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

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Department of Biochemistry.

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K. S. Rangasamy College of Arts & Science
(Autonomous)

TIRUCHENGODE - 637 215

Namakkal-Dt. Tamil Nadu. INDIA

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SCHEME OF EXAMINATION

			Exam	M	Iax Ma	rks	Credit
Subject Code	Subject	Hours of Instruction	Duration (Hours)	CA	CE	Total	Points
		First Semes	ster				
		Part A					
18PBCM101	Core I: Chemistry of Biopolymers	5	3	25	75	100	5
18PBCM102	Core II: Analytical Biochemistry	5	3	25	75	100	5
18PBCM103	Core III: Enzyme Catalysis and Regulation	5	3	25	75	100	5
18PBCM104	Core IV: Molecular Biology	5	3	25	75	100	5
18PBCM105	Core V: Cellular Biochemistry	5	3	25	75	100	5
18PBCMP101	Core Practical I: Analytical Biochemistry and Molecular Biology	4	6	40	60	100	3
		Non Cred	lit				
18PLS101	Career Competency Skills I	1	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	-	-	V -	-
	Total	30			39 3	600	28
W		Second Sem	ester	ukajin mode			
was discounted		Part A					
18PBCM201	Core VI: Intermediary Metabolism and Regulation	6	3	25	75	100	5
18PBCM202	Core VII: Plant Biochemistry	5	3	25	75	100	5
	Elective I	5	3	25	75	100	5
18PBCMP201	Core Practical II: Plant Biochemistry	5	6	40	60	100	3

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COLLEGE OF ARTS & SCIEN

Mr. M. PRASAD, 4.30, M.JA, M. In., Controller : Laminations

K.S. Rangasamy Colleguer A.S. & Science (Autonomous) Tiruchengode - 637 215, Yamilnadu, India,

Online I P							
Optional Paper					T	r	Γ
18PMBBCI201	IDC I: Clinical Microbiology	3	3	25	75	100	2
18PMBBCIP201	IDC Practical I: Clinical Microbiology	3	3	40	60	100	2
18PBTBCI201	IDC I: Plant Tissue Culture Technology	3	3	25	75	100	2
18PBTBCIP201	IDC Practical I: Plant Tissue Culture Technology	3	3	40	60	100	2
		Part B					
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
		Non Credi	t				
18PLS201	Career Competency Skills II	1	-	-	-	-	_
	Total	30				700	24
		Third Semes	ter				
		Part A		and the second			700
18PBCM301	Core VIII: Clinical Biochemistry	6	3	25	75	100	5
18PBCM302	Core IX: Biostatistics and Research Methodology	5	3	25	75	100	4
	Elective II	5	3	25	7 5 .	. 100	5
18PBCMP301	Core Practical III: Clinical Biochemistry	6	6	40	60	100	3
18PBCMP302	Core Practical IV: Statistical Software	2	3	40	60	100	2

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K. S. Rangasamy College of Arts & Science (Autonomous)

TIRUCHENGODE - 637215 Namakkal-Dt. Tamil Nadu. INDIA



Mr. M. PRASAD, MSc., M.B.A., M.Phil.,

K.S. Rangarany College of the * Edience (Autonomics)
Thruchengode - 637 215. Tamilinadu, Incl.:

Optional Papers	•						
18PMBBCI301	IDC II: Industrial Microbiology	3	3	25	75	100	2
18PMBBCIP301	IDC Practical II: Industrial Microbiology	3	3	40	60	100	2
18PBTBCI301	IDC II: Animal Tissue Culture Technology	3	3	25	75	100	2
18PBTBCIP301	IDC Practical II: Animal Tissue Culture Technology	3	3	40	60	100	2
•	Total	30				700	23
		Fourth Semes	ster		است		
		Part A	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
18PBCM401	Core X: Human Physiology and Neuroscience	5	3	25	75	100	4
18PBCM402	Core XI: Hormonal Biochemistry and Biochemical Pharmacology	5	3	25	75	100	5
18PBCPR401	Project & Viva- Voce	6	-	50	150	200	6
	Total	16				400	15
				Gran	d Tota	1 2400	90

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KS. Rangasamy College of Aris & Science (Autonomous)

Tiruchengode - 637 215. Tamilnadu. India.

