SHRI GURU RAM RAI UNIVERSITY

[Estd. by Govt. of Uttarakhand, vide Shri Guru Ram Rai University Act no. 03 of 2017 & recognized by UGC u/s (2f) of UGC Act 1956]

SYLLABUS FOR

Bachelor of Science in Food, Nutrition and Dietetics

School of Humanities and Social Sciences

(W.E.F. 2023-2024)

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MINUTES OF MEETING

FIRST BOARD OF STUDIES MEETING IN B.Sc. FOOD, NUTRITION AND DIETETICS AS PER NEP 2020

A meeting of all the members of the Board of Studies in Department of Home Science was held on 18th September 2023 from 11:00 am onwards at School of Humanities and Social Sciences, Shri Guru Ram Rai University, Pathri Bagh, Dehradun. The following members were present:

Prof. (Dr.) Geeta Rawat, Dean, SHSS, SGRR University, Dehradun (Chairperson)

Dr. Prabha Bisht, Associate Professor, S.D.M.G. (P.G) College, Dehradun (Doiwala) (External Expert)

Dr. Madhu Sharma, Associate Professor, Department of Home Science, SHSS, SGRR University, Dehradun (Convener)

Dr. Lata Sati, Assistant Professor, Department of Home Science, SHSS, SGRR University, Dehradun (Member)

Dr. Amar Lata, Assistant Professor, Department of Economics, SHSS, SGRR University, Dehradun (Member)

PROCEEDINGS AND RESOLUTIONS:

The chairperson welcomed all the members and briefed them about the syllabus according to National Education Policy 2020 being implemented as per UGC guidelines issued from time to time.

The members of the BOS discussed the agenda item wise and resolutions were made accordingly-

Agenda No. 1: To consider and approve the syllabus of B.Sc. Food, Nutrition and Dietetics as per the curriculum and credit framework for undergraduate programmes (2022) and National Higher Education Qualifications Framework (NHEQF, 2023)

Resolutions: The Honourable members discussed the syllabus in detail and approved to apply New Education Policy (NEP) 2020 for B.Sc. Food, Nutrition and Dietetics Programme with the inclusion of the nomenclature of the courses as DSC, DSE, GE, VAC, IAPC & SEC as per UGC guidelines.

Agenda No. 2: To consider and approve Program outcomes (POs), Program-specific outcomes (PSOs) Course outcomes (COs) and Course objectives proposed in the syllabus of B.Sc. Food, Nutrition and Dietetics

Resolutions: The Program outcomes (POs), Program-specific outcomes (PSOs), Course outcomes (COs) and Course objectives in B.Sc. Food, Nutrition and Dietetics Program were discussed in detail with the External Expert and all the members resolved to approve the same with minor corrections/suggestions from the honorable external expert.

Agenda No. 3: Allotment and description of course code, course name and credits in B.Sc. Food, Nutrition and Dietetics Programme.

Resolutions: The course code, course name and credits in B.Sc. Food, Nutrition and Dietetics Programme were allotted as per university norms and all the members resolved to approve the course codes, courses and credits keeping in view the UGC guidelines.

Agenda No. 4: Question paper pattern, Medium of instruction, medium of examination, types of questions, duration of the examination, allotment of marks in internal and external exams.

Resolutions:

- The members were of the view that the medium of instruction would be English medium/Hindi medium for UG Course program and which would be as per SGRR University norms.
- It was resolved by all the members that the duration of the End term examination would be as per the guidelines issued by the Board of Examination SGRR University from time to time.
- Each paper would be of 100 marks. The distribution of mid-term and end-term examination marks will be as per guidelines issued by the Board of Examination SGRR University from time to time.

Agenda No. 5: Evaluation pattern and distribution of marks.

Resolutions: All the members of BOS were of the view that the evaluation pattern and distribution of marks should be as par with other subjects and should follow university norms to bring uniformity.

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

Prof. (Dr.) Geeta Rawat, Dean, SHSS, SGRR UNIVERSITY, Dehradun (Chairperson)

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SYLLABUS FOR

Bachelor of Science in Food, Nutrition and Dietetics

School of Humanities and Social Sciences

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The B.Sc. programme in Food, Nutrition and Dietetics intends to create competent professionals with in-depth understanding of various aspects offered under this programme. The programme offers a broad range of courses spanning across areas of community nutrition, food science, dietetics and nutrition counseling. The programme aims at conceptual understanding of the key elements of food, nutrition and dietetics. Students would be trained in areas such as nutritional assessment, diet planning, food product development, health communication, clinical nutrition, nutrition education and behavior modification. The field of Food, Nutrition and Dietetics is vast, dynamic and an evolving area of specialization. This requires students to learn and be abreast with recent advances and evidence- based guidelines in the field of food and nutrition. The skills and attributes acquired during the programme would open doors to job opportunities in areas of food science, nutrition, health promotion, and disease management, also paves way for research and higher education for interested students.

