NEHRU ARTS AND SCIENCE COLLEGE

(Autonomous)

Reaccredited by NAAC with 'A' Grade, Certified by ISO 9001:2008 &14001:2004
Recognized by UGC & Affiliated to Bharathiar University
Nehru Gardens, Coimbatore-641 105

Scheme of Examination

B. Sc. Biotechnology

(Applicable to the students admitted during the academic year 2020-2021 onwards)

Semester	Part	Course Code	Name of the Course	Instruction hours / week	Duration of Examination	Examination Marks			Credits
						CIA	ESE	Total	
I	I	18U1TAM101 18U1HIN101 18U1MAL101 20U1FRN101	Language – I	5	3	25	75	100	4
	II	20U2ENG101	English – I	5	3	25	75	100	4
	III	18U3BTC101	Core Paper – I Cell Biology and Histology	4	3	25	75	100	4
		18U3BTC102	Core Paper – II Biotechniques and Instrumentation	4	3	25	75	100	4
		19U3BTP204	Core Paper – IV Biotechniques and Microbiology Practical	3	-	-	-	-	-
		18U3BTA101	Allied Paper – I Chemistry – I	4	3	20	55	75	3
		18U3BTR203	Allied Paper – III Chemistry Practical	2	-	-	-	-	-
	IV	18U4ENV101	Ability Enhances Compulsory Course - Environmental Studies	2	3	-	50	50	2
		18U4HVY201	Human Excellence-Human Values and Yoga Practice – I	1	-	-	-	-	-
				30				**525**	**21**
II	I	18U1TAM202 18U1HIN202 18U1MAL202 20U1FRN202	Language – II	5	3	25	75	100	4
	II	20U2ENG202	English – II	5	3	25	75	100	4
	III	18U3BTC203	Core Paper – III Fundamentals of Microbiology	4	3	25	75	100	4
		19U3BTP204	Core Paper – IV Biotechniques and Microbiology Practical	5	3	40	60	100	4
		18U3BTA202	Allied Paper – II Chemistry – II	4	3	20	55	75	3
		18U3BTR203	Allied Paper – III Chemistry Practical	4	3	20	30	50	2
	IV	18U4HRC202	Value Education – Human Rights and Constitution of India	2	3	-	50	50	2
		18U4HVY201	Human Excellence-Human Values and Yoga Practice – I	1	2	25	25	50	2
				30				**625**	**25**

III	I	20U1TAM303 19U1HIN303 20U1MAL303 20U1FRN303	Language – III	5	3	25	75	100	4
	II	20U2ENG303	English – III	5	3	25	75	100	4
	III	19U3BTC305	Core Paper – V Biochemistry and Metabolism	4	3	25	75	100	4
		19U3BTP407	Core Paper – VII Biochemistry and Human Physiology Practical	3	-	-	-	-	-
		18U3BTA304	Allied Paper – IV Programming in C	3	3	20	55	75	3
		18U3BTR406	Allied Paper – VI C- Programming Practical	2	-	-	-	-	-
	IV	19U4BTS301	Skill Based Paper – I Human Physiology and Disorders	3	3	20	55	75	3
	IV	19U4NM3BT1 / 19U4NM3AT1 / 19U4NM3CAF / 19U4NM3GTS / 19U4NM3WRT	# @Basic Tamil / ##Advanced Tamil / * NME: Consumer Affairs / Gandhian Thoughts / Women's Rights	2	2	50		50	2
		18U4BT3ED1/ 18U4BT3ED2	Extra Departmental Course	2	3	-	50	50	2
		18U4HVY402	Value Education – Human Values and Yoga Practice – II	1	-	-	-	-	-
		19U4BTVALC	**Skill Enhancement Add on course-Institute Industry Linkage	-	-	-	-	-	-
				30				**550**	**22**
IV	I	20U1TAM404 19U1HIN404 20U1MAL404 20U1FRN404	Language – IV	5	3	25	75	100	4
	II	20U2ENG404	English – IV	5	3	25	75	100	4
	III	18U3BTC406	Core Paper –VI Biosafety & IPR	4	3	25	75	100	4
		19U3BTP407	Core Paper – VII Biochemistry and Human Physiology Practical	4	3	40	60	100	4
		20U3BTA405	Allied Paper –V Biostatistics	3	3	20	55	75	3
		18U3BTR406	Allied Paper – VI C- Programming Practical	2	3	20	30	50	2
	IV	19U4BTS402	***Skill Based Paper – II Bioinformatics and Computational Biology	4	3	20	55	75	3
		19U4NM4BT2 19U4NM4AT2 19U4NM4GEN	# @Basic Tamil / ##Advanced Tamil / General Awareness	2	3	50		50	2
		18U4HVY402	Value Education – Human Values and Yoga Practice – II	1	2	25	25	50	2
		19U4BTVALC	**Skill Enhancement Add on course-Institute Industry Linkage	-	-	-	-	-	Grade
				30				**700**	**28**
V	III	18U3BTC508	Core Paper –VIII Microbial Biotechnology	5	3	25	75	100	4
		19U3BTC509	Core Paper – IX Immunology	5	3	25	75	100	4
		20U3BTC510	Core Paper – X	5	3	25	75	100	4

			Recombinant DNA Technology						
		19U3BTP613	Core Paper – XIII Microbial, Plant & Animal Biotechnology Practical	4	-	-	-	-	-
		18U3BTP614	Core Paper – XIV Immunology & rDNA Technology Practical	4	-	-	-	-	-
		20U3BTE501/ 20U3BTE 502/ 20U3BTE 503	Discipline Specific Elective Paper – I	4	3	25	75	100	4
	IV	18U4BTS503	Skill Based Paper – III Molecular Biology	3	3	20	55	75	3
				30				**475**	**19**
VI	III	18U3BTC611	Core Paper – XI Plant Biotechnology	5	3	25	75	100	4
		18U3BTC612	Core Paper – XII Animal Biotechnology	5	3	25	75	100	4
		19U3BTP613	Core Paper – XIII Microbial, Plant and Animal Biotechnology Practical	4	6	40	60	100	4
		18U3BTP614	Core Paper – XIV Immunology and rDNA Technology Practical	4	6	40	60	100	4
		20U3BTE604/ 20U3BTE 605/ 20U3BTE 606	Discipline Specific Elective Paper – II	4	3	25	75	100	4
		20U3BTE607 / 20U3BTE608/ 20U3BTE609	Discipline Specific Elective Paper – III	4	3	25	75	100	4
	IV	18U4BTS604	Skill Based Paper –IV Pharmacology	4	3	20	55	75	3
	V	19U5EXT601	Extension Activities	-	-	50	-	50	2
				30				**725**	**29**
Total								**3600**	**144**

LIST OF DISCPLINE SPECIFIC ELECTIVE PAPERS:

Elective	Course Code	Group	Name of the Course
Elective – I	18U3BTE501	A	Biotechnology and Food Safety
	19U3BTE607 / 20U3BTE502	B	Medical Biotechnology
	19U3BTE604 / 20U3BTE503	C	Agricultural Biotechnology
Elective – II	19U3BTE502 / 20U3BTE604	A	Food Processing Technology
	19U3BTE608 / 20U3BTE605	B	Molecular Modeling and Drug Design
	18U3BTE605 / 20U3BTE606	C	Bioremediation
Elective – III	19U3BTE503 / 20U3BTE607	A	Quality Control and Assurance
	18U3BTE609 / 20U3BTE608	B	Stem Cell Research
	18U3BTE606 / 20U3BTE609	C	Nanoscience and Technology

 # Basic Tamil -Students who have not studied Tamil upto 12th standard.

##**Advanced Tamil** – Students who have studied Tamil language upto 12^{th} / 10^{th} standard and have chosen other languages under part I of the programme but would like to advance their Tamil language skills.

*** NME** – Students shall choose any one course out of three courses.

@ No End Semester Examinations. Only Continuous Internal Assessment (CIA)

$ Not included in CGPA calculation

** Examination and Evaluation for Value Added Course shall be conducted by the Industry and the marks shall be submitted to the CoE section for the award of Grade

Extra Departmental Course offered by Biotechnology Department to other Department students

S. No.	Semester	Course Code	Name of the Course
1	III	18U4BT3ED1	Apiculture
2		18U4BT3ED2	Organic Terrace Farming

Additional Credit Course

Earning Additional credit course is not mandatory for Course Completion

Additional credits: 8

S. No.	Course	Credit/ Course	Total Credits
1	Completion of Certificate Course	1	1
2	Hindi/ other Foreign languages	1	1
3	Self Study Papers	1	2
4	MOOC Courses/Spoken Tutorial prescribed by the Departments	1	3
5	Representation - Sports/ Social Activities/ Co curricular/ Extracurricular Activities at University/ District/ State/ National/ International levels	1	1
		Total	8

Rules: The Students can earn additional credits only if they complete the above during the course period (II to V Sem.) and based on the following criteria. Proof of Completion must be submitted to the Office of Controller of Examinations before the commencement of the VI Semester. (Earning Additional credit course is not mandatory for Course Completion).

1. Students can complete Certification Courses for a minimum of 30hrs (II to V Sem. only) from reputed centers and the same certificate shall be produced to earn a credit. They shall be guided by the Department if needed.
2. Students can opt Hindi/ any Foreign Language approved by Certified Institutions to earn one credit. The certificate of Hindi must be obtained from Dakshin Bharat Hindi Prachar Sabha and He/She has to enroll and complete during their course period (II to V Sem only).
3. Students can earn one credit, if they complete one self study Paper prescribed by the Department. The Departments shall offer two Self Study Papers.
4. Students can earn one Credit, if they complete any one MOOC courses/ Spoken Tutorial prescribed by the Department. Students shall earn a maximum of 3 Additional Credits by completing 3 online courses.

Self Study Paper offered by Biotechnology Department

S. No.	Semester	Course code	Course Title
1	Semester II to V	18UBTSS01	Hematology
2		18UBTSS02	Histology

5. Award Winners in Sports/Social Activities/ Co curricular/ Extra Curricular Activities at University/ District/ State/ National/ International levels can earn One Extra Credit by producing the Certificate.

Chairman
Board of Studies in Biotechnology
Nehru Arts and Science College
Coimbatore

Programme Outcomes

PO1. Knowledge: Graduates will gain and apply knowledge of Biotechnology, Science concepts to solve problems related to field of Biotechnology

PO2. Critical Thinking: To deepen the students' knowledge and expertise to perform experiments in current biotechnology and allied fields

PO3. Communication: Communicate effectively on bioscience activities with the science community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO4. Social Interaction: Apply reasoning up to date by the appropriate knowledge to assess societal, legal and cultural issues and the subsequent tasks relevant to the science observation

PO5. Ethics: Apply ethical principles and commit to specialized ethics and responsibilities and norms of the science practice.

PO6. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO7. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of scientific change.

Programme Specific Outcomes

PSO1 Demonstrate proficiency in basic science and foundation biotechnology courses

PSO2 To develop an entrepreneur skill using their practical and theoretical knowledge

PSO3 To become an efficient researcher using practical skills

PSO4 Demonstrate a working knowledge of advanced biological sciences

PSO5 To make them capable in decision making at personal and specialized level

विषय क्रमांक	शीर्षक		
18U1HIN101	**भाग–I हिंदी**		
सत्र : I	**क्रेडिट श्रेय : 4**	**CIA: 25 Marks**	**ESE: 75Marks**

(Common to all UG Programmes)

कोर्स लक्ष्य : छात्र–छात्राओं में राष्ट्रीय भावना का विकास करना तथा राष्ट्रभाषा हिंदी एवं उससे संबंधित साहित्य की जानकारी प्रदान करना

कोर्स परिणाम :

1. सामाजिक, सांस्कृतिक और राजनैतिक परिवेश से छात्र. साहित्य के माध्यम से बोधवान होंगे।
2. व्याकरण के शिक्षण के माध्यम से छात्रों में शुद्ध भाषा में बोलने की क्षमता को विकसित होगी।
3. अंतर्राष्ट्रीय भाषा अंग्रेज़ी से राष्ट्रभाषा हिंदी में सामग्री का अनुवाद करके छात्र हिंदी की ज्ञान संपदा बढ़ाने में कामयाब होंगे।
4. विविध अनुशासनों में अनुवादों को सुचारु बनाने के लिए पारिभाषिक शब्दावली का ज्ञान होगा।

के द्वारा दिया गया अध्ययन विषयवस्तु : हिंदी

निर्देशात्मक घंटे / सप्ताह : 05

इकाई	विवरण	
I	लडाई–सर्वश्वरदयाल सक्सेना	
	निर्देशात्मक घंटे	**20**
II	एकांकी संग्रह – 1. शिवाजी का सच्चा स्वरूप (सेठ गोविन्ददास) 2. माँ (विष्णु प्रभाकर) 3. घोंसले 4. रीढ़ की हड्डी (जगदीशचन्द्र माथुर) 5. दूसरा दिन (कंचलता सब्बरलाल)	
	निर्देशात्मक घंटे	**20**
III	व्याकरण : संज्ञा, सर्वनाम, विशेषण, क्रिया, वचन, लिंग, काल, वाच्य, प्रत्यय, उपसर्ग, 'ने' का प्रयोग	
	निर्देशात्मक घंटे	**15**
IV	अनुवाद : अंग्रेज़ी–हिंदी (अनुवाद अभ्यास–3) (1-15)	
	निर्देशात्मक घंटे	**10**
V	पारिभाषिक शब्दावली	
	निर्देशात्मक घंटे	**10**
	कुल घंटे	**75**

पाठ्यपुस्तक:

1. **लडाई** : सर्वेश्वरदयाल सक्सेना
2. **एकांकी संग्रह**
3. **अनुवाद अभ्यास**–३, दक्षिण भारत हिंदी प्रचार सभा, चेन्नै–17
4. आलेखन व टिप्पणी

संदर्भ ग्रंथ :

1. डॉ. एन.ई. विश्वनाथ अय्यर, **अनुवाद कला,** पब्लिशर, संस्करण 2000
2. भोलानाथ तिवारी, **अनुवाद विज्ञान,** संस्करण 2000
3. रामदेव, **व्याकरण प्रदीप**। प्रकाशन : हिंदी भवन, 36, टागौर टाउन, इलहाबाद –2
4. **नूतन गद्य संग्रह**, सुमित्रा प्रकाशन, सुमित्रा निवास, 16/4 हास्टिंग्स रोड, इलहाबाद –211 001. संस्करण 2006

आकलन के लिए उपयुक्त अंक (25 अंक)

सीआईए. I	सीआईए. II	सीआईए. II	असाईनमेंट	संगोष्ठी	उपस्थिति	कुल
5	5	6	3	3	3	25

पाठ्यक्रम द्वारा डिज़ाइन किया गया	एच.ओ.डी. द्वारा सत्यापित	के द्वारा जांचा गया	द्वारा अनुमोदित
R. Swarnalatha 13/8/21 (R. Swarnalatha)	R. Swarnalatha 13/8/21 (R. Swarnalatha)	Dr.K.Selvaniayaki Convenor CDC	14 AUG 2021

विषय क्रमांक	शीर्षक		
18U1HIN202	**भाग–I हिंदी**		
सत्र : II	**क्रेडिट : 4**	CIA:25 Marks	ESE:75 Marks

(Common to all UG Programmes)

कोर्स लक्ष्य : भारतीयता की साहित्य के माध्यम से पहचान कराना। कहानी के माध्यम से समकालीन समय के सच की पहचान कराना। हिंदी से अंग्रेज़ी में अनुवाद के माध्यम से भारतीय ज्ञान संपदा को अंतर्राष्ट्रीय स्तर तक पहुँचाने में छात्र को समर्थ बनाना। दैनन्दिन की बातचीत में हिंदी का निर्बाध प्रयोग करने में छात्र को सक्षम बनाना।

कोर्स परिणाम :

1. छात्रों में साहित्यिक अभिरुचि के साथ सामाजिक बोध बढ़ेगा। पत्राचार के क्षेत्र में वे स्वावलम्बी हो सकेंगे।
2. भारतीय भाषा के ज्ञान को विदेश तक पहुँचाने के क्षेत्र में क्षमता हासिल करेंगे।
3. राष्ट्रभाषा हिंदी से अंतर्राष्ट्रीय भाषा अंग्रेज़ी में सामग्री का अनुवाद करके छात्र हिंदी की ज्ञान संपदा बढ़ाने में कामयाब होंगे।
4. रोज़मरा जीवन में हिंदी को बोल पाने में कामयाब होंगे।

के द्वारा दिया गया अध्ययन विषयवस्तु :हिंदी

निर्देशात्मक घंटे / सप्ताह : 05

इकाई	विवरण	
I	आधुनिक काव्य : रश्मिरथी, रामधारीसिंह दिनकर	
	निर्देशात्मक घंटे	**25**
II	कहानी – 1. पूस की रात (प्रेमचन्द), 2. आकाशदीप (जयशंकर प्रसाद) 3. अकेली (मन्नू भंडारी), 4. खेल (जैनेन्द्र कुमार) 5. सच बोलने की भूल (यशपाल) 6. चीफ की दावत (भीष्म साहनी) 7. आरोहण (संजीव) 8. सलाम (ओमप्रकाश वाल्मीकि)	
	निर्देशात्मक घंटे	**20**
III	पत्र लेखन : (सरकारी पत्र, निजी पत्र, संपादक को पत्र, ज्ञापन, परिपत्र)	
	निर्देशात्मक घंटे	**10**
IV	अनुवाद : हिंदी से अंग्रेज़ी	
	निर्देशात्मक घंटे	**10**

V	बोलचाल हिंदी – 1. साक्षात्कार 2. अध्यापक–विद्यार्थी 3. ग्राहक–दूकानदार 4. डॉक्टर–मरीज 5. मुसाफिर–यात्री	
	निर्देशात्मक घंटे	**10**
	कुल घंटे	**75**

पाठ्यपुस्तक :

1. रामधारीसिंह दिनकर, रश्मिरथी।
2. **कहानी**
3. **अनुवाद अभ्यास–3,** (दक्षिण भारत हिंदी प्रचार सभा)
4. आदर्श पत्र लेखन
5. व्याकरण

संदर्भ ग्रंथ :

1. प्रोफ. नीरज एम., **प्रामाणिक आलेखन और टिप्पणी**, राजपाल एंड सन्स, काश्मीर गेट, नई दिल्ली।
2. नीलम कपूर, **प्रयोजनमूलक हिंदी**, श्री नटराज प्रकाशन, साउथ गारडी, नई दिल्ली–2
3. डॉ. मधुधवन, **नवीन एकांकी संग्रह**, सुमित्रा प्रकाशन, अशोक नगर, अलहाबाद–1

आकलन के लिए उपयुक्त अंक (25 अंक)

सीआईए. I	सीआईए. II	सीआईए. III	असाईनमेंट	संगोष्ठी	उपस्थिति	कुल
5	5	6	3	3	3	25

पाठ्यक्रम द्वाराडिज़ाइनकियागया	एच.ओ.डी. द्वारासत्यापित	के द्वाराजांचागया	द्वाराअनुमोदित
(Dr.R. Suvanalatha)	(Dr.R. Suvanalatha)	Dr.K. Selvamingalai Convenor CDC	14 AUG 2021

Course Code	Title		
18U1MAL101	PART - I MALAYALAM - I		
Semester - I	Credits – 4	CIA: 25 Marks	ESE: 75 Marks

(Common to all UG Programmes)

Course Objective : ആധുനിക കാലഘട്ടങ്ങളിലെ കഥകളേയും കഥകാരൻമാരേയും കുറിച്ചുള്ള അവബോധം

Course Outcome :

CO1	ചെറുകഥകളും കഥാകാരൻമാരേയും കുറിച്ച് അറിവ് ലഭിക്കുന്നു.
CO2	ഭാഷയുടെ ഉപയോഗക്രമങ്ങളെക്കുറിച്ചുള്ള അറിവ്

Offered by : Malayalam

Course Content **Instructional Hours / Week : 5**

Unit	Description	
I	ചെറുകഥകൾ - കഥാമാലിക	
	Instructional Hours	16
II	ചെറുകഥകൾ - കഥാമാലിക	
	Instructional Hours	16
III	ചെറുകഥകൾ - കഥാമാലിക	
	Instructional Hours	16
IV	പ്രായോഗിക മലയാളം	
	Instructional Hours	16
V	ആശയവിപുലനം, പൊതുവായ വിഷയത്തെക്കുറിച്ച് ഉപന്യാസവും വിവർത്തനവും. (ഏകദേശം 100 വാക്കുകൾ)	
	Instructional Hours	11
	Total Hours	75

പാഠപുസ്തകങ്ങൾ

1. ചെറുകഥകൾ - **കഥാമാലിക (10 ചെറുകഥകൾ)**
2. പന്മന രാമചന്ദ്രൻനായർ – **നല്ല ഭാഷ – വാസുദേവ ഭട്ടതിരി – നല്ല മലയാളം**

സൂചനാഗ്രന്ഥങ്ങൾ

1. എം. അച്യുതൻ - **ചെറുകഥ – ഇന്നലെ, ഇന്ന്** (ഡി.സി. ബുക്സ്, കോട്ടയം)
2. കെ.എം. ജോർജ്ജ് - **സാഹിത്യചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ** (ഡി.സി. ബുക്സ്, കോട്ടയം)
3. സുകുമാർ അഴീക്കോട് **– മലയാള സാഹിത്യ വിമർശനം** (ഡി.സി. ബുക്സ്, കോട്ടയം)
4. എരുമേലി പരമേശ്വരൻ പിള്ള - **മലയാളസാഹിത്യം കാലഘട്ടങ്ങളിലൂടെ** (ഡി.സി. ബുക്സ്, കോട്ടയം)

Tools for Assessment (25 Marks)

CIA I	CIA II	Model	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course Designed by	Verified by	Checked by	Approved by
(Dr. Vijayan)	(Dr. Vijayan)	Convenor CDC	14 AUG 2021

Course Code	Title		
18U1MAL202	PART – I MALAYALAM – II		
Semester-II	Credit – 4	CIA: 25 Marks	ESE: 75 Marks

(Common to all UG Programmes)

Course Objective : വിദ്യാർത്ഥികളിൽ വായനാശീലം വർദ്ധിഷിക്കുക

Course Outcome :

CO 1	മലയാള ഭാഷയുടെ ഉൽപത്തിയേയും വികാസത്തേയും കുറിച്ചുള്ള അറിവ്
CO 2	മലയാള സാഹിത്യത്തിൽ നോവലുകൾക്കുള്ള സ്ഥാനം

Offered by : Malayalam

Course Content **Instructional Hours / Week : 5**

Unit	Description	
I	നോവൽ – ആടുജീവിതം	
	Instructional Hours	15
II	നോവൽ – ആടുജീവിതം	
	Instructional Hours	15
III	നോവൽ – ആടുജീവിതം	
	Instructional Hours	15
IV	പ്രായോഗിക മലയാളം ഭാഗം 2	
	Instructional Hours	15
V	പ്രായോഗിക മലയാളം ഭാഗം 2	
	Instructional Hours	15
	Total Hours	75

പാഠപുസ്തകങ്ങൾ

1. ബെന്യാമിൻ - **ആടുജീവിതം** (ഗ്രീൻ ബുക്സ്, കോട്ടയം)
2. കേരളപാണിനീയം – എ.ആർ. രാജരാജവർമ്മ (ഡി.സി. ബുക്സ്, കോട്ടയം)

സൂചനാഗ്രന്ഥങ്ങൾ

1. പ്രൊ. എൻ. കൃഷ്ണപിള്ള - **കൈരളിയുടെ കഥ** (ഡി.സി. ബുക്സ്, കോട്ടയം)
2. ഡോ. പന്മന രാമചന്ദ്രൻനായർ - **സമ്പൂർണ്ണ മലയാള സാഹിത്യചരിത്രം** (ഡി.സി. ബുക്സ്, കോട്ടയം)
3. ഡോ. കെ.എം. ജോർജ്ജ് – **ആധുനിക മലയാള സാഹിത്യചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ** (ഡി.സി. ബുക്സ്, കോട്ടയം)
4. എരുമേലി പരമേശ്വരൻപിള്ള - **മലയാള സാഹിത്യം – കാലഘട്ടങ്ങളിലൂടെ** (ഡി.സി. ബുക്സ്, കോട്ടയം)

Tools for Assessment (25 Marks)

CIA I	CIA II	Model	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course Designed by	Verified by	Checked by	Approved by
(Dr. Vijayan)	(Dr. Vijayan)	Convenor CDC	14 AUG 2021

Course Code	Title		
18U1TAM101	PART – I TAMIL - I		
Semester: I	Credits: 4	CIA: 25 Marks	ESE : 75 Marks

(Common to all UG Programmes)

Course Objective : மொழி இலக்கியத்தின் வாயிலாக அறம்சார் பண்பு மற்றும் ஆளுமைமிக்க மாணவர்களை உருவாக்குதல்.