ELECTIVE SUBJECT

The students shall choose any one of the following subjects as Elective I and II in the Second and Third semesters respectively.

ELECTIVE I

S.No	Semester	Subject code	Subject
1.		18PBCEL201	Recombinant DNA Technology
2.	Second	18PBCEL202	Food Processing And Quality Control

ELECTIVE II

S.No	Semester	Subject code	Subject
1.	Third	18PBCEL301	Molecular Immunology and Immunotechnology
2.		18PBCEL302	Molecular Genetics

FOR COURSE COMPLETION

Student shall complete:

- Value Education: Human Rights in II semester.
- IDC in II and III semester.
- Elective subjects in II and III semesters.
- Project & Viva-Voce in IV semester.
- Career Competency Skills in I and II semester.

TOTAL MARKS AND CREDIT DISTRIBUTION

s.NO			CREDITS
1.	PART A: Core subjects, Elective, IDC and Project	2300	88
2.	PART B: Value Education	100	2
	TOTAL	2400	90

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18PBCEL201

ELECTIVE I: RECOMBINANT DNA TECHNOLOGY

SEMESTER-II

Course Objectives:

The Course aims

- To understand the concept of rDNA technology and to acquire a comprehensive knowledge about the cloning and expression strategies.
- To apply the recent advances in gene manipulation to enhance existing ones or produce a new product.

Credits	Credits: 5 Total Hours: 50					
UNIT	CONTENTS	Hrs	СО			
	Techniques of Gene manipulation: Isolation and purification of		n			
	Nucleic Acids. Agarose Gel Electrophoresis, Southern, Northern					
	and Western hybridization. Preparation of nucleic acid probes -					
	radioactive and non-radioactive labelling. PCR - principle,					
	types (Inverse, RT, anchored and real time quantitative PCR)					
ī	and applications. DNA sequencing- Sanger's and Maxam&	10	CO1			
1	Gilbert methods.	10	COI			
	Enzymes involved in genetic manipulation: Restriction					
	endonuclease (nomenclature, types, recognition sites,		4			
	applications), DNA Ligase, Alkaline phosphatase, Reverse					
	transcriptase, Nuclease, Terminal transferase, Polynucleotide					
	kinase.					
14.	Vectors used in gene cloning: Plasmid vectors - General					
	features, properties of natural (Ti plasmid), artificial (pBR -					
11	pBR322 & pBR327 and pUC -7, 8 vectors). Bacteriophage vectors	10	CO2			
II	- life cycle, Lamda phage (charon 4A and λgt WES λB) and M13	10	CO2			
	vectors (mp 1), Cosmids (PHC 79), phagemids. BAC. Yeast	*				
	Vectors vectors based on 2µm circle and YAC. Shuttle vectors.					

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TIRUCHENGODE - 637 215

Namakkal-Dt, Tamil Nadu, INDIA

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III	Gene transferring methods and Cloning strategies: Introduction of DNA into cells – chemical (Ca-phosphate precipitation, PEG & DEAE dextran mediated transformation) and physical methods (Microinjection, biolistic transformation, liposome mediated, electroporation). Construction and screening of genomic DNA and cDNA libraries. Selectable markers & reporter genes. Identification & selection of recombinants- insertional inactivation, south-western screening for DNA binding protein, colony hybridization, plus-minus screening, HRT and HART.	10	CO3
IV	Expression vectors: expression cassettes, Promoters-strong and regulatable promoters. Maximizing the expression of cloned genes. Maximizing gene expression systems in <i>E.coli</i> , yeast, insect cell and mammalian cells. Problems caused in expression of eukaryotic genes in prokaryotic host.DNA finger printing. Gene therapy- Somatic cell gene therapy, Germ cell gene therapy. <i>Ex vivo</i> gene therapy-ADA deficiency, Cystic fibrosis and Lesch-Nyhan syndrome.	10	CO4
V	Production of transgenic plants: Plant transformation using Viral vectors and Agrobacterium. Applications of transgenic plants- insect resistance, virus resistance, herbicide resistance, stress tolerant, Plants as bioreactors- antibodies. Genetic engineering of fruit ripening. Transgenic plants with improved nutrition-Golden rice. Transgenic animals-methods of production- retroviral, microinjection & ES cell methods. Applications of transgenic animals – transgenic animals as disease models, animal bioreactors, pharming animals. Bioethics: Definition, need of Bioethics. Applications of	10	COS

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K.S. Rangasamy College of Aut. & Science (Autonomous)

Tiruchengode - 637 215, Tamilhadi... India.