Bachelor of Science in Food, Nutrition and Dietetics

OUTCOME BASED EDUCATION

Programme outcome (POs)

Students will be able to:

PO-1	Disciplinary Knowledge: Understand the role and importance of food and nutrition for the welfare of the community and acquire the skills in planning diet, health and diseases.
PO-2	Communication Skills: Learn and apply evidence-based guidelines in the field of dietetics, nutrition counselling, nutrition research laboratory, community
PO-3	Critical thinking: Understand the structure and functions of the different organs systems in relation to nutrition
PO-4	Interpersonal and Problem Solving: Design solutions and novel food products to meet the specified nutrient needs with appropriate consideration for the public health and safety
PO-5	Critical thinking, Communication and problem solving: Comprehend, communicate effectively, plan, design and implement programs in the field of nutrition and dietetics
PO-6	Decision making, Analytical and Research skills: Understand and demonstrate the knowledge of food science, food science and quality control in societal and environmental contexts
PO-7	Moral and ethical awareness/reasoning and Research skills: Apply ethical principles and commit to professional ethics and responsibilities in the field of nutrition, sports, food industry and health care sectors
PO-8	Interpersonal and Business skills: Understand the applications of nutraceuticals and functional foods in the product development from conceptualization to evaluation of the quality of the food product
PO-9	Analytical and Research skills: Comprehend the knowledge and role of food additives in food industry in relation to its analytical techniques
PO-10	Critical thinking, Analysis and Research skills: Understand and apply the concept of nutrients and nutritional science in the evaluation of health and disease
PO-11	Goal Setting and Problem-solving skills: Enable students to pursue higher education and research

Program Specific Outcome (PSOs)

After completing the programme, the students should be able to:

PSO 1	Apply food science knowledge to describe functional properties of food ingredients. Utilize the knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.
PSO 2	Apply the nutrition and dietetics-based knowledge and skills in the planning and assessment of suitable diets for individuals of every age, patients and the community in a sustainable manner. Evaluate the food product and the application of necessary preservation techniques to increase the shelf life of the product and also be a part in the auditing industry
PSO 3	Apply technical skills, knowledge of health behaviour, clinical judgment, and decision-making skills when assessing and evaluating the nutritional status of individuals and communities and their response to nutrition intervention.
PSO 4	Implement strategies for food access, procurement, preparation, and security for individuals, families, and communities. Apply skills gained in nutrition and dietetics for research, development, and entrepreneurship. Provide nutrition counselling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies

Eligibility for admission:

Any candidate who has passed 12th with science or the Higher Secondary Board of Examination with science from any recognized board or equivalent to it having not less than 40 % marks in aggregate is eligible for admission. However, SC/ST, OBC and other eligible candidates shall be given relaxation as per University rules.

Type of Course

Discipline Specific Core Courses (DSCC)

Discipline Specific Elective Courses (DSEC)

General Electives Courses (GEC)

Ability Enhancement Courses (AEC)

Skill Enhancement Elective Courses (SEEC)

IAPC: Internship/Apprenticeship / Project/ Community Outreach

VAC: Value Addition Course

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Scheme of Teaching and Evaluation of Examination

B.Sc. in Food, Nutrition and Dietetics

Certificate in Food, Nutrition and Dietetics (Duration One Year)

S.No.	Course Category	Subject Code	Subject Title	Periods per week			Evaluation Scheme				Subject Total
								Seasonal		SEE	
				L	T	P	Credit	1st Internal	2nd Internal		
Semester-I											
1.	DSC-I	FNDDC-101	Fundamentals of Food and Nutrition	3	-	-	3	15	15	70	100
2.	DSC-I	FNDDL - 101 (Lab)	Fundamentals of Food and Nutrition-Lab			2	1	15	15	70	100
3.	DSC-II	FNDDC-102	Human Physiology - I	3	-	-	3	15	15	70	100
4.	DSC-II	FNDDL-102 (Lab)	Human Physiology – I-Lab			2	1	15	15	70	100
5.	DSC-III	FNDDC-103	Food Chemistry	4	-	-	4	15	15	70	100
6.	Gen Elective	FNDGE-101	Choose from a pool	4	-	-	4	15	15	70	100
7.	AEC	AEC – 1 (2)		2	-	-	2	15	15	70	100
8.	SEC-1	FNDSC-101	Fundamentals of Nutrition and Cooking Skills with Healthy Recipe Development	2			2	15	15	70	100
9.	VAC-I		Choose one from a pool of VAC courses	2	-	-	2	15	15	70	100
							22	Total			900
Semester-II											
1.	DSC-I	FNDDC201	Principles of Food Science and Preservation	3	-	-	3	15	15	70	100
2.	DSC-I	FNDDL 201 (Lab)	Principles of Food Science and Preservation-Lab	-	-	2	1	15	15	70	100
3.	DSC-II	FNDDC- 202	Dietetics - I	3	-	-	3	15	15	70	100
4.	DSC-II	FNDDL202 (Lab)	Dietetics – I-Lab	-	-	2	1	15	15	70	100
5.	DSC-III	FNDDC-203	Post Harvest Technology	4	-	-	4	15	15	70	100