Course Outcome : தமிழ் இலக்கியங்கள் வாயிலாக சமூகச் சீர்திருத்தச் சிந்தனைகள் பெறப்படும்

Offered by : தமிழ்த்துறை

Course Content **Instructional Hours / Week: 5**

Unit	Description	
I	**அற இலக்கியம் - திருக்குறள்** 1. அறன்வலியுறுத்தல் (31 - 40 குறள்) 2. நடுவு நிலைமை (111 - 120 குறள்) 3. ஈகை (221 - 230 குறள்) 4. புகழ் (231 - 240 குறள்) 5. வாய்மை (291 - 300 குறள்)	
	Instructional Hours	**15**
II	**புதுக்கவிதைகள்** 1. பாரதியார்- நிலவு, வானம் , காற்று 2. பாரதிதாசன் - வான் 3. ஆரூர் தமிழ்நாடன்- கரிக்கிறது தாய்ப்பால் 4. காகிதப்பூக்கள் - நா. காமராசன் 5. மரங்கள் - மு. மேத்தா 6. சுவாசம் - சல்மா	
	Instructional Hours	**15**
III	**பெண்ணியம்** 1. பூச்சி வாழ்க்கை – ஆண்டாள் பிரியதர்சனி (சுயம் பேசும் கிளி) 2. தொட்டிச்செடி – கவிஞர் இளம்பிறை 3. அம்மா – சுகிர்தராணி 4. நீரில் அலையும் முகம் - அ.வெண்ணிலா	
	Instructional Hours	**15**
IV	**சிறுகதைகள்** புதுமைப்பித்தன் சிறுகதைகள் (மூன்றாம் பாகம்)	
	Instructional Hours	**15**
V	**இலக்கண - இலக்கிய வரலாறு** 1. மாணக்கர்களுக்குரிய இலக்கணம் (நன்னூல் மூன்று நூற்பா) 2. பதினெண்கீழ்க்கணக்கு நூல்கள் - அறிமுகம் 3. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 4. சிறுகதையின் தோற்றமும் வளர்ச்சியும்	
	Instructional Hours	**15**

Total Hours	**75**

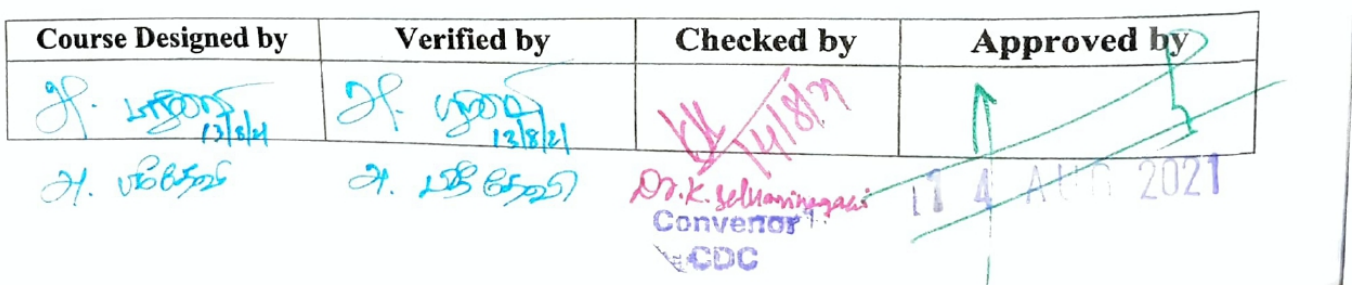
பார்வை நூல்கள்

1. பாரதியார் - பாரதியார் கவிதைத் தொகுப்பு, அபிராமி பதிப்பகம், 7-பி, கொடிமரத் தெரு, சென்னை - 600013.
2. பாரதிதாசன் - அழகின் சிரிப்பு, அபிராமி பதிப்பகம், 7-பி, கொடிமரத் தெரு, சென்னை- 600013.
3. அப்துல் ரகுமான் - அப்துல் ரகுமான் கவிதைகள், விஜயா பதிப்பகம், கோவை - 641001.
4. மு. மேத்தா - கண்ணீர்ப்பூக்கள், குமரன் புத்தக நிலையம், மதுரை.
5. திருவள்ளுவர் - திருக்குறள் பரிமேலழகர் உரை, சாரதா பதிப்பகம், ஜி - 4, சாந்தி அடுக்ககம், 2/3, ஸ்ரீ கிருஷ்ணாபுரம் தெரு, இராயப்பேட்டை, சென்னை - 600014.
6. ஆண்டாள் பிரியதர்சனி - சுயம் பேசும் கிளி கவிதைத்தொகுப்பு, ராகவேந்திரா வெளியீடு 163/2 பொன்விழா அச்சகம், பாடிக்குட்ட சாலை, அண்ணாநகர், சென்னை.
7. கவிஞர் இளம்பிறை - தொட்டிச்செடி, பொன்னி வெளியீடு, சென்னை - 91.
8. சுகிர்தராணி - தீண்டப்படாத முத்தம், காலச்சுவடு பதிப்பகம், நாகர்கோயில்.
9. அ.வெண்ணிலா - நீரில் அலையும் முகம் முதல் கவிதைத் தொகுப்பு - 2000
10. முனைவர் ச.சுபாஷ் சந்திரபோஸ் - புதுமைப்பித்தன் சிறுகதைகள் (மூன்றாம் பாகம்) பாவை பப்ளிகேஷன்ஸ், சென்னை - 600014.
11. மு.வ. - தமிழ் இலக்கிய வரலாறு சாகித்திய அகாதெமி, புதுதில்லி – 110001.
12. தமிழண்ணல் - புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை – 625001.
13. சல்மா - ஒரு மாலையும் இன்னோறு மாலையும், காலச்சுவடு பதிப்பகம், நாகர்கோவில்.
14. பவணந்தி - தென்னிந்திய சைவசித்தாந்த நூற்பதிப்புக் கழகம், திருநெல்வேலி.

Tools for Assessment (25 Marks)

CIA I	CIA II	Model	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course Designed by	Verified by	Checked by	Approved by



Course Code	Title		
18U1TAM202	PART – I TAMIL -II		
Semester: II	Credits: 4	CIA : 25 Marks	ESE : 75 Marks

(Common to all UG Programmes)

Course Objective : மொழி இலக்கியத்தின் வாயிலாக அறம்சார் பண்பு மற்றும் ஆளுமைமிக்க மாணவர்களை உருவாக்குதல்

Course Outcome : பக்தி இலக்கியங்கள் வழி வாழ்வியல் நெறிகள் பெறப்படும்.

Offered by : தமிழ்த்துறை

Course Content **Instructional Hours / Week: 5**

Unit	Description	
I	**பக்தி இலக்கியங்கள்** 1. திருவாசகம் - பிடித்த பத்து பாடல்கள் 1-10 2. நாலாயிர திவ்விய பிரபந்தம் பெரியாழ்வார் (கண்ணன் திரு அவதாரச் சிறப்பு (13 - 22) பாடல்கள்) 3. நாலாயிர திவ்விய பிரபந்தம் தொண்டரடிப் பொடியாழ்வார் திருப்பள்ளியெழுச்சி (1-5 பாடல்கள்) 4. திருவருட்பா- இராமலிங்க அடிகளார் நான்காவது திருமுறை அருள் பிரகாசமாலை 1-10 பாடல்கள்	
	Instructional Hours	**15**
II	**சிற்றிலக்கியங்கள்** 1. கலம்பகம் - நந்திக் கலம்பகம் (91 - 100 பாடல்கள்) 2. பள்ளு - முக்கூடற்பள்ளு (350 - 360) 3. குறவஞ்சி - திருக்குற்றாலக்குறவஞ்சி (1-10) 4. சதகம் - வைராக்கிய சதகம் (1-10) 5. பட்டினத்தார் பாடல்கள் (358-367)	
	Instructional Hours	**15**
III	**நாவல்** கல்மரம் - திலகவதி	
	Instructional Hours	**15**
IV	**இலக்கணம்** 1. வல்லினம் மிகும் இடங்கள் 2. வல்லினம் மிகா இடங்கள் 3. தொகை நிலைத் தொடர் 4. தொகா நிலைத் தொடர்	
	Instructional Hours	**15**
V	**இலக்கிய வரலாறு பாடத்திட்டத்தைத் தழுவியது.** 1. சைவமும் தமிழும் 2. வைணமும் தமிழும் 3. சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும்	

4. புதினத்தின் தோற்றமும் வளர்ச்சியும் 5. விண்ணப்பங்கள், மடல்கள் எழுதச் செய்தல்	
Instructional Hours	**15**
Total Hours	**75**

பார்வை நூல்கள்

1. மாணிக்கவாசகர் அருளிய திருவாசகம் - சித்தாந்த பண்டிதர் திரு.ப.இராமநாத பிள்ளை விளக்க உரையுன் கழகக வெளியீடு, திருநெல்வேலி, தென்னிந்திய சைவ சித்தாந்த நூற்பதிப்புக் கழகம் லிமிடெட், 522 டி.டி.கே. சாலை, சென்னை- 600018.
2. புலவர் த.திருவேங்கட இராமானுஜதாசன் - நாலாயிர திவ்வியப் பிரபந்தம் முதல் ஆயிரம் மூலமும் உரையும், உமா பதிப்பகம், 171, புதிய எண்.18 பவளக் காரத் தெரு, மண்ணடி, சென்னை - 600001.
3. தாயுமான திருவருட் பிரகாச வள்ளலார் - திருஅருவட்பா நான்காவது திருமுறை, சகுந்தலை நிலையம், 171, புதிய எண்.18 பவளக் காரத் தெரு, மண்ணடி, சென்னை - 600001.
4. ஆசிரியர் பெயர்தெரியவில்லை - நந்திக் கலம்பகம் - மணிவாசகர் பதிப்பகம், ராஜ வீதி, கோயமுத்தூர் - 641001.
5. முனைவர் கதிர்முருகு - முக்கூடற் பள்ளு மூலமும் உரையும், சாரதா பதிப்பகம், சென்னை.
6. புலியூர்க்கேசிகன் தெளிவுரை - திருக்குற்றாலக் குறவஞ்சி, செல்லப்பா பதிப்பகம், சென்னை.
7. சாந்தலிங்க சாமிகள் - சாந்தலிங்க அடிகளார் திருமடம் வெளியீடு, பேரூர், கோவை-10.
8. அ.மாணிக்கம் உரையாசிரியர் - பட்டினத்தார் பாடல்கள் மூலமும் உரையும், வர்த்தமானன் பதிப்பகம், 40, சரோஜினி தெரு, தியாகராய நகர், சென்னை - 17.
9. திலகவதி - கல்மரம், அம்ருதா பதிப்பகம் எண் 5, 5 வது தெரு, எஸ்.எஸ் அவென்யூ, சக்தி நகர், போரூர், சென்னை - 600116.
10. தமிழண்ணல் - புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை – 625001.
11. நல்ல தமிழ் எழுத வேண்டுமா? – அ.கி.பரந்தாமனார். அல்லி நிலையம், சென்னை - 600007.
12. முனைவர் பாக்கியமேரி - தமிழ் இலக்கிய வரலாறு –NCBH வெளியீடு, கோவை-600098.
13. மு.வ. - தமிழ் இலக்கிய வரலாறு சாகித்திய அகாதெமி, புதுதில்லி – 110001.

Tools for Assessment (25 Marks)

CIA I	CIA II	Model	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course Designed by	Verified by	Checked by	Approved by
		Dr.K.Selvaminyagan Convenor CDC	14 AUG 2021

Course Code	Title		
18U3BTA101	Allied Paper – I Chemistry – I		
Semester: I	Credits: 3	CIA : 20 Marks	ESE: 55 Marks

Course Objective

To realise the importance of basics in assemblage of small molecules and to utilise in retrieving meaningful conclusion through problem based learning.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

CO1	Know the basics in structure and reactions of organic molecules
CO2	Understand the importance of chemical kinetics
CO3	Retrieve meaningful conclusion from thermodynamic parameters
CO4	Know the limitations of each concepts and looking for an alternative in analysis
CO5	Know about green chemistry and its implications

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Structures:** Methane, Ethylene, Acetylene and Benzene. **Effects:** Inductive effects, mesomeric effect, Hyperconjugative effect, electromeric effect, stric effects in simple and macromolecules.	1,3,5	3,1
	Instructional Hours		**12**
II	**Chemical Kinetics:** Rate and its law, order and its types, Molecularity and its types. Determination of order by graphical methods. Determination of Q10, Pseudo first order reactions, Activation energy- chemical reactions in absence and presence of biocatalyst Adsorption coefficient. Fractional distillation.	4,2,1	20,30, 10,5
	Instructional Hours		**12**
III	**Electrochemistry:** Potential difference, ions, anode and cathode. Nernest equation. Relation between Nernest and free energy changes. Determination of free energy changes. pH and its scale. Determination of pH and pOH. Handersson equation and its importance. Buffer and its importance.	4	26,27
	Instructional Hours		**12**
IV	**Types of electrodes** – Standard Hydrogen Electrode, Calomel Electrode and Quinone Electrode, pH electrode. Limitation of each electrode.	4,2	28,9

	Instructional Hours		**12**
V	**Green Chemistry:** Synthesis of silver and gold nanoparticles by simple and macrobiomolecules. pH and temperature optima. Functionalisation of nanoparticles with biomolecules.	6, 7	7, 263
	Instructional Hours		**12**
		Total Hours	**60**

Text Book(s):

1. Veeriyan V, **Allied Chemistry I & II**, 1st Edition, 2004
2. Atkin's **Physical Chemistry**, 7th Edition, Oxford University Press, 2007.
3. Robert Thornton Morrisson and Robert Nelison Boyd, **Organic chemistry**, 6th Edition, Prentice Hall of India Pvt. Ltd., 2008.
4. B.R. Puri, L.R. Sharma & Madan S. Pathania, **Principles of Physical Chemistry**, Vishal Publishing Company, 6th Edition, 2005.
5. Solomons & Fryhle, **Organic Chemistry**, 8th Edition, John Wiley & Sons, 2017.
6. Namita Rajput, **Methods of Preparation of Nanoparticles – A Review**, *IJET*, 1806-1811, 2015.
7. Anumary Ealias and Saravanakumar MP, **A Review on the Classification, Characterization, Synthesis of Nanoparticles and their Applications**, *Mat. Sci. Eng.*, 1-14, 2017.

Unit I: Text Book 1 (Chapter 3), Text Book 3 (Chapter 1), Text Book 5 (Chapter 1)

Unit II: Text Book 4 (Chapter 20, 30), Text Book 2 (Chapter 10), Text Book 1 (Chapter 5)

Unit III: Text Book 4 (Chapter 26, 27)

Unit IV: Text Book 4 (Chapter 28), Text Book 2 (Chapter 29)

Unit V: Text Book 6 (Chapter 7), Text Book 7 (Chapter 263)

Reference Book(s):

1. Jerry March, **Advanced Organic Chemistry**, 4th Edition, 2004.
2. Paula Yurkanis Bruice, **Organic Chemistry**, 3rd Edition, Pearson Education, 2018.
3. Clayden, Greeves, Warren and Wothers, **Organic chemistry**, 6th Edition, Oxford University Press, 2007.
4. http://ebookacid.weebly.com/engineering/organic-chemistry-english-6th-edition

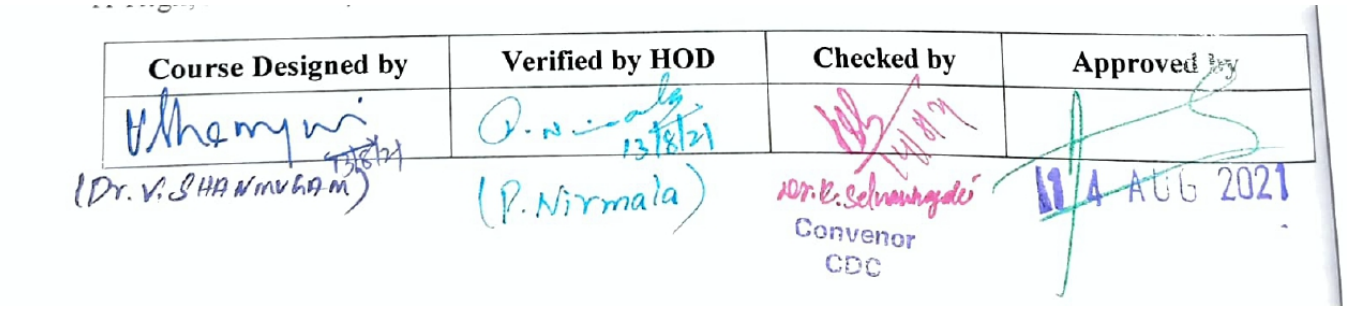
Tools for Assessment (20 Marks)

CIA I	CIA II	CIA III	Assignment	Quiz	Attendance	Total
4	4	5	2	2	3	20

Mapping

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

H-High; M-Medium; L-Low



Course Code	Title		
18U3BTA202	**Allied Paper – II Chemistry – II**		
Semester: II	**Credits: 3**	**CIA : 20 Marks**	**ESE: 55 Marks**

Course Objective

To realise the importance of basics in assemblage of small molecules and to utilise in retrieving meaningful conclusion through problem based learning.

Course Outcomes (CO)

On successful completion of the course, the students will be able to

CO1	know the basics in amino acid modification and its significance
CO2	understand the importance of radioactivity
CO3	retrieve meaningful conclusion from thermodynamic parameters
CO4	know the limitations of each spectroscopic analysis
CO5	Know the importance of electrochemistry in analysis

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Amino acid modifiers and coupling agent:** Coupling reagents and biomolecule modifiers – carboxylic groups, protein attached with ethylene glycol, thiol modifications, Tyrosine, tryptophan and intramolecular cross linking.	1,2	10,6
	Instructional Hours		**12**
II	**Radioactivity:** Radioactive elements: alpha, Beta & Gamma emitters in analysis. Half Life period. Quantification of Biomolecules in diagnosis and its advantageous and disadvantageous with other reagents. Limitations of each reagent in analysis.	5,4	5,3
	Instructional Hours		**12**
III	**Enzyme Kinetics:** Enzyme activity, Units, MM equation and its importance. Determination of Vmax & Km by various plots. Its importances. Determination of thermodynamic and kinetic parameters	3	15
	Instructional Hours		**12**
IV	**Spectroscopy:** Absorption spectroscopy- UV/VIS, IR, Resonance Raman, Fluorescence and NMR Spectroscopic techniques in analysis and its limitations/applications.	4	6
	Instructional Hours		**12**
V	**Electrochemistry:** Kohlrauschs law. Resistance and	4	26

	Conductance, Specific, equivalent and molar conductance. Conductometric titrations- weak acid, strong acids and mixture of acids.	
	Instructional Hours	**12**
	Total Hours	**60**

Text Book(s):

1. Creighton T. E., **Protein Function - A Practical Approach**, 2nd Edition, Oxford University Press, 2004.
2. Trevor Palmer, **Enzymes- Biochemistry, Biotechnology & Clinical Biochemistry**, East-West Press Pvt. Ltd. New Delhi, 2004.
3. Irwin H. Segel, **Biochemical Calculation**, John Wiley & Sons, Pvt. Ltd, 6th Edition, 2010.
4. Puri B.R., Sharma L.R. & Madan S. Pathania, **Principles of Physical Chemistry**, Vishal Publishing Company, 6th Edition, 2005.

Unit I : Text Book 1 (Chapter 10) , Text Book 2 (Chapter 6)

Unit II: Text Book 5 (Chapter 5), Text Book 4 (Chapter 3)

Unit III: Text Book 3 (Chapter 15)

Unit IV: Text Book 4 (Chapter 6)

Unit V: Text Book 4 (Chapter 26)

Reference Book(s):

1. Atkin's **Physical Chemistry**, 7th Edition, Oxford University Press, 2007.
2. David Freifelder, **Physical Biochemistry**, W.H. Freeman & Company, 2nd Edition, 2008.
3. Creighton T. E., **Protein Structure - A Practical Approach**. 2nd Edition,. Oxford University Press, 2004.

Tools for Assessment (20 Marks)

CIA I	CIA II	CIA III	Assignment	Quiz	Attendance	Total
4	4	5	2	2	3	20

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
V. Shanmugam 13/8/21	13/8/21	14/8/21	14 AUG 2021
V. SHANMUGAM	Dr. P. Nirmala		

Convenor
CDC

Course Code	Title		
18U3BTA304	Allied Paper IV - Computer Programming in C		
Semester: III	Credits: 3	CIA: 20 Marks	ESE: 55 Marks

Course Objective:

To enable students learn the basic principles and concepts of C Programming language.

Course Outcome (CO):

CO1	Define the basic principles of C programming using various features to understand the basics.
CO2	Outline various constants and variables in understanding of logics used in implementing a C program.
CO3	Apply various looping concepts in flowchart to understand a program.
CO4	Classify various functions to know the logic structure of a C program.
CO5	Outline various conditional systems and its usage

Offered by: Computer Science

Course Content **Instructional Hours/ Week: 3**

Unit	Description	Text Book	Chapter
I	**ProgrammingPreliminaries:**High LevelProgramming Language - C Language Introduction -Description of Programming Language.	1	3
	Simple Computer Programs: Writing a Program-Input Statement - Sample C Programs.	1	4
	Instructional Hours		**9**
II	**Numeric Constants and Variables:** Constants – Scalar Variables- Declaring Variable names - Defining Constants - Examples.	1	5
	Instructional Hours		**9**
III	**Arithmetic Expressions:**Assignment Statements-Arithmetic operators and modes of Expressions. Integer Expressions - Floating point expressions-Operator precedence in expressions - Examples.	1	6
	Instructional Hours		**9**
IV	**Conditional Statements:**Conditional Statements -Relational Operators.	1	8
	Implementing Loops in Programs: For Loop – WhileLoop - the do - while Loop.	1	9
	Instructional Hours		**9**
V	**Functions:**Introduction - Defining and Using Functions - Syntax rules for functiondeclaration -Global, Local and static Variables - ExamplePrograms.	1	13
	Instructional Hours		**9**
	Total Hours		**45**

Text Book(s):

1. Rajaraman V., **Computer Programming in C,** Prentice –Hall of India Pvt. Limited, New Delhi, 2006.
   Unit I : Chapter 3 (3.1 – 3.3), Chapter 4 (4.1 – 4.3)
   Unit II : Chapter 5(5.1- 5.4)
   Unit III : Chapter 6 (6.1-6.6)
   Unit IV : Chapter 8(8.1 – 8.5), Chapter 9(9.1 – 9.3)
   Unit V : Chapter 13(13.1-13.5)

Reference Book (s):

1. Ashok N Kamthane, **Programming in C,** 2nd Edition, Pearson Publication, 2012.
2. Balagurusamy E., **Programming In ANSI C,** 4th Edition, TATA McGraw-Hill Publishing Company Limited, 2007

Tools for Assessment

CIA I	CIA II	CIA III	Assignment	Seminar	Attendance	Total
4	4	5	2	2	3	20

Mapping

PSO / CO	PS 01	PS 02	PS 03	PS 04	PS 05
CO 1	M	L	M	L	M
CO 2	M	L	M	L	L
CO 3	M	M	M	M	M
CO 4	M	M	M	M	M
CO 5	M	M	L	M	M

H-High; M-Medium; L-Low

Prepared by	Verified byHoD	Checked by	Approved by
13/8/21	13/8/21		
DJ ANITHA MERLIN	Dr. N. MAVITHA	Convenor	14 AUG 2021

Course Code	Title		
18U3BTC101	Core Paper – I Cell Biology and Histology		
Semester: I	Credits: 4	CIA : 25 Marks	ESE: 75Marks

Course Objective

To understand the fundamental components in cells, its functions and essentials in histology

Course Outcomes

On successful completion of the course, the student can

CO1	Understand the structural uniqueness of prokaryotic and eukaryotic cells
CO2	Develop knowledge on specific mechanism of various cell components and reproduction
CO3	Identify special features of the specific cells
CO4	Understand cell communication
CO5	Able to differentiate Tissue sections

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Cell as a basic unit:** Discovery of the cells, classification of cell types, development of cell theory, early chemical investigation in cell biology. Prokaryotic and Eukaryotic cell organization.	1	1, 2
	Instructional Hours		**12**
II	**Cell transport phenomenon:** Membrane architecture. Active, Passive, diffusion and osmosis. **Cell division in prokaryotes and eukaryotes:** Cell cycle, mitosis, meiosis, crossing over and characteristics of cancer. Apoptosis, Stem cell. Prions.	2	11, 17
	Instructional Hours		**12**
III	**Structure and function of cytoplasmic compartments of the cell:** Ribosome and protein synthesis, energy flow through mitochondrion, chloroplast and photosynthesis, Golgi apparatus, lysozymes and micro bodies, endoplasmic reticulum, vacuoles, peroxysomes, lysozomes and Nuclear compartment. Heterochromatin and euchromatin, polytene chromosomes.	3	2
	Instructional Hours		**12**

IV	**Cell communication & Specialized cells:** Integrative and specialized cellular events, cell-cell signaling. Nerve cells, sperm cells, microfilaments, microtubules, muscle cells. Cells of vision, Nucleo-cytoplasmic interaction, cell cloning.	3	6
	Instructional Hours		**12**
V	**Basics of Histology:** Preparation of tissues for study, microscopy, autoradiography, Enzyme histochemistry, visualizing specific molecules, interpretation of structures in tissue sections	4	1
	Instructional Hours		**12**
	Total Hours		**60**

Text Book(s):

1. Gerald Karp, **Cell Biology**, Wiley Publications, 7th Edition, 2013.
2. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter, **Molecular Biology of the Cell**, Garland Science, New York, 2002.
3. De Robertis and De Robertis, **Cell and Molecular Biology**, W B Saunders Co., 8th Edition, 2010.
4. Anthony L. Mescher, **Junqueira's Basic Histology – Text and Atlas**, The McGraw-Hill Companies, 14th Edition., 2016

Unit – I:Text Book 1, Chapter 1, Chapter 2, Page No. 1-30 and 31-84.

