

K.S.Rangasamy College of Arts and Science (Autonomous),

Tiruchengode -637215

Department of Biochemistry

Programmes in Elective Course System

UG

Human Physiology (or) Nutritional Biochemistry

Computational Biology (or) Biomedical Instrumentation

PG

Recombinant DNA Technology (or) Food Processing And Quality Control

Molecular Immunology and Immunotechnology (or) Molecular Genetics

Enclosures:

1. Copy of Scheme of Examination.
2. Syllabus Copy of Courses highlighting the Elective Courses

HOD

HEAD

Department of Biochemistry.
*** S R. College of Arts & Science**
TIRUCHENGODE-637 209



PRINCIPAL

K. S. Rangasamy College of Arts & Science
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TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu, INDIA

COE

MR. M. PRASAD M.D., M.B.A., M.Phil.,
Controller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215, Tamilnadu, India.

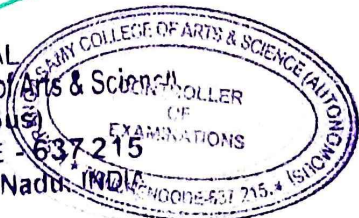
Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Maximum Marks			Credit Points
				CA	CE	Total	
First Semester							
Part I							
18UTALA101/ 18UHILA101/ 18UFRLA101	Tamil I/ Hindi I/ French I	5	3	25	75	100	3
Part II							
18UENLA101	Foundation English I	5	3	25	75	100	3
Part III							
18UBCM101	Core I: Biomolecules	6	3	25	75	100	5
18UCHBCA101	Allied I: Chemistry I	4	3	25	75	100	2
18UBCMP101	Core Practical I: Biomolecules	5	6	40	60	100	3
18UCHBCAP101	Allied Practical I: Volumetric and Organic Analysis	3	3	40	60	100	2
Part IV							
18UVE101	Value Education I: Yoga	2	3	25	75	100	2
Total		30				700	20
Second Semester							
Part I							
18UTALA201/ 18UHILA201/ 18UFRLA201	Tamil II/ Hindi II / French II	5	3	25	75	100	3
Part II							
18UENLA201	Foundation English II	5	3	25	75	100	3
Part III							
18UBCM201	Core II: Biochemical Techniques	6	3	25	75	100	5
18UMBBCA201	Allied II: Microbiology	4	3	25	75	100	2
18UBCMP201	Core Practical II: Biochemical Techniques	5	6	40	60	100	3
18UMBBCAP201	Allied Practical II: Microbiology	3	3	40	60	100	2
Part IV							
18UVE201	Value Education II: Environmental Studies	2	3	25	75	100	2

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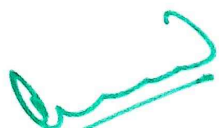


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Total		30			700	20	
Third Semester							
Part I							
18UTALA301/ 18UHILA301/ 18UFRLA301	Tamil III/ Hindi III/ French III	5	3	25	75	100	3
Part II							
18UENLA301	Foundation English III	5	3	25	75	100	3
Part III							
18UBCM301	Core III: Enzymology	4	3	25	75	100	4
18UCSBCA301	Allied III: Computer for Biology	4	3	25	75	100	2
18UBCMP301	Core Practical III: Enzymology	3	6	40	60	100	3
18UCSBCAP301	Allied Practical III: Computer for Biology	2	3	40	60	100	2
Part IV							
18UBCSB301	SBC I: Cell Biology	2	3	25	75	100	2
	NMEC I	2	3	25	75	100	2
Non Credit							
18ULS301	Career Competency Skills I	1	-	-	-	-	-
	Add on Course	2	3	-	-	100	-
Total		30				900	21
Fourth Semester							
Part I							
18UTALA401/ 18UHILA401/ 18UFRLA401	Tamil IV/ Hindi IV/ French IV	5	3	25	75	100	3
Part II							
18UENLA401	Foundation English IV	5	3	25	75	100	3
Part III							
18UBCM401	Core IV: Bioenergetics and Intermediary Metabolism	5	3	25	75	100	5
18UMABCA401	Allied IV: Biostatistics	4	3	25	75	100	2
18UBCMP401	Core Practical IV: Intermediary Metabolism	3	6	40	60	100	3
18UMABCAP401	Allied Practical IV:	2	3	40	60	100	2