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6.	Gen Elective	FNDGE201	Choose from a pool	4	-	-	4	15	15	70	100
7.	AEC	AEC – 2 (2)		2	-	-	2	15	15	70	100
8.	SEC	FNDSC201	Food Processing, Preservation and Packaging	2	-	-	2	15	15	70	100
9.	VAC-2		Choose one from a pool of VAC courses	2	-	-	2	15	15	70	100
							22	Total			900

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Course code : FNDDC-101				
Course Name : Fundamentals of Food and Nutrition				
Semester : 1st				
	L	**T**	**P**	**C**
	3	0	0	3

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To know about functions of food and essential constituents of food.
2. To gain the elementary knowledge of basic food groups.
3. To learn about meal planning for different age groups.

Course Contents:

UNIT 1 - Introduction to food and nutrition:

Definition- Foods, Nutrition, Nutrients.

Classification and function of foods.

Energy-factors affecting total energy requirements of the body

UNIT 2 - Essential constituents of food-their sources, functions, requirements, and deficiency diseases:

Protein

Carbohydrate

Fat

Vitamins

Minerals

Water

UNIT 3 - Elementary knowledge of basic food groups. Importance of basic food groups in the diet.

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Nutritive contribution of food stuffs and their importance in Indian diets like cereals and millet, pulses, nuts and oil-seeds, vegetables, fruits, milk and milk products, egg, meat, fish and other flesh, fats and oils, sugar and jaggery, spices and condiments.

UNIT 4 - Nutrition during life cycle:

Nutrition during childhood

Nutrition for adolescence

Nutrition for adults

Nutrition during old age

Pregnancy and lactation

UNIT 5 -Meal planning

Importance and basic principles of meal planning, factors affecting meal planning, meal planning for special occasions, like festival and birthday party.

Diet planning for different economic levels and different age groups- Early and late childhood adolescence, adulthood and old age.

Books Recommended:

Normal and therapeutic nutrition : Robinson

Essentials of foods and nutrition: Swaminathan

Human nutrition and application in India: Mudambi

Nutritive value of Indian foods: Gopalan C.

Basic Aahar avam Poshan Vigyan: Vimla Sharma

Poshan Vigyan Ke Mool Siddhant : S.P. Sukhiya

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Course outcomes (COs):

Upon successful completion of the course a student will be able to:

CO1	Define food, nutrition and nutrients and also Classify food according to food groups. Learn about essential constituents of food, and meal planning.
CO2	Identify and discuss the factors affecting total energy requirements of the body. Explain the essential constituents of food, and meal planning.
CO3	Enlist and explain the essential constituents of food and the functions of food.
CO4	Analyze the role of meal planning, and essential constituents of food .Discuss and write about Importance of basic food groups in the diet.
CO5	Evaluate the knowledge of basic food groups, essential constituents of food and meal planning.
CO6	Plan diet for different economic levels and different age groups by keeping in mind the essential constituents of food.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

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Course code : FNDDL-101 (Lab)				
Course Name : Fundamentals of Food and Nutrition-Lab				
Semester : 1st				
	L	T	P	C
	0	0	2	1

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

To plan diet for different economic levels and different age groups .

To prepare diet for different economic levels and different age groups .

Course Contents:

Diet planning and preparing diets for different economic levels and different age groups- Early and late childhood, adolescence, adulthood and old age.

Books Recommended:

1.Normal and therapeutic nutrition : Robinson

2.Essentials of foods and nutrition: Swaminathan

3.Human nutrition and application in India: Mudambi

4.Basic Aahar avam Poshan Vigyan: Vimla Sharma

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Recall the theoretical knowledge related to practical work.
CO2	Identify some nutritious recipes.
CO3	Plan diet for different economic levels .
CO4	Plan diet for different age groups .
CO5	Prepare diet for different economic levels .
CO6	Prepare diet for different age groups .

