosis
- 3.6 Zinc deficiency

UNIT 4: Public Health Aspects of Lifestyle Related Disorders- Public health implications and preventive strategies

- 4.1 Obesity
- 4.2 Hypertension
- 4.3 Coronary heart disease
- 4.4 Diabetes
- 4.5 Cancer
- 4.6 Public health aspects of H.I.V/ AIDS

Reference Readings:

1. M.J. Gibney, B.M. Margetts, J.M. Kearney and I. Arab, 2004, Public Health Nutrition, NS Blackwell Publishing.
2. D.B. Jelliffe and E.F.P. Jelliffe, 1989, Community Nutritional Assessment, Oxford University Press.
3. A.Y. Owen and R.T. Frankle, 1986, Nutrition in the Community, 2nd Edition, The Art of Delivering Services, Times Mirror/Mosby.
4. K. Park, 2009, Park's Textbook of Preventive and Social Medicine, 20th Edition, M/s Banarsida Bhanot, Jabalpur.
5. A. Wadhwa and S. Sharma, 2003, Nutrition in the Community, A text book, 4th Edition, SCN News, UN ACC/SCN Subcommittee on Nutrition Food Service Management.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-405)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-405.1	2	1	2	1	1	2	3	3	3	2	2
BND-DS-405.2	2	1	2	1	1	2	2	3	3	3	3
BND-DS-405.3	1	1	2	1	1	2	2	2	3	3	3
BND-DS-405.4	2	1	2	1	1	1	2	2	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BN&D-DS-454: Counseling Techniques in Nutrition (Practical)

Periods/week

Credits

Max. Marks : 100

L: 0 T:0 P:2

1

Continuous Evaluation: 50

Duration of Examination: 2 Hours

End semester examination : 50

Course Type- Discipline specific

Course outcome- The student will be able

BN&D-DS-454.1 To learn counseling patients for any disease condition.

BN&D-DS-454.2 To use teaching aid for the purpose of counseling

BN&D-DS-454.3 To analyze case history of patients for counseling.

BN&D-DS-454.4 To prepare a project on one specific disease.

Practical

1. Study of existing software in counseling
2. Preparations of teaching aids related to the field of nutrition.
3. Preparation of case history of a patient
4. Project planning for any one disease
5. Counseling of patients in OPD and preparation of report

Reference Readings

1. M.S. Bamji, K. Krishnaswamy and G.N.V. Brahman, 2009, Textbook of Human Nutrition, 3rd Edition, Oxford & IBH Publishing Co Pvt Ltd.
2. K. Khanna, S. Gupta, R. Seth, S.J. Passi, R. Mahna, S. Puri, 2016, Textbook of Nutrition and Dietetics, 2nd Edition, Phoenix Publishing House Pvt Ltd.
3. L. K. Mahan and S.S. Escott, 2008, Krause's Food & Nutrition Therapy, 12th Edition, Saunders-Elsevier.
4. N. Stacy, 2009, William's Basic Nutrition and Diet Therapy, 13th Edition, Elsevier Mosby.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BND-DS-454)	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-454.1	3	3	2	2	2	2	1	3	2	2	1
BND-DS-454.2	3	3	2	2	2	1	1	3	2	1	1
BND-DS-454.3	3	2	3	2	2	2	1	2	1	1	1
BND-DS-454.4	3	2	3	2	2	2	1	2	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-455 Public Health Nutrition (Practical)

Periods/week

Credits

Max. Marks: 100

L: 0 T:0 P:2

1

Continuous Evaluation: 50

Duration of Examination: 2 Hours

End semester examinations - 50

Course Type: Discipline Specific

Course Outcomes: The Students will be able

BND-DS-455.1 To develop skills in assessment of Nutritional Status.

BND-DS-455.2 To understand rapid assessment procedures.

BND-DS-455.3 To plan low cost, easy availability recipes.

BND-DS-455.4 To utilize knowledge for helping community

PRACTICALS:

1. Assessment of nutritional status–diet survey, anthropometry, clinical.
2. Rapid assessment procedures – focus group discussions, in- depth interviews, mapping to study health behavior, food habits and dietary patterns.
3. Field visit to Primary Health Centre.
4. Development of low cost recipes for infants, preschoolers, elementary school children, adolescents, pregnant and lactating mothers.

Reference Readings:

1. M.J. Gibney, B.M. Margetts, J.M. Kearney and I. Arab, 2004, Public Health Nutrition, NS Blackwell Publishing.
2. D.B. Jelliffe and E.F.P. Jelliffe, 1989, Community Nutritional Assessment, Oxford University Press.
3. A.Y. Owen and R.T. Frankle, 1986, Nutrition in the Community, 2nd Edition, The Art of Delivering Services, Times Mirror/Mosby.
4. K. Park, 2009, Park's Textbook of Preventive and Social Medicine, 20th Edition, M/s Banarsida Bhanot, Jabalpur.
5. A. Wadhwa and S. Sharma, 2003, Nutrition in the Community, A text book, 4th Edition, SCN News, UN ACC/SCN Subcommittee on Nutrition Food Service Management.

Continuous Evaluation table

Viva- I	30%
Viva- II	30%
Practical Record	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Practical Record

Viva I & II

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-455)	PO 1	PO 2	PO 3	PO 4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-455.1	1	1	1	2	2	2	2	3	3	1	3
BND-DS-455.2	1	1	1	2	3	1	3	3	3	3	3
BND-DS-455.3	3	1	1	2	1	1	2	3	3	3	3
BND-DS-455.4	3	1	1	1	2	1	1	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-406 Techniques of scientific writing (Theory)

Periods/week	Credits	Max. Marks : 200
L: 3 T:0 P:0	3	Continuous Evaluation: 100
Duration of Examination: 3 Hours		End semester examination :100

Course Type: Discipline Specific

Course Outcomes:

- BND-DS-406.1 To understand techniques and terms of scientific writing.
- BND-DS-406.2 To enable students to develop competence in writing and abstracting skills.
- BND-DS-406.3 To apply various forms of scientific methods in research papers writing.
- BND-DS-406.3 To critically evaluate the research papers for knowledge gaps in health topics

PART A

Unit 1 Introduction to Scientific Writing

- 1.1 scientific writing, objectives and importance
- 1.2 Types of scientific writing
- 1.3 Research Misconduct and Plagiarism

Unit 2 Characteristics and steps of writing for the following

- 2.1 Review articles, Systematic and meta analysis, Monographs.
- 2.2 Book chapters and book review.
- 2.3 Journals and Magazines

Unit 3 Outlines and titles in Research

- 3.1. Kinds of outline: Topic outlines, Conceptual outlines, Sentence outlines.
- 3.2. Drafting titles, sub titles, tables, illustrations.