1	Bioethics.	Introduction	To Intellectual Property: IPR -	
	Definition,	Other forms	of IPR - Copyright - Trademark -	
	Designs.			

Text Books

- 1. Bernard R.Glick and Jack J.Pasternak. 2007. Molecular Biotechnology. Principles and Applications of Recombinant DNA.[Third edition]. ASM press. Washington.
- 2. Ernst-L. Winnacker. 1987. From Genes to clones, Introduction to gene technology.
- 3. Sandy B. Primrose, Richard M. Twyman and Robert W. Old. 2001. Principles of Gene Manipulation. [Sixth Edition]. Blackwell Science, USA.
- 4. Satheesh, M. K. 2011. Bioethics and Biosafety. I.K. International, New Delhi.

Reference Books

- Joseph Sambrook and David William Russel. 2001. Molecular Cloning: A Laboratory Manual, Vol. 1, 2 and 3. [Third Edition]. Cold Spring Harbor Laboratory Press, New York.
- Smita Rastogi and Neelam Pathak. 2010. Genetic Engineering. Oxford University press, New york.

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(Autonomous)

TIRUCHENGODE - 637 215 Namakkal-Dt. Tamil Nadu, INDIA CONTROLLER

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Mr. M. PRATID, Misc., M.J.A., M.Phil.,
Control of Examinations
KS. Rangasany College of Arts & Science (Authorities)
Tiruchengode - 637 215. Tamilnadu. Incid.

40DD CET 000	ELECTIVE 1 : FOOD PROCESSING AND	CEMECTED II
18PBCEL202	QUALITY CONTROL	SEMESTER-II

Course Objectives:

The Course aims

- To make the students to understand the biochemical processes of food and the role of Food additives and colors in food.
- To get an insight to become an entrepreneur.

Credits	Credits: 5 Total Hours: 50				
UNIT	CONTENTS	Hrs	СО		
I	Food Processing: Scope and importance; historical developments; High temperature processing - thermal (cooking, blanching, pasteurization, sterilization, evaporation and dehydration). Low temperature processing - refrigeration (changes of foods during refrigeration storage), freezing.	10	CO1		
II	Food Preservation: Importance, principles, methods – temporary, permanent. Preservation by salting, sugar (jam), chemicals, drying, antibiotics and irradiation, cold, use of heat. Food additives: Definition, antioxidants, emulsifiers, sweeteners, colours, flavours.	10	CO2		
III	Food Storage: Refrigeration storage: requirements of refrigeration storage, refrigeration load, chilling and refrigeration, cold storage. Freezing and frozen storage: freezing curves, slow and quick freezing, factors determining freezing rate, freezing methods, changes in food during freezing, frozen food storage and freeze drying in food processing.	10	CO3		
IV	Evaluation of Food Quality: Sensory Evaluation of Foods-Appearance, colour, flavour, odour, taste, mouth feel. Types of tests-difference tests-paired comparison test, rating test-ranking test, sensitivity threshold test, descriptive test.	10	CO4		

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Tiruchengode - 657 215. Tamilhadu, Inc.a.

M.Sc., Biochemistry (Students Admitted from 2018 – 2019 onwards)

	Objective evaluation-Definition, advantage and disadvantages. Test for objective evaluation.		
v	Food Laws and Standards: Prevention of food adulteration act, standard- ISI, Agmark. HACCP- microbiological, chemical and physical hazards, steps in HACCP, critical limits for control measures.	10	CO5

Text Book

Hosahalli Ramaswamy and Michele Marcotte. 2009. Food processing - Principles 1. and Applications. Taylor & Francis group, New York.

Reference Books

- Manoranjan Kalia and Sangeetha Sood. 1999. Food Preservation and Processing. 1. Kalyani Publishers, New Delhi.
- Sreelakshmi. B. 1997. Food Science. New Age International Pvt. Ltd., New Delhi. 2. Sunetra Roday. 2011. Food hygiene and sanitation. Tata McGraw Hill Education,

3. Pvt. Ltd., New Delhi.

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K.S. Rangasamy College of Arts 1 Julence (Autonomors) Tiruchengode - 637 215. Tamilnadu. Inola.