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CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2	2	2	3	2	1	2	2	2	3	2	2	3
CO2	3	3	2	2	2	3	2	1	2	2	2	3	2	2	3
CO3	2	2	1	3	2	2	2	1	2	2	2	3	2	2	3
CO4	2	2	1	3	2	2	2	1	2	2	2	3	2	3	3
CO5	3	3	2	3	2	3	2	1	2	2	2	3	2	2	3
CO6	3	3	2	3	2	3	2	1	2	2	2	3	2	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

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Course code : FNDDC-102				
Course Name : Human Physiology - I				
Semester : 1st				
	L	T	P	C
	3	0	0	3

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To Understand the homoeostatic status of the human body
2. To Comprehend the physiological processes and functions of various vital organs as applicable to human nutrition
3. To Learn about malfunctioning of vital organs or systems

UNIT I

Introduction: Homoeostasis and body fluids. Blood: Red blood cells – Erythropoiesis, stages ofdifferentiation, function, counts, physiological variation. Hemoglobin – structure, function, concentration, physiological variation. White blood cells – production, function, life span, counts, differential counts. Platelets – origin, normal count, morphology, functions. Plasma proteins – production, concentration, types, albumin, globulin, fibrinogen. Clotting factors, mechanism of clotting, disorders of clotting factors. Blood Bank, blood groups. Anticoagulants– examples and uses. Anaemia – classification – morphological and etiological effects of anaemia on body. Blood indices – colour index, MCH, MCV, MCHC. Erythrocyte sedimentation rate (ESR). Blood volume – normal value, determination of blood volume and regulation of blood volume. Lymph – composition and function.

UNIT II

Cardiovascular system: Heart – physiological anatomy, nerve supply, properties of cardiac muscle, cardiac cycle – systole, diastole, conduction system. Cardiac output. Heart sounds: Normal heart sounds, areas of auscultation. Blood pressure – Definition, normal value, clinicalmeasurement of blood pressure. Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension, radial pulse. Heart Sounds – Normal heart sounds, characteristics and signification (significance), heart rate. Electrocardiogram (ECG) – significance, coronary, cerebral circulation and capillary circulation

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UNIT III

Digestive System: Physiological anatomy of gastro-intestinal tract, functions of digestive system. Salivary glands – structure and functions, deglutition, mastication – stages and regulation of saliva, functions of saliva. Stomach – structure and functions. Gastric secretion– composition, function, regulation of gastric juice secretion. Pancreas – structure, function, composition and regulation of pancreatic juice. Liver – functions of liver. Bile secretion - composition, function, regulation of bile secretion, bilirubin metabolism, types of bilirubin, jaundice – types, significance. Gall bladder – functions. Intestine – small intestine and large intestine. Small intestine - functions, digestion, absorption, movements. Large intestine – functions, Defecation

UNIT IV

Respiratory System: Function of respiratory system - physiological anatomy of respiratory system, respiratory tract, respiratory muscles, respiratory organs – lungs, alveoli, respiratory membrane, stages of respiration. Mechanism of normal and rigorous respiration, intra pulmonary pleural pressure, surface tension. Transportation of respiratory gases: Transportation of O_2: direction, pressure gradient, forms of transportation, oxygenation of haemoglobin, quantity of O_2 transported. Lung volumes and capacities. Regulation of respiration, mechanisms of regulation, nervous and chemical regulation, respiratory centre. Hypoxia, cyanosis, asphyxia, dyspnoea, dysbarism, artificial respiration, apnoea

Course outcomes (COs): Upon successful completion of the course a student will be able to:

CO1	Understand the homoeostatic status of the human body
CO2	Comprehend the physiological processes and functions of various vital organs as applicable to human nutrition
CO3	Apply the knowledge of physiological states to therapeutic diets
CO4	Illustrate Cardiovascular system, Digestive System, and Respiratory System
CO5	Assess malfunctioning of vital organs or systems
CO6	Writ about Homoeostasis and body fluids, Cardiovascular system, Digestive System, and Respiratory System

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

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Course code : FNDDL102 (Lab)				
Course Name : Human Physiology – I - Lab				
Semester : 1st				
	L	T	P	C
	1	0	2	1

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1.To learn to record blood pressure using various methods

2. To learn to estimate hemoglobin and carry out blood grouping

3. To assess histological sections of various organs

Course Contents:

1. Record of blood pressure – Sphygmomanometer, palpatory method, auscultatory method,variation of BP

2. Haemoglobin estimation

3. Blood grouping

4. Histology of Cartilage, bone, adipose tissue, skin, muscle

Books Recommended:

1. Guyton AC, Hall JE. Textbook of Medical Physiology, 9th Ed., Prism Books Pvt Ltd.,Bangalore, 1996

2. Chatterjee CC. Human Physiology, Calcutta, WB, 1988

3. Wilson. Anatomy and Physiology in Health and Illness, Edinburgh ChurchillLivingstone, 1989

4. Sembulingam K, Sembulingam P. Essentials of medical physiology, Jaypee Bros.Medical Publ., New Delhi, 2012

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Course outcomes (COs):

Upon successful completion of the course a student will be able to:

CO1	Recall the theoretical knowledge related to practical work.
CO2	Record blood pressure using various methods
CO3	Estimate hemoglobin
CO4	Carry out blood grouping
CO5	Assess histological sections of various organs
CO6	Write about the knowledge related to practical work.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

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Course code : FNDDC-103				
Course Name : Food Chemistry				
Semester : 1st				
	L	T	P	C
	4	0	0	4

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. Comprehensive study on definition, composition of food, water-food relation, macronutrients, vitamins and flavours.