PART B

Unit 4: Critical Appraise a research article

- 4.1. Selection and critical appraisal of research literature
- 4.2. CONSORT for trials
- 4.3. QUORUM for Meta-analysis
- 4.4 STROBE STATEMENT for observational studies

Unit 5: Development of Research Manuscript

- 5.1 Summary and abstract
- 5.2 Introduction and Objectives
- 5.3 Review of literature
- 5.4 Methods
- 5.5 Results and discussion
- 5.6 References and Annexure.

Unit 6: Process of publishing a scientific

- 6.1 Steps of peer-reviewing Research Manuscript
- 6.2 Selection of Journal and submission

Reference Readings:

1. E. Harman and I. Montagnes, 1997, The thesis and the book, 2nd Edition. New Delhi: Vistaar.
2. L.F. Locke, 1987, Proposals that work: A guide for planning dissertations & Grant proposals, 2nd Edition, Beverly Hills : Sage.
3. C.J. Mullins, 2009, A guide to writing and publishing in social and behavioral sciences, 7th Edition, New York : John Wiley & Sons.
4. R.J. Stenberg, 1991, The psychologist's companion: A guide to scientific writing for students & researchers, 4th Edition, Cambridge: CUP.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Course Articulation Matrix

CO Statement (BND-DS-406)	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-406.1	3	3	3	3	2	3	3	2	3	2	3
BND-DS-406.2	3	2	3	3	2	3	3	2	3	2	3
BND-DS-406.3	3	3	3	3	2	3	3	2	3	2	3
BND-DS-406.4	3	2	3	3	2	3	3	2	3	2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-407: Indian Traditional Food (Theory)

Periods/week	Credits	Max. Marks : 200
L: 2 T:0 P:0	2	Continuous Evaluation: 100
Duration of Examination: 3 Hours		End semester examination :100

Course Type: Discipline Specific Elective

Course Outcomes: The students will be able

BND-DS-407.1 To understand the concepts of Indian traditional food.

BND-DS-407.2 To acquire knowledge about nutritional and medicinal quality of Indian traditional foods.

BND-DS-407.3 To apply the different traditional food processing techniques

BND-DS-407.4 To design recipes according to the nutritional requirement of the person keeping in mind the medicinal quality of traditional foods

PART – A

Unit 1: Introduction to Indian Foods

- 1.1 History of Indian foods
- 1.2 Food and culture
- 1.3 Spiritual health

Unit 2: Food Pattern and ethics

- 2.1 Traditional Indian dietary pattern
- 2.2 Indian ethnic cuisines
- 2.3 Indian food ethics

PART - B

Unit 3: Traditional foods and Health

- 3.1 Nutritional /medicinal quality of traditional foods
- 3.2 Traditional food beliefs
- 3.2 Food Consciousness

Unit 4: Foods in Ayurveda

- 4.1 Satvik food
- 4.2 Rajasic foods
- 4.3 Tamasic foods
- 4.4 Traditional Food processing technologies

Reference Readings:

1. G.V. Satyavati, A.K. Gupta, S.N. Tandon and S.D Seth, 1987, Medicinal Plants of India, Vol.2, IBH Publishing Co. Pvt. Ltd., New Delhi.
2. S. Pasricha, 2011, Some Common Indian Recipes and their Nutritive Value, 4th Edition, New Age International Publishers.
3. S. Goyal, 2010, Indian Traditional foods and Ayurved, . 20th Edition, Indian Publishing Press, New Delhi.
4. N.S. Manay and M. Sadakshaswamy, 2004, Foods Facts and Principals, 3rd Edition, New age international (p) Ltd publishers.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A

and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Course Articulation Matrix

CO Statement (BND-DS-407)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-407.1	-	-	3	1	-	-	1	3	2	-	-
BND-DS-407.2	1	-	-	2	1	-	2	3	3	-	2
BND-DS-407.3	2	-	1	2	-	-	3	3	2	-	2
BND-DS-407.4	3		1	1	1	-	2	-	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC act 1956)

BND-DS-408 Human Health Psychology (Theory)

Periods/week	Credits	Max. Marks : 200
L: 2 T:0 P:0	2	Continuous Evaluation: 100
Duration of Examination: 3 Hours		End semester examination :100

Course Type: Discipline Specific Elective

Course Outcomes: The Students will be able

BND-DS-408.1. To critically evaluate the fundamental, theoretical, empirical and practical applications of health psychology

BND-DS--408.2. to describe the situation and then analyze it in terms of psychological concepts and findings

BND-DS--408.3. To appreciate the potential of health psychology to inform health promotion practice

BND-DS--408.4. To successfully design and evaluate psychology based interventions

PART A

Unit 1: Introduction to health psychology

- 1.1 Definition of health psychology
- 1.2 Field of health psychology
- 1.3 Psychophysiological basis of health
- 1.4 Mind body reciprocal relations
- 1.5 Medical ethics
- 1.6 Patience adherence
- 1.7 Models of adherence
- 1.8 Doctor-Patient communications; Relationship
- 1.9 Health care professionals

Unit 2: Social and cultural basis of health

- 2.1 Definition of illness
- 2.2 Definition of wellness, Culture and health
- 2.3 Faith and healing
- 2.4 Pain; Placebo effect

PART B

Unit 3: Stress and illness

- 3.1 Definition of stress, types of stress models
- 3.2 Coping with stress
- 3.3 Adaptation to chronic illness
- 3.4 Tobacco, Alcohol, Addiction, Treatments
- 3.5 Models of health behavior change

Unit 4: Personality and disease

- 4.1 Personality and health
- 4.2 Disease prone personalities
- 4.3 Self-healing
- 4.4 Wellness quality of life
- 4.5 Eating and food; eating disorders
- 4.6 Physical activity; exercise; sexual health

Reference Readings

1. H.S. Friedman, 2002, Health Psychology, 2nd Edition, Upper saddle river, Ne Jersey, Prentice hall.
2. M. Jonston, 1994, Current trends in health psychology, 3RD Edition, Mcgraw Hill publications, New york.
3. S. Adam, 1994, Health psychology, 3rd Edition, Marks, Murray, Evans vans Estacio Publishing house, Sweden.