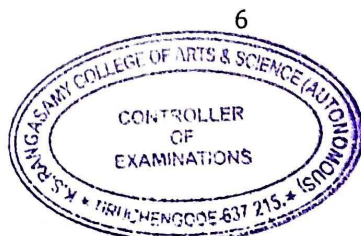
	Statistics (Using MS-Excel)						
Part IV							
18UBCSB401	SBC II: Fundamentals of Biochemical Calculations (100 % Internal Evaluation)	2	3	100	-	100	2
	NMEC II	2	3	25	75	100	2
Non - Credit							
18ULS401	Career Competency Skills II	1	-	-	-	-	-
	Add on Course	1	3	-	-	100	-
Total		30				900	22
ALC*							
Fifth Semester							
Part III							
18UBCM501	Core V: Fundamentals of Immunology	5	3	25	75	100	4
18UBCM502	Core VI: Molecular Biology	5	3	25	75	100	5
18UBCM503	Core VII: Clinical Biochemistry	5	3	25	75	100	5
18UBCM504	Core VIII: Endocrinology	4	3	25	75	100	4
	Elective I	4	3	25	75	100	4
18UBCMP501	Core Practical V: Immunology and Clinical Biochemistry	4	6	40	60	100	3
Part IV							
18UBCSB501	SBC III : Pharmacognosy (100 % Internal Evaluation)	2	3	25	75	100	2
Part V							
18UBCE501	Extension Activity	-	-	-	-		2
Non - Credit							
18ULS501	Career Competency Skills III	1	-	-	-	-	-
Total		30				700	29
ALC *							

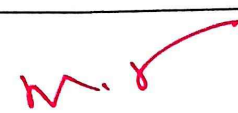


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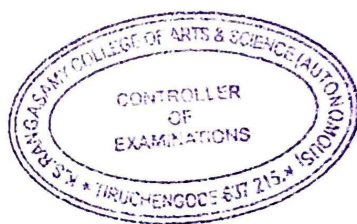



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B.Sc., Biochemistry (Students admitted from 2018- 2019 onwards)

Sixth Semester							
Part III							
18UBCM601	Core IX: Plant Biochemistry	5	3	25	75	100	5
18UBCM602	Core X: Pharmaceutical Biochemistry	5	3	25	75	100	5
18UBCM603	Core XI: Genetic Engineering	5	3	25	75	100	5
	Elective II	4	3	25	75	100	4
18UBCMP601	Core Practical VI: Plant Biochemistry and Genetic Engineering	4	6	40	60	100	3
18UBCPR601	Internship	4	-	40	60	100	4
Part IV							
18UBCSB601	SBC IV : Phytochemistry	2	3	25	75	100	2
Non - Credit							
18ULS601	Career Competency Skills IV	1	-	-	-	-	-
Total		30				700	28
Grand Total						4400	140


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ELECTIVE SUBJECT

The students shall choose any one of the following elective subjects in fifth and sixth semester.

S.No.	Semester	Subject code	Subject
1.	V	18UBCEL501	Human Physiology
2.		18UBCEL502	Nutritional Biochemistry
3.	VI	18UBCEL601	Computational Biology
4.		18UBCEL602	Biomedical Instrumentation

NON MAJOR ELECTIVE COURSE (NMEC)

Non Major Elective Course is conducted for the Students of other Departments.