Unit – II:Text Book 2, Chapter 11 and Chapter 17, Page No. 597-640 and 963-1020

Unit – III:Text Book 3, Chapter 2, Page No. 18-36.

Unit – IV:Text Book 3, Chapter 6, Page No. 150-185.

Unit – V: Text Book 4, Chapter 1, Page No. 1-16.

Reference Book(s):

1. Philip Sheeler and Donald E Bianchi, **Cell and Molecular Biology**, John Wiley, 3rd edition, 1987.
2. Lodish Baltimore, **Molecular Cell Biology**, Scientific American books, 5th Edition, 2008.
3. Stephen L Wolfe, **Molecular and Cell Biology**, Wadsworth Publishing Company, 1993.
4. Arthur Clarkson, **A Text - Book of Histology- Descriptive and Practical**, Bristol: John White & Co., London, 1896.
5. Patrice F Spitalnik, **Histology Laboratory Manual**, College of Physicians and Surgeons Columbia University, 2016-2017.

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Modelling	Quiz	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
13/8/21	13/8/21	14/8/21	14 AUG 2021
Dr. P Senthilkumar			

Convenor
CDC

Course Code	Title		
18U3BTC102	**Core Paper – II Biotechniques and Instrumentation**		
Semester: I	**Credits: 4**	**CIA : 25 Marks**	**ESE: 75Marks**

Course Objective

To provide a fundamental background in the theory of Bio-instrumentation and measurement system performance

Course Outcomes (CO)

On successful completion of the course, the student will

CO1	Remember principles of instruments in the field of biology
CO2	Demonstrate competency in carrying out standard laboratory techniques used in the discipline
CO3	Able to know the techniques of separation of macromolecules
CO4	Formulate informed decisions concerning personal and public health issues
CO5	Concept of radiation techniques and its important

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**pH meter, Centrifugation and Sterilization Techniques:** pH meter, Buffer of biological importance, Centrifuge- Preparative, Analytical and Ultra, Laminar Air Flow, Autoclave, Hot Air Oven and Incubator.	1&2	1&3
	Instructional Hours		**12**
II	**Spectroscopic Techniques:** Colorimeter, Ultraviolet and visible, Infra red and Mass Spectroscopy	1	12
	Instructional Hours		**12**
III	**Chromatographic and Electrophorosis Techniques:** Paper, Thin Layer, Column, HPLC and GC. Electrophoresis Techniques: Starch Gel, AGE, PAGE.	1	10 &11
	Instructional Hours		**12**
IV	**Immuno Techniques:** Principle and applications of FACS, RIA, PCR, Elisa Reader, Haemocytometer	2&3	4&7
	Instructional Hours		**12**
V	**Fluorescent and Radiation Techniques**: Spectro-fluorimeter, Flame photometer, Scintillation counter, Geiger Muller counter, Autoradiography	1	12&14
	Instructional Hours		**12**
	Total Hours		**60**

Text Book(s):

1. Kith Wilson and Johnwalker, **Principles and Techniques of Biochemistry and Biology**, 7th Edition, 2010.
2. John G. Webster, **Bioinstrumentation**, John Wiley & Sons, 2007.
3. Arumugam M., **Biomedical Instrumentation**, Anuradha Publications, 10th Edition, 2006.

Unit I: Text Book 1, Chapter 1; Text Book 2, Chapter 3.

Unit II: Text Book 1, Chapter 12.

Unit III: Text Book 1, Chapter 10&11.

Unit IV: Text Book 2, Chapter 4; Text Book3, Chapter 7.

Unit V:Text Book 1, Chapter 12&14.

Reference Book(s):

1. Sawhney S. K. and Randhir Singh, **Introductory Practical Biochemistry**, Narosa Publishing House, 2000.
2. Gedder A and L. E. Balsar, **Principles of Applied Biomedical Instrumentation**, John Wiley and Sons, 2009.
3. Boyer, Rodney F. Benjamin and Cummins, **Modern Experimental Biochemistry**, 2nd Edition, 1993.
4. http://www.itl.nist.gov/div898/handbook/prisection3/pri3.htm (online e book)
5. http://www.statease.com/de7_man.html (Software Tutorial Website)

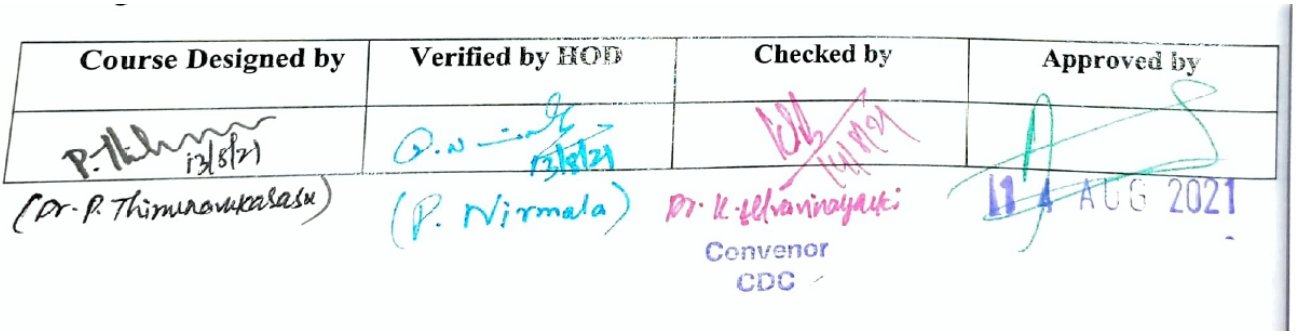
Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Quiz	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low



Course Code	Title		
18U3BTC203	Core Paper – III Fundamentals of Microbiology		
Semester: II	Credits: 4	CIA : 25 Marks	ESE: 75 Marks

Course Objective

On successful completion of the subject the student should have understood the role of microorganisms in the diversity

Course Outcomes (CO)

On successful completion of the course, the students will be able to

CO1	acquire and retain basic knowledge about the development of microbiology and different microbial groups recognized by microbial systematics
CO2	understand in the principles of optics that apply to light microscopes, bacterial unique structures, reproduction and growth
CO3	Demonstrate proficiency and use of the following in the laboratory: media preparation, serial dilution, streak plate isolation technique, preservation, bacterial staining techniques and proper culture handling
CO4	investigate bacterial population from various sample
CO5	understand the chemistry of Microbes

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Definition, History and Scope of Microbiology:** Invention of Microscope, Theory of Spontaneous Generation, Germ Theory of Disease and Koch Postulates, Vaccination, Discovery of Antibiotics, Scope of Microbiology	1	1
	Instructional Hours		**4**
II	**Basic Principles in Microscopy**: Light Microscopy, Magnification and Resolution, Dark Microscopy, and Phase contrast Microscopy	2	3
	Bacterial Structure and Growth: Bacilli, Cocci & Spirals, Flagella, Pili, Gycocalyx, Cell Wall, Cell Membrane & Endospore, Bacterial Reproduction – Binary Fission, Bacterial Growth Curve and Factors Governing Growth	2	4,5
	Instructional Hours		**15**
III	**Bacterial Classification:** Species Concept, Criteria used for Bacterial Classification, Nomenclature.	3	7
	Outline Classification and General Characterization of	4	20-22

	Eubacteria and Archaebacterium		
	Instructional Hours		**17**
IV	**Microbiological Media:** Types, Preparation, Methods of Sterilization	4	7
	Enumeration of Microorganisms: Enumeration of Microorganisms in soil, Water and Air; Isolation of Microorganisms from Environment and Infected Tissue	4	2, 8
	Culture techniques: Techniques of Pure Culture, Maintenance and Preservation; Staining: Stains and Types of Staining		
	Instructional Hours		**12**
V	**Physiology and Biochemistry of Microbes:** Photo-Autotrophs, Chemo-autotrophs, Parasitism, Saprophytism, Mutualism and Symbiosis, Commensalisms, Endozoic Microbes	4	11,32
	Instructional Hours		**12**
	Total Hours		**60**

Text Book(s):

1. Naveen Kango, **Text Book of Microbiology**, I. K. International Pvt. Ltd. Publication, 2010.
2. Jeffrey C. Pommerville, **Alcamo's Fundamentals of Microbiology**, Jones & Bartlett Publication, 9th Edition, 2011.
3. Ananthanarayan and Paniker, **Textbook of Microbiology**, Orient Blackswan, 2005.
4. Joanne Willey and Linda Sherwood and Christopher J. Woolverton, **Prescott's Microbiology**, Tata McGraw Hill Publishers, 2014.

   Unit I : Text Book 1, Chapter 4: 3-14.

   Unit II : Text Book 2, Chapter 3: 83-90, Chapter 4: 104-130, Chapter 5: 133-147.

   Unit III: Text Book 3, Chapter 7: 48-50 and 4, Chapter 20-22: 469-538.

   Unit IV: Text Book 4, Chapter 7: 154-160, Chapter 2: 31-33 & Chapter 8: 172-186.

   Unit V : Text Book 4, Chapter 11: 230-235 & Chapter 32: 700-715.

Reference Book(s):

1. Danial Lim, **Microbiology**, McGraw-Hill Companies, New York, 1998.
2. Kathleen Park Talaro, **Foundation in Microbiology**, McGraw-Hill Publications, 9th Edition, 2015.
3. Rajesh Bhatia & Rattan Lal Ichhpujani, **Essentials of Medical Microbiology**, Jaypee Brothers Medical Publishers, New Delhi, 2008.

4. Gerard J. Tortora, Berdell R. Funke, Christine L. Case, **Microbiology: An Introduction**, Pearson Publication, 20th Edition, 2015.
5. Pelczar, J. Micheal, **Microbiology**, Tata McGraw Hill Publishers, New Delhi, 2005.
6. https://www.edx.org/learn/microbiology
7. https://study.com/articles/List_of_Free_Online_Microbiology_Courses_and_Training_Options.html
8. https://microbiologysociety.org/education-outreach/resources.html

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Quiz	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Dr. P Senthilkumar			14 AUG 2021

Convenor
CDC

Course Code	Title		
18U3BTC406	**Core Paper VI: Biosafety & IPR**		
Semester: IV	**Credits: 4**	**CIA: 25 Marks**	**ESE: 75 Marks**

Course Objective:

To enable the students get an idea about the advantages and disadvantages of biotechnological applications ethical implications and intellectual property rights

Course Outcome (CO):

On successful completion of this course, the student will be able to

CO1	List the basics of Bioethics and ethical aspects
CO2	Outline the ethical implications of genetic modifications
CO3	Select the risk management and biosafety guidelines to be followed at different situations
CO4	List intellectual properties and patent rules
CO5	Compare and contrast the IPR at different parts of the world

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	Introduction to biosafety – Biosafety issues in biotechnology. Biosafety guidelines and regulations.Biosafety levels. Introduction to Biological Safety Cabinets; Biosafety Levels of Specific Microorganisms; Recommended Biosafety Levels for Infectious Agents and Infected Animals.	1,2	1
	Instructional Hours		**12**
II	Biosafety containment and its types. safety protocols.Risk assessment and Risk Management.	1	7
	Operations of Biosafety guidelines and regulations.Definition of GMOs & LMOs; Roles of Institutional Biosafety Committee, RCGM, GEAC etc. for GMO applications in food and agriculture	1	7
	Instructional Hours		**12**
III	Rules and Regulations in laboratory. Disinfection andDecontamination in laboratory.	1	11
	Laboratory Best Practices and Emergency response. Research involving plants and animals. Biosafety Protocol (CBP)	1	11
	Instructional Hours		**12**
IV	Introduction to intellectual and intellectual propertyType: Patent, copy rights, Trade marks, design rights,importance of IPRrights. International and Regional Agreement in IPR.	1, 2	13,14,19
	Instructional Hours		**12**
V	World intellectual property rights organization (WIPO)	1	15

	WTO, GATT and TRIPS. Unfair Competition and Enforcement of IPR. Patents in India- Plant breeder's rights, Patenting live organisms-Patent and its importance in biology and biotechnology.	
Instructional Hours		**12**
Total Hours		**60**

Text Book(s):

1. Sateesh M .K, **Bioethics and Biosafety,** I.K. Int. Publishing House Ltd., 2008.
2. Sree Krishna V.,**Bioethics and Biosafety in Biotechnology**, New age international publishers.2007.

Unit I : Text Book 1, 2 Chapter 1,Page No. 6-13, Page No. 2-11
Unit II : Text Book 1, Chapter 7,Page No. 159-209.
Unit III : Text Book 1, Chapter 11,Page No. 263-274.
Unit IV : Text Book 1, 2Chapter 13, 14,Page No. 293-304, Page No. 19-48
Unit V : Text Book 1, Chapter 15,Page No. 325-375

Reference Book(s):

1. http://books.cambridge.org/0521384737.htm
2. http://online.sfsu.edu/%7Erone/GEessays/gedanger.htm
3. http://www.actahort.org/members/showpdf?booknrarnr=447_125
4. http://www.cordis.lu/elsa/src/about.htm
5. Das, H.K., **Text Book of Biotechnology,** 3rd Edition, Wiley India Pvt. Ltd. 2007.
6. Ramdass, P.,**Animal Biotechnology Recent Concepts and Development**, 2008.

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Seminar	Class test	Assignment	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21	13/8/21	14/8/21	
Dr. Sudeepa	P. Nagaraja	Dr. K. Selvaraju	

Convenor / CDC

14 AUG 2021

Course Code	Title		
18U3BTC508	**Core Paper VIII: Microbial Biotechnology**		
Semester: V	**Credits: 4**	**CIA: 25 Marks**	**ESE: 75 Marks**

Course Objective:

To understand the techniques in using microorganisms in industrial product production

Course Outcome (CO):

On successful completion of the subject the student will be able to

CO 1	Understand the scope of microbial technology
CO 2	Critically evaluate the role of micro-organisms in specific biotechnological processes
CO 3	Explain the complex processes behind the development of genetically manipulated organisms
CO 4	Demonstrate a clear understanding of how biochemical pathways relate to biotechnological applications
CO 5	Commercial application of the microorganisms to the environment

Offered By: Biotechnology

Course Content **Instructional Hours / Week: 5**

Unit	Description	Text Book	Chapter
I	**Microbial Biotechnology:** Scope and application-horizons of microbial Technology	1	2
	public concern about the microbial biotechnology and economics of microbial biotechnology.	1	2
	Instructional Hours		**15**
II	**Microbes- Living factories for macromolecules:** Production of proteins in Bacteria and yeast; recombinant and synthetic vaccines;	1	3
	Microbial insecticides (*Bacillus thuringiensis*, *B. sphaericus*, *B. papilliae* and Baculo-Viruses);	1	7
	Microbial enzymes application in starch processing, textile designing, detergents, cheese making; polysaccharides and polyesters.	1	8
	Instructional Hours		**15**
III	**Microorganisms in fermentation:**Ethanol from feed stocks to fermentable sugars, sugars to alcohols	1	13
	Clostridial fermentation, lactic acid fermentation, acetic acid production	2	19
	Industrial production of various milk products	2	19
	Instructional Hours		**15**
IV	**Metabolites from microorganisms:** Amino acids; antibiotics-antibacterial agents (B-lactams, tetracyclines, peptides, amino glycosides),	1	10
	Antifungal agents, anti-tumor antibodies.	1	10
	Instructional Hours		**15**
V	**Application of microbial biotechnology in sewage and wastewater treatment:** Degradation of xenobiotics, mineral recovery, removal of heavy	1	14

	metals from aqueous effluents,		
	Production of biofertilizers (nitrogen fixing bacteria, single cell protein, mycorrhiza and phosphate solubilizing bacteria).	1	14
	Instructional Hours		**15**
		Total Hours	**75**

Text Book(s):

1. Glazer, A.N. and Nikaido, H, **Microbial Biotechnology**, W.H. Freeman & Co., New York 2007.
2. NdukaOkafor, **Modern Industrial Microbiology and Biotechnology**, Science Publishers, 2007.

Unit I : Text Book 1, Chapter 1-2: 1-45
Unit II : Text Book 1, Chapter 3, 7, 8: 46-90, 234-268.
Unit III: Text Book 1, Chapter 13: 458-486.
Unit IV: Text Book 1, Chapter 10: 324-397.
Unit V : Text Book 1 , Chapter 14: 487-540

Reference Book(s):

1. Bernard R. Glick, Jack J. Pasternak, and Cheryl L. Patten. **Molecular biotechnology principles and applications of recombinant DNA,** Washington, DC ASM Press 2010.
2. Gunasekaran. P, **Laboratory manual in Microbiology**, New Age International Limited. New Delhi, 1995.
3. https://www.schandpublishing.com/books/higher-education/biology/a-textbook-biotechnology/9788121926089/

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Model	Assignment	Attendance	Total
5	5	6	3	3	3	25

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	M	L	L	L	L
CO 2	H	M	M	M	M
CO 3	L	M	H	H	H
CO 4	L	M	H	H	H
CO 5	L	M	H	H	H

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
13/8/21	5/8/21	14/8/21	14 AUG 2021
Dr. P. Senthilkumar			

Convenor
CDC

Course Code	Title		
18U3BTC611	**Core Paper XI: Plant Biotechnology**		
Semester: VI	**Credits: 4**	**CIA : 25 Marks**	**ESE: 75 Marks**

Course Objective:
To understand the in vitro culture techniques & genetic engineering in plants, mechanism and uses of transgenic plants and Industrial applications of plant products

Course Outcome (CO):

CO1	Recall the difference between conventional and invitro plant propagation techniques
CO1	Outline the construction of PTC lab and requirements for tissue culture
CO2	Illustrate the methods of in vitro culture and transformation techniques
CO3	Use basic biotechnological techniques to explore molecular biology of plants
CO4	Biotechnology is used for plant improvement and discuss the ethical implications of that use
CO5	To know about plant genetic engineering.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 5**

Unit	Description	Text Book	Chapter
I	History of PTC, Concept of Cellular Totipotency. Laboratory Organization, Sterilization Techniques, Media Preparation. Types of media – MS, Nitch, Gamborgs. Plant growth regulators.	1	1, 2
	Instructional Hours		**15**
II	Protoplast Isolation, Fusion & Culture Regeneration – Somatic Hybrids & Cybrids. Establishment & Maintenance of Callus & Suspension Culture. Somatic embryogenesis, Synthetic seeds, Plant Micropropagation, Micrografting.	1	3,4,5
	Instructional Hours		**15**
III	Shoot tip Culture (Virus Free Plants), Haploid Plant Production, Anther & Microspore Culture, EmbryoCulture & Rescue, *Invitro* Pollination & Fertilization, Secondary Metabolites, Cryopreservation & Germplasm conservation, Role of tissue culture in agriculture & Forestry.	1,3	11, 23
	Instructional Hours		**15**
IV	Molecular biology of N_2 fixation (plants & cyanophytes, Nif gene). Plant Gene Expression Cassettes – Selectable Marker, Reporter Genes, Promoters in Plant Vectors. Transposons in plants, Somaclonal & Gametoclonal Variations in Plants.	1	27
	Instructional Hours		**15**
V	Genetic engineering of plants – Insect Resistance, Virus Resistance, Herbicide Resistance, Bacterial Resistance, Stress (Biotic & Abiotic) Resistance. Delayed Fruit 2 Ripening, Edible Vaccines & Plantibodies. Terminator seed concepts.	2	**7**
	Instructional Hours		**15**
	Total Hours		**75**

Text Book (s):

1. Chawla, **Introduction to Plant Biotechnology**, Oxford and IBH Publishers, 2nd Edition, 2003
2. Dubey R.C., **Advanced Biotechnology**, S. Chand & Co Ltd, New Delhi, 2014.
3. Singh B. D., **Plant Biotechnology**, Kalyani Publishers, 2nd Edition, reprint, 2011.

Unit I : Text Book 1, Chapter 1-2: 1-38.
Unit II : Text Book 1, Chapter 3, 4, 5: 40-78.
Unit III: Text Book 1, Chapter 11: 90-114, Text Book 3, Chapter 23: 100--114
Unit IV: Text Book 1, Chapter 27: 124-132.
Unit V: Text Book 2, Chapter 7: 87-93

Reference Book(s):

1. Chawla H. S., **Introduction to Plant Biotechnology**, , CRC Press, 3rd Revised Edition, 2018.
2. Adrian Slater, Nigel W. Scott, Mark R. Fowler, **Plant Biotechnology: The Genetic Manipulation of Plants** Oxford University Press, illustrated, reprint 2003.
3. Khalid Rehman Hakeem, Parvaiz Ahmad, Munir Ozturk, **Crop Improvement: New Approaches and Modern Techniques**, Springer US, illustrated Edition, 2013.

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Seminar	Short Test	Assignment	Total
5	5	6	3	3	3	25

Mapping

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

Course Designed by	Verified by HOD	Checked by	Approved by
13/8/21	13/8/21	14/8/21	14 AUG 2021
Dr. P. Senthilkumar	P. Jeyamoorthy	Dr. Selvaraju	Convenor CDC

Course Code	Title		
18U3BTC612	Core Paper – XII Animal Biotechnology		
Semester: VI	Credits: 4	CIA :25 Marks	ESE:75 Marks

Course Objective:

To provide students with a scientific and technical understanding of animal

Course Outcome (CO):

On successful completion of the course the student will be able to

CO1	understand the limitations and challenges in animal cell tissue culture.
CO2	know the applications of animal biotechnology.
CO3	evaluate and discuss public and ethical concerns over the use of animal biotechnology.
CO4	Learn preservative methods of cells
CO5	know about animal products

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 5**

Unit	Description	Text Book	Chapter
I	Introduction and Fundamentals of Animal Biotechnology, Media for Animal cells. Sterilization methods in ATC.	1	8, 9
	Biology of Cultured Cells, Measurement of Growth, Cell Synchronization, Senescence, Apoptosis	1	2, 27
	Instructional Hours		**15**
II	Primary, Secondary and Three dimensional Cell Culture, Cell transformation, Cell lines, Stem Cell culture, Cell viability and Cytotoxicity.	1	11,12 21,23
	Organ Culture, Cryopreservation.	1	19,25,27
	Instructional Hours		**15**
III	Methods of DNA transfer to animal cells – Calcium Phosphate Co Precipitation, Microinjection, Electrophoration, Liposome encapsulation, Biological vectors.	2	6
	Hybridoma technology, Tissue Engineering and its applications.	2	8,12
	Instructional Hours		**15**
IV	Collection, Culture and Preservation of Embryo,Culture of Embryonic stem cells and its applications.Gametogenesis and fertilization in animals.Ethical issues in animal biotechnology.	1	11,23
	Instructional Hours		**15**
V	Transgenic animals – Quality and Yield improvement.	1	7
	Production and recovery of products from animal tissue	1	6
	cultures, Cytokines, Plasminogen activators, Blood	1	27
	clotting factor, Growth hormones.	1	18
	Instructional Hours		**15**
	Total Hours		**75**

Text Book(s):

1. Freshney, **Animal Cell Culture: A Practical Approach**, John Wiley Publication, 6th Edition, 2010.
2. Michael Butler, **Animal Cell Culture and Technology**, BIOS Scientific Publishers, New York, 2nd Edition, 2008.