Instructions for external evaluation: Seven questions are to be set in total. First question will be a conceptual question covering entire syllabus and will be compulsory to attempt. Three questions will be set from part A and B (one from each unit). Students need to attempt two questions from each part. Each question will be of 10 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-408)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-408.1	2	1	1	1	1	2	3	3	3	2	2
BND-DS-408.2	2	1	1	1	1	2	2	3	3	3	3
BND-DS-408.3	1	1	1	1	1	2	2	2	3	3	3
BND-DS-408.4	2	1	2	1	1	1	2	2	3	3	3

FIFTH SEMESTER

MRIPS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-551 Capstone Project

Periods/week	Credits	Max. Marks: 200
P: 10	5	Continuous Evaluation: 100
Duration of Examination: 3 Hours		End Semester Examination: 100

Course type: Compulsory Course

Course Objectives: The students will be able:

BND-DS-551.1 To describe current issues, problems and changing concepts in the field of Nutrition and Dietetics.

BND-DS-551.2 To study, analyze and condense the current literature.

BND-DS-551.3 To present the research project.

BND-DS-551.4 To create new concepts/techniques for benefit of society.

Contents:

1. The project will be carried out by students in groups.
2. Any topic of interest may be chosen by the students in consultation with teaching faculty to include current issues, pertinent problems, and changing trends in the areas
3. Collection of Review of Literature and planning of Methodology.
4. Collection of Data on the pertinent topic.
5. Internal presentations for Continuous Evaluation
6. The project will be evaluated by an external examiner.

Format to be used for preparation of bachelor's research project report

ARRANGEMENT OF CONTENTS:

The sequence in which the thesis material should be arranged and bound should be as follows:

- a. Cover page
Inner cover page
- b. Certificate of the supervisor
- c. Acknowledgement
- d. Abstract
- e. Table of contents
- f. List of tables
- g. List of figures/graphs
- h. List of photographs
- i. List of abbreviations
- j. Body of the thesis (Introduction, Review of Literature, Material and Methods, Results and Discussions, Summary and Conclusion)
- k. References
- l. Appendices

PAGE DIMENSION, TYPING AND BINDING SPECIFICATIONS

- a. A4 size paper should be used.
- b. The Thesis should be soft bound with cover page printed on it in the specified format.
- c. Photographs, if necessary, should be suitably mounted on the same quality paper as the thesis.

- d. References should be given in a style in the text consistent with a Harvard style.
- e. The typing of cover page, title page, declaration of candidate, certificate of supervisor and names of chapters should be only on one side of the paper whereas the other printing should be on both sides of the paper.
- f. The chapter numbers should be indicated in Roman.
- g. Three copies of the thesis in binding must be submitted. In case of candidate being supervised by more than one supervisor, appropriate number of additional copies must be submitted.
- h. The cover should have the material indicated in the item 'b' above printed on it and should be written with black ink.
- i. The general text shall be typed in the font style 'Times New Roman' and Font size 12. Use 1.5 spacing between the regular text and quotations.
- j. FONT

REGULAR TEXT – Times Roman 12 pts. Normal print

CHAPTER HEADING- Times Roman 15 pts., bold print and all capitals

SECTION HEADINGS- Times Roman 12 pts., bold print and all capitals

SUBSECTION HEADINGS – Times Roman 12 pts., bold print and leading capitals i.e. only first letter in each word should be in capital. 1.5 line spacing should be used for typing the general text.

Continuous Evaluation table

Research proposal development	20%
Internal seminar/PPT	30%
Evaluation by supervisor	30%
Attendance	20%

Assessment Tools:

Oral presentation

Project submission

Course Articulation Matrix

CO Statement (BND-DS- 551)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-551.1	3	3	2	3	3	2	3	2	3	2	3
BND-DS-551.2	3	2	2	3	3	2	3	2	3	2	3
BND-DS-551.3	3	2	2	3	3	2	2	2	3	2	3
BND-DS-551.4	3	1	1	3	3	1	3	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-502: Statistics and Research Methodology (Theory)

Periods/week

Credits

Max. Marks: 200

L: 3 T: 0 P: 0

3

Continuous Evaluation: 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course Type: Program Core

Course Outcomes: The student will be able:

BND-DS-502.1: To understand the significance of Statistics and research methodology in nutrition research.

BND-DS-502.2: To classify the types, tools and methods of research.

BND-DS-502.3: To select appropriate research method for a particular research design.

BND-DS-502.4: To justify the appropriate statistical technique for the measurement/ scale and design.

PART A

Unit 1: Research – Definition and tools and techniques of Data Collection

1.1 Definition and Scope of research in nutrition

1.2 Introduction – Types of Data

1.3 Primary Data Collection

1.3.1 Questionnaire and Schedule

1.3.2 Rating and Attitude Scales

1.3.3 Interviewing and observational methods

1.4 Secondary Data Collection

1.4.1 Documents

1.4.2 Office records

1.4.3 Journals

Unit 2: Tabulation and organization of data

2.1 Processing and coding of Quantitative and Qualitative Data

2.2 Preparation of Mater sheet

2.3 Frequency and Cumulative frequency Distribution

PART B

Unit 3: Graphical representation of Quantitative and Qualitative Data

3.1 Normal Probability Distribution

3.2 Representation of Frequency Distribution

3.2.1 Histogram

3.2.2 Frequency Polygon

3.2.3 Cumulative Percentage curves

3.3 Graphs for Nominal and Ordinal Data

3.3.1 Pie Diagram and Bar charts

3.4 Graphs for relation between two variables

3.4.1 Scattered graph and line diagrams

Unit 4: Measures of Central Tendency

4.1 Mean

4.2 Median

4.3 Mode

4.4 Standard deviation

Reference Readings:

1. R. Ahuja, 2001, Research Methods, 1st Edition, Rawat Publications, Jaipur & New Delhi.
2. S. Gupta, 2002, Research Methodology and Statistical Techniques, 2nd Edition, Deep and Deep Publications, New Delhi.
3. S.P. Gupta, 1987, Statistical Methods, 25th Edition, Sultan Chand and Sons, New Delhi.
4. C.R. Kothari, 1990, Research Methodology-Methods and Techniques, 2nd Edition, Wishwa Prakashan, C.A. division of Wiley Eastern Ltd., New Delhi.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-502)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-502.1	3	3	3	3	2	3	3	2	3	2	3
BND-DS-502.2	3	2	3	3	2	3	3	2	3	2	3
BND-DS-502.3	3	3	3	3	2	3	3	2	3	2	3
BND-DS-502.4	3	2	3	3	2	3	3	2	3	2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