S.No.	Semester	Course Code	Subject
1.	III	18UBCNM301	Biochemistry in Health and Diseases
2.	IV	18UBCNM401	Functional Biology

ADD-ON COURSE

The students shall study the following Add-on Course during their Third and fourth semesters.

S.No.	Semester	Subject Code	Subject
1.	III	18UBCAC301	Clinical Laboratory Techniques
2.	IV	18UBCAC401	Medical Terminology (For Medical Coding/Medical Transcription)

ADVANCED LEARNER COURSE:

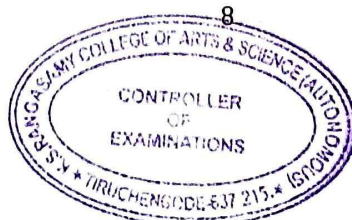
The students shall choose any one of the following Advanced Learner Course during their Fourth and Fifth semester.

S.No.	Semester	Subject Code	Subject
1.	IV	18UBCAL401	Food Biochemistry
2.		18UBCAL402	Bioprocess technology
3.	V	18UBCAL501	Soil Biochemistry
4.		18UBCAL502	Microbial Biochemistry

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FOR COURSE COMPLETION

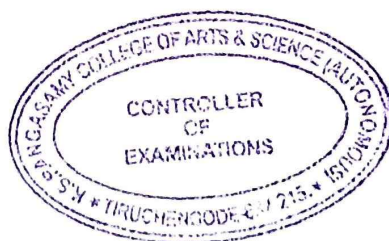
Student shall complete:

- Language subjects (Tamil/Hindi/French, English) in I, II, III and IV semester.
- Value Education: Yoga and Environmental Studies in I and II semester respectively.
- Allied subjects in I, II, III and IV semester.
- Two Add-on Course in III and IV semesters of their course of study.
- Two Non Major Elective Courses in III and IV semesters.
- Four Skill Based Courses in III, IV, V and VI semesters.
- Extension activity in V semester.
- Elective subjects in the V and VI semesters.
- Internship during the VI semester.
- Career Competency Skill in semester III, IV, V and VI.

TOTAL CREDIT DISTRIBUTION

S.No.	PART	Total Marks	Total Credits
1.	PART I: Language	400	12
2.	PART II: Foundation English	400	12
3.	PART III : Major, Allied, Elective, Internship	2800	98
4.	PART IV: Value Education, SBC, NMEC	800	16
5.	PART V: Extension Activity	-	2
TOTAL		4400	140

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18UBCEL501	ELECTIVE I: HUMAN PHYSIOLOGY	SEMESTER - V	
Course Objectives: The Course aims <ul style="list-style-type: none"> To study about the organization and function of human immune system in health and disease. To understand the principle of molecular interactions of immune cells with an antigen. 			
Credits: 4		Total Hours: 40	
UNIT	CONTENTS	Hrs	CO
I	Blood: Composition and functions of blood, blood coagulation- intrinsic and extrinsic pathways. Cardio Vascular system: Anatomy of heart. Cardiac conduction system and cardiac cycle. Blood pressure and control of blood pressure.	8	CO 1
II	Respiratory system: Anatomy of lungs. Diffusion of gases in lungs, transport of oxygen from lungs to tissues through blood, Transport of CO ₂ from tissues to lungs through blood. Muscles: Classification of muscles. Contractile elements of muscle - myosin, actin, tropomyosin and troponin. Physiology of muscle contraction.	8	CO 2
III	Digestive system: Structure and functions of different components of digestive system-stomach, pancreas, liver, gall bladder and intestine. Absorption of carbohydrates, lipids and proteins. Mechanism of HCl formation in stomach. Excretory system: Anatomy and histology of the kidneys, renal physiology - Mechanism of urine formation. Micturition.	8	CO 3
IV	Nervous system: Classification of nervous system. Classification	8	CO 4