Unit I : Text Book 1, Chapter 2,8,9,27
Unit II : Text Book 1, Chapter 11,12,19,21,23,25,27
Unit III : Text Book 2, Chapter 6,8,11,12,23
Unit IV : Text Book 1, Chapter 11,23
Unit V : Text Book 1, Chapter 6,7,18,27

Reference Book(s):

1. Mather and Barnes, **Methods in Cell Biology**, Academic Press, 1998.
2. Butler, **Mammalian Cell Biotechnology: A Practical Approach**, Oxford UNI Press, 1991.
3. Scott F. Gilbert, **Developmental Biology**, Oxford University Press, 6th Edition, 2011.
4. Singh, B., Gautam S. K. and Chauhan, M. S., **Textbook of Animal Biotechnology**, TERI, New Delhi, 2015.
5. John R. W. Masters, **Animal Cell Culture**: 3rd Edition.
6. Singer E. D. and Berg, **Exploring Genetic Mechanisms**, JHU Press, 1997.
7. https://books.google.com/books/about/Animal_Biotechnology.html?id=DKM

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Quiz	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

S - Strong; H-High; M-Medium; L-Low.

Course Designed by	Verified by HoD	Checked by	Approved by
13/8/21 (Dr. N. SARANYA)	13/8/21 P. JEGANATHAN	14/8/21 Dr. C. Selvarajan	Convenor CDC 14 AUG 2021

Course Code	Title		
18U3BTE501	**Discipline Specific Elective Paper – I(A) Biotechnology and Food Safety**		
Semester: V	**Credits: 4**	**CIA :25 Marks**	**ESE:75 Marks**

Course Objective:

To utilize application of biotechnology in food safety

Course Outcome (CO):

On successful completion of the course, the students will be able to

CO1	describe the role of biotechnology in food production, processing and security
CO2	understand the principles that make a food product safe for consumption
CO3	understand principles involving food preservation via fermentation processes
CO4	learn about the concepts and experimental techniques of food safety techniques of food biotechnology
CO5	know about Good agricultural practices.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Fundamentals of food biotechnology**: Introduction Biotechnology relating to the food industry – role of bioprocess engineering in biotechnology industry. Regulatory and Social aspects of biotechnology in foods.	1	1
	Instructional Hours		**10**
II	**Industrial production of food products:** Technological aspects of industrial production of beer and wine, bakers yeast, vitamins, single cell protein, food flavor – food color – food enzymes	3	2
	Instructional Hours		**12**
III	**Application of biotechnology in dairy industry** Biotechnological approaches in dairy industries-Bio Preservatives- Bio peptides-productions-functions-Bio detergents-applications- Bio films mechanism effects its control.	2	8
	Instructional Hours		**10**
IV	**Food safety:** Introduction to food safety: definition, food safety issues, factors affecting food safety, importance of safe foods. Shelf life of food products: factors affecting shelf life and methods to check the shelf life	2	6
	Instructional Hours		**14**
V	**Good agricultural practices:** for crops, land animals, human beings, finished goods etc. Good manufacturing practices: Concept, current problems in food industry and solutions using good manufacturing practices	3	1
	Instructional Hours		**14**
	Total Hours		**60**

Text Book(s):

1. Sarah Elderidge. **Food Biotechnology: Current issues and perspectives**. Nova science pub. Inc. 2003.

2. Fortin, N.D. **Food Regulation: Law, Science, Policy, and Practice,** John Wiley, 2009.
3. Parmjit S. Panesar, Satwinder S. Marwaha. **Biotechnology in Agriculture and Food Processing: Opportunities and Challenges**. CRC Press, 2013.

Unit – I : Text Book 1, Chapter 1, Page No. 1-50.
Unit – II : Text Book 3, Chapter 2, Page No. 217-507.
Unit – III : Text Book 2, Chapter 8, Page No. 321-411.
Unit – IV : Text Book 2, Chapter 6, Page No. 195-252.
Unit – V : Text Book 3, Chapter 1, Page No. 71-217.

Reference Book(s):

1. Beuchat, L. R., **Indigenous Fermented Foods in Biotechnology**, Vol. 5, pp. 477-528. Edited by H. J. & G. Reed. Weinheim: VerlagChemie, 1983.
2. Hamstra, A. M., **Consumer Acceptance of Food Biotechnology**, SWOKA Research Report 137, The Hague, The Netherlands, 1993.

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Computation	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low.

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21	13/8/21		
Dr. Sudeepa			

Convenor CDC

14 AUG 2021

Course Code	Title		
18U3BTE605 / 20U3BTE606	**Discipline Specific Elective Paper - II(C) Bioremediation**		
Semester: VI	**Credits: 4**	**CIA :25 Marks**	**ESE:75 Marks**

Course Objective:

To understand the concept of waste management and remediation of biological wasteproducts

Course Outcome (CO):

On successful completion of the course, the student will be able to understand

CO 1	introduction to environment and pollution
CO 2	bioremediation and its applications
CO 3	degradation of various xenobiotics
CO 4	biotechnological methods of waste management
CO5	methods of hazardous waste disposal

Offered By: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Introduction to environment and pollution:** Types of pollution- air, water and land pollutions. Types of pollutants– inorganic, organic and biotic sources	1	7
	Instructional Hours		**12**
II	**Sources of pollution:** domestic waste, agricultural waste, industrial effluents and municipal waste. Climate change, greenhouse gases and global warming Impact of pollution on environment and measurement methods	1	7
	Instructional Hours		**12**
III	**Bioremediation:** Definition – constraints and priorities of bioremediation. Bioaugmentation; bioreactors for remedial processes, types of bioremediation- in situ, ex situ, Bioremediation of heavy metals: Microorganisms for ore concentration and leaching.	2	6
	Instructional Hours		**12**
IV	**Production of biofuels:** bioethanol, biomethane,Biotechnological methods for hazardous waste nagement.Phytoremediation- concepts and application	2	11
	Instructional Hours		**12**
V	**Xenobiotic compounds:** Recalcitrance – hazardous wastes – disposal of radioactive wastes. Biodegradation of xenobiotics – Biological detoxification; Biodegradation of DDT, BHC and malathion in soil, plants and insects.	2	7
	Instructional Hours		**12**
	Total Hours		**60**

Text Book(s):

1. Stanley E. Manahan, **Environmental Science and Technology**, CRC Press, 2010.
2. Chatterjii A K, **Introduction to Environmental Biotechnology**, PHI Learning Pvt. Ltd., 2011.
3. JogdandS N, **Environmental Biotechnology**, Himalaya Publishing House, 2010.

Unit I : Text Book 1, Chapter 7: 181-205.
Unit II : Text Book 1, Chapter 7: 181-205.
Unit III: Text Book 2, Chapter 6 : 170-182.
Unit IV: Text Book 2, Chapter 11: 192-215.
Unit V: Text Book 2, Chapter 7: 133-157.

Reference Book(s):

1. William P. Conningham and Mary Ann, **Principle of Environmental Science,** Tata McGraw-Hill publishing company**.** Tokyo, 2003.
2. Hans – Joachim Jordening, Josefwinter,**Environmental Biotechnology,**New Delhi 2005.
3. https://www.springer.com/in/book/9783540211013

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Model	Assignment	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
Dr. Sudeepa			

Convenor / CDC

Course Code	Title		
18U3BTE606 / 20U3BTE609	**Discipline Specific Elective Paper – III(C) Nanoscience and Technology**		
Semester: VI	**Credits: 4**	**CIA : 25 Marks**	**ESE: 75 Marks**

Course Objective:

Provide students with an understanding of important facts, concepts, and the investigative procedures of foundations in nanotechnology

Course Outcome (CO):

On successful completion of the course, the students will be able to

CO1	attain basic knowledge about nanotechnology and its types
CO2	comprehend the synthesis and characterization of nanomaterials
CO3	express the methods and appearance of nanotubes
CO4	look at nanomaterial formation
CO5	investigate uses of nanomaterials

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Introduction and Classification:** What is nanotechnology – Classification of Nanostructures - 1D, 2D and 3 D nanomaterials – Nanoscale Architecture.	1	1
	Instructional Hours		**12**
II	**Synthesis of Nanomaterials:** Top down – ball milerling; Bottom up – co-precipitaion – sol-gel – electrodeposition – using natural nanoparticles – chemical vapor deposition.	1	1
	Instructional Hours		**12**
III	**Characterization:** X-ray diffraction – Scherrer's formula – Scanning Electron Microscopy – Transmission Electron Microscopy – Fluorescence Microscopy.	2	4
	Instructional Hours		**12**
IV	**The Carbon Nanotube:** New Forms of Cabon – Types of Nanotubes – Formation of Nanotubes – Uses for nanotubes – Biological Applications.	3	4-7
	Instructional Hours		**12**
V	**Applications of Nanomaterials:** Insulation material – biosensor – phosphors – batteries – high power magnets – medical implants – other medical uses.	4	10-12
	Instructional Hours		**12**
	Total Hours		**60**

Text Book(s):

1. Robert W. Kelsall, Ian W. Hamley and Mark Geoghegan,**Nanoscale Science and Technology**, John Wiley & Sons Ltd, 2005.
2. Zhen Guo and Li Tan, **Fundamentals and Applications of Nanomaterials**, Artech House, Norwood, 2009.
3. Morinubo Endo, Sumio Iijima and Mildred S. Dresselhaus, **Carbon Nanotubes,** Elsevier Science Limited, 1st Edition, 1996.

4. M. Meyyappan, **Carbon Nanotubes Science and Applications**, CRC Press, New York,

Unit – I: Text Book 1, Chapter 1, Page No. 1-16.
Unit – II: Text Book 1, Chapter 1, Page No. 32-54.
Unit – III: Text Book 2, Chapter 4, Page No. 75-91.
Unit – IV: Text Book 3, Chapter 4-7, Page No. 27-64.
Unit – V: Text Book 4, Chapter 10-12, Page No. 237-278.

Reference Book(s):

1. Yury Gogotsi, **Nanomaterials Handbook**, CRC Press, Taylor & Francis Group, 2006.
2. Mahendra Rai, Nelson Duran, **Metal Nanoparticles in Microbiology**, Springer Heidelberg Dordrecht London New York, 2011.
3. Linda Williams, Dr. Wade Adams, **Nanotechnology Demystified**, McGraw-Hill, 2007.
4. Hari Singh Nalwa, **Handbook of Nanostructured Materials and Nanotechnology**, Academic Press, 2000.
5. https://symbiosisonlinepublishing.com/nanoscience-technology/
6. https://www.class-central.com/tag/nanotechnology

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Unit test	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
Dr. P Senthilkumar			

14 AUG 2021

Convenor
CDC

Course Code	Title		
18U3BTE609 / 20U3BTE608	**Discipline Specific Elective Paper-III(B) Stem Cell Research**		
Semester: VI	**Credits: 4**	**CIA :25 Marks**	**ESE:75 Marks**

Course Objective:

To understand the concept of stem cell therapy and regenerative medicine

Course Outcome (CO):

On successful completion of the course, the student will be able to:

CO1	Learn the Stem cell development.
CO2	Understand the Regenerative Medicine.
CO3	Know about the ethical guidelines involved in stem cell therapy.
CO4	To know about nuclear transfer technology.
CO5	To know about ethics.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	Introduction to Stem cell biology -Properties, Existence.	1	13
	Applications and current standings of the stem cell technology.	1	13
	Stem Cells in detail- Embryonic stem cells, Stem Cells from Adults.	1	13
	Pluripotency. Stem-cell plasticity, Regulators of pluripotency and differentiation of stem cell.	1	13
	The problem of differentiation of stem cells. Stem Cells and imprinted genes.	1	13
	Instructional Hours		**13**
II	Regenerative medicine: Current stem cell therapies. Stem cells for studying cancer and finding cures to other diseases.	1	13
	Correlation between stem cells and cancer, Stem cells and aging.	1	13
	Clinical applications of hematopoietic stem cells, cord blood,	1	13
	first successful transplantation of cord blood in a child with Fanconi's anemia.	1	13
	Instructional Hours		**13**
III	Treatment of neural diseases such as Parkinson's disease, Huntington's disease and Alzheimer's disease.	1	13
	Repair of damaged organs such as the liver and pancreas.	1	13
	Instructional Hours		**11**
IV	Nuclear transfer Technology, Human Therapeutic and Reproductive Cloning, Therapeutic Cloning for Cure of Parkinson's-like Disease In mice	1	
	Human Cloning and Human Dignity: An Ethical Inquiry.	1	13
	Patient-Specific Embryonic Stem Cells Derived from Human SCNT Blastocyst, Somatic Cell Nuclear Transfer.	1	13
	Instructional Hours		**13**
V	Ethics: Controversy surrounding human embryonic stem cell research, societal implications.	2	1
	Current Ethical Guidelines in India and other countries.	1	13
	Instructional Hours		**10**

Total Hours	60

Text Book(s):

1. Sasidhara, R., **Animal Biotechnology**, MJP Publishers, 2015.
2. Sateesh, M. K., **Bioethics and Biosafety**, L. K. International Publishing House, 2010.

Unit – I: Text Book 1, Chapter 13.Page No. 55-65
Unit – II: Text Book 1, Chapter 13.Page No. 68-78
Unit – III: Text Book 1, Chapter 13.Page No. 89-95
Unit – IV: Text Book 1, Chapter 13.Page No. 96-103
Unit – V: Text Book 2,1, Chapter 1: .Page No. 1-13, Chapter 13: Page No. 104-118.

Reference Book(s):

1. Robert Lanza, **Essentials of Stem Cell Biology**, Academic Press, 2009.
2. Paul Knopfler, **Stem Cells: An Insider's Guide**, World Scientific Publishing, 2013.

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Quiz	Assignment	Attendance	Total
5	5	6	3	3	3	25

Mapping

PSO / CO	PS O1	PS O2	PS O3	PS O4	PS O5
CO 1	H	M	M	M	M
CO 2	H	M	M	M	M
CO 3	L	M	M	H	H
CO 4	L	M	H	H	H
CO5	L	H	M	L	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
13/8/21 (Dr. P. Thimmarayasamy)	13/8/21 (P. Nirmala)	Dr. K. Selvanayaki Convenor CDC	14 AUG 2021

Course Code	Title		
18U3BTP614	**Core Paper – XIV Immunology and rDNA Technology Practical**		
Semester: V & VI	**Credits: 4**	**CIA: 40 Marks**	**ESE: 60 Marks**

Course Objective:

To have a hands-on experience on immunological techniques and nucleic acid engineering

Course Outcome (CO):

On successful completion of the course the students will be able to understand the

CO 1	concept of immunology
CO 2	defense mechanism of higher vertebrates against invading pathogen.
CO 3	antigen-antibody interactions and genes in diseases diagnosis
CO 4	identification of antigens and antibodies through immunological assays for
CO 5	mechanism of action and the use of antibodies & restrictions enzymes in biotechnology research

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

S. No	Experiment
	Immunology
1.	Preparation of antigens,
2.	Immunization and methods of bleeding
3.	Serum separation and storage
4.	Viability tests of cells (trypan blue test)
5.	Antigen- Antibody Reactions-Blood grouping& Rh typing, Widal test for typhoid fever
6.	Passive agglutination test-ASO, CRP
7.	Immuno diffusion-Single radial, double and rocket
8.	ELISA- Demonstration
	rDNA Technology
9.	Agarose gel Electrophoresis
10.	Isolation of Genomic DNA—Bacteria, Plant and Animal
11.	Elution of DNA from Agarose gel.
12.	Isolation of Plasmid DNA
13.	Isolation and Quantification of RNA
14.	Restriction Digestion, Ligation and Mapping
15.	Southern blotting --- Demonstration
16.	Northern blotting --- Demonstration
17.	Western blotting --- Demonstration
18.	Separation of Protein by SDS PAGE
19.	PCR- Demonstration
	Total Hours 120

Tools for Assessment (40 Marks)

Mid Test I	Model I	Performance	Observation	Result	Attendance	Total
10	10	05	05	06	04	40

Mapping

PSO / CO	PS O1	PS O2	PS O3	PS O4	PS O5
CO 1	H	L	H	H	M
CO 2	H	L	H	H	M
CO 3	M	M	H	H	H
CO 4	L	M	H	H	H
CO 5	M	H	H	H	H

H-High; M-Medium; L-Low

Countersigned by	Verified by HoD	Checked by	Approved by
A. Anitha 13/8/21	13/8/21	14/8/21	
Dr. A. Anitha	P. N [illegible]	Dele. Chairman	

Convener 11 AUG 2021

Course Code	Title		
18U3BTR203	**Allied Paper III - Chemistry Practical**		
Semester: I & II	**Credits: 2**	**CIA : 20 Marks**	**ESE: 30 Marks**

Course Objective

To utilise the theoretical knowledge by hands on training in lab, to incite application oriented research attitude in student and to gather meaningful conclusions

Course Outcomes (CO)

On successful completion of the course, the students will be able to

CO1	Reason out and analyze pI of aminoacids
CO2	Know to harness the reaction at ambient conditions
CO3	Know that Vmax and Km differs for each enzyme
CO4	Know to calculate order of reactions and write rate law for a reaction
CO5	To understand monolayer adsorption of ligands on solids

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 2 (I Sem.), 4 (II Sem.)**

S. No.	Experiment
1	Determination of pI of Alanine and Glutamic acid
2	Determination of activation energy of a uncatalysed and catalysed reactions
3	Quantifying amount of metal iron (2+) by volumetric titrations
4	Determining strength of weak and strong acids by conductometric titrations
5	Determination of Vamx and Km of peroxidise
6	Determination of thermodynamic parameters like ΔG, ΔH, ΔS values
7	Determination of order of ester hydrolysis
8	Determination of adsorption coefficient – Langmuir isotherm
9	Separation of metal ions by ion exchanger
10	Quantification of metal iron(2+) by volumetric titrations
	Total Hours **90**

Tools for Assessment (20 Marks)

Test I	MODEL I	Performance I	Performance II	Observation	Attendance	Total
3	3	4	4	3	3	20

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by
V. Shanmugam 13/8/21	12/8/21	14/8/21	
V. SHANMUGAM	Dr. P. Nirmala		14 AUG 2021

Convenor
CDC

.

Course Code	Title		
18U3BTR406	Allied Paper VI : C Programming Practical		
Semester: IV	Credits: 2	CIA: 20 Marks	ESE: 30 Marks

Course Objective:

To make the student learn programming language, problem solving techniques and write program in C language.

Course Outcome (CO):

CO1	How to execute programs in C language
CO2	Explain with structured programs using control structures and functions
CO3	Develop programs that perform operations using derived data types
CO4	Construct the applications using sequential and random access file processing
CO5	How to develop programmes using control structures and looping statements

Offered by: Computer Science

Course Content **Instructional Hours/ Week: 2**

S.No.	Programming List
1.	Find Greatest Among Three Numbers using If Statement
2.	Write a program to print the number in reverse order
3.	Write a program to print n even numbers.
4.	Print Fibonacci series for given n numbers
5.	Find Positive, Negative and Zero integers.
6.	Write a program to print the numbers in ascending order
7.	Write a program to count words, characters in sentence
8.	Write a program to print Prime Numbers
9.	Write a program to print the number in words
10.	Write a program to check whether the given string is palindrome or not.
	Total Hours 30

Tools for Assessment (20 Marks)

Demonstration	Program Execution	Test I	Test II	Observation	Attendance	Total
3	3	4	4	3	3	20

Mapping

CO \ PSO	PS 01	PS 02	PS 03	PS 04	PS 05
CO 1	M	M	L	L	M
CO 2	M	M	M	M	M
CO 3	M	M	M	M	M
CO 4	M	M	M	M	M
CO5	M	M	L	L	M

H-High; M-Medium; L-Low.

Course Designed by	Verified by	Checked by	Approved by
D.J. ANITHA MERLIN 13/8/21	13/8/21		14 AUG 2021 Convenor CDC

Course Code	Title		
18U4BTS604	**Skill Based Subject IV: Pharmacology**		
Semester: VI	**Credits: 3**	**CIA : 20 Marks**	**ESE: 55Marks**

Course Objective:

To understand the concept of therapy for various ailments and disorders

Course Outcomes (Co):

On successful completion of this course, the student will be able to

CO1	acquire the knowledge of Drug formulation
CO2	understand the Drug metabolism and allergy reactions
CO3	apply their knowledge in Clinical diagnosis
CO4	identify the usage of medicines for different disease
CO5	To know about pharmacology of Microbial infection, Cancer and Reproductive disorders

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	Pharmacology – origins and antecedents – Pharmacology in the 20th century – Drugs – Sources, dosage forms and routes of administration. Absorption, factors modifying drug absorption, distribution, metabolism – Phase I, II reactions.	1	2
	Instructional Hours		**13**
II	Targets for drug action, receptor proteins, ion channel and drug targets, control of receptor expression, assay of drug potency: Chemical, bioassay and immunoassay-Drug tolerance and drug dependence.	1	4
	Instructional Hours		**12**
III	Principles of basic Pharmacokinetics, Adverse response to drugs, drug intolerance, drug allergy, tachyphylaxis, drug abuse, vaccination against infection, factors modifying drug action and effect.	2	6
	Instructional Hours		**13**
IV	Mechanism of action of drugs used in therapy of Respiratory systems – cough, bronchial asthma, pulmonary tuberculosis, Cancer chemotherapy.	1	5
	Instructional Hours		**12**
V	Antimicrobial drugs – sulfonamide, trimethoprim, penicillin, aminoglycosides and bacterial resistance. Anti-fertility and ovulation inducing drugs.	1	12,13
	Thyroid and anti thyroid drugs, insulin and anti diabetic drugs.	2	5
	Instructional Hours		**10**
	Total Hours		**60**

Text Book(s):

1. Tripathi, K. D., **Essential of Medical Pharmacology**, Jaypee Brothers Publishres, 6th Edition, 2013.
2. RangH. P., Dale M. M., RitterJ. M., Moore P. K., **Pharmacology**, Wiley Publication, 5th Edition, 2003.

Unit I	:	Text Book 1, Chapter 2. Page No. 33-47, Page No. 65-79.
Unit II	:	Text Book 1Chapter 4, Page No. 85-98, Page No. 120 - 138
Unit III	:	Text Book 2, Chapter 6,Page No.145-156.
Unit IV	:	Text Book 1, Chapter, Page No.198- 234.
Unit V	:	Text Book 2, Chapter 5, Page No. 85-98.

Reference Book(s):

1. James Mriter, **A textbook of Clinical Pharmacology and Therapeutics**, 5thEdition, 2010.
2. https://www2.bc.edu/wanda-anderson/pharmacologyonlineresources.html

Tools for Assessment (20 Marks)

CIA I	CIA II	CIA III	Quiz	Seminar	Assignment	Total
4	4	5	2	2	3	20

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
13/8/21 (Dr. N. SARANYA)	13/8/21 P. Jeyaram	14/8/21 Convenor CDC	14 AUG 2021

Course Code	Title	
18U4BT3ED1	EDC Paper I: Apiculture	
Semester: III	Credits: 2	ESE: 50 Marks

Course Objective:

To offer self employment to the students after their graduation because it is essentially a rural-based and welfare - oriented agro based industry

Course Outcome (CO):

At the end of the course a student should be able to

CO1	understand a brief history about bee keeping and rearing
CO2	analyze the different bee keeping equipments and cultivation methods
CO3	understand the different diseases of bees and its control methods
CO4	attain self-sufficiency of quality honey products for socio-economic development and environmental sustainability
CO5	know about Entrepreneurship in Apiculture.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 2**

Unit	Description	Text Book	Chapter
I	**Biology of Bees:** History, Classification	1	1
	Biology of Honey Bees	1	5
	Social Organization of Bee Colony	1	6
	Instructional Hours		**6**
II	**Rearing of Bees:** Artificial Bee rearing (Apiary)	1	8
	Beehives – Newton and Langstroth	2	9
	Bee Pasturage	2	7
	Selection of Bee Species for Apiculture	1	9
	Bee Keeping Equipment	1	7
	Methods of Extraction of Honey (Indigenous and Modern).	2	4, 5
	Instructional Hours		**6**
III	**Diseases and Enemies:** Bee Diseases and Enemies	2	10
	Control and Preventive measures		
	Instructional Hours		**6**
IV	**Bee Economy:** Products of Apiculture Industry and its Uses (Honey, Bees Wax, Propolis), Pollen.	1	10
	Bee poisoning and utility of bees in toxicity studies	1	13
	Instructional Hours		**6**
V	**Entrepreneurship in Apiculture:** Bee Keeping Industry – Recent Efforts	1	15
	Modern Methods in employing artificial Beehives for cross pollination in horticultural gardens	2	12
	Instructional Hours		**6**
	Total Hours		**30**

Text Book(s):

1. Kugonza, D.R., **Beekeeping – Theory and Practice**, Fountain Publishers, Kampala – Uganda, 2009.
2. Singh S., **Beekeeping in India**, Indian council of Agricultural Research, New Delhi, 1962.
3. Gupta, J.K., Belavadi, V.V. and Singh, Sh. M., **Apiculture**, www.agrimoon.com, 2012.