RIC-500: Research and Innovation Catalyst-III

Periods/week Credits Max. Marks : 100
P: 2 1 Continuous Evaluation: 100

Pre-requisites: Research and Innovation Catalyst-II

Course Type: Programme Core

Course outcomes: The students will be able

- RIC-500.1. To compare the various research methodologies and choosing the appropriate one
- RIC-500.2. To apply the contextual knowledge in designing and conducting the experiments
- RIC-500.3. To analyze and interpret the research outcomes and adapt a process to yield the quality output
- RIC-500.4. To gain hands on experience in techniques/technologies
- RIC-500.5. To analyze the further scope of research
- RIC-500.6. To adapt working with group members

Unit 1: Setting up the simulation/experiment environment

- 1.1. Deciding the hypothesis or direction to carry out simulation/experiments
- 1.2. Identifying the set of experiments/simulations for designing the model or analysing the data
- 1.3. Finding the resources for performing experiments/simulations
- 1.4. Choosing the appropriate research methodology

Unit 2: Planning of experiments

- 2.1 Formulate experimental procedures
- 2.2 Procurement of materials
- 2.3 Modification of the experimental set-up, if required

Unit 3: Execution of experiments/simulations

- 3.1. Conduct experiments/ build prototype
- 3.2. Tabulating and recording data
- 3.3. Analysis and interpretation of the data
- 3.4. Interpreting convolution between experimental data and hypothesis/simulation
- 3.5. Comparison of the results for discrepancies
- 3.6. Listing and analysing the observations to get the further research direction

Unit 4: Standardizing the results

- 4.1 Blocking, randomization and replication of experiments to ensure repeatability and reproducibility
- 4.2 Interpreting convolution between experimental data and hypothesis/simulation
- 4.3 Comparison of the results for discrepancies
- 4.4 Listing of observations
- 4.5 Analysing the observations to get the further research direction
- 4.6 Exploring opportunities for future work

Unit 5: Documentation and presentation

- 5.1 Integration of relevant theory, findings in a structured way and draw appropriate conclusions
- 5.2 Review and modification of the draft
- 5.3 Mock presentation
- 5.4 Identification of journal/conference

Evaluation Criteria: The following evaluation parameters shall be considered for internal assessment by both research coordinators and faculty coordinator or research mentors:-

S. No.	Parameters	Description	(Marks)	
1.	Attendance	<ul style="list-style-type: none"> Percentage of classes attended by the students 	10	10
2.	Continuous Performance	<ul style="list-style-type: none"> Judge individual student's participation in the experiments Proper experimental planning Collecting evidences substantiating to the experiments Time bound completion of experiments 	10 4 6 10	30
3.	Execution of experiments	<ul style="list-style-type: none"> Finding available resources Usage of Scientific Literature Databases. e.g., Scopus/ Web of Science/ etc. for theoretical guidance Understanding the technique/technology used Analysis and interpretation of results Percentage of reproducibility Knowledge gained over the topic 	4 4 6 4 6	24
4.	Report and Presentation And Finalization of experimental paper	<ul style="list-style-type: none"> Presentation of slides Experimental findings and content (Graph, Tables, Diagrams, Real time videos etc.) Report Compilation and structuring of experimental paper with the obtained results Relevance of technique/technology/methodology used Conclusion and scope of future research Finding the target journal/conference 	12 12 12	36

References:

1. www.originlab.com
2. <http://www.cambridgesoft.com/software>
3. <http://www.synergy.com/>
4. www.mathworks.com/products/matlab.html

BOOKS

1. E. Harman and I. Montagnes (Ed.) (1997), The thesis and the book, Now Delhi: Vistaar.
2. L.F. Locke and others (1987), Proposals that work: A guide for planning dissertations.
3. C.J. Mullins, (1997), A guide to writing and publishing in social and behavioral.
4. R.J. Stenberg (1991), The psychologist's companion: A guide to scientific writing for sciences. New York : John Wiley & Sons students & researchers, Cambridge: CUP.-

Course Articulation Matrix:

CO Statement (XX-500)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4
RIC-500.1	3	2	2	-	2	2	3	-	-	2	2
RIC-500.2	3	1	-	1	2	3	3	1	-	2	2
RIC-500.3	3	3	1	-	-	2	3	-	-	1	2
RIC-500.4	-	-	-	-	2	2	3	-	1	-	2
RIC-500.5	3	2	1	1	1	2	3	-	-	2	2
RIC-500.6	-	3	3	2	3	-	3	-	-	1	2

'3' (Tick) or 'More' Substantial/High Correlation, '2' Moderate/Medium Correlation, '1' Slightly/Low Correlation, 'Blank' No Correlation

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-503: Basics of Nutrition Epidemiology (Theory)

Periods/week

Credits

Max. Marks: 200

L: 2 T: 0 P:0

2

Continuous Evaluation : 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course Type: Program Discipline specific

Course Outcomes: Students will be able:

BND-DS-503.1. To describe and associate the principles of nutritional epidemiology and its terminology

BND-DS-503.2. To understand the epidemiological research designs

BND-DS-503.3. To apply knowledge in defining various epidemiological diseases

BND-DS-503.4. To analyse complexity of various nutritional diseases.

PART A

Unit 1: Introduction to Nutrition Epidemiology

1.1 Overview of the principles of nutritional epidemiology

1.2 Definition, Vital statistics and Causes of Epidemiological indicators: Crude death rate, Infant Mortality Rate, Under five Mortality Rate, Birth rate, Fertility rate, Maternal mortality rate/ratio & its relationship with nutrition

1.3 Disease frequency, causes and prevention -population at risk, Incidence and its comparison

1.4 Determinants of Maternal and Child Health & indicators commonly used to track maternal/ child health & nutrition

Unit 2: The design of nutritional epidemiological studies

2.1 Ecological studies

2.2 Cross-sectional studies

2.3 Cohort studies

2.4 Case-control studies

2.5 Experimental studies: clinical trials, field trials, community trials, and intervention studies

PART- B

Unit 3: The measurement of exposure and outcome

3.1 Food consumption, nutrient intake, and the use of food composition tables

3.2 Assessment of food consumption and nutrient intake

3.3 Socio-demographic and psycho-social variables

Unit 4: The nutritional Biomarkers

4.1 Definition and classification of nutritional biomarkers

4.2 Biochemical markers of nutrient intake

4.3 The validation of dietary assessment

Reference Readings:

- 1.W. Walter, 2012, Nutritional Epidemiology, 2nd Edition, Oxford University Press, USA.
- 2.R. Bonita, R. Beaglehole and T. Kjellström, 2006, Basic Epidemiology, 2nd Edition, WHO, http://whqlibdoc.who.int/publications/2006/9241547073_eng.pdf.
- 3.G. Moon and M. Gould, 2000, Epidemiology: An Introduction, 2nd Edition, Philadelphia, Open University Press.
- 4.L. Lillian, 1996, Nutritional Epidemiology: Possibilities and Limitations, 1st Edition, Washington DC, ILSI Press.
- 5.Mother Care, 1990, Behavioural Determinants of Maternal Health Care Choices in Developing Countries, Mother Care, USA.
- 6.M. Lawrence, 2008, Public Health Nutrition - Textbook of Community Medicine, 1st Edition, CBS Publication.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
 Sessional tests
 Surprise questions during lectures/Class Performance
 Term end examination

Course Articulation Matrix

CO Statement (BND-DS-503)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-503.1	3	3	3	3	2	3	3	2	3	2	3
BND-DS-503.2	3	2	3	3	2	3	3	2	3	2	3
BND-DS-503.3	3	3	3	3	2	3	3	2	3	2	3
BND-DS-503.4	3	2	3	3	2	3	3	2	3	2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-504: Functional Foods (Theory)

Periods/week
L: 2 T: 0 P: 0

Credits
2

Max Marks: 200
Continuous Evaluation: 100
End Semester Examination: 100

Course Type: Discipline specific

Course Outcomes: The students will be able:

BN&D-DS-504.1.To remember the type and role of functional foods and nutraceuticals in maintenance and prevalence of disease.

BN&D-DS-504.2.To understand the concept of prebiotics and its association with health.

BN&D-DS-504.3.To demonstrate the relationship between consumption of probiotics and its impact on health in consumers.

BN&D-DS-504.4.To explore the application of functional food components at industrial level.

PART – A

Unit 1 Introduction

- 1.1 Functional Food and Nutraceuticals- Definition, history, types and classification.
- 1.2 Perceived effect of diet on disease prevention
- 1.3 Understanding benefits of functional foods and nutraceuticals

Unit 2 Prebiotics

- 2.1 Prebiotics- Taxonomy and important features of probiotic micro- organisms.
- 2.2 Health effects of probiotics including mechanism of action.

Part B

Unit 3 Probiotics

- 3.1 Probiotics in various foods: fermented milk products, non-milk products etc.
- 3.2 Quality Assurance of probiotics and safety.
- 3.3 Definition, chemistry, sources, metabolism and bioavailability, effect of processing, physiological effects, effects on human health and potential applications in risk reduction of diseases.

Unit 4 Functional Food Perspective

- 4.1 Non-digestible carbohydrates/oligosaccharides, Dietary fibre, Resistant starch, Gums.
- 4.2 Polyphenols: Flavonoids, catechins, isoflavones, tannins, Phytoestrogens, Phytosterols, Glucosinolates, Organosulphur compounds, Other components – Phytates, Protease

Reference Readings:

1. R. Neeser and J.B. German, 2004, Bioprocesses and Biotechnology for Functional Foods and Nutraceuticals, 1st Edition, Jean, Marcel Dekker, Inc.
2. T.S. Tracy and R.L. Kingston, 1995, Herbal Products, 2nd Edition, Humana Press.
3. J. Young, 1996, Functional Foods: Strategies for successful product development, FT Management Report Pearson Professional Publishers, London.
4. W.J. Hurst, 2002, Methods of Analysis for Functional Foods and Nutraceuticals, 2nd Edition, London, New York.
5. E.C. Robert, R. Wildman and C. Taylor, 2002, Handbook of Nutraceuticals and Functional Foods, 3rd Edition, Wallace.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
 Sessional tests
 Surprise questions during lectures/Class Performance
 Term end examination

COURSE ARTICULATION MATRIX

CO Statement (BN&D-DS-504)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BN&D-DS-504.1	3	2	2	3	2	1	3	1	2	1	1
BN&D-DS-504.2	3	2	2	2	2	1	3	1	2	2	2
BN&D-DS-504.3	3	2	1	1	2	2	3	1	2	2	2
BN&D-DS-504.4	3	2	1	1	2	2	3	2	2	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-505 Nutrition and Food Security (Theory)

Periods/week Credits
L: 2 2
Duration of Examination: 3 Hrs

Max. Marks : 200
Continuous Evaluation:100
End semester Examination:100

Course Type: Discipline specific

Course Outcomes: students will be able to:

- BND-DS-505.1. To understand the food revolutions in India and its impact on food security of the nation.
- BND-DS-505.2. To assess the various components of national and household food security.
- BND-DS-505.3. To analyze the food distribution system in India.
- BND-DS-505.4. To critically evaluate the knowledge lacunae in food security.

PART A

Unit 1 Introduction to Food Security

- 1.1 Food Security and Agricultural revolutions in India
- 1.2 Demographic cycle and population trends in India
- 1.3 Current trends in GDP and food availability in India
- 1.4 Climate change and food security in India

Unit 2 National and household food security

- 2.1 Role of women in family and social food security
- 2.2 National and household food security
- 2.3 Factors affecting food security system.
- 2.4 Role of Public Sector Programs related to Food and Nutrition Security

PART B

Unit 3 Food Security and Nutritional Outcomes

- 3.1 Status of Nutrition among Adults and Children
- 3.2 Linkages between Agriculture Performance and Nutrition
- 3.3 Major Programs and Partnerships to Improve Nutrition Security

Unit 4 PDS and Food security act

- 4.1 Trends in food production in India
- 4.2 Food and nutrient intake
- 4.3 Role of PDS in food security
- 4.3 National Food Security Act, 2013

Reference Readings:

- 1. A. Wadhwa and S. Sharma, (2003), Nutrition in the community, Elite Publishing, New Delhi.
- 2. M. Barrie Margetts and M. John Kearney, 2012, Public Health Nutrition, Blackwell Publishing.