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	and structure of neuron. Properties – excitability, conductivity, refractory period. Synapse – classification and function. Neurotransmitters – Excitatory and inhibitory neurotransmitters with special reference to acetylcholine and GABA. Special senses: Eye – Structure of eyeball, Visual process – structure and functions of rods and cones, Wald’s visual cycle.		
V	Reproductive System: Male Reproductive System: Functional anatomy of Testes and other accessory organs. Spermatogenesis. Female Reproductive System: Functional anatomy of primary (ovary) and accessory (uterus, cervix and vagina) organs. Menstrual cycle. Process of ovulation	8	CO 5

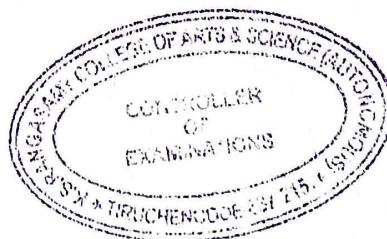
Text Books

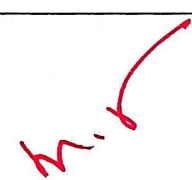
1. *Gerald J. Tortora and Sandra Reynolds.* 2003. **Principles of Anatomy and Physiology.** [Tenth Edition]. John Wiley and Sons. Inc. Pub., New York. (UNIT - I, II).
2. *Sembulingam, K. and Prema Sembulingam.* 2000. **Essentials of Medical Physiology.** [Second Edition]. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi. (UNIT - III, IV & V).

Reference Book

1. *Kathleen, J. W., Wilson, O.B.E. and Anne Waugh.* 1998. **Ross and Wilson Anatomy and Physiology in Health and Illness.** [Eighth Edition]. Churchill Livingston, New York.


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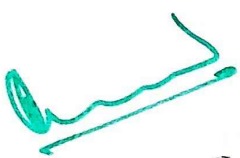


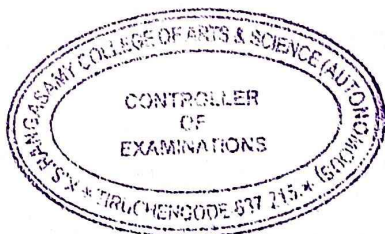

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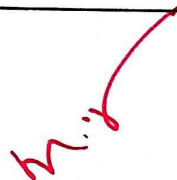
18UBCEL502	ELECTIVE I: NUTRITIONAL BIOCHEMISTRY	SEMESTER - V	
Course Objectives The Course aims <ul style="list-style-type: none"> To enable the learners to understand the major role in the Nutrition and Diet for the maintenance of normal health. 			
Credits: 4		Total Hours: 40	
UNIT	CONTENTS	Hrs	CO
I	Nutrition- Concepts, Role of nutrition in maintaining health. Nutritional problems in India. Food Safety and Standards. Energy -Unit of Energy -kcal, Measurements of energy- Direct and Indirect calorimetry. Definition and factors affecting-Specific Dynamic action (SDA), Respiratory quotient (RQ), Basal metabolic rate (BMR), Body mass index (BMI).	8	CO 1
II	Carbohydrates, Fats, Proteins - Classification, calorific value, recommended daily allowances, Dietary sources. Functions, digestion, absorption, storage and metabolism. Malnutrition: Deficiencies and Over consumption. Obesity- Definition, etiology, complications, prevention and treatment.	8	CO 2
III	Vitamins: Classification. Recommended daily allowances, dietary sources, functions and deficiencies of water and fat soluble vitamins. Minerals: Macro elements - recommended daily allowances, dietary sources, functions and deficiencies of Ca, Mg, Na, P, K, S and Cl. Microelements - recommended daily allowances, dietary sources, functions and deficiencies of Cu, Zn, I, Fe, Mn, Co, Mo, Se, Cr and F. Over consumption and toxicity.	8	CO 3
IV	Diet and Physiological Status: Protein energy malnutrition (PEM) (Kwashiorkor and Marasmus). Human milk and its	8	CO 4

