AC/II(23-24).2.RUS3

S. P. Mandali's

Ramnarain Ruia Autonomous College

(Affiliated to University of Mumbai)

Syllabus for

Program: UG Biotechnology

Program Code: RUSBTK

(Credit Based Semester and Grading System for Academic Year 2024–2025)

GRADUATE ATTRIBUTES

GA	Description **A student completing Bachelor's Degree in Science program will be able to:**
GA 1	Recall and explain acquired scientific knowledge in a comprehensive manner and apply the skills acquired in their chosen discipline. Interpret scientific ideas and relate its interconnectedness to various fields in science.
GA 2	Evaluate scientific ideas critically, analyse problems, explore options for practical demonstrations, illustrate work plans and execute them, organise data and draw inferences.
GA 3	Explore and evaluate digital information and use it for knowledge upgradation. Apply relevant information so gathered for analysis and communication using appropriate digital tools.
GA 4	Ask relevant questions, understand scientific relevance, hypothesize a scientific problem, construct and execute a project plan and analyse results.
GA 5	Take complex challenges, work responsibly and independently, as well as in cohesion with a team for completion of a task. Communicate effectively, convincingly and in an articulate manner.
GA 6	Apply scientific information with sensitivity to values of different cultural groups. Disseminate scientific knowledge effectively for upliftment of the society.
GA 7	Follow ethical practices at work place and be unbiased and critical in interpretation of scientific data. Understand the environmental issues and explore sustainable solutions for it.
GA 8	Keep abreast with current scientific developments in the specific discipline and adapt to technological advancements for better application of scientific knowledge as a lifelong learner

PROGRAM OUTCOMES

PO	Description **A student completing Bachelor's Degree in Science program in the subject of Biotechnology will be able to:**
PO 1	Adept in basic sciences along with a thorough understanding of biotechnology principles and chemical sciences to create a foundation for higher education with the insights into interdisciplinary approach.
PO 2	Demonstrate the applications of fundamental biological processes from the molecular, cellular, industrial and environmental perspective.
PO 3	Develop effective communication skills with improved individual and team work abilities in the domain of scientific research writing. Showcase their innovative ideas and research work efficiently.
PO 4	Reflect, analyse and interpret information or data for investigating the problem in fields of biotechnology. Acquire scientific and entrepreneur skills to furnish sustainable solutions to coeval problems
PO 5	Illustrate the relevance of ethical implications and standard laboratory practices in tissue culture techniques, forensic biology, developmental biology and other fields of biotechnology.
PO 6	Apply the conceptual knowledge to develop coherent, efficacious and proficient practical, technical and analytical skills.

PROGRAMME OUTLINE

YEAR	SEMESTER	PAPER	COURSE CODE	COURSE TITLE	CREDITS
FYBSc **I**	**I**	DSC	RUSBTK.O101	Biotechnology I- Fundamentals of biotechnology	3
		DSC	RUSBTKP.O101	Practicals based on Biotechnology I- (Fundamentals of biotechnology)	1
		DSC	RUSBTK.O102	Fundamentals of chemistry for biotechnology	3
		DSC	RUSBTKP.O101	Practicals based on Fundamentals of chemistry for biotechnology	1
		OE	RUSOEBTK.O101	Fitness - I	3
		OE	RUSOEBTKP.O101	Practicals based on Fitness - I	1
		VSC	RUSVSCBTKP.O101	Marine Biotechnology	2
		SEC	RUSSECBTKP.O101	Microscopy and microbial techniques	2
FYBSc	II	DSC	RUSBTK.E111	Biotechnology II- Fundamentals of genetics	3
		DSC	RUSBTKP.E111	Practical of Biotechnology-II	1
		DSC	RUSBTK.E112	Bioorganic chemistry	3

I		DSC	RUSBTKP.E112	Practical of subject 2	1
		OE	RUSOEBTK.E111	Fitness - II	3
		OE	RUSOEBTKP.E111	Practicals based on Fitness - II	1
		VSC	RUSVSCBTKP.E111	Techniques in forensic science	2
		SEC	RUSSECBTKP.E111	Techniques in tissue culture	2

SEMESTER I

Course Code: RUSOEBTK.O101
Course Title: FITNESS - I
Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	CO DESCRIPTION
CO 1	Discuss about nutrition and meals required in workout regimes.
CO 2	Comment on physiological changes occurring during exercises.
CO 3	Elaborate on the impact of various stresses on exercise.
CO 4	Compare and contrast between various disorders related to nutrition and eating behaviour.
CO 5	Estimate the impact of exercise on physiological parameters.