ELECTIVE I: RECOMBINANT DNA SEMESTER-II **18PBCEL201 TECHNOLOGY**

Course Objectives:

The Course aims

- To understand the concept of rDNA technology and to acquire a comprehensive knowledge about the cloning and expression strategies.
- To apply the recent advances in gene manipulation to enhance existing ones or produce a new product.

Credits	Credits: 5 Total Hours: 50				
UNIT	CONTENTS	Hrs	CO		
	Techniques of Gene manipulation : Isolation and purification of				
	Nucleic Acids. Agarose Gel Electrophoresis, Southern, Northern				
	and Western hybridization. Preparation of nucleic acid probes -				
	radioactive and non-radioactive labelling. PCR - principle,				
	types (Inverse, RT, anchored and real time quantitative PCR)				
-	and applications. DNA sequencing- Sanger's and Maxam&	10	CO1		
I	Gilbert methods.				
	Enzymes involved in genetic manipulation: Restriction				
	endonuclease (nomenclature, types, recognition sites,	i di			
,5	applications), DNA Ligase, Alkaline phosphatase, Reverse transcriptase, Nuclease, Terminal transferase, Polynucleotide	1887	7		
	kinase.				
	Vectors used in gene cloning: Plasmid vectors - General		*		
	features, properties of natural (Ti plasmid), artificial (pBR -				
77	pBR322 & pBR327 and pUC -7, 8 vectors). Bacteriophage vectors	10	CO2		
II	- life cycle, Lamda phage (charon 4A and λgt WES λB) and M13				
	vectors (mp 1), Cosmids (PHC 79), phagemids. BAC. Yeast				
	Vectors vectors based on 2µm circle and YAC. Shuttle vectors.				

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III	Gene transferring methods and Cloning strategies Introduction of DNA into cells – chemical (Ca-phosphate precipitation, PEG & DEAE dextran mediated transformation) and physical methods (Microinjection, biolistic transformation, liposome mediated, electroporation). Construction and screening of genomic DNA and cDNA libraries. Selectable markers & reporter genes. Identification & selection of recombinants- insertional inactivation, south-western screening for DNA binding protein, colony hybridization, plus-minus screening, HRT and HART.	10	CO3
IV	Expression vectors: expression cassettes, Promoters-strong and regulatable promoters. Maximizing the expression of cloned genes. Maximizing gene expression systems in <i>E.coli</i> , yeast, insect cell and mammalian cells. Problems caused in expression of eukaryotic genes in prokaryotic host.DNA finger printing. Gene therapy- Somatic cell gene therapy, Germ cell gene therapy. <i>Ex vivo</i> gene therapy-ADA deficiency, Cystic fibrosis and Lesch-Nyhan syndrome.	10	CO4
v	Production of transgenic plants: Plant transformation using Viral vectors and Agrobacterium. Applications of transgenic plants- insect resistance, virus resistance, herbicide resistance, stress tolerant, Plants as bioreactors- antibodies. Genetic engineering of fruit ripening. Transgenic plants with improved nutrition-Golden rice. Transgenic animals-methods of production- retroviral, microinjection & ES cell methods. Applications of transgenic animals – transgenic animals as disease models, animal bioreactors, pharming animals. Bioethics: Definition, need of Bioethics. Applications of	10	CO5

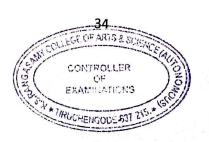
PRINCIPAL

K. S. Rangasamy College of Arts & Science

(Autonomous)

TIRUCHENGODE - 637 215

Namakkal-Dt. Tamil Nadu. INDAA



Mr. Mr. PRASIND Hillor, et.d.A., M.Phil.,
Gormanier of C.-Lande et ens
KS. Pergestry College State & Science (Autonorus)
Truchengodo - 637 215. Tamilhady, India

Bioethics.	Introduction	To	Intellectual	Property:	IPR	-	
Definition,	Other forms	of I	PR - Copyri	ght - Trade	emark	-	
Designs.							