Unit I : Text Book 1, Chapter 1, 5, 6: Page No.3-11, Page No. 44-58.
Unit II : Text Book 1, Chapter 7, 8, 9: Page No. 83-144; Text Book 2, Chapter 4,
5, 7, Page No. 9: Page No. 48-80, Page No. 90-122, Page No. 148-158.
Unit III: Text Book 2, Chapter 10: Page No.158-175.
Unit IV: Text Book 1, Chapter 10, 13: Page No. 152-179, Page No. 203-235.
Unit V : Text Book 1, Chapter 15: Page No. 245-251, Text Book 2, Chapter 12: Page No. 193-205.

Reference Book(s):

1. Prost, P. J., **Apiculture**. Oxford and IBH, New Delhi, 1962.
2. Bisht D.S., **Apiculture**, ICAR Publication, 2016.
3. Sharma P.L. and Singh, S.H., **Book of Bee keeping,** 1995.
4. Roger, A. Morse, **The ABC and XYZ of Bee culture**, 40th Edition, A. I. Root & Co., Medina, Ohio, 1990.
5. https://en.wikisource.org/wiki/Portal:Apiculture

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
13/8/21 (Dr. N. SARANYA)	13/8/21 P. JEYARAMAN	14/8/21 Convenor CDC	14 AUG 2021

Course Code	Title	
18U4BT3ED2	**EDC - Organic Terrace Farming**	
Semester: III	**Credits: 2**	**ESE: 50 Marks**

Course Objective:

The goal is to increase and improve education in practical organic agriculture as farming and horticulture skills and concepts

Course Outcome (CO):

On the successful completion of the course the students will get an overall understanding of

CO 1	understanding about terrace farming concept and its importance
CO 2	how to grow organic vegetables in pots, pot filling
CO 3	investigate the benefits of growing organic foods for both human health and the environment
CO 4	analyzing the importance of organic gardens
CO 5	nutritional assessment and health impact

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 2**

Unit	Description	Text Book	Chapter
I	**Introduction to organic farming**-Principles of Organic Farming & Need for organic farming Various Organic Farming methods, Benefits. Different concepts of organic farming – Natural farming, Biodynamic farming, Perma culture and Zero Budget Farming. Alternative farming systems – conventional, organic.	1,2	1
	Instructional Hours		**6**
II	**Gardening:** Introduction to Gardening and landscaping,types of materials used for gardening. Different gardening – Vertical garden, Roof garden, Terrace garden, Sky rise garden, Scenic gardens. Home garden and its importance.	3,4	
	Instructional Hours		**6**
III	**Preparation of terrace garden:** Green roof construction - Selecting plant containers - Seed Selection - Soil Preparation – Seeding - Watering and Timing - irrigation systems - Pest control – Composting.	5	-
	Instructional Hours		**6**
IV	**Parameters for maintenance of terrace garden:** Sunlight – water facility – pests and insects - manures and fertilizers –weeding-soil preparation – types of pots and containers used – organic pest control agents.	5	-
	Instructional Hours		**6**
V	**Practical:**Determination of seed viability and fertility by different methods. Preparation of Biodynamic farming - cow horn manures and Quality checking. Terrace Farming-Practical. Organic Farming Products-Marketing, Theory and Practical	6,7,8	-

Aspects.	
Instructional Hours	**6**
Total Hours	**30**

Text Book(s):

1. PalaniappanS.P and K. Annadurai, **Organic Farming**, Scientific Publishers (India), Jodhpur, 1999.
2. http://parisaramahiti.kar.nic.in/21.Natural%20Farming%202010-07.pdf
3. http://agritech.tnau.ac.in/horticulture/horti_Landscaping_vertical%20gardening.html
4. http://agritech.tnau.ac.in/horticulture/horti_Landscaping_roofgarden.html
5. http://agritech.tnau.ac.in/horticulture/horti_Landscaping_types%20of%20garden.html
6. https://www.webpages.uidaho.edu/plsc300/Labs/lab13%20seed%20viability%20testing-12.pdf
7. http://agritech.tnau.ac.in/org_farm/orgfarm_biodynmic_prep500.html
8. https://www.youtube.com/watch?v=f3Aeak9TjtA

Unit – I: Text Book 1, Chapter 1, Page No. 1-26, Weblink 2
Unit – II: Weblink 3,4
Unit – III: Weblink 5
Unit – IV: Weblink 5
Unit – V: Weblink 6,7,8

Reference Book(s):

1. Pratibha and P.Trived,**Home Gardening**, ICAR, New Delhi., 1987
2. GopalSamy Iyengar,**Complete Gardening In India**,IBH, India , 1990.
3. Nambison, K.M.P. **Design Elements of Landscape Gardening**, Oxford and IBH Publications, New Delhi, 1992.
4. Sharma K. Arun, **A Hand Book of Organic Farming Agrobios (India) Jodhpur**, 1992.

Mapping

PSO / CO	PS O1	PS O2	PS O3	PS O4	PS O5
CO 1	M	M	H	H	M
CO 2	H	L	H	H	M
CO 3	L	M	H	H	M
CO 4	M	M	H	H	H
CO 5	L	L	H	H	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21	13/8/21	14/8/21	
Dr. Sudeepa			

Convenor / CDC

14 AUG 2021

Course Code	Title		
18U4BTS503	**Skill Based Paper – III Molecular Biology**		
Semester: V	**Credits: 3**	**CIA: 20 Marks**	**ESE: 55 Marks**

Course Objective:

To provide knowledge of molecular biology and genetics of prokaryotic and eukaryotic organisms to the students

Course Outcome (CO):

On successful completion of the course, the students will be able to

CO1	tell aboutbasic genetics concept the structure of genes and chromosomes
CO2	explain the changes in genes and its phenotypic effects
CO3	illustrate the process of replication and gene expression
CO4	examine the process of recombination and mutation and infer its outcome
CO5	understand gene controlling mechanisms

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 3**

Unit	Description	Text Book	Chapter
I	**Discovery of DNA as genetic material**: Griffith's experiment, Hershy and Chase warring blender experiment, Chargaff's rule,	1	1
	DNA replication in Prokaryotes and Eukaryotes, Enzymes and proteins involved in replication.	1	1
	Instructional Hours		**9**
II	**Transcription & transcriptional control:** (Prokaryotes and Eukaryotes), Initiation, elongation, termination, promoter sequences, TATA box, Hogness box, CAAT box, Enhancers, upstream activating sequences.	1	19
	Post transcriptional modifications: splicing, spliceosomes.	1	20
	Instructional Hours		**9**
III	**Translation:** Prokaryotic and eukaryotic translation, Initiation, elongation and termination, post translational modifications of proteins.	1	24,25
	Import into nucleus, mitochondria and chloroplast. Genetic code: Codon, Anti-codon		
	Instructional Hours		**9**
IV	**Gene Mutation and its mechanism:** Types of mutation: Forward; Reverse; Intragenic suppressor; Extragenic suppressor; point mutations; Missense; Nonsense; Somatic versus germinal mutation. Mutagenesis-spontaneous and induced.	2	14
	DNA repair mechanisms: Direct reversal; Excision repair (base excision, nucleotide excision and mismatch); recombinational repair; SOS response and SOS bypass.	2	14
	Instructional Hours		**9**
V	**Operon concepts (Lac & Trp).** Gene silencing. Recombination – Homologous and Non – homologous recombination.	2	15

Transformation, Transduction and Conjugation	
Instructional Hours	**9**
Total Hours	**45**

Text Book(s):

1. Jocelyn E. Krebs, Stephen T. Kilpatrick, Elliott S. Goldstein, **Lewin's Genes XI,** Jones and Bartlett Publishers, Inc. 2013.
2. William S. Klug & Michael R. Cummings, **Essentials of Genetics,** Prentice Hall Internationals, Edition: 2, 1996.

Unit I : Text Book 1, Chapter 1: 1-26.
Unit II : Text Book 1, Chapter19, 20:509-547.
Unit III: Text Book 1, Chapter 24, 25: 671-714.
Unit IV: Text Book 2, Chapter 14: 303-320.
Unit V : Text Book 2, Chapter 15: 329-349

Reference book(s):

1. Darnell, Lodish, Baltimore, **Molecular Cell Biology,** Scientific American Books, Inc., 1994.
2. Benjamin A Pierce, **Genetics: A Conceptual Approach,** Freeman and Company, New York, 2nd Edition, 2005.
3. Brown, T. A., **Genomes 2,** Published by Garland Science Publishing, New York. 2002.
4. Gerald Karp, **Cell and Molecular Biology,** Published by John Wiley, Edition: 6.2009.
5. Bruce Alberts, **Molecular Biology of the Cell**, Published by Garland Science, Taylor &Francies.2014.
6. https://pdfs.semanticscholar.org/a610/f4e5b9797218bd6ecbfd597787129deaf78f.pdf
7. https://www.youtube.com/watch?v=aWpAe3rc5BU

Tools for Assessment (20 Marks)

CIA I	CIA II	CIA III	Assignment	Quiz	Attendance	Total
4	4	5	2	2	3	20

Mapping

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

H-High; M-Medium; L-Low.

Course Designed by	Verified by HOD	Checked by	Approved by
13/8/21	13/8/21	14/8/21	14 AUG 2021
Dr. P. Senthilkumar			Convenor CDC

Course Code	Title	
18U4ENV101	Ability Enhancement Compulsory course (AECC) Environmental Studies	
Semester: I	Credits: 2	ESE : 50 Marks

(Common to all UG Programmes)

Course Objective: This course enables the students to recognize the interconnectedness of multiple factors in environmental challenges and communicate clearly and competently matters of environmental concern.

Course Outcome:

CO 1	To understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
CO 2	To understand concepts and methods from ecological and physical sciences and their application in environmental problem solving.
CO 3	To solve the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
CO 4	To reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
CO5	To apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

Course Content **Instructional Hours / Week : 2**

Unit	Description	Text Book	Chapter
I	**Natural Resources:** Forest resources, Water resources, Mineral resources Food resources and Energy resources.	1	5
	Instructional Hours		**6**
II	**Ecosystems:** Concept of an ecosystem, Structure and function; Introduction, types characteristic features, structure and function of ecosystem **Activity: Prepare an album on types of Ecosystem.**	1	3
	Instructional Hours		**6**
III	**Environmental Pollution:** Definition Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution and Noise pollution, Solid waste management **Activity: Discuss the solutions for water pollution.**	1	8,9,11, 10,12,15
	Instructional Hours		**6**
IV	**Social Issues and the Environment** Water conservation, rain water harvesting, watershed management, Environmental ethics : Issue summits' and possible solutions and Public awareness **Activity: Identify and analyze a Social Issue and an Environment issue in your locality.**	1 2	17 9

	Instructional Hours		**4**
V	**Disaster Management:** Floods, Earthquakes, Cyclones, Landslides: From management to mitigation of disasters: The main elements of a mitigation and measures of strategy: Floods, Earthquakes, Cyclones and Landslides	3	16
	Instructional Hours		**6**
Case Studies: Use Social media for e-networking and dissemination of ideas on environmental issues. (Or) Visit to a Nearby biome / Wildlife Sanctuary/ our own campus & study the various bioresources.			**2**
	Total hours		**30**

Text Book(s):

1. Agarwal,K.M.,Sikdar,P.K.,Deb,S.C. (2002). A Textbook of Environment. Macmillan India Ltd. Kolkata, India.
2. Dash.M.C. (2004). "Ecology, Chemistry & Management of Environmental Pollution". Published By Rajiv Beri For Macmillan India Ltd. 2/10 Ansari Road, Daryaganj, New Delhi – 110002.
3. From UGC website: https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf

Reference Book(s):

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
3. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions
4. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p
5. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt. Ltd 345 p.

Course designed by	Verified by	Checked by	Approved by
(Susheepa)		Convenor CDC	

Course Code	Title	
18U4HRC202	Ability Enhancement Compulsory Course : **Human Rights and Constitution of India**	
Semester: II	**Credits: 2**	**Max. Marks : 50**

Course Objective: Understand the concept of human rights and the importance of Indian Constitution.

Course Outcome:

CO1	Understand the principal aspects of human rights and duties in a broad sweep.
CO2	Understand the fundamental duties and rights of Indian Citizen

Offered by:

Course Content **Instructional Hours / Week: 2**

Unit	Description	
I	**Human Rights and Conceptual Background of Human Rights** Definition, Meaning Inherent, inalienable, Universal, indivisible Values: Dignity, liberty, equality and justice.	
	Instructional Hours	**6**
II	**Philosophical and Historical Perspectives** : Theories of Human Rights - Human Rights Movements- History of Human Rights Civilization	
	Instructional Hours	**6**
III	HR for target population: Refugees, War victims, Prisoners, Custodial Violence Women and Children, Senior Citizens.	
	Instructional Hours	**6**
IV	Human Rights and Duties in India Evolution : Independence Movement , Making of the constitution Indian Constitution : Fundamental Rights –directive Principles – Fundamental Duties.	
	Instructional Hours	**6**
V	Enforcement and Protection Mechanism of Human Rights in India. Judiciary, National Human Rights Commission and other Commissions and Committees. Non-Governmental Organizations, Information Media and Education.	
	Instructional Hours	**6**
	Total Hours	**30**

Text Book:

1. **"Human Rights and Constitution of India",** complied by the Department of Social Work, Nehru Arts and Science College.

Course Designed by	Verified by	Checked by	Approved by

Convenor
CDC

14 AUG 2021

Course Code	Title		
18U4HVY201	Human Values and Yoga Practice I		
Semester: I& II	Credits: 2	CIA: 25 Marks	ESE: 25 Marks

(Common to all UG programmes)

Course Objective:

- To help the students appreciate the essential complementarily between 'values' and 'skills' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
- To prepare and distribute standardized Yoga teaching and training materials with reference to institute health

Course Outcome (CO):

At the end of the course, students are expected

CO 1	To inculcate in students, a sense of respect towards harnessing values of life and spirit of fulfilling social responsibilities.
CO 2	To inspire individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening.
CO 3	To inculcate cultural behavioral patterns
CO 4	To understand physical body and Health concepts

Course Content **Instructional Hours / Week: 1**

Unit	Description	
I	**Human Values**-Introduction-Definition of Ethics and Values-Character and Conduct - Nature and Scope of Ethics.	
	Instructional Hours	**6**
II	**Individual and Society**-Theories of Society-Social Relationships and Society-Empathy: Compassion towards other being -Environmental Ethics and Nature.	
	Instructional Hours	**6**
III	Cultural Education - Purity India - Patriotism - Time management. Greatness of Womanhood - Food is medicine- Individual peace -World Peace.	
	Instructional Hours	**6**
IV	Power of Meditation- Development of mind in stages - Mental Frequencies - Methods for Concentration. Meditation Practices - Surya namaskar.	
	Instructional Hours	**6**
V	Simplified Physical Exercise – Kayakalpa Practices - Training for Potentialising the Mind.	
	Instructional Hours	**6**
	Total Hours	**30**

Textbook:

1. **"Value Education",** compiled by Centre for Human Excellence, Nehru Arts and Science College.

Course designed by	Verified by	Checked by	Approved by

Course Code	Title		
18U4HVY402	**Value Education: Human values and Yoga Practice II**		
Semester: III & IV	**Credit: 2**	**CIA: 25 Marks**	**ESE: 25 Marks**

Course Objective

- To help the students appreciate the essential complementarily between 'values' and 'skills' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
- To prepare and distribute standardized Yoga teaching and training materials with reference to institute health

Course Outcome (CO):

At the end of the course, students are expected

CO 1	To become more aware of their self and their relationships and would have better reflective and discerning ability.
CO 2	It is hoped that they would be able to apply what they have learnt to their own self in different ordinary day-to-day settings in real life with higher commitment and courage.
CO 3	To enable students to lead a practical life adding value to human relations.
CO 4	To have the basic Knowledge on Simplified Physical Exercises and Asanas and Meditation

Course Content **Instructional Hours / Week: 1**

Unit	Description	Text Book	Chapter
I	**Self-realization and Human Values-** Self-realization and Harmony-Rules and Regulations-Rights and Duties-Good and Obligation-Integrity and Conscience. **Obligation to Family-** Trust and Respect -Codes of Conduct -Citizens Charter - Emotional Intelligence.	1	1,4
	Instructional Hours		**6**
II	Impact of Modern Education and Media on Values: Impact of Science and Technology on Values; Effects of computer aided media on Values (Internet, e-mail, Chat etc.); Role of teacher in the preservation of tradition and culture;	1	5
	Instructional Hours		**6**
III	Eradication of worries - Maintaining youthfulness - Greatness of friendship – Refinement of worries - Neutralization of anger- Intelligent quotient (IQ), Emotional quotient (EQ), Spiritual Quotient (SQ)	1	2,3
	Instructional Hours		**6**
IV	Standing Posture: Tadasana, Padahastasana, Virabhadrasana; Sitting posture: Ustrasana, Ardha Matsyendrasana,	2	4,5

	Paschimottanasana.		
	Instructional Hours		**6**
V	Supine posture: Sarvangasana, Halasana, Chakrasana. Prone posture: Bhujangasana, shalabhasana; Dhanurasana; Balancing postures: Vrikshasana, Natarajasana, Utkatasana; Pranayama: Bhastrika, Bhramari, NadiShodhan.	2	6,9
	Instructional Hours		**6**
	Total Hours		**30**

Textbook(s):

1. Kiran, D.R. "Professional Ethics & Human Values", TATA McGraw Hill Education.
2. Chandrasekaran, 1999.Sound Health through yoga, Prem Kalyan Publications, Madurai.

Reference Books:

1. Vethathiri Maharishi, 2011,"Value Education", Vethathiri Publication, Erode
2. Thathuvagnani Vethathiri Maharishi, 2014, "Simplified Physical Exercises". Vethathiri Publications

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21	P. N 13/8/21	14/8/21	
Dr. Sudeepa	P. Nagarajan	Dr. K. Selvanayaki	

Convenor / CDC

17 AUG 2021

Course Code	Title	
18UBTSS01	**Self Study Paper I: Hematology**	
Semester: II - IV	**Credit: 1**	**ESE: 50 Marks**

Course Objective:

To understand red cell disorders, coagulopathies, anticoagulant and thrombolytic therapies, blood & marrow morphology, hematopathology, immunohematology, bone marrow transplantation and hematopoietic growth factors.

Course Outcome (CO):

On successful completion of this course, the student will be able to:

CO 1	Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history
CO 2	Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.
CO 3	Adapt hematology laboratory techniques and procedures when errors and discrepancies in results are obtained to effect resolution in a professional and timely manner.
CO 4	Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
CO 5	Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: --**

Unit	Description	Text Book	Chapter
I	**Blood composition:** Blood Plasma, RBC, WBC, Platelets, Function of blood, Formation of blood cells, Formation of platelets (Thrombopoiesis).	3	1
	Iron deficiency anaemia: Iron metabolism, Clinical features of iron deficiency, Laboratory investigations, Management, Prevention.	1	1
	Macrocytic anaemias	1	2
	The hereditary anaemias.	1	3
	Polycythaemia, essential thrombocythaemia, and myelofibrosis.	1	4
	Chronic myeloid leukaemia	1	5
	The acute leukaemias	1	6
	Instructional Hours		--
II	**Platelet disorders:** Normal haemostasis, Congenital abnormalities, Acquired abnormalities, History and examination of patients, Investigations, Management.	1	7
	The myelodysplastic syndromes,	1	8
	Multiple myeloma and related conditions	1	9
	Instructional Hours		--
III	**Bleeding disorders, thrombosis, and Anticoagulation:** History, Laboratory investigation, Congenital disorders, Acquired disorders, Arterial thrombosis, Venous thrombosis, Anticoagulation.	1	10
	Malignant lymphomas and chronic lymphocytic leukaemia.	1	11

Instructional Hours			--
IV	**Haematological investigations:** Full blood count, Blood film, Plasma viscosity, ESR, Haematinic assays, Haemoglobin electrophoresis, Haptoglobin, Schumm's test, Kleihauer test, Reticulocytes, Urinary haemosiderin, Ham's test, Immunophenotyping, Cytogenetics, HLA typing.	2	16
Instructional Hours			--
V	**Blood transfusion:** Using the blood transfusion laboratory, Maximum surgical blood ordering schedule (MSBOS), Transfusion of red blood cells, Platelet transfusion, Fresh frozen plasma (FFP), Cryoprecipitate, Intravenous immunoglobulin, Autologous blood transfusion, Jehovah's Witnesses.	2	17
Instructional Hours			--
Total Hours			--

Text Book(s):

1. Drew Provan., **ABC of Clinical Haematology**, BMJ Publishing Group, London. 2nd Edition, 2003.
2. Drew Provan, **Oxford Handbook of Clinical Haematology**, 2nd Edition, Oxford University Press, New York. 2004.
3. Yared Alemu, Alemayehu Atomsa, Zewdneh Sahlemariam., **Hematology** (For Medical Laboratory Students), Ethiopia Ministry of Health and Education. 2006.

Unit 1: Text Book 1, 3: Chapter 1-6, 1.
Unit 2: Text Book 1: Chapter 7-9.
Unit 3: Text Book 1: Chapter 7-9.
Unit 4: Text Book 2: Chapter 16.
Unit 5: Text Book 2: Chapter 17.

Reference Book(s):

1. McKenzie, Shirlyn B., **Clinical Laboratory Hematology**, 2nd Edition, Prentice Hall. 2009.
2. Rodak, B.F., Fritsma, G.A., Keohane, E., **Hematology: Clinical Principles and Applications**, 4th Edition, Elsevier Saunders. 2011.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	L	L	M	H	M
CO 2	L	L	M	M	M
CO 3	L	H	M	M	L
CO 4	L	H	M	L	L
CO 5	M	L	H	M	M

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21 Dr. Sudeepa	13/8/21		

Convenor CDC

14 AUG 2021

Course Code	Title	
18UBTSS02	**Self Study Paper II: Histology**	
Semester: II – IV	**Credit: 1**	**ESE: 50 Marks**

Course Objective:

To understand tissue preparation, fixation, clearing, molding and treatment

Course Outcome (CO):

On successful completion of this course, the student will be able to:

CO1	Understand cytoplasmic organelles
CO2	Know various layers of cells
CO3	Learn about functions of various organs
CO4	Remember neuron structure and function
CO5	Perform histochemical staining techniques

Offered by: Biotechnology

Course Content **Instructional Hours / Week: --**

Unit	Description	Text Book	Chapter
I	**The Cytoplasm:** Cell Differentiation, Cytoplasmic Organelles, The Cytoskeleton, Inclusions	1	2
	The Nucleus: Components of the Nucleus The Cell Cycle Mitosis Stem Cells & Tissue Renewal Meiosis Apoptosis	1	3
	Instructional Hours		--
II	**Epithelial Tissue:** Characteristic Features of Epithelial Cells, Specializations of the Apical Cell Surface, Types of Epithelia, Transport Across Epithelia, Renewal of Epithelial Cells	1	4
	Connective Tissue: Cells of Connective, Types of Connective Tissue	2	5
	Extracellular matrix, Fibers of, connective tissues	2	6
	Dense connective tissues: Connective tissues with special properties	2	7
	Skeletal tissues: Cartilage	2	8
	Skeletal tissues: Bone	2	9
	Instructional Hours		--
III	**Muscle tissues:** Skeletal Muscle, Cardiac Muscle, Smooth Muscle	2	11
	The Circulatory System: Heart, Tissues of the Vascular Wall, Vasculature, Lymphatic Vascular System	1	11
	Instructional Hours		--
IV	Nerve Tissue & the Nervous System: Development of Nerve Tissue, Neurons, Glial Cells & Neuronal Activity, Central Nervous System, Peripheral Nervous System, Neural Plasticity & Regeneration	1	9
	Instructional Hours		--
V	Histology & Its Methods of Study: Preparation of Tissues for Study, Light Microscopy, Electron Microscopy, Autoradiography, Cell & Tissue Culture,	1	1

	Enzyme Histochemistry, Visualizing Specific Molecules, Interpretation of Structures in Tissue Sections	
Instructional Hours		--
Total Hours		--

Text Book(s):

1. Junqueiras, **Basic Histology Text and Atlas**, 13th Edition, McGraw-Hill Education, 2013
2. Chereshneva, E.V., Gatina, K.I., and Prylutskaya, I. A., **General Histology**, Donetsk Education, 2011.