DETAILED SYLLABUS

Course Code	Unit	Course/ Unit Title	Credits/ Lectures
	I	**Nutrition For Fitness** Special considerations for fitness enthusiasts, special needs for vegetarian fitness enthusiasts, energy needs of the fitness enthusiasts,pre workout meals during workout, post workouts and recovery guidelines for electrolyte replacements, Nutrition applications in life cycle, Nutrition from infancy through adolescence, nutrition in adulthood	**1/15**

	II	**APPLIED EXERCISE PHYSIOLOGY** Human energy metabolism during exercise Human energy system and fatigue during exercise Aerobic and anaerobic change with training Factors affecting training response Exercising during and post pregnancy Body composition and physical performances Exercise performance and environmental stress Exercising at medium and high altitude Thermal stress during exercise	**1/15**
	III	**NUTRITIONAL and EATING DISORDERS** Anorexia Nervosa, Bulimia Nervosa,Binge eating disorder,Avoidant or restrictive food intake disorder, Pica, Rumination Other specified feeding and eating disorders: Purging disorder Night eating syndrome Atypical anorexia nervosa Subthreshold bulimia nervosa and binge eating disorder Orthorexia Conditions which include metabolic syndromes, female athlete triads, ethics of weight control in fitness.	**1/15**

Course Code:RUSOEBTKP.O101

Course Title: PRACTICALS BASED ON FITNESS- I
DETAILED SYLLABUS

Course Code	Course/ Unit Title	Credits
RUSOEBTKP.O101	1. BMI and WHR estimation 2. Estimation of fat mass using Harpenden Caliper 3. Estimation of Blood pressure pre and post physical stress 4. Estimation of Blood lactic acid levels pre and post physical stress 5. Estimation of thermal stress during physical workout 6. Heart rate profiling using ECG pre , during and post physical workout 7. Measurement of Cardiorespiratory fitness a. 1.5 mile test b. Shuttle run test 8. Estimation of Blood glucose level pre and post calorie intake 9. Estimation of glycemic index pre and post physical stress	**1**

SEMESTER II
Course Code: RUSOEBTK.E111
Course Title: FITNESS-II
Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	CO DESCRIPTION
CO 1	Elaborate on various types of diet plans used in the current world.
CO 2	Comment on different kinds of supplements and boosters.
CO 3	Discuss the role of medical complications in diet planning.
CO 4	Analyse commercial food supplements using suitable qualitative and quantitative assays.

DETAILED SYLLABUS

Course Code	Unit	Course/ Unit Title	Credits/ Lectures
	I	**ADVANCE DIETARY PLANS FOR FITNESS ENTHUSIASTS** Hydration, monitoring hydration status and electrolyte status, fluids and fitness, fluid choices, carbohydrate rich diet and bonking Ketogenic diet, protein rich diet, Mediterranean diet, DASH (Dietary approaches to stop hypertension)diet, MIND (mediterranean- DASH Intervention for Neurodegenerative delay)diet, FAD dieting, Traditional Asian diet, Recovery fluids and nutrients	**1/ 15**
	II	**Supplements, performance enhancers and engineered** nutritional food products / ergogenic aids Vitamin and mineral supplements, performance	**1/ 15**

		enhancers, energy boosters, immunity boosters, commercial nutritional foods and fluids, High protein bar production and quality assessment SCP : Single cell proteins Immunity booster production using vitamins, phytocompounds, mineral salts and PUFA Performance enhancers productions using branched chain amino acids and phytocompounds Sports nutrigenomics	
	III	**DIETARY CONSIDERATIONS DURING SPECIAL COMPLICATIONS** Diet and cancer Diet and diabetes Diet and alcoholism (AUD) Dietary considerations during pregnancy Dietary considerations during menopause Childhood Obesity Celiac disease	**1/15**

SEMESTER II

Course Code:RUSOEBTKP.E111

Course Title: PRACTICALS BASED ON FITNESS-II

DETAILED SYLLABUS

Course Code	Course/ Unit Title	Credits
RUSOEBTKP.E111	1. Estimation of Vitamin/s as ergogenic aids from commercial supplements (in cooking oils) . 2. Production of Single cell protein products 3. Estimation of minerals from ergogenic aids 4. Protein estimation from commercial protein supplements 5. Quantitative estimation of commercially available antioxidants 6. Microscopic analysis of various types of starch 7. Microscopic analysis of various types of proteins 8. Visit to Food industry 9. Estimation of steroid/s levels in ergogenic aids 10. Estimation of omega 3/6 from supplements 11. Estimation of narcotics/ drug abuse 12. Estimation of doping molecules in commercial supplements	**1**

MODALITY OF ASSESSMENT

OE

Theory Examination Pattern

Internal assessment -40%- 20 Marks

Sr.No	Evaluation Type	Marks
1	Class test/Assignment	20
	Total Marks	20

B) External examination - 60 %: 30 marks

Semester End Theory Assessment - 30 marks

I. Duration - These examinations shall be of 1 hour duration.

II. Paper Pattern:
1. There shall be 02 questions each of 15 marks. On each unit there will be one question.
All questions shall be compulsory with internal choice within the questions.
2. 60% options will be provided.

Questions	Options	Marks	Questions from
Q1	a. Objectives (1M each) any 3 out of 4 b. Brief Answer(4M each) any 3 out of 4	3 12	Unit 1
Q2	a. Objectives (1M each) any 3 out of 4 b. Brief Answer(4M each) any 3 out of 4	3 12	Unit 2
Q3	a. Objectives (1M each) any 3 out of 4 b. Brief Answer(4M each) any 3 out of 4	3 12	Unit 3

Practical Examination Pattern:

(Semester end practical examination):
50 Marks

PARTICULARS	MARKS
Lab work	40
Journal	5
Viva	5
TOTAL	**50**