2. Study of various natural food pigments, enzymatic reactions, changes taking place and new product development and browning reactions in food required at industrial level.

UNIT I

Introduction: Composition of food, water in food, structure of water and ice, types of water, absorption and adsorption phenomenon, Water activity and packaging, Water activity and shelf-life

Lipids: Classification of lipids, Physical properties of lipids. Chemical properties of lipids. Effect of frying on fats, Changes in fats and oils on storage and its prevention, Technology of edible fats and oils - Refining, Hydrogenation and Interesterification, Fat Mimetics

UNIT II

Proteins: Protein classification and structure, Nature of food proteins (plant and animal proteins, Physical and chemical properties of proteins, Functional properties of proteins. Carbohydrates: Classification of carbohydrates, Structure of important polysaccharides, Chemical reactions of carbohydrates, Modified celluloses and starches.

Flavours: Definition and basic tastes, Description of food flavours, Flavour enhancers

UNIT III

Minerals: Major and minor minerals, Metal uptake in canned foods, Toxic metals Natural Food Pigments: Introduction and classification, Water soluble and insoluble foodpigments (chlorophyll, carotenoids, anthocyanins and flavonoids, beet pigments) Browning Reactions in Food: Browning, Maillard reaction, Caramelization reaction.

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UNIT IV

Enzymes: Introduction, General characteristics, Enzymes in food processing, Industrial Uses of Enzymes, Immobilized enzymes

Changes occurring during food processing treatments: Drying and dehydration, Irradiation,Freezing, Canning

New product development: Definition, importance, need of product development, steps ofproduct development, tools

Books Recommended:

1. Fennema, OR. Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996

2. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002

3. Wong, DWS. Food Enzymes, Chapman and Hall, New York, 1995

4. Potter, N.N. and Hotchkiss, J.H, Food Science, 5th Ed., Chapman & Hall, 1995

5. DeMan, J.M., Principles of Food Chemistry, AVI, New York, 1980

6. DeMan, J.M., Principles of Food Chemistry, 3rd Ed., Springer 1999

7. Desrosier, NW. and Desrosier, JN., The technology of food preservation, 4th Ed., Westport, Conn., AVI Pub. Co, 1977.

8. Fuller, GW. New Product Development from Concept to Marketplace, CRC Press, 2004.

9. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002

10. Nooralabettu, K.P. Enzyme Technology, Pace Maker of Biotechnology, PHI Learning Private Limited, New Delhi. 2011

Course outcomes (COs):

Upon successful completion of the course a student will be able to:

CO1	Define and have an overview on food chemistry including composition and the importance of water.
CO2	Classify the carbohydrates, lipids, proteins, vitamins and flavour, minerals and natural food pigments used in food products.
CO3	Apply the knowledge of food chemistry, and browning reactions in food products.
CO4	Illustrate the knowledge related to Food Chemistry.
CO5	Assess and discuss about the knowledge related to Food Chemistry.
CO6	Build own product in innovative way by understanding changes that occurs during food development and use of enzyme technology.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

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Course code : FNDSC-101				
Course Name: Fundamentals of Nutrition and Cooking Skills with Healthy Recipe Development				
Semester: 1st				
	L	T	P	C
	2	0	0	2

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To gain the elementary knowledge of food, nutrition and basic food groups.

2.To know about Food sanitation and hygiene, Food preservation, Food Adulteration and Consumer Protection.

3. To learn about different methods of cooking and meal planning.

Course Contents:

Unit I - Introduction to food and nutrition:

Definition- Foods, Nutrition, Nutrients.

Food Groups.

Classification and function of food.

Unit II- Food:

Food sanitation and hygiene.

Food preservation – Principles and methods. Home scale methods of food preservation.

Food Adulteration and Consumer Protection.

Unit III- Methods of cooking and preventing nutrient losses:

Dry, moist, frying and microwave cooking.

Advantages, disadvantages and the effect of various methods of cooking on nutrients.

Minimizing nutrient losses.

Planning various dishes using different methods of cooking:

-Boiling / steaming

-Roasting

-Frying-Deep/shallow

-Pressure cooking

-Hot air cooking/Baking

Unit IV- Meal planning:

Importance of meal planning.

Factors effecting meal planning: age, nutritional, socio-cultural, religious, economic factors and availability of material resources. Meal planning for special occasions, like festival and birthday party. Meal planning for pregnant woman, Meal planning for lactating mother.