Unit 1: Text Book 1: Chapter 2, 3.
Unit 2: Text Book 1, 2: Chapter 4, 5-9.
Unit 3: Text Book 1,2: Chapter 11, 11.
Unit 4: Text Book 1: Chapter 9.
Unit 5: Text Book 1: Chapter 1.

Reference Book(s):

1. McKenzie, Shirlyn B., **Clinical Laboratory Hematology**, Second Edition, Pearson Education, 2011.
2. Rodak, B.F., Fritsma, G.A. & Keohane, E., **Hematology: Clinical Principles and Applications**, 4th Edition, Elsevier Saunders, 2011.

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21 Dr. Sudeepa	13/8/21		

Convenor CDC

14 AUG 2021

विषय क्रमांक	शीर्षक	
19U1HIN303	**भाग–I हिंदी**	
सत्र : III	**क्रेडिट श्रेय : 4**	ESE:75 CIA:25

कोर्स का लक्ष्य : छात्रों को हिन्दी साहित्य का ज्ञान प्रदान करना।
छात्रों को साहित्य के संदर्भ में विभिन्न साहित्यिक विधाओं के विकास क्रम का परिचय देना।
छात्रों को युगीन सामाजिक, राजनीतिक, धार्मिक, साहित्यिक तथा आर्थिक परिस्थितियों के परिप्रेक्ष्य में हिंदी से अवगत कराना।

कोर्स का अपेक्षित परिणाम : हिंदी भाषा एवं साहित्य का सम्यक ज्ञान भारतीय जीवन एवं संस्कृति के विविधता का ज्ञान प्राप्त कराना।
हिंदी भाषा और साहित्य के प्रति बुनियादी रूप विकसित कराना।

के द्वारा प्रस्तुत पाठ्य सामग्री : हिंदी शिक्षण के लिए निर्धारित घंटे / सप्ताह : 06

इकाई	विवरण	
I	हिंदी साहित्य का इतिहास : (आदिकाल भक्ति काल) में प्रवृत्तियों का सामान्य ज्ञान	
	शिक्षण के लिए निर्धारित घंटे	**25**
II	प्राचीन काव्य : 1. कबीर के दोहे (12 दोहा), 2. सूरदास (4 भजन) 3. तुलसीदास (3 पद) 4. मीराबाई के पद	
	शिक्षण के लिए निर्धारित घंटे	**15**
III	आधुनिक काव्य – 1. निराला–अभी न होगा मेरा अंत, 2. अरुण कमल–मुक्ति 3. जयशंकर प्रसाद–मनुष्यता 4. वीरेन डंगवाल–पंद्रह अगस्त 5. सुभद्राकुमारी चौहान–जालियाँवाला बाग में वसंत	
	शिक्षण के लिए निर्धारित घंटे	**15**
IV	अलंकार : शब्दालंकार, अर्थालंकार, अनुप्रास, यमक, श्लेष, उपमालंकार, उत्प्रेक्षा, अतिशयोक्ति	
	शिक्षण के लिए निर्धारित घंटे	10
V	गद्यांश लेखन शब्द शुद्धि, वाक्य शुद्धि, संक्षिप्तीकरण, अनेक शब्दों के लिए एक शब्द	
	शिक्षण के लिए निर्धारित घंटे	**10**
	कुल घंटे	**75**

पाठ्यपुस्तक :

1. **काव्य सुमन,** राजपाल एण्ड सन्स, दिल्ली।
2. **काव्य तरंग,** सुमित्रा प्रकाशन, इलाहाद
3. kavithakosh.org
4. bharatdarshan.co.nz

संदर्भ ग्रंथ :

1. डॉ. नगेन्द्रा, **हिंदी साहित्य का इतिहास**, नेशनल पब्लिकेशन, अंधेरी रोड, दरियागंज, नई दिल्ली। संस्करण 1987
2. सं. महेन्द्र कुलक्षेत्र, **काव्य सुमन**, राजपाल एंड सन्स, काश्मीरी गेट, नई दिल्ली–110 006
3. राम बनसल विज्ञाचार्या, **कंपयूटर : सामान्य ज्ञान एवं यूसर गैड**, वाणी प्रकाशन, नई दिल्ली–110 002. संस्करण 2010
4. रामचन्द्र शुक्ला, **हिंदी साहित्य का सरल इतिहास**, वाणी प्रकाशन, नई दिल्ली। संस्करण 2003
5. एम.ए. रंजित शर्मा, **हिंदी साहित्य का सरल इतिहास**, प्रकाशन : विनोद पुस्तक मंदिर, आग्रा–2. संस्करण 2000

वेब स्रोत

a) www.webdunia.com b) www.hindinest.com c) www.bhashaindia.com

आकलन के लिए उपयुक्त अंक (25 अंक)

सीआईए. I	सीआईए. II	सीआईए. II	असाईनमेंट	संगोष्ठी	उपस्थिति	कुल
5	5	6	3	3	3	25

पाठ्यक्रम द्वारा डिज़ाइन किया गया	एच.ओ.डी. द्वारा सत्यापित	के द्वारा जांचा गया	द्वारा अनुमोदित
R. Suvarnalatha 13/8/21 (R. Suvarnalatha)	R. Suvarnalatha 13/8/21 (R. Suvarnalatha)	Dr.K.Selvaraj Convenor CDC	14 AUG 2021

विषय क्रमांक	शीर्षक	
19U1HIN404	**भाग–I हिंदी**	
सत्र : IV	**क्रेडिट श्रेय : 4**	ESE:75 CIA:25

कोर्स का लक्ष्य : आधुनिक हिन्दी साहित्य के विभिन्न आन्दोलनों के परिचित कराना।

आधुनिक हिन्दी गद्य साहित्य के इतिहास से परिचय कराना।

सिनेमा की समीक्षा के द्वारा छात्रों में रचनात्मक क्षमता का विकास करना।

कोर्स का अपेक्षित परिणाम : छात्रों में साहित्यिक रुचि के साथ सामाजिक बोध बढ़ाना।

सामाजिक परिवेश में भारतीय सिनेमा का योगदान समझाना।

के द्वारा प्रस्तुत पाठ्य सामग्री : हिंदी शिक्षण के लिए निर्धारित घंटे / सप्ताह : 06

इकाई	विवरण	
I	**उपन्यास:** आपका बंटी–मन्नू भंडारी	
	शिक्षण के लिए निर्धारित घंटे	**25**
II	**कहानियाँ** : 1. लौटना और लौटना (मृदुला गर्ग), 2. गिल्लू (महादेवी वर्मा), 3. ममता (जयशंकर प्रसाद), 4. मवाली (मोहन राकेश), 5. अपना–पराया (जैनेन्द्र कुमार)	
	शिक्षण के लिए निर्धारित घंटे	**15**
III	**आधुनिक काल** : हिन्दी साहित्य का इतिहास (गद्य, उपन्यास और कहानियाँ) परिचय, प्रवृत्तियाँ का सामान्य ज्ञान	
	शिक्षण के लिए निर्धारित घंटे	**15**
IV	**सामान्य निबंध** : आधुनिक शिक्षा प्रणाली, लिंग समस्या, मोबाइल का दुष्परिणाम, आधुनिक युवा पीढ़ी, आधुनिक संचार क्रांति।	
	शिक्षण के लिए निर्धारित घंटे	**10**
V	सिनेमा समीक्षा	
	शिक्षण के लिए निर्धारित घंटे	**10**
	कुल घंटे	**75**

पाठ्यपुस्तक :

1. **आपका बंटी** : राधाकृष्ण प्रकाशन, दिल्ली।
2. **'हर साल बेगाने',** राजपाल एंड सन्स, दिल्ली।
3. '**कहानी कुंज**', गोविन्द प्रकाशन, मथुरा।
4. '**मेरा परिवार**' लोकभारती प्रकाशन, अलाहाबाद।

संदर्भ ग्रंथ :

1. रमेश, **आदर्श निबंध**, विनोद पुस्तक मंदिर प्रकाशन, हॉस्पिटल रोड, आग्रा–2
2. राजेन्द्र यादव, **उपन्यास : स्वरूप और संवेदना**, वाणी प्रकाशन, नई दिल्ली। संस्करण 2000
3. डॉ. शशिभूषण सिंगल, **हिंदी उपन्यास : प्रवृत्तियाँ और शिल्प।**

वेब स्रोत

a) www.hindikahanihindi.katha.com b) www.pustak.org

आकलन के लिए उपयुक्त अंक (25 अंक)

सीआईए. I	सीआईए. II	सीआईए. II	असाईनमेंट	संगोष्ठी	उपस्थिति	कुल
5	5	6	3	3	3	25

पाठ्यक्रम द्वारा डिज़ाइन किया गया	एच.ओ.डी. द्वारा सत्यापित	के द्वारा जांचा गया	द्वारा अनुमोदित
R. Swarnalatha 13/8/21 (R. Swarnalatha)	R. Swarnalatha 13/8/21 (R. Swarnalatha)	Dr. K. Selvaraj Convenor CDC	14 AUG 2021

Course Code	Title		
19U3BTC305	**Core Paper – V Biochemistry and Metabolism**		
Semester: III	**Credits: 4**	**CIA: 25 Marks**	**ESE: 75 Marks**

Course Objective:

To understand the structure of atoms, interactions within biomolecules, structure of biomolecules, thermodynamic and energy concepts during metabolism.

Course Outcome (CO):

On the successful completion of the course the students will get an overall understanding of

CO 1	Structure of atoms and various biomolecules
CO 2	Energies of various interactions and significance
CO 3	Functions of various biomolecules in living system
CO 4	Regulation of biomolecules and inhibition
CO 5	Metabolism of biomolecules in homeostasis.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	Atoms, atomic theory, valency, atomic weight, molecular and, equivalent weights, Molarity, Normality and Molality.	2	1
	Interactions – Covalent: Polar and Non-polar, Electrovalent, Vanderwaal's and London forces.	1	2
	Structure of water molecules, properties and ionization of water, pH and buffer.	1,2	22,1
	Determination of free energy change and coupled reactions	2	3
	Instructional Hours		**12**
II	Classification of amino acids, features of peptide bond, Structural organization of proteins. Biological function of proteins.	1	4,5
	Enzymes and its IUPAC classification. Nomenclature of enzymes. Biosensors ant its types. Glucose, cholesterol and oxygen sensors.	3	6
	Regulation of enzyme activity, active sites, activators, inhibitors – types, Types of reversible inhibitor, Irreversible inhibitor and significances.	3	10
	Isoenzymes –LDH and allosteric enzymes – PFK & Heamoglobin	1	15
	Instructional Hours		**12**
III	Definition, Nomenclature , classifications and structure of sugars: Monosaccharides and Disaccharides	3	4
	Structural features of polysaccharides	1	8
	Glycolysis and its importance	3,1	14
	TCA Cycle	3	13
	Synthesis of glucose from glycerol, glucose from pyruvic acid	3	17
	Glycogen break down and synthesis	1	25
	Instructional Hours		**12**
IV	Definition, Nomenclature, classification and structure of lipids	3	6

	Fatty acid biosynthesis	3	18
	Oxidation of saturated and unsaturated fatty acids.	3	18
	Instructional Hours		**12**
V	Structure of nitrogenous bases, nucleosides and nucleotides.	4	33
	Classification of DNA and its structure. Structure of tRNA	4	35
	Biosynthesis and degradation of nucleic acids (Purines and Pyrimidines)	4	34
	Integration of metabolism	4	27
	Instructional Hours		**12**
	Total Hours		**60**

Text Book(s):

1. Donald Voet, Judith G. Voet, **Biochemistry**, Wiley & Sons, 4th Edition, 2010.
2. Irwin H. Segel, **Biochemical calculations**, 2nd Edition, John Wiley & Sons, 2004.
3. Stroev E A, **Biochemistry**, 4th Edition, Mir Publishers, Moscow, 1990.
4. Robert K. Murray, Darryl K. Granner, Peter A. Mayes, Victor W. Rodwell, **Harper's Illustrated Biochemistry**, McGraw-Hill Professional, 26th Edition, 2010.

Unit I: Book 2- Pages 1-10, 10-19, 145-165, Book 1 - Pages 22-29, 31-36
Unit II: Book 1- Pages 76-92, 95-97, 129-140, 320-330 Book 3-Pages 40-56, 125-160
Unit III: Book 3-Pages 63-88, 217-229,251-254, Book 1-Pages 207-224, 427-446,196-206, Book 4- Pages 152-185
Unit IV: Book 3-Pages 88-101, 256-270,
Unit V: Book 4- Pages 339-359

Reference Book(s):

1. Geoffrey L. Zubay, **Biochemistry**, 4th Edition, Wm. C. Brown Publishers, 1998.
2. Trevor Palmer, **Enzymes: Biochemistry, Biotechnology and Clinical Chemistry**, 5th Edition, Horwood Publishing Limited, 2001
3. Albert L. Lehninger, David Lee Nelson, Michael M. Cox, **Lehninger Principles of Biochemistry**, 5th Edition, W.H. Freeman, 2008.
4. NPTEL Course: https://nptel.ac.in/courses/104106106/
5. Video: https://www.youtube.com/watch?v=GFP8xWDVlW0
6. Video: https://www.youtube.com/watch?v=M35YAudHmW8

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
5	5	6	3	3	3	25

Mapping

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	L	L	M	H	M
CO 2	L	L	M	M	M
CO 3	L	H	M	M	L
CO 4	L	H	M	L	L
CO 5	M	L	H	M	M

Course designed by	Verified by	Checked by	Approved by
(P. Thirunavukkarasu)	(P. Nirmala)	Dr. K. Selvaraniyali Convenor CDC	14 AUG 2021

Course Code	Title		
19U3BTC509	Core Paper - IX Immunology		
Semester: V	Credits: 4	CIA: 25 Marks	ESE: 75 Marks

Course Objective:

To acquire knowledge on antibody, antigen, defense mechanism and their regulations, principles of immunization and vaccines. They able to describe the roles of the immune system in both maintaining health and contributing to disease.

Course Outcome (CO):

On the successful completion of the course the students will get an overall understanding of

CO 1	Fundamental knowledge of immune responses against antigen
CO 2	Defense mechanism of higher vertebrates against invading pathogen.
CO 3	Immunological techniques in disease diagnosis
CO 4	Importance of vaccination in betterment of human mankind
CO 5	Key concept of immunology in relation with scientific modern world

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 5**

Unit	Description	Text Book	Chapter
I	**Development in Immunology** - History	1	1
	Immunity: Humoral and Cell mediated immune response	1	1
	Primary and Secondary immune response.	1	1
	Innate and Acquired immunity	1	1
	MHC molecules, Antigen processing and presentation	1	7,8
	Antigens: Types, classification, Epitope, Haptens	1	3
	Instructional Hours		**15**
II	**Immune cell development**: Hematopoiesis.	1	2
	Cells involved in immune system: WBC, RBC and platelets	1,3	2, Sec B
	Primary and Secondary lymphoid organs: Thymus, Bone marrow, Lymph nodes and Spleen.	1	2
	Antibodies: Basic structure, classes and their biological functions	1,3	4, Sec D
	Immunoglobulin Gene expression.	1	5
	B cell and T cell activation	1	10,11
	CD molecules	1	1
	Instructional Hours		**15**
III	**Complement:** activation and regulation	1	13
	Cytokines: Structure and functions, Interferon and interleukins.	1	12
	Hypersensitivity reactions: Type I, II, III and Delayed type hypersensitivity	1,2	16,14
	Autoimmunity: Primary and secondary Immuno deficiency disorders	1	19,20
	Immuno regulation: Tolerance. Suppression.	1	21
	Instructional Hours		**15**
IV	**Transplantation:** Mechanism of Graft rejection	1	21

	Antigen antibody reactions: Precipitation and agglutination	1	6
	Immunodiffusion and immunoelectrophoresis	1	6
	Principle and Applications of RIA	1	6
	ELISA	1	6
	Fluorescent antibody techniques	1	6
	Monoclonal antibody.	1	4
Instructional Hours			**15**
V	Tumor immunology	1	22
	immune surveillance mechanism	1	22
	immunization: passive and Active immunization	1	18
	Types of vaccines: Inactivated, attenuated	1	18
	Recombinant Vaccines, Peptide and DNA vaccines	1	18
	Synthetic vaccines, plant-based vaccines	1	18
Instructional Hours			**15**
Total Hours			**75**

Text Book(s):

1. Richard A. Goldsby, Thomas J. Kindt, Janis Kuby, Barbara A. Osborne. C, **Immunology,** WH Freeman & Company, New York, 5th Edition, 2003.
2. Arthur Rabson, Ivan M. Roitt, Peter J. Delves., **Really Essential Medical Immunology,** Blackwell Publishing Pvt. Ltd., 2nd Edition, 2005.
3. Lydyard, P.M., Whelan, A., M.W. Fanger., **Instant notes in Immunology,** 2nd Edition Scientific Publishers Limited, 2004.

Unit I: Text Book 1, Chapter 1: 1-18, Chapter 3: 57 – 73,
Chapter 7: 161 – 174, Chapter 8: 185 – 196

Unit II: Text Book 1, Chapter 1: 1-18, Chapter 2: 24 – 53, Chapter 4: 76 – 99,
Chapter 5: 106 – 115, Chapter 10: 221 - 244, Chapter 11: 247 – 263
Text Book 3, Section B: 15-39, Section D: 61 – 98.

Unit III: Text Book 1, Chapter 12: 278 - 292, Chapter 13: 299 - 317,
Chapter 16: 363 - 386, Chapter 19: 431 – 458, Chapter 20: 462 – 479,
Chapter 21: 481 – 498
Text Book 2, Chapter 14:148-163.

Unit IV: Text Book 1, Chapter 4: 99 –101, Chapter 6: 137 – 155,
Chapter 21: 481 – 498

Unit V: Text Book 1, Chapter 18: 413 – 427, Chapter 22: 502 – 523

Reference Book(s):

1. Roitt, I. M. and P. J. Delves., **Roitt's Essential Immunology,** Oxford: Blackwell Science, 10th Edition, 2001.
2. Chakravarthy, A.K., **Immunology,** Tata Mc Graw Hill Publishing Co. Ltd., New Delhi. 1996.
3. Ian R. Tizard., **Immunology,** Saunders college publishers, New York, 4th Edition, 1995.
4. http://ebooks.bharathuniv.ac.in/gdlc1/gdlc1/Libraries/Bio%20Technology%20Library/Janis%20Kuby/Immunology,%20kuby.%205%20edition%20(260)/Immunology,%20kuby.%205%20edition%20-%20Janis%20Kuby.pdf
5. http://www.dphu.org/uploads/attachements/books/books_5453_0.pdf

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Model	Assignment	Attendance	Total
5	5	6	3	3	3	25

Mapping

PSO / CO	PS O1	PS O2	PS O3	PS O4	PS O5
CO 1	M	M	H	H	M
CO 2	H	L	H	H	M
CO 3	L	M	H	H	M
CO 4	M	M	H	H	H
CO 5	L	L	H	H	M

H-High; M-Medium; L-Low

Countersigned by	Verified by HoD	Checked by	Approved by
Dr. A. Anitha 13/8/21	13/8/21	Dr. Selvaraju	14 AUG 2021

Course Code	Title		
19U3BTE502 / 20U3BTE604	Discipline Specific Elective Paper – II(A) Food Processing Technology		
Semester: VI	Credits: 4	CIA :25 Marks	ESE:75 Marks

Course Objective:

To acquaint with principles of different techniques used in processing and preservation of foods

Course Outcome (CO):

On successful completion of the course, the students will be able to

CO1	identify the areas of concern in the processing of food
CO2	analyze the process of harvesting, processing and storage of food.
CO3	ability to apply novel technologies to real-life innovative products and processes
CO4	in depth knowledge of novel and innovative ideas in food science
CO5	in depth knowledge of novel and innovative ideas in food science

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Processing of food and its importance:** Source of food - food of plant, animal and microbial origin; processing – cereals, pulses, grains, vegetables and fruits, milk and animal foods, sea weeds, algae, oil seeds & fats, sugars, tea, coffee, cocoa, spices and condiments, additives; need and significance of processing these foods	3	1
	Instructional Hours		**10**
II	**Methods of food handling and storage:** Nature of harvested crop, plant and animal; storage of raw materials and products using low temperature, freezing of raw and processed foods.	1	2
	Instructional Hours		**12**
III	**Large-scale food processing:** Milling of grains and pulses; edible oil extraction; Pasteurization of milk and yoghurt; canning and bottling of foods; drying – Traditional and modern methods of drying, Dehydration of fruits, vegetables, milk and animal products; preservation by use of acid, sugar and salt; Pickling and curing with microorganisms, use of salt, and microbial fermentation; frying, baking, extrusion cooking, snack foods.	2	8
	Instructional Hours		**10**
IV	**Food wastes in various processes:** Waste disposal-solid and liquid waste; rodent and insect control; use of pesticides; ETP; selecting and installing necessary equipment. Storage related changes/Waste types and usages/personnel protection equipment.	2	6
	Instructional Hours		**14**
V	**Food hygiene:** Food related hazards – Biological hazards – physical hazards – microbiological considerations in	3	1

	foods. Food adulteration – Training & Education for safe methods of handling and processing food; sterilization and disinfection of manufacturing plant; use of sanitizers, detergents, heat, chemicals, Cleaning of equipment and premises.	
Instructional Hours		**14**
Total Hours		**60**

Text Book(s):

1. Karnal, Marcus and D.B. Lund .**Physical Principles of Food Preservation**. Rutledge, 2003.
2. VanGarde, S.J. and Woodburn. M **Food Preservation and Safety Principles and Practice**. Surbhi Publications, 2001.
3. Sivasankar B. **Food Processing & Preservation**, Prentice Hall of India, 2002.

Unit – I: Text Book 3, Chapter 1, Page No. 1-81.
Unit – II: Text Book 1, Chapter 2, Page No. 378-427.
Unit – III: Text Book 2, Chapter 8, Page No. 321-411.
Unit – IV: Text Book 2, Chapter 6, Page No. 195-252.
Unit – V: Text Book 3, Chapter 1, Page No. 71-217.

Reference Book(s):

1. Vaclavik, V.A. and Christian E.W. **Essentials of Food Science.** 2nd Edition, KluwerAcademic, Springer, 2003.

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Computation	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low.

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21 Dr. Sudeepa	13/8/21		

Convenor CDC

14 AUG 2021

Course Code	Title		
19U3BTE503 / 20U3BTE607	Discipline Specific Elective Paper –III (A) Quality Control and Assurance		
Semester: VI	Credits: 4	CIA :25 Marks	ESE:75 Marks

Course Objective:

To provide a basic understanding of quality concepts and practice in biotechnology companies

Course Outcomes (CO):

On successful completion of the course, the students will be able to

CO1	describe approaches to planning and organization of a quality control system.
CO2	gain knowledge on TQM tools for continuous process improvement of ISO and know about quality systems.
CO3	get a basic acquaintance with standards and specifications.
CO4	interpretation of Intellectual property rightstechniques of food biotechnology.
CO5	know about basics of intellectual property.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	Definition, types of hazard-physical, chemical and biological, factorsaffecting foodand drug safety. Quality Control Concepts as applied to the food andpharma industry, Regulatory standards.	1	1
	Instructional Hours		**10**
II	General Concepts of quality control and Major quality control functions. Definition of Quality Assurance. Difference between QA and QC. Definition of TQC Nature, approaches and role of management. Definition of SQC, determining the need for SQC, Definition – control chart, uses process control, QC tools.	1	1
	Instructional Hours		**12**
III	Standards and Specifications: Voluntary and Compulsory standards, Packaging and labeling standards: ISO and HACCP, FSSAI.	1	2
	Instructional Hours		**10**
IV	Quality Improvement Techniques: Quality Improvement Plans (QIP), Quality Control Circles (QCC), Total quality management (TQM).	1	2
	Instructional Hours		**14**
V	**Overview of intellectual property: I**ntroduction and the need for intellectual property right (IPR) IPR in India – Genesis and Development IPR in abroad Some important examples of IPR, Conflicts and Do's and Don'ts on IPR.	2	7
	Instructional Hours		**14**
	Total Hours		**60**

Text Book(s):

1. Jurg P. Seiler, **Handbook of Good Laboratory Practices**, UNDP/World Bank/WHO, 2006.
2. WHO Guidelines, **Quality Assurance of Pharmaceuticals**, Volume 2, World Health Organization, 2007.

Unit – I: Text Book 1, Chapter 1, Page No. 1-50.
Unit – II: Text Book 3, Chapter 2, Page No. 217-507.
Unit – III: Text Book 2, Chapter 8, Page No. 321-411.
Unit – IV: Text Book 2, Chapter 6, Page No. 195-252.
Unit – V: Text Book 3, Chapter 1, Page No. 71-217.