Text Books

- **1.** Bernard R.Glick and Jack J.Pasternak. 2007. **Molecular Biotechnology**. Principles and Applications of Recombinant DNA.[Third edition]. ASM press. Washington.
- 2. Ernst-L.Winnacker. 1987. From Genes to clones, Introduction to gene technology.
- 3. Sandy B. Primrose, Richard M. Twyman and Robert W. Old. 2001. Principles of Gene Manipulation. [Sixth Edition]. Blackwell Science, USA.
- **4.** *Satheesh, M. K.* 2011. **Bioethics and Biosafety**. I.K. International, New Delhi.

Reference Books

- Joseph Sambrook and David William Russel. 2001. Molecular Cloning: A Laboratory Manual, Vol. 1, 2 and 3. [Third Edition]. Cold Spring Harbor Laboratory Press, New York.
- **2.** *Smita Rastogi and Neelam Pathak.* 2010. **Genetic Engineering**. Oxford University press, New york.

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TIRUCHENGODE - 637 215

Namakkal-DI, Tamil Nadu, INDIA



iver. M. PRASAD, M.Sc., M.B.A., M.Phil.,
Controller of Examinations
KS. Rangasany College clarks & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

ELECTIVE II: FOOD PROCESSING AND SEMESTER-II **18PBCEL202 QUALITY CONTROL**

Course Objectives:

The Course aims

- To make the students to understand the biochemical processes of food and the role of Food additives and colors in food.
- To get an insight to become an entrepreneur.

Credits	Credits: 5 Total Hours: 50				
UNIT	CONTENTS	Hrs	со		
I	Food Processing: Scope and importance; historical developments; High temperature processing - thermal (cooking, blanching, pasteurization, sterilization, evaporation and dehydration). Low temperature processing - refrigeration (changes of foods during refrigeration storage), freezing.	10	CO1		
II	Food Preservation: Importance, principles, methods – temporary, permanent. Preservation by salting, sugar (jam), chemicals, drying, antibiotics and irradiation, cold, use of heat. Food additives: Definition, antioxidants, emulsifiers, sweeteners, colours, flavours.				
III	Food Storage: Refrigeration storage: requirements of refrigeration storage, refrigeration load, chilling and refrigeration, cold storage. Freezing and frozen storage: freezing curves, slow and quick freezing, factors determining freezing rate, freezing methods, changes in food during freezing, frozen food storage and freeze drying in food processing.	10	CO3		
IV	Evaluation of Food Quality : Sensory Evaluation of Foods-Appearance, colour, flavour, odour, taste, mouth feel. Types of tests-difference tests-paired comparison test, rating test-ranking test, sensitivity threshold test, descriptive test.		CO4		

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TIRUCHENGODE - 637 215 Namakkal-Dt, Tamil Nadu, INDIA

37 OLLEGE OF ARTS & ST EXAMINATIONS * TIRUCHENGODE-631 215.*

Mr. M. PRASAD 4 30, M.B.A., M. P.III., Controller or Examinations K.S. Rangasarny College of Auts 3. Science (Autonomous) Tiruchengode - 637 215, Tamilnadu, Inc. i.

M.Sc., Biochemistry (Students Admitted from 2018 - 2019 onwards)

	Objective evaluation-Definition, advantage and disadvantages.		
	Test for objective evaluation.		
	Food Laws and Standards: Prevention of food adulteration act,		
v	standard- ISI, Agmark. HACCP- microbiological, chemical and	10	CO5
	physical hazards, steps in HACCP, critical limits for control	10	
	measures.		

Text Book

Hosahalli Ramaswamy and Michele Marcotte. 2009. Food processing - Principles and Applications. Taylor & Francis group, New York.

Reference Books

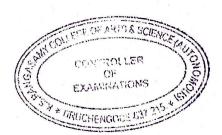
- Manoranjan Kalia and Sangeetha Sood. 1999. Food Preservation and Processing.

 1. Kalyani Publishers, New Delhi.
- 2. Sreelakshmi. B. 1997. Food Science. New Age International Pvt. Ltd., New Delhi.
- Sunetra Roday. 2011. Food hygiene and sanitation. Tata McGraw Hill Education, 3. Pvt. Ltd., New Delhi.

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Mr. M. PRASAD, M.Sc., m.S.A., M.Phil., Confinition of Commingtons K.S. Rangasony Cologo of Am & Science (Autonomous) Thruchengodo - 637, 215. Tamilnadu. India.