Planning nutrient rich dishes:

-Protein rich dish

-Carbohydrate rich dish

-Fat rich dish

-Vitamins rich dish

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Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Memorize the concepts related to nutrition, food adulteration and consumer protection. Define food, nutrition and nutrients and also Classify food according to food groups and write the functions of food.
CO2	Understand the concept of nutrition, nutrient rich dishes and methods of cooking. Define food sanitation and hygiene and discuss about it.
CO3	Discuss about Food preservation, Food Adulteration and Consumer Protection.
CO4	Apply the knowledge related to nutrition, and nutrient rich dishes to prevent the loss of nutrients while cooking. Use the the knowledge to preserve food and find out adulterants in food items. Use the knowledge related to consumer protection in day to day life
CO5	Evaluate the knowledge related to nutrition, nutrient rich dishes, different methods of cooking and prevention of nutrient losses. Write about classification and functions of food.
CO6	Plan nutrient rich dishes using different methods of cooking. Plan diet for pregnant woman and lactating mother.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : FNDDC-201				
Course Name : Principles of Food Science and Preservation				
Semester : 2nd				
	L	T	P	C
	3	0	0	3

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To understand the basic knowledge of nutrition in making foods choices.

2. Learn to distinguish and relate the characteristics and properties of foods.

3. To develop an understanding of food safety, standards, and food Preservation

Course Contents

UNIT I

Introduction to Food Science: Properties of food (a) Colloids, sols, gels, foam (b) Emulsion formation (c) Bound and free water (d) pH value, osmosis and osmotic pressure (e) Boiling, melting and freezing points. Sensory evaluation - Subjective and objective. Cereals and millets - Production, importance & composition - cereal products. Wheat, rice maize, ragi and sorghum. Malting and cooking of cereals, non-enzymatic reactions, leavening agents.

Fermented products, milling of wheat, parboiling of rice, pulses- composition, toxic constituents and cooking of pulses, variety and processing

UNIT II

Fruits and vegetables – composition, pigments, flavors and variety- changes during cooking-enzymatic browning, non-enzymatic browning. Milk and milk products- composition, storage- Processing of milk – Effects of heat on milk protein - Milk products available in India. Egg - structure, composition, storage, grade, evaluation, selection, Role of egg in food preparation, factors affecting coagulation of egg proteins.

UNIT III

Sugar, Jaggery and honey - Composition, different forms of sugar, storage- Behaviors of syrups at different temperatures- Crystallization and caramelization. Oil and Fats- Composition, types, storage, plasticity, Hydrogenation and processing.

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Changes during heating- Fats as shortening agents, smoking point, Rancidity, specific fat (Lard, Butter, Margarine) Meat, Fish poultry-structure, composition, storage, Post mortem changes in meat, Curing of meat, Tenderization, Aging of meat, selection, Meat cookery

UNIT IV

Concepts of food safety and standards. Food Preservation, food spoilage, method of preservation by low temperature, high temperature, dehydration, food irradiation.

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Memorize the concepts related to food science and preservation.
CO2	Learn to distinguish and relate the characteristics and properties of foods.
CO3	Apply the knowledge gained on characteristics and properties of foods during cooking
CO4	Analyze the knowledge related to food science and preservation.
CO5	Evaluate the basic knowledge of nutrition in making foods choices and obtaining an adequate diet.
CO6	Develop appropriate food preparation and processing methods to ensure quality standards.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

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Course code : FNDDL-201 (Lab)				
Course Name : Principles of Food Science and Preservation-Lab				
Semester : 2nd				
	L	T	P	C
	0	0	2	1

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To Learn about standardization of common food preparation and sensory evaluation.
2. To Learn about starch cookery, leavened products, milk cookery and fermented products.
3. To Learn about egg cookery, fat and oil cookery, syrup formation,.

Course Contents:

1. Weights & measures, standardization of common food preparation.
2. Sensory evaluation
3. Starch cookery - Rice and Wheat preparation, factors influencing dough development, gluten formation.
4. Leavened products, milk cookery-casein formation, curd setting.
5. Fermented products and pulse cookery.
6. Vegetable cookery- Effect on pigments and enzymatic browning in fruits and vegetables
7. Egg cookery and fat and oil cookery.
8. Sugar and Jaggery- Syrup formation, crystallization and caramelization.