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	viruses, Breast vs formulated milk feeding. Nutritional requirements in pregnancy and lactation. Sports Nutrition (Elementary details).		
V	Food allergy - Definition of Food allergy. Effect of drugs on food. Drug nutrient interactions. Nutritional therapy. Role of diet and nutrition in the prevention and treatment of diseases and various ailments - Diabetes mellitus, cardiovascular diseases, kidney disorders.	8	CO 5
Text Book			
1. Swaminathan, M. 2004. Essentials of Food and Nutrition. The Bangalore Printing and Publishing Co. Ltd., Bangalore.			
Reference Books			
1. Garrow, J. S. and James, W. P. T. 2000. Human Nutrition and Dietetics. [Tenth Edition]. Churchill Livingstone Publishers, UK.			
2. Wong, D. W. S. 1996. Mechanism and Theory in Food Chemistry. CBS, New Delhi.			


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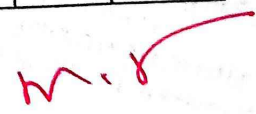



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18UBCEL601		ELECTIVE II: COMPUTATIONAL BIOLOGY	SEMESTER - VI	
Course Objectives				
The Course aims				
<ul style="list-style-type: none"> To enable the learners to understand the basic concept in Bioinformatics 				
Credits: 4			Total Hours: 40	
UNIT	CONTENTS	Hrs	CO	
I	Genomics - Definition. Hierarchical view of genome analysis. Subfields - Definition (structural, functional and comparative genomics). Genome mapping- Definition. Physical mapping. Expressed sequence tags (EST). Gene expression analysis - DNA microarray. DNA polymorphism - Definition. Single nucleotide polymorphism. RFLP and its applications.	8	CO 1	
II	Proteomics - Definition. Protein sequencing - Steps - End group analysis (Edman degradation), cleavage of disulfide bonds, separation, purification and characterization polypeptide chains, amino acid composition, specific peptide cleavage reactions, separation and purification of peptide fragments, sequence determination, ordering the peptide fragments, assignment of disulfide bond positions, peptide sequencing by MS, peptide mapping. Protein expression analysis - 2D PAGE and isoelectric focusing.	8	CO 2	
III	Nucleic acid database: Bioinformatics - Introduction, History and Applications. Internet concepts. Biological Database - types, classification and properties. Sequence Formats - FASTA. Nucleic acid Sequence Database - NCBI - Features and tools. GENBANK - format, divisions and retrieval system. Retrieving Human BRCA1 gene sequence. EMBL and DDBJ.	8	CO 3	


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IV	Protein Database: Protein sequence database - SWISSPROT-format, features and sequence retrieval system. Molecular visualization tools: RasMol, MolMol. Retrieving Human myosin protein sequence. Features of PIR. Protein Structure database - SCOP, CATH and PDB. PDB - Database submission & retrieving tools. Retrieving Human insulin protein structure. Secondary structure prediction - Neural network and Chou-fasman method. Analysis of casein secondary structural features by Chou- fasman method.	8	CO 4
V	Comparative genomics and proteomics: Sequence alignment - Types. Local and Global alignment. Pair wise alignment - BLAST: principle & types. BRCA1 sequence analysis - Principle, methods, applications and similarity search with BLAST. Multiple sequence alignment- CLUSTAL W. Study of similarities - BLOSUM, PAM and Gap (Elementary details).	8	CO 5

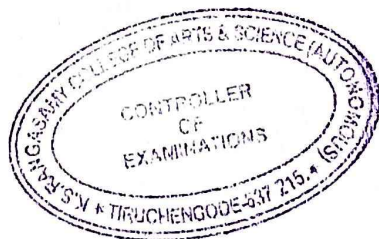
Text Books

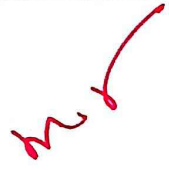
1. *Attwood, T. K. and Parry Smith, D. J.* 2005. **Introduction to Bioinformatics.** [First Edition]. Pearson Education. New Delhi. (UNIT - I, III, IV & V).
2. *Donald Voet and Judith G.Voet.* 1995. **Biochemistry.** [Second Edition]. John Wiley & Sons, Inc. New York. (UNIT - II).