Instructions for external evaluation: Seven questions are to be set in total. First question will be a conceptual question covering entire syllabus and will be compulsory to attempt. Three questions will be

set from part A and B (one from each unit). Students need to attempt two questions from each part. Each question will be of 10 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Course Articulation Matrix

CO Statement (BND-DS-505)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-505.1	2	1	1	2	1	1	1	2	2	1	2
BND-DS-505.2	2	2	2	1	1	2	1	1	1	3	1
BND-DS-505.3	1	2	2	3	3	2	1	3	1	1	3
BND-DS-505.4	3	3	1	3	3	2	3	2	2	1	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

BN&D-DS-506 Health and Weight Management (Theory)

Periods/week Credits
L: 2 2

Max. Marks: 200
Continuous Evaluation: 100
End Semester Examination: 100

Duration of Examination: 3Hrs

Course Type: Discipline Specific Elective

Course Outcomes: The Students will be able:

- BND-DS-506.1. To describe the scientific principles of weight management with an emphasis on lifestyle modification for improving health
BND-DS-506.2. To study the multi factorial aspects of obesity, maintenance of healthy weight, and the relationship of weight status and chronic disease prevention
BND-DS-506.3. To inculcate lifestyle coaching techniques in weight management.
BND-DS-506.4. To instill understanding of special topics such as: fad diets, eating disorders and supplementation.

PART-A

Unit 1 Introduction to Weight Management

- 1.1 Concepts of underweight, overweight and obesity
- 1.2 Body weight components and Measurement of Obesity (BMI, Skin fold thickness, Waist circumference, Waist to Hip Ratio and Bioelectric Impedance (BIA))
- 1.3 Energy Balance
- 1.4 Theories related to weight management: fat cell theory, set point theory.

Unit 2 Weight imbalance-Obesity

- 2.1 Prevalence and current scenario
- 2.2 Types of Obesity
- 2.3 Etiological factors : Genetic, Psychological, Behavioral and physiological
- 2.4 Hazards of Obesity
- 2.5 Nutritional Management

PART-B

Unit 3 Weight imbalance - Underweight

- 3.1 Prevalence and current scenario
- 3.2 Etiological factors
- 3.3 Health Hazards of underweight
- 3.4 Nutritional Management

Unit 4 Management Strategies

- 4.1 Lifestyle Changes
- 4.2 Plateau effect, weight cycling
- 4.3 Surgical procedures
- 4.4 Nutritional Supplements and fad diets
- 4.5 Medicines and Herbal Remedies

Reference readings:

1. L.K. Mahan and S.S. Escott, 2000, Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2. M.E. Shils, J.A. Olson, M. Shike and A.C. Ross, 1999, Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. M.S. Bamji, N.P. Rao and V. Reddy, 1996, Textbook of Human Nutrition, 11th edition, New Delhi (India): Oxford and IBH Publishing Co Pvt Ltd.
4. K. Kumud, S. Gupta, S.J. Passi, R. Sethi, R. Mahana and S. Puri, 2016, Text book of Nutrition and Dietetics, 2nd Edition, Elite publishing House Pvt Ltd.

Instructions for External Evaluation: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials
 Sessional tests
 Surprise questions during lectures/Class Performance
 Term end examination

Course Articulation Matrix

CO Statement (BND-DS-506)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-506.1	1	1	1	1	2	2	3	3	3	1	1
BND-DS-506.2	1	1	2	2	1	2	2	3	3	1	1
BND-DS-506.3	3	1	1	1	2	3	3	3	3	2	2
BND-DS-506.4	3	1	1	2	2	2	2	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND -DS-507: Food Marketing and Consumerism (Theory)

Periods/week

Credits

Max. Marks: 200

L:2 T: 0 P: 0

2

Continuous Evaluation: 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course Type: Discipline Specific Elective

Course Outcomes: Students will be able to:

BND-DS-507.1: To understand the consumer behavior and its importance.

BND-DS-507.2: To study the market strategies and their analysis.

BND-DS-507.3: To compare various purchasing process and the importance of consumer satisfaction.

BND-DS-507.4: To analyze consumer knowledge and understand its benefits.

PART-A

Unit-I Introduction and concept

- 1.1 Introduction of market strategy and consumer behavior, Market Analysis, consumer decision process.
- 1.2 Importance of consumer behavior; evolution of consumer behavior
- 1.3 Methods of studying consumer behavior
- 1.4 Customer centric organizations

Unit 2 Market analysis

- 2.1 Definition and concept - Market analysis
- 2.2 Market segmentation, marketing mix strategies
- 2.3 Value of brands in marketing strategy
- 2.4 Need recognition; internal and external search; pre-purchase evaluation

PART-B

Unit 3 Different types of purchase situations

- 3.1 Retailing and the purchase process
- 3.2 Determinants of retail success or failure; point-of-purchase materials
- 3.3 Consumer logistics; location based retailing; direct marketing consumption behaviors
- 3.4 Importance of customer satisfaction
- 3.5 Factors affecting satisfaction level

Unit 4 Importance of consumer knowledge

- 4.1 Types of consumer knowledge
- 4.2 Sources of consumer knowledge
- 4.3 Benefits of understanding consumer knowledge

Reference Readings:

1. Schiffman and Kanuk, 1997, Consumer Behavior, 6th edition, Prentice Hall India.
2. Loudon and B. Della, 1995, Consumer Behavior, 4th edition, Tata McGraw Hill.
3. S.R. Nair, 1995, Consumer Behaviour in Indian, 7th Edition, Himalaya Publication.
4. B. Hawkins and Coney, 1997, Consumer Behavior building marketing strategy, 7th Edition, McGraw Hill International edition.

5. K.K. Srivastava, 2011, Consumer Behaviour in Indian Context, 10th Edition, Galgotia Publishing Co, New Delhi.

Instructions for External Evaluation: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 10 marks.

Continuous Evaluation table

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

Course Articulation Matrix

CO Statement (BND-DS-507)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-507.1	1	1	1	1	2	2	3	3	3	1	1
BND-DS-507.2	1	1	2	2	1	2	2	3	3	1	1
BND-DS-507.3	3	1	1	1	2	3	3	3	3	2	2
BND-DS-507.4	3	1	1	2	2	2	2	3	3	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND –DS-508 Hospital and Healthcare Management (Theory)

Periods/week

Credits

Max. Marks:200

L: 2

2

Continuous Evaluation: 100

Duration of Examination: 3 Hours

End Semester Examination: 100

Course Type: Discipline Specific Elective

Course Outcomes: The students will be able:

BND –DS-508.1 To learn management education in the field of health service industry.

BND –DS-508.2 To describe imperatives of hospital planning

BND –DS-508.3 To apply different modern management techniques in managing health care services in the country.

BND –DS-508.4 To plan appropriate management strategies required for proper hospital and healthcare.