Reference Book(s):

1. Philip. A. C., **Reconceptualizing Quality**, New Age International Publishers, Banglore, 2001.
2. Bhatia, R. and Ichhpujan, R.L., **Quality Assurance in Microbiology**, CBS Publishers and Distributors, New Delhi, 2004.
3. Kher, C.P., **Quality Control for the Food Industry**, ITC Publishers, Geneva, 2000.

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Computation	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low.

Course Designed by	Verified by HoD	Checked by	Approved by
13/8/21 (Dr. N. SARANYA)	13/8/21 P. Jeyaram	14/8/21 Dr. Selvaraju	Convenor CDC 14 AUG 2021

Course Code	Title		
19U3BTE604 / 20U3BTE503	**Discipline Specific Elective Paper - I(C) Agricultural Biotechnology**		
Semester: V	**Credits: 4**	**CIA : 25 Marks**	**ESE: 75 Marks**

Course Objective:

To impart knowledge on the basics of Biotechnology applications for improvement in Agriculture.

Course Outcome (CO):

On successful completion of the course, the student will be able to

CO1	Define the terms by specific examples of agricultural and horticultural biotechnology applications.
CO2	Explain benefits of selective breeding and propagation animals such as improved nutritional value and resistant to selected viruses.
CO3	Comparison between bio fertilizer and chemical fertilizer
CO4	Summarize the methods used to produce transgenic plants, and explain the selection processes for identifying transformed plant cells
CO5	Understand production and importance of natural fertilizers

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	Cell Structure and Function: Prokaryotic and eukaryotic cell architecture, Microbial analysis of cell, Segregation cell wall, plasma membrane, protein secretion and targeting, cell division, growth and differentiation. Regression techniques for relative analysis of variables.	1,2	1
	Instructional Hours		**12**
II	Introduction to Agriculture Biotechnology, growth and historical perspective of agricultural biotechnology crop improvement, plant breeding techniques. Lab scale experiments improving plantations.	1	3,4
	Instructional Hours		**12**
III	Agriculture biotechnology – Risks and applications. Transgenic plants resistance to biotic and abiotic stress. Transgenic plants in crop improvement. Advantages and applications of transgenic plants. Risk assessment techniques, probability studies. Organic and inorganic definitions.	2	5,6
	Instructional Hours		**12**
IV	Transgenic plants in quality modifications – Starch, Oil, Protein, Golden Rice, Suppression of endogenous gene. Plants derived vaccines, lower modification and colour. Targetting transgenic product to chloroplast and mitochondria. Concept of byproducts, qualitative to usage, impacts of derived vaccines.	1	8

Instructional Hours			**12**
V	Importance of Biofertilizers in agriculture (Rhizobium, Azotobacter, Mycorrhiza, Actinorhiza) advantages and current status, vermiculture, composting, current practices and production of biofertilizers. Understanding of biofertilizer, application and examples.	2	15
Instructional Hours			**12**
Total Hours			**60**

Text Book (s):

1. Singh B. D., **Plant Biotechnology**, Kalyani Publications, 2006.
2. Purohit S.S., **Biotechnology Fundamentals and Application**, Agro Bios, 4th Edition, 2017. `

Unit I : Text Book 1, Chapter 1: 1-20, Text Book 2, Chapter 1: 1-18.
Unit II : Text Book 1, Chapter 3: 36-50, Chapter 4: 25-36
Unit III: Text Book 2, Chapter 5: 37-45, Chapter 6: 50-67.
Unit IV: Text Book 1, Chapter 8: 80-98.
Unit V : Text Book 2, Chapter 15: 120-130

Reference Book(s):

1. Stuart J. Smyth, Peter W.B. Phillips, David Castle, **Handbook on Agriculture, Biotechnology and Development**, Edward Elgar Publishing, 2014.
2. Ahindra Nag, **Textbook of Agricultural Biotechnology**, PHI Learning Pvt. Ltd., 2008.
3. http://www.fao.org/docrep/014/i2300e/i2300e.pdf
4. http://site.iugaza.edu.ps/mwhindi/files/BIOTECHNOLOGY-PROCEDURES-AND-EXPERIMENTS-HANDBOOK.pdf
5. https://repository.cimmyt.org/xmlui/bitstream/handle/10883/3751/91276.pdf?sequence=1

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Seminar	Quiz	Assignment	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
13/8/21	13/8/21	14/8/21	
(Dr. N. SARANYA)	P. JEYALAKSHMI	Dr. C. Selvarajan	

Convenor CDC

14 AUG 2021

Course Code	Title		
19U3BTE607 / 20U3BTE502	Discipline Specific Elective Paper - I(B) Medical Biotechnology		
Semester: V	Credits: 4	CIA: 25 Marks	ESE: 75 Marks

Course Objective:

To understand various bio products available for diagnosis in the market

Course Outcome (CO):

On the successful completion of the course the students will know the role of biotechnology in medical fields.

CO 1	Basics in pharma products
CO 2	Tools available for diagnosis.
CO 3	Limitations of each tools
CO 4	Importanceofneutraceuticals
CO 5	Applications of nano drug delivery system

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	Biotechnological revolutions- Genomics,combinatorial chemistry	1,2	1
	Insight into basic biology-Areas of application,	1,2	1
	Diagnosis and prediction of disorders, Limits and approaches.	1	1
	Instructional Hours		**12**
II	Role of biotechnology in healthcare	1	1
	Worldwide market and work in medical biotechnology	1	2
	Vaccine production-New developments.	1,2	2,3,14
	Biosensors in clinical diagnosis, chiral technology	1	3-6
	Monoclonal antibodies for immunotherapy.	1,2	2,7-10,11,16
	Instructional Hours		**12**
III	Pharming for human proteins and neutraceuticals Tissue engineering and therapeuticcloning,	1,2,3	19, 21,12
	Application of nanotechnology in biomedical sciences- Green nanosubstances, gene delivery, drug delivery. Nanotechnology in replacing defective cells.	1,2,3	16,18-20,15
	Instructional Hours		**12**
IV	Effects of free radicals on proteins	3	1,2
	Effects of free radicals on lipids	3	3
	Role of antioxidant enzymes and chemical antioxidants	3	1,2
	Phytosterol and types, as a drug candidate	3	1,2
	Instructional Hours		**12**
V	Microbial Biotransformations.	3	1,2
	IntroductionTypes of reactions mediated by microorganisms	3	3,4
	Design of Biotransformations, Biotransformation process andits improvement with special reference to steroids, Someimportant medicines produced by biotechnology.	3	4
	Instructional Hours		**12**

Total Hours	60

Text Book(s):

1. Trevor Palmer,**Enzymes: Biochemistry**, **Biotechnology and Clinical Chemistry**, 5thEdition, Published by Horwood Publishing Limited, 2001.
2. JogdandS.N., **Medical Biotechnology**, Himalaya publications,2011
3. Kokate, Jalalpure, Hurakadle, **Text Book for Pharmaceutical Biotechnology**, 2011

Unit – I: Text Book 1,2 Chapter 1, Page No. 1-25.
Unit – II: Text Book 1,2 Chapter2,3,6,7,10,11,14., Page No. 125-289.
Unit – III: Text Book 1, Chapter 15,16,18,19,21, Page No. 578-679.
Unit – IV: Text Book 3, Chapter 1,2,4, 11, Page No. 320-321
Unit – V: Text Book 3, Chapter 3,4. Page no. 130-148.

Reference Book(s) :

1. https://www.youtube.com/watch?v=ByBv1008lbM
2. https://www.youtube.com/watch?v=X_sWBKqH1J4
3. https://www.youtube.com/watch?v=Ffog5RVHELI
4. https://www.youtube.com/watch?v=AqWzqhDaoz0
5. https://www.youtube.com/watch?v=u0E7TDmHBqM
6. https://www.youtube.com/watch?v=adfny1cfvkI

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Seminar	Quiz	Assignment	Total
5	5	6	3	3	3	25

Mapping

PSO / CO	PS 01	PS 02	PS 03	PS 04	PS 05
CO 1	L	L	M	H	M
CO 2	M	L	M	M	M
CO 3	L	H	M	M	L
CO 4	L	H	M	L	L
CO 5	M	L	H	M	M

H-High; M-Medium; L-Low

Course Designed by	Verified by HoD	Checked by	Approved by
V. Thenmozhi 13/8/21	13/8/21		
V. SHANMUGAM			

14 AUG 2021

Convenor / CDC

Course Code	Title		
19U3BTE608 / 20U3BTE605	Discipline Specific Elective Paper – II(B) Molecular Modeling and Drug Design		
Semester: VI	Credits: 4	CIA :25 Marks	ESE:75 Marks

Course Objective:

To understand the principles and procedures behind designing new drugs and to recognize the protocols for modeling a drug structure

Course Outcome (CO):

On successful completion of the course the students will able to

CO1	Tell the basic concepts of molecular modeling
CO2	Interpret methods for active site identification and its measurable parameters
CO3	Identify the mechanism of drug interactions
CO4	Examine the structure activity relationship of a molecule
CO5	Introduction to molecular docking

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Introduction to Molecular Modelling:** Introduction, Useful Concepts in Molecular Modelling: Coordinate Systems. Potential Energy Surfaces. Molecular Graphics. Surfaces. Computer Hardware and Software. The Molecular Modelling Literature. Genome mapping and correlation.	1	1
	Instructional Hours		**10**
II	**Bond Stretching**: Angle Bending. Introduction to Non-bonded Interactions. Electrostatic Interactions. Van der Waals Interactions. Hydrogen Bonding in Molecular Mechanics. Force Field Models for the Simulation of Liquid Water.	1	4
	Instructional Hours		**12**
III	**Macromolecular modeling** – Identification and mapping of active sites - Design of ligands for known macromolecular target sites.	1	10
	Instructional Hours		**10**
IV	**Drug-receptor interactions**: Classical SAR/QSAR studies and their Implications to the 3-D modeler. 2-D and 3- D database searching – pharmocophore identification and novel drug design.	2	9,11
	Instructional Hours		**14**
V	**Introduction to molecular docking**: Rigid docking, Flexible docking, manual docking, Advantage and disadvantage of Flex-X, Flex-S, AUTODOCK and other docking software	1	12
	Instructional Hours		**14**
	Total Hours		**60**

Text Book(s):

1. Andrew Leach., **Molecular Modelling: Principles and Applications**, Addison Wesley Longman, Essex, England, 2nd Edition, 2010.
2. Karcher, W. and Devilliers, J., **Practical Applications of QSAR in Environmental Chemistry and Toxicology**, Kluwer Academic Publishers, London, 1990.

Unit – I: Text Book 1, Chapter 1, Page No. 1-23.
Unit – II: Text Book 1, Chapter 4, Page No. 165-216.
Unit – III: Text Book 1, Chapter 10, Page No. 509-522.
Unit – IV: Text Book 2, Chapter 9, 11, Page No. 150-185.
Unit – V: Text Book 1, Chapter 12, Page No. 640-667.

Reference Book(s):

1. Haile, J. M., **Molecular Dynamics Simulation Elementary Methods**, John Wiley and Sons, 1997.
2. Alan Hinchliffe., **Molecular Modelling for Beginners**, John Wiley Publishers, 2003.
3. Cohen, N., **Guide Book on Molecular Modeling in Drug Design**, Academic Press, San Deigo, 1996.
4. Bruce C. Baguley and David J. Kerr., **Anticancer Drug Development**, Academic Press, New York, 2002.
5. https://www.omicsonline.org/drug-discovery-jaa.1000025.pdf
6. https://www.biophys.mpg.de/fileadmin/user_upload/pics_tb/Lecture-2-QSAR.pdf

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Computation	Attendance	Total
5	5	6	3	3	3	25

Mapping

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

H-High; M-Medium; L-Low.

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21 Dr. Sudeepa	13/8/21		

Convener, CDC

14 AUG 2021

Course Code	Title		
19U3BTP204	**Core Paper – IV Biotechniques and Microbiology Practical**		
Semester: I & II	**Credits: 4**	**CIA : 40 Marks**	**ESE:60 Marks**

Course Objective

Provide students with an understanding of important facts, concepts, and the investigative procedures of a biophysical and microbiology laboratory.

Course Outcomes (CO)

CO1	Students will acquire and retain basic knowledge about biotechniques and microbiology practicals and its safety measures
CO2	Students will be able understand the operation techniques of basic biophysical instruments
CO3	Students will demonstrate the methods for isolation, subculture and maintenance of bacterial specimens
CO4	Students can able to examine aseptic technique
CO5	Students will able to investigate bacterial morphology and physiology

Offered by: Biotechnology

Course Content **Instructional Hours / Week:3 (I Sem.), 5 (II Sem.)**

S. No.	Experiment
Biotechniques	
1	Principle and Operation of Calorimeter
2	Principle and Operation of Centrifuge
3	Principle and Operation of pH meter – Measurement of pH.
4	Preparation of Phosphate Buffer
5	pKa Value Determination
6	Beer Lamberts Law Verification
Microbiology	
7	Laboratory Safety Guidelines
8	Microscopy – Bright Field
9	Cleaning and Sterilization of Glasswares
10	Sterilization
11	Preparation of Culture Media – Liquid and Solid
12	Aseptic Technique and Culture Inoculation
13	Serial Dilution Technique
14	Measurement of bacterial growth.
15	Morphological Variations of Bacteria– Measurement of bacterial size.
16	Smear Preparation and fixation
17	Simple Staining
18	Gram Staining
19	Motility test
20	Cultivation of Anaerobic Bacteria
	Total Hours **120**

Tools for Assessment (40 Marks)

Mid Test I	MODEL I	Performance I	Performance II	Observation	Attendance	Total
10	10	5	5	6	4	40

Mapping

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

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by

Convenor CDC

14 AUG 2021

Course Code	Title		
19U3BTP407	Core Paper – VII Biochemistry and Human Physiology Practical		
Semester: III & IV	Credits: 4	CIA :40 Marks	ESE:60 Marks

Course Objective:

To understand the basics of reagent preparation, estimation of biomolecules and methods used in basic diagnosis of diseases.

Course Outcome (CO):

On successful completion of the course, the students will be able to

CO1	quantitate various biomolecules.
CO2	analyze unknown compounds.
CO3	understand and interpret the results of diagnosis of human samples
CO4	view the Blood cell morphology.
CO5	analyze biochemicals in clinical specimen

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 3 (III Sem.), 4 (IV Sem.)**

S. No.	Experiment
Biochemistry	
1.	Preparation of Buffer- Phosphate
2.	Principles of Colorimeter, Spectrophotometer and pH
3.	Determination of Normality, Molarity, Molality, Percent Solution
4.	Estimation of Protein - Lowry's method
5.	Estimation of DNA by DPA Method
6.	Estimation of RNA by Orcinol method
7.	Estimation of Glucose by DNS method
8.	Estimation of total free amino acids – Ninhydrin reagent
9.	Separation of amino acids by paper chromatography.
10.	Separation of Plant Pigments by Column Chromatography
11.	Analysis of Oils- Iodine Number- Saponification Value
Human Physiology	
13.	Estimation of Carbohydrate content in Urine
14.	Estimation of Protein in Urine
15.	Estimation of Bile salts and Bile pigments in Urine
16.	Estimation of Sodium and Potassium in Urine
17.	Analysis of Vitamin C
18.	Analysis of Hemoglobin, glucose level, ESR and platelets in blood
19.	Enumeration of RBC and WBC using hemocytometer
20.	Differential Leukocytes blood cell count
	Total Hours 105

Tools for Assessment (40 Marks)

Mid Test I	Model I	Performance I	Performance II	Observation	Attendance	Total
10	10	5	5	6	4	40

Mapping

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

S - Strong; H-High; M-Medium; L-Low.

Course Designed by	Verified by HoD	Checked by	Approved by
Sudeepa 13/8/21	13/8/21	14/8/21	
Dr. Sudeepa			

Convenor / CDC

17 / AUG 2021

Course Code	Title		
19U3BTP613	**Core Paper - XIII: Microbial, Plant and Animal Biotechnology Practical**		
Semester: V & VI	**Credits: 4**	**CIA :40 Marks**	**ESE: 60 Marks**

Course Objective:

To have a hands on experience on microbial biotechnology techniques and tissue culture of plant and animal cells

Course Outcome (CO):

On successful completion of this course, the student will be able to understand the

CO1	To gain the Knowledge on industrial utilization of microbes
CO2	To understand the Plant tissue culture techniques
CO3	To apply animal cell culture technique in the field of Medical Biotechnology
CO4	To analyze animal cell culture techniques
CO5	To evaluate disease diagnosis by using cell culture technique

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Expt. No.	Name of the Experiment
1.	Fermentor design and working principles - (Demo)
2.	Production and assay of extra cellular enzyme - protease - submerged
3.	Wine Production
4.	Ethanol production and calculate the percentage of alcohol
5.	SCP – Production
6.	Preparation of Plant tissue culture media and Sterilization
7.	In vitro germination of seeds
8.	Callus induction and differentiation
9.	Embryo Culture
10.	Somatic embryogenesis
11.	Artificial seed production
12.	Animal tissue culture - (Demo)
13.	Preparation of Primary animal Cell culture and maintenance of cell line
14.	Morphological Characterization of animal cell line.
15.	Sterilization techniques – media, glass wares
16.	Preparation of reagents and medium for animal tissue culture
17.	Cryopreservation
18.	Separation of lymphocytes from blood using gradient medium
19.	Culturing of lymphocytes
20.	Tumour induction in mice
21.	Tryphan blue assay / Cell Viability Assay
22.	MTT assay
	Total Hours 120

Tools for Assessment (40Marks)

Mid Test I	Model I	Observation	Performance	Result	Attendance	Total
10	10	05	05	06	04	40

Mapping

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

H-High; M-Medium; L-Low

Countersigned by	Verified by HoD	Checked by	Approved by
Dr. A. Anitha 13/8/21	13/8/21	Dr. Selvarangam	11 AUG 2021

Course Code	Title		
19U4BTS301	**Skill Based Paper - I Human Physiology and Disorders**		
Semester: III	**Credits: 3**	**CIA : 20 Marks**	**ESE:55 Marks**

Course Objective:

To understand various organs of human, their physiological activities and the disorders

Course Outcomes (CO):

On successful completion of the course, the student will be able to

CO1	understand various systems in human body.
CO2	activities of various organs.
CO3	apply terminologies applicable to pathology and describe the courses and natural progress of human disease.
CO4	outline the current research in disease-specific disciplines and what is currently known about treatment options for various human diseases.
CO5	know about Kidney functions and disorders.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 3**

Unit	Description	Text Book	Chapter
I	Blood & Body Fluid – blood cells – WBC, RBC and Platelets, Haematopoiesis – mechanism of coagulation – plasma proteins: albumin, globulin and fibrinogen.	1	3
	Bone marrow: functions	1	3
	Instructional Hours		**10**
II	Muscle- skeletal muscles: composition and functions of skeletal and cardiac muscles, electromyography. Nervous System: organization, sensory receptors, sense of hearing, taste and smell.	1	5
	Special senses – optics of vision – function of retina – cortical and brain stem control of motor function. Cerebrospinal.	1	5
	Instructional Hours		**07**
III	Digestive System – digestive tract – gastrointestinal function – motility– secretary functions of alimentary tract – digestion and absorption.	1	2
	Respiratory System- pulmonary ventilation – pulmonary circulation – gaseous exchange - O_2 and CO_2 transport in blood and body fluids – mechanism of breathing – ventilation.	1	2
	Cardio Vascular System – Heart as pump – rhythmic excitation – electrocardiogram.	1	2
	Instructional Hours		**12**
IV	Endocrines – pituitary hormones and their control by hypothalamus. Thyroid metabolic hormones – adreno-cortical hormones: insulin and glucagons. Gonadotrophic hormones –testosterone – estrogen.	1	7, 9
	Instructional Hours		**08**

V	Disorders of Kidney and Liver	2	18, 19
	Diseases of Heart, Disorders of hormones: Thyroid hormone (Hyperthyroidism and Hypothyroidism) and Insulin hormone (Diabetes mellitus).	2	25, 27
Instructional Hours			**08**
Total Hours			**45**

Text Book(s):

1. David Wright, **Human Physiology and Health**, Heinemann Educational Publishers, 2007.
2. Allen Gaw, Robert A. Cowan, **An Illustrated Color Text of Clinical Biochemistry**, Churchill Living stone press, 2nd Edition, 2013.

Unit I : Text Book 1, Chapter 3, pages 34 – 40.
Unit II : Text Book 1, Chapter 5, pages 62 - 70
Unit III : Text Book 1, Chapter 2, pages 24 – 28, 52 -54
Unit IV : Text Book 1, Chapter 7,9, pages 38 - 42
Unit V : Text Book 2, Chapter 18, 19, 25, 27, pages 21,24,52,58

Reference Book(s):

1. Chatterjee, **Human physiology**, Medical Allied Agency, Kolkatta, 11th Edition, 2016.
2. Gary A. Thiodeare& Kevin T Patton, **Anthony's Text book of Anatomy and Physiology**, Moshi Year Book, New York, 2nd Edition, 2008.
3. Jan Koolman and Klaus-Heinrich Roehm, **Color Atlas of Biochemistry**, Thieme Publications, 2nd Edition, 2010.
4. Colleen M. Smith, Allan D. Marks and Michael A. Lieberman, **Marks' Basic Medical Biochemistry: A Clinical Approach**, Lippincott Williams and Wilkins, 2nd Edition, 2009.
5. https://www.cliffsnotes.com/study-guides/anatomy-and-physiology
6. https://www.studocu.com › Athabasca University › Human Anatomy and Physiology

Tools for Assessment (20 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Attendance	Total
4	4	5	2	2	3	20

Mapping

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

Course Designed by	Verified by HOD	Checked by	Approved by
Dr. O.S. Nirmi			

Convenor
CDC

14 AUG 2021

Course Code	Title		
19U4BTS402	Skill Based Paper – II Bioinformatics and Computational Biology		
Semester: IV	Credits: 3	CIA :20 Marks	ESE:55 Marks

Course Objective:

To understand the basic concepts in the *in silico* analysis of macromolecules

Course Outcome (CO):

CO1	Tell the basics of database and data formats
CO2	Explain the importance of alignment and methods of biological data analysis
CO3	Apply alignment in predicting taxonomical relationship between the organisms
CO4	Inspect the structures of macromolecules and understand the structure-function relationships
CO5	To know about Applications of Bioinformatics.

Offered by: Biotechnology

Course Content **Instructional Hours / Week: 4**

Unit	Description	Text Book	Chapter
I	**Introduction:** Introduction to Databases, Types of Databases, Biological Data formats, Information flow in biological systems - Central Dogma of Molecular Biology.	1,2	1,2
	Instructional Hours		**10**
II	**Sequence Alignment:** Pairwise and Multiple Alignment, Significance of Alignment, Optimal alignment methods, substitution matrix and gap penalties.	1	2,10
	Computational Tools: Introduction to Linux, basics of Linux systems. Introduction to PERL, Operators in PERL.	1	5,6
	Instructional Hours		**12**
III	**Database similarity searching:** BLAST, FASTA, Low complexity regions, repetitive elements.	1	11
	Gene Identification: Basis of Gene identification, Pattern Recognition, Gene prediction methods and tools.	1	14
	Instructional Hours		**14**
IV	**Phylogenetic analysis:** phylogenetic models, data analysis, Tree Building methods, Phylogenetic softwares.	2	4
	Instructional Hours		**10**
V	**Applications of Bioinformatics:** RNA secondary structure, RNA structure prediction methods. Protein structure prediction - primary, secondary structure prediction, function prediction. Molecular Docking	1	15
	Instructional Hours		**14**
	Total Hours		**60**

Text Book(s):

1. Rastogi, C. S., Namita Mendiratta., **Bioinformatics-Methods and Applications,** PHI Learning Pvt. Ltd., 4th Edition, 2013.

2. Harisha, S., **Fundamentals of Bioinformatics**, I. K. International Publishing House, 1st Edition, 2007.

Unit – I: Text Book 1, 2, Chapter 1, Chapter 2, Page No. 1-26 and 14-55.
Unit – II: Text Book 1, 2, Chapter 1, 2 and Chapter 10, Page No. 55-108 and 148-172.
Unit – III: Text Book 1, Chapter 11, 14, Page No. 173-190, 223-234.
Unit – IV: Text Book 2, Chapter 4, Page No. 84-105.
Unit – V: Text Book 1, Chapter 15, Page No. 235-285.