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1. Manay N S, Shadaksharaswamy M. Foods - Facts and principles, New Age InternationalPubl.,New Delhi, 2010

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3. Hughes and Benniion M. Introductory Foods, Macmillan and Co, New York, 1980

4. Dowell P, Bailey A. The Book of ingredients, Dorling Kindersley Ltd., London, 1980

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9. Prescott SC, Proctor BE. Food Technology, McGraw Hill, 1937

10. Desroier NV. The technology of food preservation, AVI Pub. Co, 1963

11. Lal G, Siddappa GS, Tandon GL. Preservation of food and vegetables, ICAR, New Delhi1960

12. Manay NS, Shadaksharaswamy M. Foods - Facts and principles, New Age InternationalPubl., New Delhi, 2010

Course outcomes (COs):Upon successful completion of the course a student will be able to

CO1	Recall the theoretical knowledge related to practical work.
CO2	Standardize common food preparation.
CO3	Prepare different types of products from rice and wheat.
CO4	Prepare Leavened products, milk products, syrup from sugar and jaggery
CO5	Evaluate the food by using sensory evaluation method.
CO6	Perform vegetable cookery, and egg cookery.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : FNDDC-202				
Course Name : Dietetics - I				
Semester : 2nd				
	L	T	P	C
	3	0	0	3

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To know the principles of diet therapy
2. To understand the modifications of normal diet for therapeutic purposes.
3. To learn the role of a registered dietician
4. To identify the roles of others who collaborate in delivery of food and nutrition services

Course Contents:

UNIT I

Definition of dietetics, clinical dietetics, objectives of dietetics, Growth and scope of dietetics,Characteristics and role of dietician in health care, classification of dietitian, characteristics ofa dietitian, objectives of diet therapy. Hospital Dietary services- role and functions

Unit II

Concept of diet therapy and meal planning - Basic principles of meal planning: Explanation of terms: concept of health, recommended dietary allowances (RDA), Adequate intake, Foodexchange list, food guide pyramid Factors affecting meal planning, use of food composition tables, Reference man and woman. Planning of balanced diet and approaches of assessingnutrient requirements. Food prescription.

Unit III

Planning diets of different activity levels for various income groups. Definition of nutritionalcare, interpersonal relationship with patient, Team approach to nutritional care, Diet prescription

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UNIT IV

Routine hospital diets: Liquid diet, semi-solid, regular and bland diet. Modification of normaldiets. Types of feeding - oral feeding and tube feeding - enteral and parental

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Memorize the concepts related to Dietetics.
CO2	Understand the knowledge related to diet therapy, meal planning for various income groups and routine hospital diets.
CO3	Apply the knowledge gained on diet therapy, meal planning for various income groups and routine hospital diets.
CO4	Analyze the knowledge related to diet therapy, meal planning for various income groups and routine hospital diets.
CO5	Evaluate the knowledge related to diet therapy, meal planning for various income groups and routine hospital diets.
CO6	Plan meal for various income groups and routine hospital patients.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : FNDDL-202 (Lab)				
Course Name : Dietetics – I (Lab)				
Semester : 2nd				
	L	T	P	C
	0	0	2	1

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To plan fluid diets
2. To plan diet for febrile conditions
3. To modify normal diet for therapeutic purposes.

Course Contents:

1. Identification of food sources for various nutrients using food composition tables.
2. Planning and preparation of meals for adults of different activity levels for various income groups.
3. Estimation of BMI
4. Planning, preparing and calculating fluid diets.

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4. Begum R., A textbook of foods, nutrition and dietetics, Sterling Publ., Delhi, 1989
5. Joshi SA. Nutrition and dietetics, Tata McGraw Hill Publications, New Delhi, 1992

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6. Srilakshmi B. Dietetics, 6th Ed., New Age International Publ., New Delhi, 2011

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Recall the theoretical knowledge related to practical work.
CO2	Identify food sources for various nutrients using food composition tables.
CO3	Plan and prepare meals for adults of different activity levels for various income groups.
CO4	Estimate BMI
CO5	Plan fluid diets.
CO6	Prepare fluid diets.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

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Course code : FNDDC-203				
Course Name : Post Harvest Technology				
Semester : 2nd				
	L	T	P	C
	4	0	0	4

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1.To comprehend the need for preservation and processing

2. To understand the rationale behind processing leading to a final product with enhanced characteristics and shelf life.

3.To know about the reactions and changes taking place during freezing and refrigeration

4.To understand the methodology of drying to preserve the harvest and turn it into multiple use.

Course Contents:

UNIT I

Introduction to food processing: Historical development of food processing, Definition of food processing, aims and objectives of food processing, preparation of raw material for processing, introduction to different processes employed in food processing- milling, cooking, boiling, steaming, braising, stewing, roasting, frying, grilling, baking, fermentation,pickling, refining, canning, definition of shelf life, perishable foods, semi perishable foods, shelf stable foods

Unit II

Freezing and Refrigeration: Introduction to refrigeration, cool storage and freezing, definition, principle of freezing, freezing curve, changes occurring during freezing, types of freezing , introduction to thawing, changes during thawing and its effect on food.

Unit III

Sterilization: Principle and applications: commercial sterilization, Pasteurization, ultra high temperature sterilization, aseptic processing and blanching, Hurdle technology, microwave processing.