PART A

Unit 1: Principles and Practices of Management

- 1.1 Basic concepts of Management
- 1.2 Principles of management
- 1.3 Characteristics of Management
- 1.4 Process of Management

Unit 2: Hospital Planning

- 2.1. Types of hospital organization
- 2.2 Statutory requirements for planning
- 2.3. Steps in hospital planning
- 2.4 out patient department/accident/emergency
- 2.5 Indoor accommodation,
- 2.6 Ward design,
- 2.7 Bed wise planning,
- 2.8 Special requirements of certain departments such as ICU, OT ,Pediatric, Maternity ward.
- 2.9 Planning for various categories of Staff, Administrative action for Appointment, Training

PART B

Unit 3: Health Care

- 3.1. Health Administration in India
- 3.2. Health Care Delivery System.
- 3.3. National Health Policy
- 3.4. National Health Programmes
- 3.5 Quality Management in Health Care
 - 3.5.1 Role of Quality Council of India (QCI)
 - 3.5.2 National Accreditation Board of Hospitals (NABH).

Unit 4: Human Resource Management

- 4.1. Functions of Human Resource Management
- 4.2. Position of the Personnel Department
- 4.3 Job Analysis, Job Description & Specifications for Hospital Staff.

- 4.4. Selection & Recruitment
- 4.5. Manpower Development & Training
- 4.6. Career Planning
- 4.7 Wage Administration, Salary Administration
- 4.8 Employee Benefits & Social Security
- 4.9. Performance Appraisals: Techniques & Practices
- 4.10. Industrial Relations
- 4.11. Employee Communication

Reference Readings:

1. International Standard Classification of Occupations, 2008 revision, Unit Group 3252: Medical records and health information technicians.
2. S. Srinivasan, 2010, Management Process in Health Care, Voluntary Health Association of India, New Delhi.
3. G.D. Kunders, 2010, Hospitals: Planning, Design and Management, 1st Edition, Prism Books Pvt. Ltd., Bangalore.
4. A.T. Syed, 2005, Hospital and Health Services Administration Principles and Practice, 1st Edition, Oxford University Press, New Delhi.

Instructions for External Evaluation: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt .Three questions will be set from each part A and part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks

Pattern of Continuous Evaluation

Sessional- I	30%
Sessional- II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Course Articulation Matrix

CO Statement (BND-DS-508)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-508.1	-	-	3	1	-	-	1	3	2	-	-
BND-DS-508.2	1	-	-	2	1	-	2	3	3	-	2
BND-DS-508.3	2	-	1	2	-	-	3	3	2	-	2
BND-DS-508.4	3		1	1	1	-	2	-	3	3	3

SIXTH SEMESTER

MRIRRS

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act 1956)

BND-DS-651: Clinical Internship/Industrial Training

Periods/week	Credits	Max. Marks: 200
L:0 T:0 P: 16	8	Continuous Evaluation: 100
Duration of Examination: 3 Hours		End Semester Examination: 100

Course Type: Program Core

Course Outcomes: The student will be able:

BND-DS-651.1 To understand the principles of planning, organizing and managing food service departments of hospital/industry.

BND-DS-651.2 To apply principles of hygiene and sanitation in food service of hospital/industry.

BND-DS-651.3 To be able to deal with daily challenges of hospital/industry

BND-DS-651.4 To develop skills to become entrepreneur/open own venture.

Aspects to be covered:

1.1 Placements in hospital dietary departments and diet clinics / Food Industries / NGO's / International Organisation to gain knowledge to:

- Establish rapport with patients- assess the nutritional status and dietary history of patients.
- Plan diet sheets after careful study of the patients case sheets-prepare and provide guidance in the production of therapeutic diets.
- Supervise preparation of diets- assist and guide in tray setting with special emphasis on portion control and therapeutic modifications.
- Supervise delivery of trays to the patients.
- Get feedbacks from patients regarding diets.
- Discuss/consult with doctors for modifications.
- Undertake case study at hospital situations
- Visits to different dietary departments of various hospitals
- Updating knowledge by presentations and participation through seminars and projects
- Gain experience in the administrative set up of a dietary department

1.2 Placements in Food Industries to enhance skills related to:

- Food product development
- Food analysis
- Food regulatory issues (food laws)
- Food safety and quality systems
- Nutrition research
- Nutrition- related marketing and public relations
- Consumer and health professional education

1.3 Placements in NGOs/ International Organizations to explore arena of :

- Programmes and policies
- Nutrition and socio economic development
- Scope of programmes and health administration
- Training and HRD aspects of programmes
- Community participation
- Surveillance

Continuous Evaluation table

Evaluation by the Supervisor in the Industry	37.5%
Evaluation by Faculty mentor during training visit	25%
Internal Seminar cum Presentation	37.5%

Parameters for End Semester Assessment after Training:

Project Report	30 %
Seminar cum Presentation	20 %
Viva	50 %

Course Articulation Matrix

CO Statement (BND-DS-508)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4
BND-DS-651.1	-	-	3	1	-	-	1	3	2	-	-
BND-DS-651.2	1	-	-	2	1	-	2	3	3	-	2
BND-DS-651.3	2	-	1	2	-	-	3	3	2	-	2
BND-DS-651.4	3		1	1	1	-	2	-	3	3	3

APPENDIX A

Courses focusing on Global, National and Regional Development

Course Code	Course Name	Global	National	Regional
BND-DS-101	Basics of Food and Nutrition	✓	✓	✓
BND-DS-151	Basics of Food and Nutrition(Practical)	✓	✓	✓
BND-DS-102	Fundamentals of Biochemistry	✓	✓	
BND-DS-152	Fundamentals of Biochemistry (Practical)	✓	✓	
BND-DS-103	Human Anatomy and Physiology-I	✓	✓	
BND-DS-153	Human Anatomy and Physiology-I (Practical)	✓	✓	
BND-DS-104	Health, Food Hygiene & Sanitation			✓
BND-DS-105	Life span Development			✓
BND-DS-106	Communication and Extension Education			✓
BND-DS-154	Health, Food Hygiene & Sanitation(Practical)			✓
BND-DS-155	Life span Development (Practical)			✓
BND-DS-156	Communication and Extension Education (Practical)			✓
CH-202B	Environmental Studies	✓	✓	✓
BND-201	Manav Rachna Life Skills – I			✓
BND-DS-201	Biochemistry and Metabolism	✓	✓	
BND-DS-251	Biochemistry and Metabolism (Practical)	✓	✓	
BND-DS-202	Nutrition: A Life cycle approach	✓	✓	✓
BND-DS-252	Nutrition: A Life cycle approach (Practical)	✓	✓	✓
BND-DS-203	Human Anatomy and Physiology-II	✓	✓	
BND-DS-253	Human Anatomy and Physiology-II (Practical)	✓	✓	

BND-DS-204	Food and Nutrition Labeling		✓	✓
BND-DS-205	Food Laws & Regulation		✓	✓
BND-DS-254	Food and Nutrition Labeling(Practical)		✓	✓
BND-DS-255	Food Laws & Regulation (Practical)		✓	✓
BND-DS-301	Fundamentals of Food Science	✓		
BND-DS-351	Fundamentals of Food Science (Practical)	✓		
BND-DS-302	Community Health Nutrition		✓	✓
BND-DS-352	Community Health Nutrition(Practical)		✓	✓
BND-DS-303	Health, Fitness and Sports Nutrition	✓	✓	
BND-DS-353	Health, Fitness and Sports Nutrition (Practical)	✓	✓	
RIC -300	Research and Innovation Catalyst-I	✓	✓	✓
BND-DS-304	Preventive Medicine and Promotive Health		✓	✓
BND-DS-305	Maternal & Child Health and Nutrition			✓
BND-DS-306	Food Packaging		✓	✓
BND-DS-307	Food Science and Technology		✓	✓
BND-DS-308	Basics of Food Microbiology		✓	✓
BND-DS-357	Food Science and Technology (Practical)		✓	✓
BND-DS-358	Basics of Food Microbiology (Practical)		✓	✓
BND-DS-309	Introduction to First Aid & Nursing			✓
BND-DS-310	Introduction to Herbal Science			✓
BND-401	Manav Rachna Life Skills – II			✓
BND-DS-401	Therapeutic and Clinical Nutrition		✓	✓
BND-DS-451	Therapeutic and Clinical Nutrition (Practical)		✓	✓
BND-DS-402	Institutional Catering Management	✓	✓	✓

BND-DS-452	Institutional Catering Management (Practical)	✓	✓	✓
BND-DS-403	Instrumentation for Food Analysis		✓	✓
BND-DS-453	Instrumentation for Food Analysis (Practical)		✓	✓
BND-DS-404	Counseling Techniques in Nutrition		✓	✓
BND-DS-405	Public Health Nutrition		✓	✓
RIC -400	Research and Innovation Catalyst-II	✓	✓	✓
BND-DS-454	Counseling Techniques in Nutrition (Practical)		✓	
BND-DS-455	Public Health Nutrition (Practical)		✓	✓
BND-DS-406	Techniques of Scientific Writing	✓	✓	
BND-DS-407	Indian Traditional Foods		✓	✓
BND-DS-408	Human Health Psychology		✓	✓
BND-DS-551	Capstone Project	✓		✓
BND-DS-502	Statistics and Research methodology	✓	✓	
RIC -500	Research and Innovation Catalyst-III	✓	✓	✓
BND-DS-503	Basics of Nutrition Epidemiology		✓	✓
BND-DS-504	Functional Foods			✓
BND-DS-505	Nutrition and Food Security		✓	✓
BND-DS-506	Health and Weight Management		✓	
BND-DS-507	Food Marketing & Consumerism		✓	
BND-DS-508	Hospital & Health Care Management		✓	
BND-601	Manav Rachna Life Skills – III			✓
BND-DS-651	Clinical Internship / Industrial Training	✓	✓	✓

APPENDIX B

Courses focusing on Entrepreneurship, Employability and Skill development

Course Code	Name of the Course	Entrepreneurship	Employability	Skill Development
BND-DS-101	Basics of Food and Nutrition			✓
BND-DS-151	Basics of Food and Nutrition (Practical)			✓
BND-DS-152	Fundamentals of Biochemistry (Practical)			✓
BND-DS-153	Human Anatomy and Physiology-I (Practical)			✓
BND-DS= 154	Health, Food Hygiene & Sanitation(Practical)			✓
BND-DS-155	Life span Development (Practical)			✓
BND-DS-156	Communication and Extension Education (Practical)			✓
BND-DS-201	Biochemistry and Metabolism (Practical)			✓
BND-DS-202	Nutrition: A Life cycle approach			✓
BND-DS-252	Nutrition: A Life cycle approach (Practical)			✓
BND-DS-253	Human Anatomy and Physiology-II (Practical)			✓
BND-DS-204	Food and Nutrition Labeling			✓
BND-DS-254	Food and Nutrition Labeling(Practical)			✓
BND-DS-255	Food Laws & Regulation (Practical)			✓
BND-DS-301	Fundamentals of Food Science			✓
BND-DS-351	Fundamentals of Food Science (Practical)		✓	✓
BND-DS-302	Community Health Nutrition			✓

BND-DS-352	Community Health Nutrition(Practical)			✓
BND-DS-303	Health, Fitness and Sports Nutrition			✓
BND-DS-353	Health, Fitness and Sports Nutrition (Practical)		✓	✓
BND-DS-304	Preventive Medicine and Promotive Health			✓
BND-DS-306	Food Packaging			✓
BND-DS-307	Food Science and Technology			✓
BND-DS-357	Food Science and Technology (Practical)			✓
BND-DS-308	Basics of Food Microbiology			✓
BND-DS-358	Basics of Food Microbiology (Practical)			✓
BND-DS-451	Therapeutic and Clinical Nutrition (Practical)		✓	✓
BND-DS-452	Institutional Catering Management (Practical)	✓	✓	✓
BND-DS-453	Instrumentation for Food Analysis (Practical)		✓	✓
BND-DS-454	Counseling Techniques in Nutrition (Practical)		✓	✓
BND-DS-455	Public Health Nutrition (Practical)		✓	✓
BND-DS-406	Techniques of Scientific Writing			✓
BND-DS-551	Capstone Project		✓	✓
BND-DS-502	Statistics and Research methodology			✓
BND-DS-503	Basics of Nutrition Epidemiology			✓
BND-DS-504	Functional Foods			✓
BND-DS-651	Clinical Internship / Industrial Training	✓	✓	

APPENDIX C

Courses focusing on Professional ethics, Environment and sustainability, Gender Equality and Human values

Course Code	Name of Courses	Professional Ethics	Environment & Sustainability	Gender Equality	Human Values
BND-DS-104	Health, Food Hygiene & Sanitation				✓
BND-DS-105	Life Span Development			✓	
CH-202B	Environmental studies		✓		
BND-DS-202	Nutrition: A life Cycle Approach			✓	
BND-DS-205	Food Laws & Regulation	✓			
BND-DS-305	Maternal & Child Health and Nutrition			✓	
BND-DS-309	Introduction to First Aid and Nursing				✓
BND-DS-352	Community Health Nutrition		✓		