Reference Book


1. *David W. Mount.* 2004. **Bioinformatics: Sequence and Genome Analysis.** CSHL.


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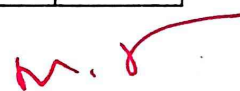



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18UBCEL602	ELECTIVE II: BIOMEDICAL INSTRUMENTATION	SEMESTER - VI	
Course Objectives The Course aims <ul style="list-style-type: none"> To enable the learners to understand the basic concept in Biomedical Instrumentation. 			
Credits: 4		Total Hours: 40	
UNIT	CONTENTS	Hrs	CO
I	Biomedical Instrumentation: Definition, Classification of Biomedical instrumentation, sources of biomedical signals, components, design factors and characteristics. Difficulties in measuring living system.	8	CO 1
II	Electrodes- theory, types-biopotential, microelectrodes, metal plate and needle electrodes. Transducers - types - magnetic induction, piezoelectric, photovoltaic, thermoelectric, strain guage. Sensors.	8	CO 2
III	Biopotential Recorders: Resting and action potential, propagation of action potential, wave forms- ECG, EMG, EEG, EOG, EGG & ERG. Specialized Medical Equipments: X- ray machine, Angiography.	8	CO 3
IV	Physiological assist devices- pace makers, artificial heart valves, defibrillators, nerve and muscle stimulator (Galvanic and interrupted Galvanic current), heart-lung machine-mechanical functions, oxygenators- bubble, film. Kidney machine-hemo and peritoneal dialysis.	8	CO 4
V	Advances in biomedical instrumentation- Lasers, endoscopes-types. Cryogenic surgery. Gamma ray camera,	8	CO 5


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computerized tomography, infrared thermography, ultrasonic imaging, magnetic resonance imaging.		
Text Books		
1. Anandanatarajan, R. 2013. Biomedical Instrumentation and measurements. PHI Learning Pvt., Ltd. New Delhi.		
2. Arumugam, M. 2011. Biomedical Instrumentation. Anuradha publications, Chennai.		
Reference Book		
1. Khandpur, R. S. 1995. Hand book of Biomedical instrumentation. Tata Mc.Graw-Hill publishing company Ltd., New Delhi.		

COURSE OUTCOMES (CO)

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

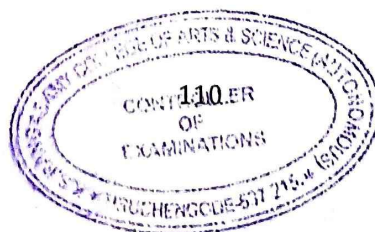
CO1	Explain the classification of biomedical instruments
CO2	Analyze the working of electrodes and transducers
CO3	Relate the principle & working of biopotential recorders
CO4	Tailor on the principles and working physiological assist devices
CO5	Narrate the recent advancements in biomedical instruments

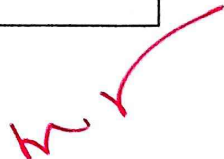
MAPPING

PSO \ CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	H	M	H	H
CO2	L	H	M	H	H
CO3	L	H	M	H	H
CO4	L	H	M	H	H
CO5	L	H	M	H	H

H-High; M-Medium; L-Low


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 K. S. Rangasamy College of Arts & Science
 (Autonomous)
 TIRUCHENGODE - 637 215
 Namakkal-Dt. Tamil Nadu, INDIA




CONTROLLER OF EXAMINATIONS
 K.S. Rangasamy College of Arts & Science (Autonomous)
 Tiruchengode - 637 215, Tamilnadu, India.