Reference Book(s):

1. Teresa Attwood, **Introduction to Bioinformatics**, Pearson Publications, 1st Edition, 2007.
2. Andreas D. Baxevanis, B.F. Francis Ouellette, **Bioinformatics**, Wiley Publishers, 3rd Edition, 2011.
3. https://www.ncbi.nlm.nih.gov/books/NBK143764/
4. https://www.expasy.org/links
5. https://ww2.chemistry.gatech.edu/~lw26/course_Information/4581/labs/tbp/rasmol/rasmol_tbp_fset.html

Tools for Assessment (20 Marks)

CIA I	CIA II	CIA III	Assignment	Computation	Attendance	Total
4	4	5	2	2	3	20

Mapping

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

H-High; M-Medium; L-Low.

Course Designed by	Verified by HOD	Checked by	Approved by
Dr. P Senthilkumar			14 AUG 2021

Convenor
CDC

Course Code	Title	
19U4NM3AT1	ADVANCED TAMIL - I	
Semester: III	Credits: 2	ESE : 50 Marks

(Common to all UG Programmes)

Course Objective: புதுக்கவிதை உருவாக்கும் திறன் வளர்த்தல் - மொழித்திறனை மேம்படுத்துதல்.

Course Outcomes:
1. கடிதம் எழுதுதல் மற்றும் மொழியறிவைப் பெறுதல்.
2. படைப்பாக்கத்திறன் பெறச்செய்தல்.
3. மொழியைப் பிழையின்றிப் பேச, எழுதத்திறன் பெறச்செய்தல்

Offered by : தமிழ்த்துறை

Course Content **Instructional Hours / Week: 2**

Unit	Description
I	**புதுக்கவிதை** 1. பாரதியார் – புதுமைப்பெண் 2. பாரதிதாசன் - இருண்ட வீடு
	Instructional Hours 10
II	**பிழை நீக்குதல்** வார்த்தைப் பிழை நீக்கம் தொடர் பிழை நீக்கம் பத்தி எழுதச் செய்தல்
	Instructional Hours 5
III	**இலக்கணப் பயிற்சி அளித்தல்** தொகை நிலைத் தொடர், தொகா நிலைத்தொடர் ஆகுபெயர், ஆகுபெயர் வகைகள்
	Instructional Hours 5
IV	**கடிதம் எழுதுதல்** பாராட்டுக்கடிதம் நன்றிக்கடிதம் அழைப்புக்கடிதம் அலுவலகக் கடிதம்
	Instructional Hours 5
V	**இலக்கிய வரலாறு** புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் பாரதியார் - குறிப்பு பாரதிதாசன் - குறிப்பு
	Instructional Hours 5
	Total Hours 30

பாடத்தொகுப்பு :

இளங்கலை தமிழ் மாணவர்களுக்குரிய பாட நூல் "**திரட்டு**" தமிழ்த்துறை.
தொகுப்பு: தமிழ்த்துறை, நேரு கலை அறிவியல் கல்லூரி, கோயம்புத்தூர்.

பார்வை நூல்கள்:

1. பாரதியார் – பாரதியார் கவிதைகள், அபிராமி பதிப்பகம், 7- பி, கொடி மரத் தெரு, சென்னை.
2. பவணந்தி முனிவர் – நன்னூல் பூலியூர்க்கேசிகன் உரை, சாரதா பதிப்பகம், சென்னை.
3. தமிழண்ணல் - புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
4. அ.கி. பரந்தாமனார் – நல்ல தமிழ் எழுத வேண்டுமா? அல்லி நிலையம், சென்னை.
5. கா..கோ.வேங்கடராமன் - தமிழ் இலக்கிய வரலாறு, தமிழ்மண் பதிப்பகம் - நாமக்கல்.
6. மாணவர் தமிழ் இலக்கணம் - புலவர்.கவியழகன், எம்.ஏ., சூடாமணி பிரசுரம், சென்னை.

Course Designed by	Verified by	Checked by	Approved by

14 AUG 2021

Convenor
CDC

Course Code	Title	
19U4NM3BT1	BASIC TAMIL - I	
Semester: III	Credits: 2	CIA : 50 Marks

(Common to all UG Programmes)

Course Objective: தமிழ் மொழியைக் கற்பித்தல் – மொழித்திறனை வளர்த்தல்

Course Outcomes:

1. தமிழ் எழுத்துக்கள் அறிமுகம் செய்தல் மற்றும் வாசித்தல்.
2. பிற மொழி கற்றல் ஆர்வம் தூண்டல்.
3. பிற மொழி அறிவுத் திறன் மேம்படச்செய்தல்.
4. வார்த்தை அமைக்கும் திறன் பெறச்செய்தல்.
5. கையெழுத்துத்திறன் பெறச்செய்தல்.

Offered by : தமிழ்த்துறை

Course Content **Instructional Hours / Week: 2**

Unit	Description	
I	**தமிழ் மொழியின் அடிப்படைக் கூறுகள்**	
	எழுத்துக்கள் - உயிர் எழுத்துக்கள் மெய் எழுத்துக்கள் உயிர்மெய் எழுத்துக்கள்	
	Instructional Hours	**5**
II	**சொல் அமைத்தல்**	
	ஓர் எழுத்து ஒரு மொழி இரண்டு முதல் ஐந்து எழுத்துச் சொற்கள் தமிழ் மாதங்கள் பெயர், கிழமைகளின் பெயர் வண்ணங்கள் பெயர், சொல் ஆக்கம்	
	Instructional Hours	**10**
III	**தொடரமைப்பு**	
	எழுவாய் செயப்படுபொருள் பயனிலை	
	Instructional Hours	**5**
IV	**குறிப்பு எழுதுதல்**	
	தொடரமைப்பு பத்தி அமைப்பு	
	Instructional Hours	**5**
V	**பிழை நீக்குதல்**	
	ஒற்றுப்பிழை வாக்கியப் பிழை	
	Instructional Hours	**5**
	Total Hours	**30**

பாடத்தொகுப்பு :

இளங்கலை தமிழ் மாணவர்களுக்குரிய பாட நூல் **"அரிச்சுவடி"**

தொகுப்பு: தமிழ்த்துறை, நேரு கலை அறிவியல் கல்லூரி, கோயம்புத்தூர்.

Course Designed by	Verified by	Checked by	Approved by
அ. யுகேஸ்வரி	அ. யுகேஸ்வரி	Dr. K. Selvakumar, Convenor, CDC	14 AUG 2021

Course Code	Title	
19U4NM3CAF	**Non Major Elective :Consumer Affairs**	
Semester: III	**Credits :2**	**ESE: 50 Marks**

Course Outcome:

CO1	Know their rights and responsibilities as a consumer
CO2	Gain knowledge about Legal framework of protecting consumer rights
CO3	Understand the procedure about redressal of consumer complaints
CO4	Learn about Consumer related regulatory
CO5	Comprehend business firms ,interface with consumers

Course Content **Instructional Hours/Week: 2**

Unit	Description	
I	**Conceptual Framework** **Consumer and Markets:** Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology.	
	Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process	
	Instructional Hours	**6**
II	**The Consumer Protection Law in India** **Objectives and Basic Concepts:** Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, deficiency in service, unfair trade practice.	
	Instructional Hours	**6**
III	**Grievance Redressal Mechanism under the Indian Consumer Protection Law** Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Offences and penalties.	
	Instructional Hours	**6**
IV	**Role of Industry Regulators in Consumer Protection** i. Telecommunication: TRAI ii. Food Products: FSSAI iii. Insurance : IRDA and Insurance Ombudsman	
	Instructional Hours	**6**
V	**Contemporary Issues in Consumer Affairs** **Consumer Movement in India:** Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption,	

	National Consumer Helpline, Comparative Product testing.	
	Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Agmark, Hallmarking, Licensing and Surveillance.	
	Instructional Hours	**6**
	Total Hours	**30**

Text book:

1. "Consumer Affairs", Compiled by Department of Business Administration, Nehru Arts and Science College.

Suggested Readings:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) Consumer Affairs, Universities Press.
2. Choudhary, Ram Naresh Prasad (2005). Consumer Protection Law Provisions and Procedure, Deep and Deep Publications Pvt Ltd.
3. G. Ganesan and M. Sumathy. (2012). Globalisation and Consumerism: Issues and Challenges, Regal Publications
4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, New Delhi
5. Rajyalaxmi Rao (2012), Consumer is King, Universal Law Publishing Company
6. Girimaji, Pushpa (2002). Consumer Right for Everyone, Penguin Books.

Course Designed by	Verified by	Checked by	Approved by
		Convenor CDC	14 AUG 2021

Course Code	Title	
19U4NM3GTS	Gandhian Thoughts	
Semester: III	Credits : 2	ESE: 50 Marks

Course Objective: To make them understand the philosophies of Gandhi better and fulfill their duties and responsibilities towards the society.

Course Outcome: To upgrade the knowledge and skills of the students in Gandhian Thoughts and to encourage patriotism among the new generation, to put light on social issues and value of life.

Course Content **Instructional Hours/Week: 02**

Unit	Description
I	**Educational Philosophy of Gandhiji :** Definitions on Education - What is True Education? - Gandhiji's New Scheme of Education - Wardha Scheme of Education - Main Aims of Gandhian Education - Why Gandhiji's Scheme of Education was Called 'Basic Education?' - Features of the Wardha Scheme of Education - Features of Basic Education - The Methodology of Basic Education - The Content of Basic Education - Routine Work of a Basic School
	Instructional Hours 6
II	**Gandhian Concept of Correlation of Studies -** Technique of Correlation - The Place of Teacher in Basic Education - Merits of Basic Education - Educational Scenario after Independence - Influences of Gandhiji on Education Commissions - Basic Schools in the Present Society - Education for Peace – A Gandhian View - Why Basic Education is called a Holistic Model
	Instructional Hours 6
III	**Gandhiji's View on Truth and Non-Violence :** Gandhiji's Words about Truth - Meaning of Truth, Truth is God - Truth and God - The Importance of Truth in Human Life - Absolute and Relative Truth - Realisation of the Self - Liberation.
	Instructional Hours 6
IV	**Mahatma Gandhi's Views on Women :** Status of Women in Pre Independence India - Gandhi's Perception of Women - Role of Women in Family – Perception of Gandhi - Value of Equality - Women in Politics - Gandhiji's Vision to Abolish Social Evils against Women - Role of Women as Envisaged by Gandhi.
	Instructional Hours 6
V	**Gandhiji's View on Democracy (Gram Swaraj) :** City and Village - Gram Swaraj - Critique of Industrialisation - Critique of Machinery
	Instructional Hours 6
	Total Hours 30

Text Book(s):

1. " Gandhian Thoughts", Compiled by Nehru Arts and Science College.

Course Designed by	Verified by HOD	Checked by	Approved by
13/8/21	13/8/21	14/8/21	14 AUG 2021

Convenor CDC

Course Code	Title	
19U4NM3WRT	**Women's Rights**	
Semester: III	**Credits: 2**	**ESE : 50 Marks**

Course Objective:

To facilitate the awareness on the social, economic, political, intellectual or cultural contributions of one or more women

Course Outcome:

- Examine the similarities and differences among women within and across cultures and at various moments
- Describe gender socialization and its consequences in a particular society
- Analyze how these factors with the privileges and disadvantages they confer have shaped one's own experiences, presumptions, viewpoints, and sense of identity
- Read and respond to feminist scholarship

Course Content **Instructional Hours/Week:2**

Unit	Description	Text book	Chapter
I	**Laws, Legal System and Change** Definition - Constitutional law, CEDAW and International Human Rights - Laws and Norms – Laws and Social Context - Constitutional and Legal Framework	2	2
	Instructional Hours		**6**
II	**Politics of land and gender in India** Land as Productive Resources	1	5
	Locating Identities – Women's Claims to Land – Right to Property - Case Studies	1	6,7
	Instructional Hours		**6**
III	**Women's Rights:Access to Justice** Introduction – Criminal Law – Crime Against WomenDomestic Violence – Dowry Related Harassment and Dowry Deaths- Molestation – Sexual Abuse and Rape Loopholes in Practice – Law Enforcement Agency	3	**7**
	Instructional Hours		**6**
IV	**Women's Rights**		
	Violence Against Women – Domestic Violence The Protection of Women from Domestic Violence Act, 2005, The Marriage Validation Act, 1982 - The Hindu Widow Re-marriage Act, 1856- The Dowry Prohibition Act, 1961	3	5
	Instructional Hours 6		

V	**Special Women Welfare Laws** Sexual Harassment at Work Places, Rape and Indecent Representation ,The Indecedent Representation (Prohibition) Act, 1986 , Immoral Trafficking , The Immoral Traffic (Prevention) Act, 1956 - Acts Enacted for Women Development and Empowerment , Role of Rape Crisis Centers. Protection of Children from sexual Offences Act 2012	3	9
			Instructional Hours6
		Total Instructional Hours	**30**

Text Books:

1. Nitya Rao **Good Women do not Inherit Land** Social Science Press and Orient Blackswan 2008
2. International Solidarity Network**Knowing Our Rights** An imprint of Kali for Women 2006
3. P. D. Kaushik **"Women Rights"** Bookwell Publication 2007 UN Centre for Human Rights, Discrimination against Women (Geneva: World Campaign for Human Rights, 1994).

Reference Books:

1. ArunaGoal **Violence Protective Measures for Women Development and Empowerment,** Deep and Deep Publications Pvt. 2004
2. Monica Chawla **Gender Justice**, Deep and Deep Publications Pvt. Ltd.2006
3. Preeti Mishra **Domestic Violence Against Women,** Deep and Deep Publications Pvt. 2007
4. ClairM.Renzetti, Jeffrey L.Edleson, Raquel Kennedy Bergen, Source Book on **Violence Against Women** Sage Publications 2001

Course Designed by	Verified by HOD	Checked by	Approved by
13/8/21	13/8/21	14/8/21	14 AUG 2021

Convenor CDC

Course Code	Title	
19U4NM4AT2	**ADVANCED TAMIL - II**	
Semester: IV	**Credits: 2**	**ESE : 50 Marks**

(Common to all UG Programmes)

Course Objective: நூல்களின் வழி அறச்சிந்தனைகளை உருவாக்குதல்
செம்மொழியினைச் செம்மைப்படுத்துதல்.

Course Outcomes:
1. அறச்சிந்தனைகள் பெறுதல் மற்றும் இலக்கண வழக்கு முறைகளைப் பெறுதல்.
2. மொழியைப் பிழையின்றிப் பேச, எழுத திறன் பெறச்செய்தல்

Offered by : தமிழ்த்துறை

Course Content **Instructional Hours / Week: 2**

Unit	Description
I	**பதினெண் கீழ்க்கணக்கு நூல்கள்**
	திருக்குறள் 1. வாய்மை 2. கூடா நட்பு 3. செய்நன்றியறிதல்
	Instructional Hours 10
II	**சிறுகதை**
	பூனாத்தி சிறுகதைகள் - வெ. இறையன்பு 1. விடுகதை 2. நண்பர்கள்
	Instructional Hours 5
III	**எழுத்துப்பிழை நீக்க வழிகள்**
	1. சொற்களைச் சரியாகப் பயன்படுத்தும் முறை 2. வினைச் சொற்கள், பெயர்ச்சொற்கள்
	Instructional Hours 5
IV	**வழக்கறிதல்**
	மரபு, இயல்பு, வழக்கு – தகுதி வழக்கு அறிதல்
V	**படைப்பாற்றல் பயிற்சி**
	கவிதை – சிறுகதை – நூல் மதிப்பீடு எழுதுதல்
	Instructional Hours 5
	Total Hours 30

பாடத்தொகுப்பு :

இளங்கலை தமிழ் மாணவர்களுக்குரிய பாட நூல் "**திரட்டு**".

தொகுப்பு: தமிழ்த்துறை, நேரு கலை அறிவியல் கல்லூரி, கோயம்புத்தூர்.

பார்வை நூல்கள்:

1. திருக்குறள் – பரிமேலழகர் உரை, மணிவாசகர் பதிப்பகம், சென்னை.
2. அ.கி. பரந்தாமனார் – நல்ல தமிழ் எழுத வேண்டுமா? அல்லி நிலையம், சென்னை.
3. பவணந்தி முனிவர், நன்னூல் பூலியூர்க்கேசிகன் உரை, சாரதா பதிப்பகம், சென்னை.
4. வெ. இறையன்பு – பூனாத்தி, கவிதா பதிப்பகம், சென்னை.

Course Designed by	Verified by	Checked by	Approved by

13/8/21 13/8/21 14/8/21 14 AUG 2021

Convenor
CDC

Course Code	Title	
19U4NM3BT2	BASIC TAMIL - II	
Semester: IV	Credits: 2	CIA : 50 Marks

(Common to all UG Programmes)

Course Objective: அற இலக்கியங்களை அறிமுகப்படுத்தல்

Course Outcomes:

1. அற இலக்கிய அறிவு பெறுதல் - சிறு சிறு கதைகள் வழி சமூக அறிவு பெறுதல்.
2. மொழியைப் பிழையின்றிப் பேச, எழுத திறன் பெறச்செய்தல்.

Offered by : தமிழ்த்துறை

Course Content **Instructional Hours / Week: 2**

Unit	Description	
I	**நீதி நூல்கள்**	
	1. பாரதியார் - ஆத்திச்சூடி – முதல் 12 வரிகள் 2. கொன்றைவேந்தன் முதல் 7 வரிகள்	
	Instructional Hours	**5**
II	**திருக்குறள்**	
	கடவுள் வாழ்த்து - அகரமுதல எனத் தொடங்கும்... அதி. - 1 குறள் - 1 வான் சிறப்பு - நீரின்றி அமையாது உலகு... அதி. - 2 குறள் - 10 அன்புடைமை - அன்பின் வழியது உயிர்நிலை ...அதி. - 8 குறள் - 10 கல்வி - கண்ணுடையார் என்பர் ..... அதி. - 40 குறள் - 3 இனியவை கூறல் - இனிய உளவாக இன்னாத ... அதி. - 10 குறள் - 10	
	Instructional Hours	**10**
III	**நீதிக்கதைகள்**	
	முல்லாவின் வேடிக்கைக் கதைகள், பீர்பால் கதைகள்	
	Instructional Hours	**5**
IV	**கிராமியக் கதைகள்**	
	1. பரமார்த்தக்குரு கதைகள் 2. நாட்டுப்புறக் கதைகள் அறிமுகம்	
V	**மொழிப் பயிற்சி**	
	1. பிறமொழிச்சொற்களுக்கு தமிழ்ச்சொல் எழுதுதல் 2. தன்விவரம் எழுதுதல் 3. எங்கள் கல்லூரி	
	Instructional Hours	**5**
	Total Hours	**30**

பாடத்தொகுப்பு :

இளங்கலை தமிழ் மாணவர்களுக்குரிய பாட நூல் **"அரிச்சுவடி"**

தொகுப்பு: தமிழ்த்துறை, நேரு கலை அறிவியல் கல்லூரி, கோயம்புத்தூர்.

Course Designed by	Verified by	Checked by	Approved by

14 AUG 2021

Convenor
CDC

Course Code	Title	
19U4NM4GEN	General Awareness	
Semester: IV	Credits : 2	ESE : 50 Marks

Course Objective:

Enable the students to learn General knowledge and prepare different competitive exams.

Course Outcome:

- Analysis the Verbal and Numerical Aptitude
- Understood the General Science and Technology and Education
- GainKnowledge inComputer aids and Social Studies
- DevelopAptitude and problem solving skills

Course Content **Instructional Hours / Week: 2**

S.No.	Topics
1	Verbal Aptitude
2	Numerical Aptitude
3	Abstract Reasoning
4	Tamil and Other Literature
5	General Science and Technology
6	Computer
7	Economics and Commerce
8	History and Freedom Struggle
9	Sports
10	Current Affairs
	Total Hours :30

Text Book: "General Awareness", compiled by Nehru Arts and Science College, Coimbatore

Countersigned by	Verified by HoD	Checked by	Approved by
Dr. A. Anitha 13/8/21	13/8/21		
Dr. A. Anitha	P. Nagarajan	Dr. K. Shanmugam	

Convener 11 AUG 2021

Course Code	Title		
20U1FRN101	PART – I FRENCH – I		
Semester - I	Credits : 4	CIA: 25 Marks	ESE: 75 Marks

(Common to all UG Programs except B. Sc. Catering Science and Hotel Management)

Course Objective : To make the students know and understand the value of French language and help them to follow the culture and tradition.

Course Outcomes (CO)

CO1	Empowering reading skill
CO2	Translation

Offered by : The French department

Course Content **Instructional Hours / Week : 5**

Unit	Description	
I	Bonjour	
	Instructional Hours	**15**
II	Rencontres	
	Instructional Hours	**15**
III	100 % questions	
	Instructional Hours	**15**
IV	Enquête	
	Instructional Hours	**15**
V	Invitations	
	Instructional Hours	**15**
	Total Hours	**75**

Text Book:

1. **CONNEXIONS 1 Methode de Français Niveau 1** – Régine Mérieux Yves Loiseau

Tools for Assessment (25 Marks)

CIA I	CIA II	Model	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course designed by	Verified by	Checked by	Approved by
13/8/21 (Dr. Abirami)	13/8/21 (Dr. Abirami)	Dr. K. Selvavinayagam Convenor CBC	14 AUG 2021

Course Code	Title		
20U1FRN202	Part I : FRENCH – II		
Semester: II	Credits: 4	CIA : 25 Marks	ESE: 75 Marks

Course Objective : To make the students know and understand the value of French language and help them to follow the culture and tradition.

Course Outcome

CO1	Empowering reading skill
CO2	Translation

Offered by : The French Department

Course Content **Instructional Hours / Week : 5**

Unit	Description	
I	À table!	
	Instructional Hours	15
II	Rallye	
	Instructional Hours	15
III	Chez moi	
	Instructional Hours	15
IV	Les Vacances	
	Instructional Hours	15
V	Au jour le jour	
	Instructional Hours	15
	Total Hours	75

Text Book :

1. CONNEXIONS 1 Methode de Français Niveau 1 – Régine Mérieux Yves Loiseau

Tools for assessment (25 marks)

CIA I	CIA II	Model	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course designed by	Verified by	Checked by	Approved by
13/8/21 (Dr. Abirami)	13/8/21 (Dr. Abirami)	Dr.K. Selvanayagam Convenor CDC	14 AUG 2021

Course Code	TITLE		
20U1FRN 303	**PART - I FRENCH - III**		
Semester : III	**Credits - 4**	**CIA Marks : 25**	**ESE Marks: 75**

Course Objective: To make the students know and understand the value of French language and help them to follow the culture and tradition.

COURSE OUTCOME

CO1	Empowering reading skill
CO2	Translation

Offered by: The French Department

Course Content **Instructional Hours /Week: 5**

UNIT	DESCRIPTION	
I	Roman	
	Instructional Hours	15
II	Je te retrouverai	
	Instructional Hours	15
III	Au quotidian	
	Instructional Hours	15
IV	L'amour de l'art	
	Instructional Hours	15
V	Toujours plus!	
	Instructional Hours	15
	Total Hours	75

Text Book:

1. CONNEXIONS Méthode de Français Niveau 1 – Régine Mérieux
   Yves Loiseau
2. CONNEXIONS Méthode de Français Niveau 2 – Régine Mérieux
   Yves Loiseau

Tools for assessment (25 marks)

CIA I	CIA II	MODEL	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course designed by	Verified by	Checked by	Approved by
13/8/21 (Dr. Abirami)	13/8/21 (Dr. Abirami)	Dr. K. Selvamurugan Convenor CDC	14 AUG 2021

Course Code	TITLE		
20U1FRN 404	PART - I FRENCH - IV		
Semester : IV	Credits - 4	CIA Marks : 25	ESE Marks: 75

Course Objective: To make the students know and understand the value of French language and help them to follow the culture and tradition.

COURSE OUTCOME

CO1	Empowering reading skill
CO2	Translation

Offered by: The French Department

Course Content **Instructional Hours /Week: 5**

UNIT	DESCRIPTION	
I	Le tour du monde en 80 jours	
	Instructional Hours	15
II	Ici et Ailleurs	
	Instructional Hours	15
III	Projets	
	Instructional Hours	15
IV	Savoir-vivre	
	Instructional Hours	15
V	Sans voiture	
	Instructional Hours	15
	Total Hours	75

TextBook :

1. CONNEXIONS Méthode de Français Niveau
2. 2 – Régine Mérieux Yves Loiseau

Tools for assessment (25 marks)

CIA I	CIA II	MODEL	Assignment	Seminar	Attendance	Total
5	5	6	3	3	3	25

Course designed by	Verified by	Checked by	Approved by
13/8/21 (Dr. Abirami)	13/8/21 (Dr. Abirami)	Dr. K. Selvavinayagam Convenor CDC	14 AUG 2021