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Unit IV

Drying and Dehydration: Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e., mechanical drying), types of drying, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry. Evaporation: Definition and principle of evaporation, factors affecting evaporation, names of evaporators used in food industry. Irradiation: Introduction, units of radiation, kinds of ionizing radiationsused in food irradiation, mechanism of action, uses of radiation processing in food industry. Fermentation: Principles of fermentation, Types of fermentation, curing and pickling, Advantages

REFERENCES

1. Frazier WC, Westoff DC. Food Microbiology 4th Ed., Tata Mc Graw Hill Publ. Co. Ltd.,1998

2. Desroier NV. The technology of food preservation, AVI Pub. Co, 1963

3. Lal G, Siddappa GS, Tandon GL. Preservation of food and vegetables, ICAR, New Delhi,1960.

4. Potter NN, Hotchkiss JH. Food Science, 5th Ed., CBS Publisher and Distributors, Delhi,1966

5. Prescott SC, Proctor BE. Food Technology, McGraw Hill, 1937

6. Johnson R, Anderson MT. Food Preservation, 2012

7. Manay NS, Shadaksharaswamy M. Foods - Facts and principles, New Age InternationalPubl.,New Delhi, 2010

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Memorize the concepts related to Post Harvest Technology .
CO2	Understand the knowledge related to Food Processing, Freezing and Refrigeration, Sterilization, Drying and Dehydration
CO3	Apply the knowledge gained on Food Processing, Freezing and Refrigeration, Sterilization, Drying and Dehydration
CO4	Analyze the knowledge related to Food Processing, Freezing and Refrigeration, Sterilization, Drying and Dehydration
CO5	Evaluate the knowledge related to to Food Processing, Freezing and Refrigeration, Sterilization, Drying and Dehydration
CO6	Write about Food Processing, Freezing and Refrigeration, Sterilization, Drying and Dehydration.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2	-	1	-	1	1	-	1	1	2	2	2	2	2	2	3
CO2	2	2	2	-	2	2	-	1	2	2	2	2	2	2	2	3
CO3	3	2	2	1	2	2	-	1	2	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3
CO5	3	3	3	1	2	2	2	2	2	2	2	2	2	2	2	3
CO6	3	3	3	2	2	2	2	2	3	2	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correla

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Course code : FNDSC-201				
Course Name : Food Processing, Preservation and Packaging				
Semester : 2nd	L	T	P	C
	2	0	0	2

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are:

1. To enable the students to know about food processing.
2. To make the students aware about Food Laws and Standards.
3. To familiarize the students with food preservation, packaging and labelling of foods.

Course Contents :

Unit 1: Food Processing

Cereals: Wheat-Structure, Composition and Nutritive Value, Milling of Wheat, Products of wheat

Rice: Composition, Milling, Parboiling, Rice Products

Millets (Maize): Nutritive value, processing and Products

(Ragi): Nutritive value, Milling and malting

Pulses: Composition and Nutritive value, digestibility of pulses, processing, Toxic constituents

Nuts and oil Seeds: Different nuts and oil seeds, Processing of refined oil

Milk: Nutritive value, processing of milk, Some fermented and non-fermented milk products

Unit 2: Food Preservation

Food Spoilage,

Method of food preservation-by low temperature, high temperature, preservatives and Fermentation

Unit 3: Packaging and Labelling of Foods

Packaging-Functions, classification, material used for packing, Laws related to packaging, Nutrition Labelling

Unit 4: Food Laws and Standards

Food Preservation and Standard Act: Food Safety and Standards Authority of India (FSSAI).

Standardization Mark – India: Bureau of Indian Standards (BIS) and AGMARK

International Standards: Codex Alimentarius and Hazard Analysis Critical Control Point (HACCP)

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Course Outcomes (COs):

Upon successful completion of the course a student will be able to:

CO1	Remember and define the basic concept of Food preservation, food laws and standards, packaging and labeling of food, and food processing .
CO2	Understand and Explain food preservation and processing, food packaging and labelling, food laws and standard
CO3	Discuss and apply the knowledge related to food laws and standard, food packaging and labeling, food processing and preservation.
CO4	Analyze and conclude the information related to food processing and preservation, packaging and labeling of foods, food laws and standard.
CO5	Evaluate the knowledge with respect to food preservation and processing, food packaging/labelling, food laws and standards
CO6	Express and Write about food laws and standards, food preservation and processing, food packaging/labelling.

CO-PO, PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	1	-	2	2	2	2	-	2	2	2	2	2	3
CO2	2	2	2	1	-	2	2	2	2	-	2	2	2	2	2	2
CO3	2	2	2	1	3	2	2	2	2	-	2	2	3	3	3	3
CO4	2	2	2	1	-	2	2	2	2	-	2	2	2	2	2	2
CO5	2	2	2	1	-	2	2	2	2	-	2	2	2	2	2	2
CO6	2	2	2	1	3	2	2	2	2	-	2	2	3	3	3	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated