ST. MARY'S COLLEGE (Autonomous)

(Re-accredited with 'A$^+$' Grade by NAAC)

Thoothukudi-628001, Tamil Nadu

(Affiliated to Manonmaniam Sundaranar University)

Syllabus

B.Sc. Botany

School of Biological Sciences

Outcome Based Curriculum

(W.e.f.2018)

Preamble

The Department of Botany offers an enriched learning environment in Plant Science. The Botany programme provides basic training in Plant Biology, Ecology, Physiology, Marine Botany, Mycology, Plant Diseases and Biotechnology. The department has excellent laboratory and research facilities to augment research in the fields of botany. Besides, students develop transferable skills, critical and lateral thinking, analytic and interpretive skills and communicating skills. It has great scope for higher education in diverse branches of botany. The programme opens avenues for multiple job opportunities as Soil and Plant Scientist, Biophysicist, Biochemist, Biological Technician, Environmental Scientist, Mycologist, Plant Breeders, Horticulturist and Entrepreneur in plant products and herbal medicine.

Vision:

Developing academically, professionally and ethically empowered human resources.

Mission:

To provide an academic ambience that strengthens critical thinking, scientific inquiry and problem solving in the frontier areas of plant biology.

Programme Outcome

PO.No	Upon completion of B.Sc Degree programme , the graduates will be able to
PO 1	apply the acquired knowledge of fundamental concepts in the field of science and to find solutions to various problems.
PO 2	inculcate innovative skills and team – work among students to meet societal expectations.
PO 3	perform analysis to assess, interpret, and create innovative ideas through practical experiments.
PO 4	facilitate to enter multidisciplinary path to solve day-to-day scientific problems.
PO 5	carry out fieldworks and projects, both independently and in collaboration with others, and to report in a constructive way.
PO 6	improve communication ability and knowledge transfer through ICT aided learning integrated with library resources.
PO 7	transfer the knowledge to the other stakeholders through extensive community development programme.
PO 8	attain competency in job market / entrepreneurship.

Programme Specific Outcome

PSO No.	Students of B.Sc Botany will be able to
PSO-1	identify different groups of plants /organisms and understand their origin, evolution and phylogenetic relationships that will enable to infer the trends of life on earth.
PSO-2	find how organism functions at biochemical and genome level and able to relate to growth, development and behavior of different forms of life
PSO-3	observe interconnectedness of life on earth through nutrient cycling and energy flow of nutrients and able to articulate the values of natural resources in different walk of life
PSO-4	challenge the interdisciplinary science and apply them for biological analysis and problem solving.
PSO-5	analyse, recognize and evaluate the structural make up of coastal and marine environments, their physical and chemical characteristics and sustainable opportunities for alternative education
PSO-6	practice and demonstrate the techniques that ensure skill development and job option.
PSO-7	extend science to address major environmental and ethical issues to develop just and sustainable solution
PSO-8	design, experiment, formulate hypothesis, analysing data and present data for academic classes and scientific forum

Course Structure (w.e.f. 2018)
Semester –I

Part	Components	Sub. Code	Title of the Paper	Hrs/ Week	Credits	Max. Marks		
						CIA	ESE	Total
I	Tamil / French	18ULTA11 18ULFA11	இக்கால இலக்கியம்: செய்யுள், இலக்கணம், உரைநடை, சிறுகதை, இலக்கிய வரலாறு Preliminary French course	6	4	40	60	100
II	General English	18UGEN11	Prose, Poetry, Extensive reading & Language study- I	6	4	40	60	100
III	Core I	18UBOC11	Cell Biology and Genetics	4	4	40	60	100
	Core II	18UBOC12	Algae and Bryophytes	4	4	40	60	100
	Core Practical I	18UBOCR1	18UBOC11&18UBOC12	2	1	40	60	100
	Allied I	18UZOA11	Animal Biology	4	3	40	60	100
	Allied Practical I	18UZOAR1		2	1			
IV	Ability Enhancement Course	18UAVE11	Value Education	2	2	20	30	50
Total				**30**	**23**			

Semester II

Part	Components	Sub. Code	Title of the Paper	Hrs/ Week	Credits	Max. Marks		
						CIA	ESE	Total
I	Tamil / French	18ULTA21 18ULFA21	சமய இலக்கியங்களும், நீதி இலக்கியங்களும்: செய்யுள், இலக்கணம், உரைநடை, வாழ்க்கை வரலாறு, இலக்கிய வரலாறு Basic French course	6	4	40	60	100
II	General English	18UGEN21	Prose, Poetry, Extensive reading & Language study- II	6	4	40	60	100
III	Core III	18UBOC21	Fungi, Lichens and Plant Pathology	4	4	40	60	100
	Core IV	18UBOC22	Anatomy and Embryology	4	4	40	60	100
	Core Practical II	18UBOCR2	18UBOC21&18UBOC22	2	1			
	Allied I	18UZOA21	Genetics, Developmental Biology and Physiology	4	3	40	60	100
	Allied Practical I	18UZOAR1	18UZOA11 &18UZOA21	2	1	40	60	100
IV	Ability Enhancement Course	18UAEV21	Environmental Studies	2	2	20	30	50
Total				**30**	**23**			

Semester III

Part	Components	Sub. Code	Title of the Paper	Hrs/ Week	Credits	Max.Marks		
						CIA	ESE	Total
I	Tamil / French	18ULTA31 18ULFA31	காப்பிய இலக்கியம்: செய்யுள், இலக்கணம், உரைநடை, சிறுகதை, இலக்கிய வரலாறு Advanced French Course	6	4	40	60	100
II	General English	18UGEN31	Prose, Poetry, Extensive reading & Language study -III	6	4	40	60	100
III	Core V	18UBOC31	Pteridophytes,Gymnosperms and Paleobotany	4	4	40	60	100
	Core Practical III	18UBOCR3	18UBOC31	2	1	40	60	100
	Allied II	18UCHA31	Allied Chemistry - **I**	4	3	40	60	100
	Allied Practical II	18UCHAR2		2	1			
	Core Skill Based	18UBOS31	Horticulture and Plant Breeding	4	4	40	60	100
	NME I	18UBON31	Plant Resources Utilization	2	2	20	30	50
IV	Ability Enhancement Course	18UAWS31	Women's Synergy		2	20	30	50
	Self Study or On-line Course / Internship (Optional)	18UBOSS1	Organic farming		+2		50	50
Total				**30**	**25+2**			

Semester IV

Part	Components	Sub. Code	Title of the Paper	Hrs/ Week	Credits	Max.Marks		
						CIA	ESE	Total
I	Tamil / French	18ULTA41 18ULFA41	சங்க இலக்கியம்: செய்யுள், இலக்கணம், உரைநடை, வாழ்க்கை வரலாறு, இலக்கிய வரலாறு Language through Literature	6	4	40	60	100
II	General English	18UGEN41	Prose, Poetry, Extensive reading & Language study- IV	6	4	40	60	100
III	Core VI	18UBOC41	Taxonomy of Angiosperms	4	4	40	60	100
	Core Practical IV	18UBOCR4	18UBOC41	2	1	40	60	100
	Allied II	18UCHA41	Allied Chemistry - II	4	3	40	60	100
	Allied Practical II	18UCHAR2	18UCHA31 &18UCHA41	2	1	40	60	100
	Core Skill Based	18UBOS41	Herbal Health Care Products	4	4	40	60	100
	NME II	18UBON41	Food Technology	2	2	20	30	50
IV	Ability Enhancement Course	18UAYM41	Yoga & Meditation		2	20	30	50
	Self Study /Online Course (Optional)	18UBOSS2	Botany for competitive examinations		+2		50	50
V	NCC, NSS & Sports				1			
	Extension Activities CDP				+1			
Total				**30**	**26+3**			

Semester V

Part	Components	Sub. Code	Title of the Paper	Hrs/ Week	Credits	Max.Marks		
						CIA	ESE	Total
III	Core VII (Common Core)	18UBCC51	Biotechnology	4	3	40	60	100
	Core VIII	18UBOC52	Microbiology	5	4	40	60	100
	Core IX	18UBOC53	Biochemistry	5	4	40	60	100
	Core Integral I	18UBOI51	Biostatistics and Biological techniques	4	4	40	60	100
	Core Integral II	18UBOI52	Pharmacognosy	4	4	40	60	100
	Common Core Practical V	18UBCCR1	18UBCC51	2	1	40	60	100
	Core Practical VI	18UBOCR5	18UBOC52 & 18UBOC53	4	2	40	60	100
IV	Common Skill Based	18UCSB51	Computer for Digital Era and Soft Skills	2	2	20	30	50
	Self Study / On-line Course (Compulsory)	18UBOSS3	Economic Botany	--	2		50	50
Total				**30**	**26**			

Semester VI

Part	Components	Sub. Code	Title of the Paper	Hrs/ Week	Credits	Max.Marks		
						CIA	ESE	Total
III	Core X	18UBOC61	Plant Physiology	5	4	40	60	100
	Core XI	18UBOC62	Marine Botany	5	4	40	60	100
	Core XII	18UBOC63	Ecology and Phytogeography	4	4	40	60	100
	Core Integral III	18UBOI61	Molecular Biology and Bioinformatics	4	4	40	60	100
	Core Practical VII	18UBOCR7	18UBOC61, 18UBOC62 & 18UBOC63	6	3	40	60	100
IV	Project	18UBOP61	Project	6	3	40	60	100
Total				**30**	**22**			
Total				**180**	**145+5**			

Semester	Hours	Credits	Extra Credits
I	30	23	---
II	30	23	---
III	30	25	2
IV	30	26	3
V	30	26	--
VI	30	22	--
Total	**180**	**145**	**5**

Courses	Number of Courses	Hours / week	Credits	Extra Credits
Tamil	4	24	16	--
English	4	24	16	--
Core	12T+7P	52T+20P	47T+10P	--
Core Skill Based	2	8	8	--
Core Integral	3	12	12	--
Group Project	1	6	3	--
Allied	4T+2P	16T+8P	12T+4P	--
NME	2	4	4	--
Ability Enhancement Course	4	4 (4 Extra Hours)	8	--
Common Skill Based	1	2	2	--
NCC, NSS & Sports		--	1	
Extension Activities		--		1
Self Study Papers (Optional)	2	--		4
Self Study Papers (Compulsory)	1	--	2	--
Total		**180**	**145**	**5**

தமிழ்த் துறை
தமிழ் பாடத்திட்டம் 2018 – 2021

பாடத்திட்டத்தின் நோக்கங்கள்

1. அனைத்து துறை மாணவர்களும் பயன்பெறும் வகையில் பாடத்திட்டம் வரையறை செய்யப்பட்டுள்ளது.

2. தமிழ் இலக்கிய கல்வியை எளிமையுடன் ஆழமாக்கிக் கற்பிக்கும் விதமாகத் தற்கால இலக்கியம் தொடங்கி, சங்க இலக்கியம் வரை கற்பித்தல்.

3. தமிழ் மொழியில் பிழையின்றி கற்கும் விதமாக எழுத்து, சொல் , பொருள், யாப்பு, அணி என இலக்கணத்தைக் பயிற்றுவித்தல்.

4. மாணவர்களின் நலன் கருதி இலக்கிய வரலாற்றுப் பகுதியானது செய்யுள் அமைப்பிற்கேற்ப வகைப்படுத்தப்பட்டு கற்பிக்கப்படுதல்

பயன்கள்

1. காலந்தோறும் வளர்ந்துவரும் தமிழ் கவிதைகளின் வடிவினையும், கருத்தோட்டத்தினையும் மாணவியர் அறிந்து கொள்வர்.

2. தமிழ் மொழியைப் பிழையின்றி எழுதவும் பேசவும் முடியும்.

3. தன்னம்பிக்கை உருவாகும்.

4. தகவல் தொடர்பு சாதனங்கள் தமிழ் வளர்ச்சிக்குப் பயன்படுவதை அறிந்து கொள்வர்.

5. படைப்பாற்றலை வளர்த்துக்கொள்வர்.

6. தமிழ் இலக்கியங்கள் அன்று முதல் இன்று வரை பெற்றுவரும் சிறப்பை உணர்வர்.

7. இலக்கிய வரலாற்றின் வழி, மொழியின் வளர்ச்சியையும் காலந்தோறும் மாறிவரும் இலக்கியங்களின் பல்வேறு வகைகளையும் தெரிந்து கொள்வர்.

8. துறைதோறும் தமிழ் மொழியின் வளர்ச்சியை அறிவர்.

9. சங்கம் வைத்து தமிழாய்ந்த மன்னர், புலவர், மக்கள் இவர்களின் வாழ்வியல் அறங்களைக் கண்டறிவர்.

10. பண்பாட்டுச் சிறப்பினை மொழியின் வழி அறிந்து தம் வாழ்வில் கடைபிடிப்பர்.

11. வேலைவாய்ப்பிற்கான தேர்வுகளில் திறமையுடன் பங்கேற்பர்.

SEMESTER - I			
Part-1 தமிழ்	**தாள் - 1 இக்கால இலக்கியம்** **செய்யுள், இலக்கணம், உரைநடை, சிறுகதை, இலக்கிய வரலாறு**		
18ULTA11	**Hrs / Week:6**	**Hrs / Semester: 90**	**Credits: 4**

Vision: மாணவியருக்கு நல்ல மதிப்பீடுகளைக் கற்பித்து, வாழ்வில் அவற்றைப் பின்பற்ற வழிவகுத்தல்.

Mission: இலக்கிய மாந்தரின் வாழ்க்கை அனுபவங்கள் மூலம் பிரச்சனைகளை எதிர்கொள்ளும் திறம், தன்னம்பிக்கை, ஆளுமைத்திறம், மொழிஅறிவு இவற்றை உருவாக்குதல்.

Course Outcome:

CO.No.	இப்பாடத்திட்டத்தின் மூலம், மாணவியர்	Cognitive Level
CO-1	பெண் சார்ந்த விடுதலை உணர்வை வளர்க்கிறது.	வளர்ச்சி
CO-2	இனம், சாதி குறித்த பாகுபாட்டிலிருந்து விடுதலை பெறும் வழிவகைகளைக் கற்றுக்கொடுக்கிறது.	நடைமுறைப்படுத்தல்
CO-3	இயற்கையைப் பேணுதற்கும் வாழ்வின் வளர்ச்சிநிலையை மேம்படுத்திக் கொள்ளுதற்கும் உதவுகிறது.	நடைமுறைப்படுத்தல்
CO-4	சமயநல்லிணக்கம், ஒற்றுமைஉணர்வு, இறைநம்பிக்கை இவற்றை உருவாக்குகிறது.	உருவாக்கம்
CO-5	மொழியை பிழையின்றி பேசவும் எழுதவும் உதவுகின்றது.	புரிதல் திறன் மேம்பாடு
CO-6	தனிமனித வாழ்க்கைச் சிக்கல்களை எதிர்கொள்ளும் நிலையை உருவாக்குகிறது	நடைமுறைப்படுத்தல்
CO-7	சமுதாய பிரச்சினைகளை எதிர்கொள்ளும் திறம் கிடைக்கிறது.	நடைமுறைப்படுத்தல்
CO-8	போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையில் படைப்பாக்கத் திறனை வளர்க்க உதவுகிறது.	படைப்பாற்றல் திறன் மேம்பாடு

SEMESTER – I			
Part – I தமிழ்; Paper – 1	**இக்கால இலக்கியம், செய்யுள், இலக்கணம், உரைநடை, சிறுகதை, இலக்கிய வரலாறு**		
18ULTA11	Hrs/Week: 6	Hrs / Semester: 90	Credits: 4

அலகு– 1 செய்யுள் – 1 மணி

1. மனதில் உறுதிவேண்டும் - பாரதியார்
2. ஒழுக்கம் விழுப்பம் தரும் - பாரதிதாசன்
3. ஐந்துபெரிது ஆறு சிறிது - வைரமுத்து
4. போட்டி - அப்துல் ரகுமான்
5. மனிதனும் இயற்கையும் - சிற்பி
6. நன்றிக்கடன் - பா.விஜய்
7. மேலாடை - சுரதா
8. கவிஞர்கள் கவனிக்க - ஜெ.செல்வகுமாரி
9. மாதவம் - சக்திஜோதி
10. ஹைக்கூ கவிதைகள்
11. நாட்டார் பாடல்கள்
    1. விளையாட்டு
    2. உழவும் தொழிலும்

அலகு–2 இலக்கணம் - 1 மணி

எழுத்து

1. எழுத்துப் பற்றிய விளக்கம். ஓரெழுத்து ஒருமொழி
2. முதலெழுத்துகள்.
3. சார்பெழுத்துகள்
4. சுட்டெழுத்துகள், வினாவெழுத்துகள்
5. மொழிமுதல் எழுத்துகள், மொழிஇறுதி எழுத்துகள்
6. வல்லினம் மிகும் இடங்கள், வல்லினம் மிகா இடங்கள்

அலகு– 3 உரைநடை - 1 மணி

இலக்கியச் சாரல் - ச.பாரிஜாதம்

(கட்டுரை எண்கள் - 1, 2, 3, 8, 9, 10)

அலகு– 4 சிறுகதை - 1 மணி

1. அகிலன் - தாய்ப்பசு
2. புதுமைப்பித்தன் - சாபவிமோசனம்
3. அண்ணா - செவ்வாழை
4. ஜெயகாந்தன் - அக்கினிப்பிரவேசம்
5. இரா.கலாராணி - மௌனப்போராளி
6. ஜெயரதி அகஸ்டின் - ஜோடிப் பொருத்தம்

அலகு –5 இலக்கிய வரலாறு - 2 மணி

1. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
2. சிறுகதையின் தோற்றமும் வளர்ச்சியும்
3. நாட்டுப்புறப் பாடல்கள்
4. தகவல் தொடர்புசாதனங்களும் தமிழ் வளர்ச்சியும்
5. மொழிப்பயிற்சி : புதுக்கவிதை,சிறுகதை,பத்திரிகைக்குசெய்தி

SEMESTER – II			
Part-1 Tamil **தாள் -2 சமயஇலக்கியங்களும் நீதி இலக்கியங்களும்** செய்யுள், இலக்கணம், உரைநடை, வாழ்க்கை வரலாறு, இலக்கிய வரலாறு			
18ULTA21	**Hrs / Week:6**	**Hrs / Semester: 90**	**Credits: 4**

Vision:

வாழ்வியல் நன்னெறிகளான மனிதநேயம், சமத்துவம் போன்றவற்றை வளர்த்துக் கொள்ள கற்றுக்கொடுத்தல்

Mission:

அறநெறியைக் கடைபிடிப்பதே நிலையானதும் நீடித்ததுமான நன்மையைத் தருவது என்பதைச் சான்றோரின் வாழ்க்கைநெறிகள் மூலம் உணரச்செய்தல், மொழிஅறிவு, இலக்கியஅறிவு இவற்றை வளர்த்துக் கொள்ளக் கற்றுக்கொடுத்தல்

Course Outcomes:

CO.No.	இப்பாடத்திட்டத்தின் மூலம், மாணவியர்	Cognitive Level
CO-1	இறைஆற்றலை உணர்ந்துகொள்ள உதவுகிறது	மதிப்பீடு
CO-2	நல்லநண்பர்களையும், நல்லமனிதர்களையும் இனம்கண்டுகொள்ள வழிவகுக்கிறது	நடைமுறைப்படுத்தல்
CO-3	அன்பு, இரக்கம், நற்சொல், நற்செயல் போன்ற நற்பண்புகளோடு வாழவழிவகுக்கிறது	மதிப்பீடு
CO-4	மனிதநேய பண்புகளோடு வாழ்ந்த சான்றோரின் அனுபவங்களைப் பெற்றுக்கொள்ள உதவுகிறது	நடைமுறைப்படுத்தல்
CO-5	மொழியை பிழையின்றி பேசவும் எழுதவும் உதவுகின்றது.	புரிதல், திறன் மேம்பாடு
CO-6	துனிமனித வாழ்க்கைச் சிக்கல்களையும் பிரச்சினைகளையும் எதிர்கொள்ளும் ஆற்றலை உருவாக்குகிறது	நடைமுறைப்படுத்தல், திறன் மேம்பாடு
CO-7	இறைவன்முன் அனைவரும் சமம் என்ற சிந்தனையை உருவாக்குகிறது	மதிப்பீடு
CO-8	போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையில் படைப்பாக்கத் திறனை வளர்க்க உதவுகிறது	படைப்பாற்றல்

SEMESTER - II			
Part – I Tamil தாள் – II சமய இலக்கியங்களும் நீதி இலக்கியங்களும் செய்யுள், இலக்கணம், உரைநடை, வாழ்க்கை வரலாறு, இலக்கிய வரலாறு			
Code:18ULTA21	Hrs/Week: 6	Hrs / Semester: 90	Credits: 4

அலகு– 1 செய்யுள் - 2 மணி

சைவம்
1. தேவாரம் - சுந்தரர்
2. திருவாசகம் - மாணிக்கவாசகர்
3. திருமந்திரம் - திருமூலர்

வைணவம்
1. ஆண்டாள் - நாச்சியார் திருமொழி
2. நம்மாழ்வார் - திருவாய்மொழி

பௌத்தம் : மணிமேகலை

கிறித்துவம் : கிறிஸ்து மொழிக்குறள்

இசுலாமியம் : பேட்டைஆம்பூர் அப்துல் காதிர் சாகிபு பாடல்

நீதி இலக்கியங்கள்
1. திருக்குறள்
2. நாலடியார்
3. பழமொழிநானூறு

அலகு–2 இலக்கணம் - 1 மணி
1. சொல்லின் பொது இலக்கணம்
2. பெயர்ச்சொல் - அறுவகை பெயர்கள்
3. வினைச்சொல் - வகைகள் - முற்று, எச்சம், ஏவல், வியங்கோள், செய்வினை, செயப்பாட்டுவினை, தன்வினை, பிறவினை
4. இடைச்சொல் - ஏகார ஓகார உம்மை இடைச்சொற்கள்
5. உரிச்சொல் - வகைகள்

அலகு– 3 உரைநடை - 1 மணி

எண்ணங்கள் - எம். எஸ். உதயமூர்த்தி

அலகு– 4 வாழ்க்கை வரலாறு - 1 மணி

அன்னைதெரேசா-பசுமைக்குமார்

அலகு–5 இலக்கியவரலாறு - 1 மணி
1. சைவ இலக்கியங்கள்
2. வைணவ இலக்கியங்கள்
3. கிறிஸ்துவம் தமிழுக்குச் செய்த தொண்டு
4. இஸ்லாமியம் தமிழுக்குச் செய்த தொண்டு

பதினெண் கீழ்க்கணக்கு நூல்கள் - அறநூல்கள் 11 மட்டும்

SEMESTER – III			
Part-I Tamil Paper - 3 காப்பிய இலக்கியங்களும் சிற்றிலக்கியங்களும்			
18ULTA31	**Hrs / Week:6**	**Hrs / Semester: 90**	**Credits: 4**

Vision: மாணவியருக்கு தனது உரிமைகளைப் போராடி பெறுவதற்கும் நல்ல உறவுகளை இனம் கண்டு மதிக்கவும் கற்றுக்கொடுத்தல்.

Mission: காப்பிய மாந்தரின் வாழ்க்கையின் மூலமாக நம்பிக்கை, நல்ல உறவுகள், இயற்கையை நேசித்தல், மொழிஅறிவு போன்றவற்றை வளரச் செய்தல்.

Course Outcome:

CO.No.	இப்பாடத்திட்டம் மாணவியருக்கு	அறிவுசார் மதிப்பீடு
CO-1	பெண்கள் நீதிக்குப் போராடும் உணர்வை வளர்க்கிறது.	நடைமுறைப்படுத்தல்
CO-2	அரசியல் சூழ்ச்சி, இனம், சாதி குறித்த பாகுபாடு இவற்றிலிருந்து விடுதலை பெறும் வழிவகைகளைக் கற்றுக்கொடுக்கிறது.	நடைமுறைப்படுத்தல்
CO-3	இயற்கையைப் பேணுதற்கு உதவுகிறது.	நடைமுறைப்படுத்தல்
CO-4	சமயநல்லிணக்கம், இறைநம்பிக்கை இவற்றை உருவாக்குகிறது.	உருவாக்கம்
CO-5	மொழியைப் பிழையின்றி பேசவும் எழுதவும் உதவுகின்றது.	புரிந்துகொள்ளுதல், திறன் மேம்பாடு
CO-6	தனிமனித வாழ்க்கைச் சிக்கல்களை எதிர்கொள்ளும் நிலையை உருவாக்குகிறது	நடைமுறைப்படுத்தல்
CO-7	விவசாயிகளின் வாழ்க்கைப் பிரச்சினை, சமுதாயப்பிரச்சினை இவற்றை உணர்ந்து அவற்றை நீக்கும் திறனை உருவாக்குகிறது.	நடைமுறைப்படுத்தல், திறன் மேம்பாடு
CO-8	போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையில் படைப்பாக்கத் திறனை வளர்க்க உதவுகிறது.	படைப்பாற்றல், திறன் மேம்பாடு

SEMESTER – III			
Part-I Tamil Paper - 3 காப்பிய இலக்கியங்களும் சிற்றிலக்கியங்களும்			
18ULTA31	Hrs / Week:6	Hrs / Semester: 90	Credits: 4

அலகு - 1 செய்யுள் - 2 மணி

காப்பியங்கள்

1. சிலப்பதிகாரம் - வழக்குரைகாதை : 1 – 80 பாடலடிகள்
2. மணிமேகலை - பாத்திரம் பெற்ற காதை : 75– 145 பாடலடிகள்
3. சீவகசிந்தாமணி - கோவிந்தையார் இலம்பகம் - பாடல்கள்: 411, 421, 430, 437, 440, 441, 448, 454, 456, 474, 477, 483, 484, 488, 489.
4. கம்பராமாயணம் - நகரப் படலம் - பாடல்கள்: 94, 95, 98, 100, 103, 104, 108, 114, 116, 119, 129, 132, 138, 147, 153, 159, 160.
5. சீறாப்புராணம் - விடமீட்ட படலம் - பாடல்கள் : 1, 4, 5, 6, 7, 9, 12, 13, 15, 16, 17, 20, 23, 25, 27, 29, 32, 33, 34, 36, 37, 40, 42, 44.
6. இயேசுகாவியம் - மலைப்பொழிவு
7. பெரியபுராணம் - பூசலார் புராணம்

சிற்றிலக்கியங்கள்

1. முத்துக்குமாரசாமி பிள்ளைத்தமிழ் - செங்கீரைப் பருவம் - முதல் பத்து அடிகள்
2. முக்கூடற்பள்ளு - நகர்வளம் 19-வது பாடல்
3. நந்திக் கலம்பகம் - வெற்றிமுரசு சிறப்பு
4. திருக்குற்றாலக் குறவஞ்சி பாடல் - 9

அலகு - 2 இலக்கணம் - 1 மணி

பொருள் இலக்கணம்

1. அகப்பொருள் : எழுதிணை விளக்கம் - முதல், கரு, உரிப்பொருள்
2. புறப்பொருள் : வெட்சிதிணை முதல் பாடாண்திணை வரை விளக்கம் மட்டும்

யாப்பு இலக்கணம்

1. யாப்பு உறுப்புகள்

அலகு - 3 - உரைநடை - 1மணி

நீ போகும் பாதைகள் - கீழ்குளம் வில்லவன்

அலகு - 4 புதினம் - 1

பூர்வீக பூமி - சூர்யகாந்தன்

அலகு - 5 இலக்கிய வரலாறு - 1 மணி

1. ஐம்பெருங்காப்பிங்கள்
2. ஐஞ்சிறுகாப்பியங்கள்
3. சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும், பிள்ளைத்தமிழ், கலம்பகம், குறவஞ்சி, பரணி.

SEMESTER – IV			
Part-1 Tamil Paper – IV சங்க இலக்கியம்			
18ULTA41	**Hrs / Week:6**	**Hrs / Semester: 90**	**Credits: 4**

Vision: மாணவியருக்கு நல்ல மதிப்பீடுகளைக் கற்பித்து, வாழ்வில் அவற்றைப் பின்பற்ற வழிவகுத்தல்.

Mission: இலக்கிய மாந்தரின் மூலம் நல்லவாழ்க்கை அனுபவங்களைப் பெறச்செய்து தன்னம்பிக்கை, ஆளுமைத் திறம், மொழி அறிவு இவற்றை உருவாக்குதல்.

Course Outcome:

CO.No.	இப்பாடத்திட்டம் மாணவியருக்கு	அறிவுசார் மதிப்பீடு
CO-1	அனுபவ அறிவை வளர்க்கிறது.	நடைமுறைப்படுத்தல்
CO-2	பழந்தமிழர் வாழ்வியல் முறைகளை கற்று பயனடைய உதவுகிறது.	நடைமுறைப்படுத்தல்
CO-3	ஆய்வு நோக்கினை வளர்க்கவும் வாழ்வின் வளர்ச்சி நிலையை மேம்படுத்திக் கொள்ளவும் உதவுகிறது.	நடைமுறைப்படுத்தல், உருவாக்கம்
CO-4	மனிதநேயம், இறை நம்பிக்கை இவற்றை உருவாக்குகிறது.	உருவாக்கம்
CO-5	மொழியைப் பிழையின்றி பேசவும் எழுதவும் உதவுகின்றது.	திறன் மேம்பாடு
CO-6	தனிமனித வாழ்க்கைச் சிக்கல்களை எதிர்கொள்ளும் நிலையை உருவாக்குகிறது	நடைமுறைப்படுத்தல், உருவாக்கம்
CO-7	சமுதாய பிரச்சினைகளை எதிர்கொள்ளும் திறம் கிடைக்கிறது.	நடைமுறைப்படுத்தல், திறன் மேம்பாடு
CO-8	போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையில் படைப்பாக்கத் திறனை வளர்க்க உதவுகிறது.	படைப்பாற்றல், திறன் மேம்பாடு

SEMESTER – IV			
Part-1 Tamil Paper – IV சங்க இலக்கியம்			
18ULTA41	**Hrs / Week:6**	**Hrs / Semester: 90**	**Credits: 4**

அலகு - 1 செய்யுள் - 2 மணி

எட்டுத்தொகை

1. நற்றிணை - பாடல்கள் : 1, 12
2. குறுந்தொகை - பாடல்கள் : 23, 58, 135
3. ஐங்குநுறூறு - மஞ்ஞைப்பத்து - பாடல்கள் : 294, 296, 297, 299
4. பதிற்றுப்பத்து - பாடல் : 28
5. கலித்தொகை - பாடல் : 27
6. அகநானூறு - பாடல்கள் : 173, 270
7. புறநானூறு - பாடல்கள் : 279, 312

பத்துப்பாட்டு

நெடுநல்வாடை - 80 வரிகள்

அலகு - 2 இலக்கணம் - 1 மணி

1. பாவகைகள் - வெண்பா, ஆசிரியப்பா
   பொது இலக்கணம்

2. அணி இலக்கணம் - உவமை, உருவகம், வேற்றுமை, வஞ்சப்புகழ்ச்சி, சிலேடை, தற்குறிப்பேற்றம்

3. வாக்கிய வகைகள்
4. பிறமொழிச் சொற்களை நீக்கி எழுதுதல்
   அ. ஆங்கிலச் சொற்கள்
   ஆ. வடமொழிச் சொற்கள்
   இ. தெலுங்குச் சொற்கள்

அலகு - 3 உரைநடை - 1மணி

சிந்தனைக் களஞ்சியம் - தமிழ்த்துறை - கட்டுரைத் தொகுப்பு, தூய மரியன்னை கல்லூரி (தன்னாட்சி), தூத்துக்குடி

அலகு - 4 நாடகம் - 1 மணி

தண்ணீர் தண்ணீர் - கோமல் சுவாமிநாதன்

அலகு - 5 இலக்கிய வரலாறு - 1 மணி

1. எட்டுத்தொகை நூல்கள்
2. பத்துப்பாட்டு நூல்கள்
3. சங்க இலக்கியத்தின் தனிச்சிறப்புகள்

Preamble

Acquisition of a foreign language and exposure to a different culture enhances the quality of a person. An understanding of a different civilisation opens vistas in the perception of the learner. Learning a new language is an additional skill and it widens the employability scope of the students, considering the large number of international collaborations in the global market.

Vision:

To impart knowledge and skill in French to enhance employment opportunities of the students

Mission :

To promote an understanding and appreciation of the French language and literature

Part-I Course in French is set to equip the students with an additional qualification, of acquisition of a foreign language, French. Two-year course in French creates

- Ability to act and respond in specific life-time situations of communication
- Ability to understand and translate sentences into target language
- Capability to compare and evaluate the life style of the French in contrast with Indians
- Capability to create a text of her own, narrating her day to day life
- Capability to summarize a poem or a dialogue in her own words
- Capability to use the knowledge and skill in diverse professions such as translator, interpreter , editor etc in multinational companies

Criteria of eligibility

Part-I French course is offered to students who have studied French in schools and also to students who have no knowledge of French, beginners.

I B.A., / B.Sc Part I FRENCH

SEMESTER – I			
PART – I French Paper – I Preliminary French Course			
Code : 18ULFA11	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Vision :

To initiate a beginner to the francophonic world and to train them to make their maiden efforts in spoken and written French

Mission:

To create a number of real life situations to make the learner express herself in the target language through experiential teaching method

Course Outcomes :

CO	At end of this Course, the students will be able to	CL
1.	To identify French monuments and celebrities	Kn,Ap
2.	To understand the living style of the French	Un
3.	To know and understand the taste and leisure time activities of the French people	Kn, Un
4.	From the perspective of communication	
5.	To describe a lodging	Cr
6.	To redact an advertisement	Cr
7.	To express her desires and preferences	Cr
8.	To create a blog and to express herself	Cr
9.	To redact a portrait of a personality	Cr

Prescribed Text Book:

Cocton Marie-Noëlle,Heu Elodie, Houssa Catherine, Kasazian Emilie,

Dupleix Dorothée et Ripaud Delphine, *Saison 1* Les Editions Didier,Paris,2015.

Unite I : Mes cinq sens en action
Unite II : S'ouvrir aux autres
Unite III : Partager son lieu de vie
Unite IV : Vivre au quotidien
Unite V : Fêtes et Traditions

Books, Journals and Learning Resources :

- le cahier d'activités(CD Audio INCLUS)
- Le manuel numérique premium classe
- Grammaire « Le Nouvel Entrainez-vous avec 450 Nouveaux Exercices » par Evelyne Sirejols, Tempesta Giovanna
- Les applis complémentaires
- 450 nouveaux exercices(niveau débutant)par Grand-Clément Odile
  Clé International, 2003.
- Les 500 exercices de grammaire par Akyuz Anne,Bazelle-Shahmaei Bernadette,Bonenfant Joelle, Gliemann Marie-Francoise,Hachette livre,2005
- Grammaire Progressive du français par Grégoire Maia, Clé International,2002.
- Grammaire « Le Nouvel Entrainez-vous avec 450 Nouveaux Exercices » par Sirejols Evelyne , Tempesta Giovanna
- www.didierfle.com/saison
- www.facebook.com/SaisonFLE

I B.A., / B.Sc Part I FRENCH

SEMESTER – II			
Paper – II Basic French Course			
Code : 18ULFA21	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

VISION : To develop and improve upon the acquisition of four competencies of language learning

MISSION : To motivate and to enthuse the learner's mind to life-long learning experience evidenced through various situations of communication

Course Outcomes:

CO	At end of this Course, the students will be able to	CL
1.	To understand the cultural practices of the French	Kn, Un
2.	To know and understand cultural life at Louisiane	Kn, Un
3.	To know the dressing style of the French	Kn
4.	To know the eating habits of the French	Kn, Un
5.	To be exposed to city life and various modes of transport	Kn, Un
6.	To describe a city	Kn, Un
7.	To compare cities	An,
8.	To redact an invitation	Cr
9.	To create a recipe of her own	Ap, Cr
10.	To describe an outfit	Ap, Cr
11.	To narrate an outing	Ap, Cr

Prescribed Text Book: Cocton Marie-Noëlle,Heu Elodie, Houssa Catherine, Kasazian Emilie, Dupleix Dorothée et Ripaud Delphine, *Saison,* Les Editions Didier,Paris,2015.

Unite I : S'ouvrir à la culture

Unite II : La langue française en partage

Unite II I : Gouter a la campagne

Unite IV : La gastronomie française, une question de gout

Unite V : Voyager dans sa ville, La Belgique, carrefour de l'Europe

Books, Journals and Learning Resources

1. le cahier d'activités(CD Audio INCLUS)
2. Le manuel numérique premium classe
3. Les applis complémentaires
4. Grand-Clément Odile,*450 nouveaux exercices(niveau débutant*) Clé International, 2003.
5. Akyuz Anne,Bazelle-Shahmaei Bernadette, Bonenfant Joelle, Gliemann Marie-Francoise, *Les 500 exercices de grammaire* ,Hachette livre,2005
6. Grégoire Maia ,*Grammaire Progressive du français* , Clé International,2002.
7. Sirejols Evelyne , Tempesta Giovanna,*Grammaire « Le Nouvel Entrainez-vous avec 450 Nouveaux Exercices*

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I B.Com., / BBA / B.Sc(Computer Science) Part I FRENCH

SEMESTER – I			
Paper Title-Basic French and Commercial terms			
Code : 18ULFB11	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Vision :

To impart knowledge of the culture of the French and to give training in speaking and writing French to a beginner

Mission :

To provide ample opportunities to induce and ignite the independent learning capacity.

CO	At end of this Course, the students will be able to	CL
1.	To adopt French as the language of the class	Kn, Un
2.	To enrol herself on a social media network	Ap, Cr
3.	To orient herself in a city	Un, Ap
4.	To adapt herself to new habits and rhythm of life	Un, Ap
5.	To invite and to respond to an invitation	Un, Cr, Ap
6.	To prepare a programme of outing	Un, Cr, Ap
7.	To translate the commercial terms from English to French& vice versa	Un, Ap
8.	To know and understand various aspects of cultural life of the French	Kn, Un

Prescribed Text Book:

Girardet Jacky, Pécheur Jacques, Gibbe Colette, Parizet Marie-Louise, *Tendances*, Clé International, 2016.

Prescribed Units:

Unite 1 : Commencer en français

Unite 2 : Arriver dans un pays francophone

Unite 3 : Découvrir une ville

Unite 4 : Vivre dans une famille, termes commerciaux

Unite 5 : Participer à une sortie

Books, journals and other references:

1. Evelyne Sirejols, Tempesta Giovanna *Grammaire « Le Nouvel Entrainez-vous avec 450 Nouveaux Exercices »*
2. Girardet Jacky, Pécheur Jacques, *Cahier d'activités*, Clé International ,2016.
3. Grand-Clément Odile,*450 nouveaux exercices(niveau débutant)* Clé International, 2003
4. Akyuz Anne, Bazelle-Shahmaei Bernadette,Bonenfant Joelle, Gliemann Marie-Francoise, *Les 500 exercices de grammaire* Hachette livre,2005
5. Grégoire Maia, Thievenez Odile*, Grammaire Progressive du français,* Clé International, 2002.

I B.Com., / BBA / B.Sc (Computer Science) Part I FRENCH

SEMESTER – II			
Paper Title-Essential French and Commercial correspondance			
Code : 18ULFB21	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Vision :

To build upon the language skills acquired to reach a standard level of speaking and writing French

Mission :

To give thrust on the actional approach to motivate the autonomy of the learner.

CO	At end of this Course, the students will be able to	CL
1.	To understand travel documents and to describe a displacement	Kn, Un
2.	To write a post card or mail about a voyage	Ap, Cr
3.	To know and understand the means of payment	Kn, Un
4.	To express her needs	Ap, Cr
5.	To create words of felicitation, thanks, excuse and to formulate a wish	Ap, Cr
6.	To know and understand the cultural life of the French	Kn, Un
7.	To describe an itinerary, to give instructions	Ap, Cr
8.	To redact commercial letters in French	Ap, Cr

Prescribed Text Book:

Girardet Jacky, Pécheur Jacques, Gibbe Colette, Parizet Marie-Louise, *Tendances,* Clé International, 2016.

Prescribed Units:

Unite 1 : Voyager

Unite 2 : Faire des achats

Unite 3 : Se faire des relations

Unite 4 : Organiser ses loisirs

Unite 5 : Se loger

Books for reference:

1. Girardet Jacky, Pécheur Jacques *Cahier d'activités* Clé International ,2016.
2. Grand-Clément Odile,*450 nouveaux exercices(niveau débutant)* Clé International, 2003.
3. Akyuz Anne,Bazelle-Shahmaei Bernadette,Bonenfant Joelle, Gliemann Marie-Francoise, *Les 500 exercices de grammaire* Hachette livre,2005.
4. Grégoire Maia ,*Grammaire Progressive du français* Clé International,2002.
5. Sirejols Evelyne , Tempesta Giovanna *Grammaire « Le Nouvel Entrainez-vous avec 450 Nouveaux Exercices »*

II B.A., / B.Sc Part I FRENCH

SEMESTER – III			
Paper – III Advanced French Course			
Code : 18ULFA31	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Vision : To enhance further the acquisition of four competencies of language learning

Mission : To create the independent capability of the learner to respond and tackle the various situations of communication when the learner is in the native country of the target language

Course Outcome:

CO	At end of this Course, the students will be able to	CL
CO-1	describe the souvenirs of the past	Ap, Cr
CO-2	create novel things with ancient objects	Cr
CO-3	attempt business ventures on the internet	Un, Ap
CO-4	understand the expatriate's experience	Un, Ap
CO-5	prepare for study in foreign countries	Ap, Cr
CO-6	speak of the weather	Ap, Cr
CO-7	speak about the system of education in France	Un,Ap
CO-8	become conscious of the environment	Ap, Cr

Prescribed Text Book: Cocton Marie-Noëlle,Heu Elodie, Houssa Catherine, Kasazian Emilie, Dupleix Dorothée et Ripaud Delphine, *Saison,* Les Editions Didier,Paris,2015.

Unite I : Faire du neuf avec du vieux-Faire revivre les objets-

Unite II : Exprimer l'accord ou le désaccord-Exprimer l'obligation et l'interdiction

Unite III : Changer d'air- Demander/donner son opinion-Parler du temps qu'il fait-

Unite IV : Découvrir-Apprendre-Réussir

Unite V : Devenir éco-citoyen-Ecrire une biographie-Institutions et femmes d'exception

Books, Journals and Learning Resources

1. le cahier d'activités(CD Audio INCLUS)
2. Le manuel numérique premium classe
3. Les applis complémentaires
4. Grand-Clément Odile,*450 nouveaux exercices(niveau débutant*) Clé International, 2003.
5. Akyuz Anne,Bazelle-Shahmaei Bernadette, Bonenfant Joelle, Gliemann Marie-Francoise, *Les 500 exercices de grammaire* ,Hachette livre,2005
6. Grégoire Maia ,*Grammaire Progressive du français* , Clé International,2002.
7. Sirejols Evelyne , Tempesta Giovanna,*Grammaire « Le Nouvel Entrainez-vous avec 450 Nouveaux Exercices*
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II B.A., / B.Sc Part I FRENCH

SEMESTER – IV			
Paper – IV French Language through Literature			
Code : 18ULFA41	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

VISION : To initiate the learner to the realm of French Literature

MISSION : To create and develop the taste for literary readings in the target language

Course Outcome:

CO	At end of this Course, the students will be able to	CL
CO-1	comprehend the French literary background	Un, An
CO-2	imbibe the basic grammatical structures of the language	Un, An
CO-3	inculcate the values imparted through the literary texts	Un, An
CO-4	appreciate the simple literary texts	An, Ap
CO-5	acquire literary knowledge and enhance aesthetic perception	An, Ap
CO-6	explore a literary text, with the perspective of analysing the matter and manner of writing	An, Ap
CO-7	reflect upon the author's ideas and transform her own personality	Ap, Cr
CO-8	discover, interrogate and reflect on the humanistic value	Ap, Cr

II B.A., / B.Sc Part I FRENCH

SEMESTER – IV			
Paper – IV French Language through Literature			
Code : 18ULFA41	**Hrs/week : 6**	**Hrs/Sem : 90**	**Credits : 4**

Unité 1:

1. Au soir , auprès d'une chandelle -Pierre de Ronsard
2.Caractères -La Bruyère
3.La barbe bleue -Charles Perrault

Unité 2 :

1.La Jeune Tarentine -André Chénier
2. La Révolution Française
3.L'impératif

Unité 3 :

1.Le Pape est mort -Guy de Maupassant
2.A l'école des petits dieux -Bernard Wéber
3.Pronoms Relatifs

Unite4 :

1.Oh voleur !quelle vie -Le Clezio
2.L'avalée des avalées - Ducharme
3.Pronoms Relatifs

Unité 5 :

1.L'homme qui plantait des arbres -Jean Giono
2.Pour toi mon amour -Jacques Prévert
3.Les indicateurs Temporels

Books for Reference :

1.Blondeau Nicole, Allouache Ferroud jà, Ne Marie-Françoise**,** *Littérature Progressive du Français,*Cle International,2004.
2. Akyuz Anne,Bazelle-Shahmaei Bernadette, Bonenfant Joelle, Gliemann Marie-Francoise, *Les 500 exercices de grammaire* ,Hachette livre,2005
3.Grégoire Maia ,*Grammaire Progressive du français* , Clé International,2002.
4.Sirejols Evelyne , Tempesta Giovanna,*Grammaire « Le Nouvel Entrainez-vous avec 450 Nouveaux Exercices*
5.Auge Helene, Marlhens Claire, Molinos Llucia, *Grammaire et Communication*, Clé International,2008

At the end of two-year course, students will be able to

1. Develop their communicative skills in English for employment.
2. Employ their English proficiency to excel in cultural exchanges and to connect themselves globally.
3. Develop their comprehension and analytical skills in order to be innovative in all disciplines.
4. Build confidence and helps to maintain cordial relationship with colleagues in their flourishing career.
5. Express themselves as skilful English news readers and journalists.
6. Convert their passive vocabulary into active one; enhancing their speaking and writing skills.
7. Exercise their creativity in writing English.
8. Gain proficiency in writing skills and help them to write grammatically correct sentences.
9. Tune their soft skills which enable them to maintain good career records.
10. Improve their passion for reading literary works.

SEMESTER - I			
Part II English	**Prose, Poetry, Extensive Reading and Language Study- I**		
18UGEN11	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Vision:
To provide adequate exposure and opportunities for students to imbibe, develop, practice and use the LSRW skills with more opportunities to experiment and fine tune their productive skills – speaking and writing.

Mission:

To help students read and comprehend content in English

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	Cognitive Level
CO-1	Understand the written word in everyday life through the study of basic comprehension skills	Un
CO-2	Apply and incorporate basic grammar, mechanics, and sentence variety in writing.	Ap
CO-3	Label and paraphrase main ideas in readings.	Ap
CO-4	Develop their ability to read and spell words through an analysis of the structure of the English language.	Re
CO-5	Analyse the theme of prescribed texts of literature.	Un
CO-6	Evaluate the parts of speech.	Ev
CO-7	Listen and comprehend speech sounds.	Co
CO-8	Construct simple sentences and short paragraphs in response to reading.	Cr

SEMESTER - I			
Part II English	**Prose, Poetry, Extensive Reading and Language Study-I**		
18UGEN11	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Unit I - Poetry

Sarojini Naidu - Village Song

John Milton - On His Blindness

Robert Frost - The Road Not Taken

Unit II - Prose

Leigh Hunt – Getting Upon Cold Mornings

Robert Lynd - Sweets

Unit III - Short Story

Ernest Hemingway - A Day's Wait

Rabindranath Tagore - Kabuliwala

Unit IV – Grammar & Vocabulary

Parts of Speech, Tenses –Present, Past, Vocabulary of the Specific Domain, Punctuation, Kinds of Sentences

Unit V – Oral & Written Communication

Listening for handling simple situations, Listening Comprehension, Reading- passages from magazines & stories, Speaking – Introduction to body language, Basic interactions, Filling Forms, Developing Hints, Letters – leave letters, permission letters & personal letters

Text Books:

Units I – III – To be compiled by the Research Department of English

Units IV – V – CLIL (Content & Language Integrated Learning) – Module I by TANSCHE (Tamil Nadu State Council for Higher Education)

SEMESTER – II			
Part II English	**Prose, Poetry, Extensive Reading and Language Study- II**		
18UGEN21	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Vision: To intensify English language teaching and learning to promote communication skills based on the strengths in specific domains of knowledge that students are already sound in.

Mission: To expose students to language skills through the core subjects.

To help students identify how writers use the creative resources of language-in poetry, nonfiction, and short fiction - to explore the entire range of human experience.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	Cognitive Level
CO-1	Classify and develop the skills of interpretation, critical thinking, and clear writing.	An
CO-2	Demonstrate improved oral fluency.	Un
CO-3	Support future academic study by developing a high social, aesthetic and cultural literacy.	Cr
CO-4	Construct parts of a paragraph and essay, through prose writings.	An
CO-5	Build effective communication skills.	Un
CO-6	Make use of context clues and analyse poetic content and correlate to experiences.	An
CO-7	Use vocabulary through the study of word parts.	Ap
CO-8	Comprehend passages	Un

SEMESTER – II			
Part II English	**Prose, Poetry, Extensive Reading and Language Study- II**		
18UGEN21	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Unit I - Poetry

Nissim Ezekiel - The Night of the Scorpion

William Wordsworth- The Tables Turned

Walt Whitman - One's Self I Sing

Unit II - Prose

A.J. Cronin - Two Gentlemen of Verona

Robin Sharma -Your Commitment to Self- Mastery: Kaizen

Unit III - Short Story

Khushwant Singh - Karma

Oscar Wilde - The Happy Prince

Unit IV – Grammar & Vocabulary

Present & Past Continuous form, Command form, Will/Going to, Subject – Verb Agreement, Vocabulary of the Specific Domain, Paragraphing

Unit V – Oral & Written Communication

Listening for handling tough situations, Reading – passages from newspapers, incomplete stories, Pronunciation, Speaking (Storyline, Telephone Conversation), Key Functions

Text Books :

Units I – III – To be compiled by the Research Department of English

Units IV – V – CLIL (Content & Language Integrated Learning) – Module II by TANSCHE (Tamil Nadu State Council for Higher Education)

SEMESTER – III			
Part II English	**Prose, Poetry, Extensive Reading and Language Study- III**		
18UGEN31	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Vision: To teach English based on the strengths in specific domains of knowledge that students are already sound in.

Mission: To expose students to language skills through the core subjects.

To help students explore the creative resources of language-in poetry, nonfiction, and one-act plays to enhance their vocabulary for interpersonal, academic, and real-life situations.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	Cognitive Level
CO-1	Identify the common errors in their day today communication.	Ev
CO-2	Imbibe the language skills necessary for maintaining cordial relationship.	Ap
CO-3	Revise, organize and edit their assignments successfully.	Cr
CO-4	Enhance communicative competence in English.	Cr
CO-5	Construct sentences in different verb forms.	Ap
CO-6	Formulate specific questions and key ideas in class discussion.	Ap
CO-7	Appraise the specific values for life through the literary texts.	Ev
CO-8	Make use of grammar and vocabulary in practical ways.	Ap

SEMESTER – III			
Part II English	**Prose, Poetry, Extensive Reading and Language Study- III**		
18UGEN31	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Unit I – Poetry

Toru Dutt - Lotus

John Keats - La Belle Dame Sans Merci

Langston Hughes - The Weary Blues

Unit II – Prose

A.G. Gardiner - A Fellow Traveller

G.K. Chesterton - The Fallacy of Success

Unit III - One Act Play

Cedric Mount - The Never Never Nest

Percival Wilde - The Hour of Truth

Unit IV – Grammar & Vocabulary

Present & Past Perfect form, Connectives & Linkers, Vocabulary of the Specific Domain, Paragraphing

Unit V – Oral & Written Communication

Evaluative Listening, Different Reading Strategies, Pronunciation, Public Speaking, Negotiation & Turn Taking, Tongue Twisters, Writing – Formal Letters, Emails, One Word Substitutes.

Text Books :

Units I – III – To be compiled by the Research Department of English

Units IV – V – CLIL (Content & Language Integrated Learning) – Module III by TANSCHE (Tamil Nadu State Council for Higher Education)

SEMESTER – IV			
Part II English	**Prose, Poetry, Extensive Reading and Language Study- IV**		
18UGEN41	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Vision: To teach English based on the strengths in specific domains of knowledge that students are already sound in.

Mission: To expose students to language skills through the core subjects.

To help students explore the creative resources of language-in poetry, nonfiction, and Shakespearean plays and gain insight into the literary traditions and cultures of the brave new world.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	Cognitive Level
CO-1	Interpret texts with an awareness of the specific cultural context.	A
CO-2	Improve their communication skills	U
CO-3	Compose and deliver engaging oral presentations.	A
CO-4	Adapt stylistic elements to aid and enhance communication.	Cr
CO-5	Modify their perspectives on the themes of perennial human interest.	Ev
CO-6	Adapt the vocabulary acquired through their reading and to use them in various situations in their everyday lives.	Cr
CO-7	Formulate appropriate writing style.	A
CO-8	Compose essays in a well-developed, academic voice.	Cr

SEMESTER – IV			
Part II English	**Prose, Poetry, Extensive Reading and Language Study- IV**		
18UGEN41	**Hrs / Week: 6**	**Hrs / Semester: 90**	**Credits: 4**

Unit I – Poetry

Rabindranath Tagore - The Lord of My Life

Tennyson - Ulysses

Gabriel Okara - Once Upon a Time

Unit II - Prose

Juliane Koepcke - My First Plane Crash

Frank R. Stockton –The Lady or the Tiger

Unit III – Scenes from Shakespeare

A Midsummer Night's Dream – Act II, Scene ii

Tempest – Act III, Scene i

Unit IV – Grammar & Vocabulary

Modals & Auxiliaries, Active & Passive Voice, Direct & Indirect Speech, Transformation of Sentences,Vocabulary of the Specific Domain, Homophones & Homonyms

Unit V – Oral & Written Communication

Extensive Reading/ Film (with subtitles) Viewing, Refuting, Arguing & Debating, Defending & Challenging Interviews (face to face, telephone & video conferencing), Making Presentations, Tongue Twisters

Text Books :

Units I – III – To be compiled by the Research Department of English

Units IV – V – CLIL (Content & Language Integrated Learning) – Module IV by TANSCHE (Tamil Nadu State Council for Higher Education)

SEMESTER - I			
Core I	**Cell Biology and Genetics**		
Code: 18UBOC11	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Vision:

To understand the basic cellular components and principles of their functions.

Mission:

To understand the structure and chemical organization of sub cellular components of the plant cell.

To understand the classicl Mendelian theory on heredity and alterative pattern of gene expression.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	understand the structure and function of basic organelles of plant cells	1	Un
CO-2	describe the structural organization and transport function of the plasma membrane	2	Un
CO-3	identify the non living inclusions and their significance	4	Re
CO-4	reveal morphogenetic events through mitosis and meiosis	2	Re
CO-5	understand theories of heredity through Mendel's hybridization experiment	2,4	Un,Cr
CO-6	draw checker boards and predict the outcome of offspring of hybridization	8	Ap
CO-7	infer inter allelic and inter genic interaction in determination of specific characters including blood groupings in man	4	Re,Un
CO-8	comprehend the polygenic inheritance and mechanism of sex determination in plants	4	An

SEMESTER – I			
Core I	**Cell Biology and Genetics**		
Code: 18UBOC11	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Unit I : Ultra structure of the plant cell, chemistry of cell wall. Plasma membrane – unit membrane structure – Fluid mosaic model. Ultra structure of endoplasmic reticulum and Golgi apparatus

Unit II : Ultra structure and functions of chloroplast, mitochondria, ribosome and nucleus

Unit III : Ultra structure and functions of chromosome. Non-living inclusions-starch grains, cystolith, raphides and aleurone. Cell division –mitosis and meiosis.

Unit IV : Mendel's laws of heredity with reference to monohybrid and dihybrid crosses. Incomplete dominance (monohybrid). Lethal gene action in maize and mice.

Unit V : Interaction of genes: comb shape in fowls, complementary genes and duplicate factors. Multiple alleles with reference to blood groups (ABO and Rh) in man, multiple factor inheritance – ear size in corn. Sex determination in plants (*Melandrium*).

Text Books:

1. John Jothi Prakash, E. 2010. *Principles of Genetics and genetic engineering.* Emkay Publications, Delhi.
2. Verma, P.S. and V.K. Agarwal. 2007, *Cell biology, Genetics, Molecular Biology, Evolution and Ecology*, S.Chand and Co., New Delhi.

Books for Reference :

1. Channarayappa. 2010. *Celbiology.* University Press (India) Private limited.
2. Dnyansagar, V. R. 1986. *Cytology and Genetics.* Tata Mc Graw – Hill Publishing Company limited, New Delhi.
3. Power, C. B. 2002. *Cellbiology*. Himalaya Publishing House.
4. Lohar, P. S. 2009. *Cell and molecular biology*. MJP Publishers. Chennai.
5. Vijendra Das, L. D. 2005. *Genetics and plant breeding*. New age International (P) limited Publishers.
6. Verma, P.S. and V.K. Agarwal. 2007 *Cytology*. S.Chand and Co., New Delhi.
7. Verma, P.S. and V.K. Agarwal.1991. *Genetics*. S. Chand and Co., New Delhi.

PRACTICALS

Hrs / Week – 2 **Credit: 1**

1. Electron micrograph of a typical plant cell, nucleus, chloroplast, mitochondrion, Golgi apparatus
2. Micro preparation to visualize starch grains (Potato) and raphides (Balsam / *Dracaena*), cystolith, aleurone

3. Preparation of Onion root tip using squash technique and identification of different stages of mitosis.

4. To work out simple genetic problems in monohybrid, dihybrid, incomplete dominance, interaction of genes (9:3:3:1, 15:1 and 9:7) and lethal genes.
5. Submission of Record note book.

Books for Reference

1. Bendre Kumar, 2014, A Text book of Practical Botany, Volume I & II (7^{th} Edition) Rastogi Publications, Merrut.

SEMESTER – I			
Core II	**Algae and Bryophytes**		
Code:18UBOC12	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Vision:

To have comprehensive idea on primitive plants.

Mission:

To understand the major groups of lower plants and their characteristics.

To study the effective utilization of algae and bryophytes for environment and human well being

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	find out the general characteristics of Algae and Bryophytes and structure of them.	1	An
CO-2	evaluate the importance of algae and Bryophytes and their role in everyday life and environment.	7	Ev
CO-3	distinguish mosses and thallose liverworts	3	An
CO-4	compare and contrast different classes of algae and bryophytes	2	Un
CO-5	identify Algae and Bryophytes samples collected from the field	8	Re
CO-6	distinguish life cycle pattern in different groups of Algae and Bryophytes	7	Ap
CO-7	understand the criteria behind the classification of Algae and Bryophytes	1	Un
CO-8	apply the knowledge for self employability	6	Ap

SEMESTER – I			
Core II	**Algae and Bryophytes**		
Code:18UBOC12	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Unit I : Classification of algae based on Fritsch (1954). General characters of Algae, Organization of thallus, Methods of reproduction-vegetative, asexual and sexual, Alternation of generation and life cycle patterns in algae.

Unit II : *Oscillatoria* - Occurrence, thallus structure, cell structure, movement, reproduction-vegetative and life cycle.
Volvox- Occurrence, structure of colony, cell structure, reproduction-asexual (daughter colony formation), sexual reproduction and life cycle. *Caulerpa*-occurrence, thallus structure and variations, reproduction-vegetative, sexual reproduction and life cycle.

Unit III : Occurrence, thallus structure, reproduction-vegetative, sexual and life cycle of *Sargassum* and *Gracilaria*.
Beneficial roles of algae in agriculture, industry, medicine, food, fodder and

Fisheries

Unit IV : Classification of Bryophytes by Rothmaler (1951). General characteristics of Bryophytes.
Marchantia- Occurrence, thallus structure, reproduction-asexual and sexual. Structure of sporophyte, Life history (development of sex organs and sporophyte excluded).

Unit V : *Funaria*- Occurrence, structure of young and adult gametophyte, reproduction-vegetative and sexual. Structure of sporophyte, dehiscence of capsule. Life history (development of sex organs and sporophyte excluded).Economic importance of Bryophytes (direct and indirect uses).

Text Books:

1. Pandey, S.N. and P.S. Trivedi. 2006. A Text Book of Botany Vol. I and II VIKAS Publishing House Pvt. Ltd., New Delhi.
2. Sharma, O.P.2006. Text Book of Algae. Tata Mc. Graw-Hall Publications, New Delhi.

Books for Reference:

1. Fritsch, F.E. 1972. The Structure and Reproduction of Algae Vol.I all II. Cambridge Univeristy Press, London.
2. Kamat, N.D. 1982. Topics in Algae. Sai Kraipa Prakasham, Aurangabad.

3. Parihar, N.S 1967. Bryophyta. Central Book Depot Publications in Botany, Allahabad.
4. Robert Edward Lee. 2009. Phycology. Cambridge University Press.
5. Vashishta, B.R, A.K. Sinha. and V.P. Singh. 2007. Algae. S.Chand and Co., Ltd., New Delhi
6. Vashishta, B.R, A.K. Sinha. and V.P. Singh. 2006. Bryophyta. S.Chand and Co. Ltd., New Delhi.

PRACTICALS
Hr/ week: 2

- *Oscillatoria (*Micropreparation)
- *Volvox* (Slide) - vegetative colony, colony with daughter colonies
- *Caulerpa* thallus organisation
- *Caulerpa* - rhizome (section)
- *Sargassum* thallus
- *Sargassum* stipe, leaf (section), male and female conceptacles (slides)
- *Gracilaria* thallus
- *Gracilaria* thallus/ thallus with cystocarp (section)
- *Marchantia* thallus
- *Marchantia* VS of Archegoniophore and VS of Sporophyte (Slide)
- *Funaria* T.S of leaf, Antheridial cluster(WM), Archegonial cluster (WM) and , L.S. of Sporophyte (slide)
- Submission: Record note book / Field visit report

Books for Reference

1. Bendre Kumar, 2014, A Text book of Practical Botany, Volume I & II (7^{th} Edition) Rastogi Publications, Merrut.

SEMESTER I			
Allied I Animal Biology			
Code: 18UZOA11	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 3**

Vision : To make the students to realize about the diverse forms of invertebrates and vertebrates

Mission : Students will develop broad knowledge of the extreme diversity in animal forms, functions, adaptations and natural history.

Course Outcome:

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire basic knowledge of animal diversity and its organisation	1	Un
CO-2	compare common and distinctive features of invertebrate phyla	1	Un
CO-3	understand the parasitic adaptations and management of nematodes	1	Un
CO-4	ability to control the insect pests	1	Ap
CO-5	characterize the major classes of subphylum vertebrata	1	Re
CO-6	assess the interaction of organisms with environment and their adaptive mechanism	1, 11	Re
CO-7	distinguish the unique features and evolutionary relationship between each chordate group	1	Cr
CO-8	apply the knowledge of biological diversity to our daily life and conservation of bioresources	1, 11	Ap

SEMESTER I			
Allied I Animal Biology			
Code: 18UZOA11	Hrs/Week : 4	Hrs/Sem : 60	Credits : 3

Unit I Invertebrata

General characters and outline classification of invertebrates upto classes

General characters of phylum Protozoa,Porifera,Coelenterata,Helminthes

Annelida, Arthropoda, Mollusca and Echinodermata

Type study :*Paramecium* – external characters, locomotion,osmoregulation nutrition,

Reproduction- binary fission and conjugation.

Unit II Nematode Parasites and Insect Pests

Nematode parasites of man – external morphology, life cycle, pathogeny,parasitic adaptations and control measures of the following:

Ascaris lumbricoides round worm)

Wuchereria bancrofti (filarial worm)

Insect Pests

Pests of paddy – *Leptocorisa varicornis* and *Triporeya incertulas*

Pests of coconut – *Oryctes rhinoceros* and *Rhynchophoru*

Unit III General Topics in Invertebrata

Canal system in sponges- Polymorphism in Coelenterata-Social life in insects -

Honey bee- Pearl culture - Water vascular system in Echinodermata

Unit IV Chordata

General characters and outline classification of Chordata

Salient features of classes Pisces,Amphibia, Reptilia, Aves and Mammalia.

Economic importance of food fishes

Fresh water fishes- *Catla catla* (Catla), *Labeo rohita* (Rohu) and *Cirrhinus mrigala* (Mrigala) Marine water fishes – *Cybium maculatum* (Seer fish), *Trichiurus* (Ribbon fish) and *Anguilla anguilla* (Eel)

Unit V General Topics in Chordata

Identification of poisonous snakes- poison apparatus – biting mechanism – first aid for snake bite-Migration in fishes- Parental care in Amphibia- flight adaptations -aquatic mammals.

Text Books

1. Arumugam N. 2017 *Text Book of Animal Diversity Invertebrata and Chordata.* Saras Publication, Nagercoil.
2. Jayasurya, N.Arumugam, A. Thangamani, S.Prasanna Kumar and Ramprabhu,2013. *Economic Zoology* Saras Publication, Nagercoil.

Books for Reference

1. Ekambaranatha Iyyer M. A Viswanathan S. 1993, *Manual of Zoology Vol I Vol II* Viswanathan Printers and Publishers, Chennai.
2 Nair N. C, Leelavathy S, Soundara Pandian N, Murugan T. and Arumugam N. 2004,*A Text Book of Invertebrates. First edition* Saras Publication, Nagercoil.
3. Arumugam N. 2010 *Text Book of Chordates* . Revised edition Saras Publication, Nagercoil.
4. Jordon E. C.and.Verma P.S. *2009 Invertebrate Zoology. Revised edition.* S. Chand and Company Ltd. New Delhi.
5. Shukla G.S.and Upadhyay V.B. 1985 *Economic Zoology,* First edition. Rastogi Publication, Meerut.

PRACTICALS

Hrs / Week – 2

Cockroach : Digestive system and Nervous System

Mounting : Honey bee - Mouth parts

Earth worm - Body setae

Shark -Placoid scale

Slides/Models/Charts:

Invertebrata: *Paramecium*,*Leucosolenia*, *Obelia* colony, *Ascaris* (male and female) insect pests (*Oryctes rhinoceros*,*Leptocorisa varicornis*), Pearl oyster, Octopus and Star fish

Chordata: *Anguilla* (Eel), *Salamander*, *Naja naja,* poison apparatus, Pigeon, aquatic mammals (Whale and Dolphin)

Books for Reference

1. S. Leelavathy, N.Soundara Pandian and T. Murugan. 2013. *Practical Zoology Vol.I Invertebrata*. Saras Publication, Nagercoil.

2. P.S.Verma and S. Chand. *A Manual of Practical Zoology Chordates*. S. Chand and Company Ltd, Ramnagar, New Delhi.

SEMESTER - I			
Ability Enhancement Course - Value Education			
Code : 18UAVE11	**Hrs/Week : 2**	**Hrs / Semester: 30**	**Credits : 2**

Unit I : Introduction

Value education and its Relevance to present day – Meaning of Value Education – Education and its role – Leading a fulfilling life of universal values

Unit II : Cultivation of Personal Values

Personal Values– Truth - Honesty and Integrity – Love –Compassion – Gratitude - Courage – Optimism – Friendship

Unit III : Elimination of Negative Emotions

Overcome fear – Jealousy is harmful – Sources of jealousy **-** Jealousy and compulsiveness- Be an optimist – Gossip is Dynamite – Anger

Unit IV : Family Values

Familial Responsibilities –Five Basic Functions of a Mother - Fathers' role in the family - Five Duties of Children to Parents - Indian Cultural Values

Unit V : Spiritual Value

Cultivating Good Manners – Being Persuasive – Being authentic – Professional Ethics – Work Culture – Code of Conduct

SEMESTER - II			
Core III	**Fungi, Lichens and Plant pathology**		
Code:18UBOC21	**Hrs / Week: 4**	**Hrs / Sem : 60**	**Credits: 4**

Vision:

Imbibe knowledge on uniqueness of Fungi and Lichens

Mission:

To study the life cycle patterns of fungi and lichen.

To learn about the plant diseases and their impact on crops

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	characterize and identify the diversity of fungal and lichen world and their adaptations	1	Un
CO-2	Identify fungal specimens microscopically	2	Ap
CO-3	Identify major groups of fungi and lichens based on morphology and anatomy	2	Ap
CO-4	understand and explain the ecological roles and trophic modes of major Fungal and Lichen groups	5	Ap
CO-5	evaluate the importance of Fungi and Lichens , their role in everyday life and environment	7	Ev
CO-6	understand the various plant diseases and their impact on agriculture	7	Un
CO-7	identify symptoms and diagnose different plant diseases and methods to control.	6	Ap
CO-8	identify pathogenecity with their specific symptoms	4	Ev

SEMESTER - II			
Core III	**Fungi, Lichens and Plant pathology**		
Code:18UBOC21	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Unit I : Classification of fungi based on Alexopoulus and Mims (1979), General characters.
Occurrence, somatic structure, asexual reproduction, sexual reproduction and life cycle of *Albugo* and *Aspergillus*.

Unit II : *Peziza* - Occurrence, somatic structure, asexual reproduction, sexual reproduction and life cycle.
Puccinia - Occurrence, primary host, alternative host and life cycle.
Role of fungi in medicine, industry, agriculture, food and food products.

Unit III : Lichens- Classification, association, morphology of thallus- crustose, foliose, fruiticose, reproduction and economic importance.
Usnea- Structure and reproduction.

Unit IV : Study of the following diseases with reference to causal organism, symptoms, dissemination and control measures: tikka disease of groundnut, red rot of sugarcane and blast disease of paddy.

Unit V : Study of the following diseases with reference to causal organism, symptoms, dissemination and control measures: canker disease of citrus, angular leaf spot of cotton and bunchy top of banana.

Text Books:

1. Johri, R.M., Smeh Lata, Kavitha Tyagi. 2011. A Text Book of Fungi, Dominant Publishers and Distributors Pvt. Ltd., New Delhi
2. Pandey, S.N. and P.S Trivedi 2006. A Text Book of Botany Vol. I Vikas Publishing House Pvt. Ltd., New Delhi & I.
3. Singh, V., P.C. Pandey and D.K.Jain. 2002. A Text Book of Botany, Rastogi Publication, Meerut.

Books for Reference:

1. Ahmadjian, V and M.E. Hale.1973. The lichens, Academic Press, London.
2. Alexpoulous, C.J., C.W. Mims, and M. Blackwell. 1988. Introductory Mycology, Wiley Eastern Limited, New Delhi
3. Dubey, H.C.2005. An introduction of fungi. Vikas Publishing House, New Delhi.
4. Pandey, B.P. 2007. Plant Pathology S.Chand and Co.Ltd New Delhi.
5. Rangasamy, G. 1992. Diseases of Crop Plants in India Prenties Hall of India, New Delhi.
6. Singh, R.S. 1991. Plant Diseases. Oxford IBH, New Delhi
7. Sharma, P.D. 2012. Mcrobiology and Plant Pathology, Third Edition, Rastogi Publications, Meerut.
8. Vashishta, B.R and A.K. Sinha. 2007. Fungi. S. S. Chand and Co Ltd. New Delhi.

PRACTICALS
Hrs/ week: 2

1. Micro preparation and identification of *Albugo,Aspergillus, Peziza and Puccinia.*
2. Morphological studies on crustose, foliose and fruiticose lichens
3. Micropreparation to study *Usnea* thallus and apothecium
4. Study of diseased plant materials:
    a. Tikka disease of groundnut
    b. Red rot of sugarcane
    c. Blast of paddy
    d. Canker disease of citrus.
    e. Angular leaf spot of cotton
    f. Bunchy top of banana
5. Submission: Record note book

Books for Reference

Bendre Kumar, 2014, A Text book of Practical Botany, Volume I & II (7th Edition) Rastogi, Publications, Merrut.

SEMESTER - II			
Core IV	**Anatomy and Embryology**		
Code:18UBOC21	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Vision:

To understand the fundamental organization of tissues and developmental events of plants

Mission:

To understand the developmental process from flower to fruit

To gain knowledge on the histological architecture of plants

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	classify meristems and explain the organization of root apex	2	Ev ,An
CO-2	distinguish meristematic and permanent tissues	8	An
CO-3	compare the secondary growth in dicot stem and root(normal and anomalous)	3 , 7	An
CO-4	describe the structure of a microsporangium and pollengrains and	1 ,3	Un , E
CO-5	Explain the structure and development of male gametophyte.	1	Un
CO-6	explain the structure and development of megasporangium	2 , 3	Ev
CO-7	understand fertilization and double fertilization.	2	Un
CO-8	differentiate dicot embryo from monocot embryo.	2 ,3	An

SEMESTER - II			
Core IV	**Anatomy and Embryology**		
Code:18UBOC21	**Hrs / Week: 4**	**Hrs / Sem : 60**	**Credits: 4**

Unit I : Tissues-definition and types. Meristems -classification based on position. Shoot apex (Tunica – corpus theory). Root apex (Histogen theory). Permanent tissues-simple -parenchyma, collenchyma,and sclerenchyma; Complex- xylem and phloem.

Unit II : Normal secondary thickening in dicot stem (*Polyalthia*) and root (*Azadirachta*). Anomalous secondary thickening in dicot stem (*Boerhaavia)* and monocot stem (*Dracena*)

Unit III : Anther – structure, anther wall, tapetum. Microsporogenesis. Pollen grain structure and pollen wall development. Pollinium. Development of male gametophyte

Unit IV : Structure of orthotropous ovule. Ovule-types. Megasporogenesis
Structure and development of female gametophyte (Polygonum type). Double fertilization, and post fertilization changes.

Unit V : Endosperm-types (nuclear, cellular and helobial -each one example) and haustorial behavior of endosperm. Dicot embryo-*Capsella* type, Monocot embryo *Luzula* type.

Text Books:

1. Pandey, B.P. 1995. Embryology of Angiosperms S. Chand and Company Ltd. Ram Nagar, New Delhi.
2. Pandey, B.P. 2005. Plant Anatomy S. Chand and Company Ltd. Ram Nagar, New Delhi.

Books for Reference :

1. Bhojwani SS and S.P Bhatnagar. 2007. The embryology of Angiosperms. Vikas Publishing house PVT. Ltd.,
2. Eames, A.J. and L.H. Mac Danniels. 1972. An Introduction to Plant Anatomy, Tata Mc Graw- Hill Publishing Company Ltd, New Delhi.
3. Maheswari, P. 1971. Introduction to embryology of angiosperm. Tata Mc Graw Hill publications and Co.
4. Singh, V., P.C. Pandey and D.K. Jain. 1987. Anatomy of Seed Plants, Rastogi Publication, Meerut.

PRACTICALS
Hrs / week : 2

- Observation of tissues, - parenchyma, collenchyma, chlorenchyma, sclerenchyma.
- Sectioning of dicot stem(*Polyalthia, Boerhaavia*) , root(*Azadirachta*) , monocot stem (*Dracaena*) to study the secondary growth
- Dissection of pollinium (*Calotropis*)
- Dissection of dicot embryo (*Tridax*)
- Sectioning – T.S. of *Datura* anther (mature stage).
- Observation of permanent slide- Anther (tetrad and pollen grain stage)
- Observation of permanent slide - Anatropous ovule.
- Models-orthotropous, amphitropous and camphylotropous ovule.
- Submission: Record note book

Books for Reference

Bendre Kumar, 2014, A Text book of Practical Botany, Volume I & II (7th Edition) Rastogi Publications, Merrut.

SEMESTER II			
Allied II	**Genetics, Developmental Biology and Physiology**		
Code: 18UZOA21	**Hrs/ Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

Vision

To highlight the importance of genetics, developmental biology and physiology to the society

Mission

Students will learn the developmental stages, structure and functions of various organ systems of human.

Course Outcome :

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	compare and contrast the Mendelian inheritance and its modifications	4	An
CO - 2	highlight the importance of genetics and welfare of human society.	11	Ev
CO – 3	acquire competence skills in developmental process	1	Un
CO – 4	learn the technical skills in developmental biology	3	Re
CO – 5	understand the basic principles of digestion	2	Un
CO – 6	create knowledge about the nervous coordination	7	Cr
CO – 7	analyze the functions of urinary tract of human	9	Ap
CO - 8	comprehense the structure and functions of human reproductive system	9	Ap

SEMESTER II			
Allied II	**Genetics, Developmental Biology and Physiology**		
Code: 18UZOA21	**Hrs/ Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

Unit I Genetics

Mendelian laws – monohybrid and dihybrid cross – back cross – test cross – ABO blood group – Rh factor in man - Erythroblastosis foetalis – sex determination in man – sex linked inheritance of haemophilia and colour blindness – Down's and Klinefelter's syndrome.

Unit II Developmental Biology

Frog - structure of sperm and ovum – fertilization – cleavage, gastrulation – fate map. Placenta in mammals – types (diffuse, cotyledonary, intermediate, zonary, discoidal and metadiscoidal) and functions. Test tube babies – twins- amniocentesis.

Unit III Physiology - Digestion

Nutrition : Food constituents – carbohydrates, proteins and fats.
Digestion : Role of enzymes in the digestion of carbohydrates, proteins and fats
Absorption : Absorption of digested food

Unit IV Respiration and Nervous co - ordination

Respiration : Haemoglobin – transport and exchange of oxygen and carbondioxide, Nervous co-ordination : Structure and types of neurons – conduction of nerve impulse through neuron and synapse.

Unit V Excretion and Reproduction

Excretion : Structure of nephron - urine formation – dialysis.
Reproduction : Srtucture of human testis and ovary, Graafian follicle, menstrual cycle and its hormonal control.

Text Books :

1. Arumugam .N., 2007. *Developmental Zoology, Ecology, Animal Physiology and Evolution* . Saras Publication – Nagercoil
2. Verma.P.S. and U.K. Agarwal*,2000 Chordate Embryology (10th Edition)* S.Chand & Company Ltd, New Delhi.

Books for Reference

1. Verma, P.S. and V.K.Agarwal 2013. *Cell Biology, Genetics, Molecular Biology, Evolution & Ecology.* S.Chand & Company.
2. Arumugam N(2009*) Developmental Zoology* - Saras Publication
3. Meyyan R.P 2007 . *Genetics.* Saras Publication, Nagercoil
4. Verma P.S., Tyagi B.S. and V.K. Agarwal. 2002. *Animal Physiology, 6 th Edition.* S.Chand & Company Ltd, New Delhi.

PRACTICALS

Hrs/ Week : 2

1. Verification of Mendel's monohybrid cross using beads
2. ABO blood grouping - Demonstration
3. Qualitative tests for glucose, protein and lipid
4. Effect of temperature on the opercular movement of fish ; Calculation of Q_{10}
5. Examination of excretory products (ammonia, urea and uric acid crystals)
6. Museum specimens : Slides / Charts / Models

   Sex linked inheritance of colour blindness, haemophilia, Down syndrome. Frog - sperm and egg, diffuse placenta (pig), cotyledonary placenta (sheep). Villus, nephron, neuron, human sperm and human egg

Books for Reference

Jeyasurya, Dulsy Fatima, Kumaresan and Selvaraj 2013.*Practical Zoology Volume* –3, Saras Publication, Nagercoil

Semester – II			
Environmental Studies			
Code : 18UAEV21	**Hrs/ Week : 2**	**Hrs/Sem:30**	**Credits : 2**

Course Outcomes:

Upon completion of this course, the students will be able to

1 Recognize the biotic and abiotic components of ecosystem and how they function
2 Use natural resources more efficiently and know more sustainable ways of living
3. Acquire an attitude of concern for the environment
4. Participate in improvement and protection of environment
5. Manage unpredictable disasters
6 Create awareness about environmental issues to the public

Unit I Environment and Ecosystem

Aim and need for Environmental Awareness - Components of Environment Ecosystem - Components of Ecosystem: Abiotic and biotic factors (Producer, Consumer and Decomposer) – Food Chain, Tropic Levels - Food Web, Energy flow and Ecological pyramids

Unit II Natural Resources:

Renewable and non-renewable resources – Water Resources: Uses and Conservation of Water – Rain Water Harvesting – Forest Resources: Importance of Forests - Major and Minor forest produces - Conservation of Forest Energy Resources: Solar Fossil Fuel – Wind – Role of individuals in the conservation of natural resources

Unit III Environmental Pollution

Pollutants – Types of pollution: Air, Water, Noise and Plastic Pollution – Causes, effects and Control measures – Solid Waste Management

Unit IV **Human Population and Environment**

Effect of human population on environment – Population Explosion problems related to population explosion – Involvement of population in conservation of environment – Measures adopted by the Government to control population growth – Environment and human health

Unit V **Disaster Management**

Floods–Drought–Earthquakes– Cyclones – Landslide–Tsunami–Control measures

SEMESTER – III			
Core V	**Pteridophytes, Gymnosperms and Paleobotany**		
Code: 18UBOC31	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Vision:

- To learn the diversity, structural organization and reproduction of Pteridophytes and Gymnosperms

Mission:

- To study the forms prescribed in the syllabus under natural condition.
- To understand the chronological events those have taken place in the history of earth.

Course Outcome

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	summarize the general characters of Pteridophytes and Gymnosperms	1	Cr
CO-2	critically analyse the affinities and differences between Pteridophytes and Gymnosperms and relate them to understand the evolutionary trends	1	Re
CO-3	outline and recall the classification of Gymnosperms and appraise the economic importance of Pteridophytes and Gymnosperms	3	Ev
CO-4	understand the different stages in the life cycle of Pteridophytes and Gymnosperms	2	Un
CO-5	identify the types of fossils and discuss the fossilization process.	2	An
CO-6	relate the geological era with evolution of plants	2	Un
CO-7	learn about some of the fossils of pteridophytes and Gymnosperms	2	Un
CO-8	justify and analyze the evolution of seed plants from pteidophytes	2	Ev

SEMESTER – III			
Core V	**Pteridophytes, Gymnosperms and Paleobotany**		
18UBOC31	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Unit I: General characters of Pteridophytes .Outline the classification of Pteridophytes by Smith (1955), Stelar evolution, heterospory and seed habit. Economic importance – food,fodder,medicine,ecological indicators,ornamental and biofertilizer.

Unit II: Distribution, external structure, internal structure , reproduction, types of gametophyte and life cycle of *Lycopodium* and *Selaginella* (Developmental details not required).

Unit III: Distribution, external structure, internal structure, reproduction, types of gametophyte and life cycle of *Dicranopteris* and *Marsilea* (Developmental details not required)

Unit IV: General characters of Gymnosperms, Outline the classification of Gymnosperms by Chamberlain. Distribution, external structure,internal structure , reproduction, and life cycle of *Pinus* and *Gnetum.* (Developmental details not required)

Unit V: Economic importance of Gymnosperms –food, fodder, oranamentals and industrial uses. Fossils - introduction, process of fossilization -theories of fossilization, types of fossils. Techniques to study fossils- Geological time scale. Fossil Pteridophytes- *Rhynia,* Fossil Gymnosperm- *Lyginopteris*- Constructed plant parts.

Text Books:

Pandey, S.N., P.S. Trivedi and S.P. Misra, 2006. *A text Book of Botany Vol. II.* Vikas Publishing House Pvt.Ltd.New Delhi.

Books for Reference:

1. Chamberlain, C.J., 1986. *Gymnosperms* – Structure and evolution. CBS Publishers & Distributors. Delhi.
2. Meyen, V. 1987. *Fundamentals of Paleobotany*. Chapman and Hall Ltd. London.
3. Rashid, A., 1985. *An introduction to Pteridophyta*. Vani Educational Books. Vikas Publishing House Pvt. Ltd.New Delhi.
4. Shukla, A.C., S.P. Misra, 1982. *Essentials of Paleobotany*. Vikas Publishing House Pvt. Ltd. New Delhi.
5. Vashishta, P.C., A.K. Sinha and Anil Kumar, 2007. *Botany for degree students- Gymnosperms.* S.Chand & Co., New Delhi.
6. Vashishta, P.C., A.K. Sinha and Anil Kumar, 2008. *Botany for degree students – Pteridophyta*. S.Chand & Co., New Delhi.

Practical

Hrs/week : 2

Pteridophytes :

Lycopodium - Habit, sectioning of stem and cone

Permanent slides: stem and cone

Selaginella - Habit, sectioning of rhizophore, stem and cone

Permanent slides: stem and cone

Dicranopteris - Habit, sectioning of rhizome, petiole and sporophyll

Permanent slides: rhizome and petiole

Marsilea- Habit, sectioning of rhizome, petiole and sporocarp

Permanent slides: petiole and sporocarp at different plane

Gymnosperms :

Pinus - Twig, dwarf shoot, sectioning of stem and needle

Permanent slides: stem, young and mature male, female cone, seed entire

Gnetum- Twig, sectioning of stem and leaf, wood showing anomalous secondary thickening

Permanent slides: stem and leaf, Male and female inflorescence, seed entire

Fossils : *Rhynia* (Stem) , *Lyginopteris* - Constructed plant parts

Submission: Record note book

Books for Reference:

Srivastava H. N, 1987. *Practical Botany Volume I,* Pradeep Publications, Jalandhar

SEMESTER III			
Allied	**Allied Chemistry - I**		
Code : 18UCHA31	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credit : 3**

Vision : Develop an appreciation of Chemistry and its application in daily life

Mission

- Understand the importance of atomic structure and the gradation in properties of elements
- Know the fundamental concepts in organic chemistry
- Recognize the significance of biomolecules in biochemical processes
- Develop skills to separate the plant materials using Chromatographic technique

Course Outcome:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	account for the filling of electron in orbitals and to inscribe the electronic configuration of elements	1, 3	Re, Ap
CO 2	recognize conductors, insulators and semiconductors	1, 3	Re
CO 3	adapt a method to purify organic compounds and to estimate the amount of Carbon, Hydrogen and sulphur in a sample	1,2, 3,7	Un
CO 4	evaluate molecular weight of a chemical compound	6	Cr
CO 5	correlate the importance of colloids in day to day life and to develop a basic understanding of emulsions	1, 5	An
CO 6	reframe glucose into fructose and vice versa and to identify protein by their colour reactions	1	Cr, An
CO 7	record the steps involved in Hoffmann's exhaustive Methylation	6	Re
CO 8	explain isoprene rule and its significance	1	Un

SEMESTER III			
Allied	**Allied Chemistry - I**		
Code : 18UCHA31	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credit : 3**

Unit I Atomic Structure and Chemical Bonding

Quantum numbers and their significance- Pauli's exclusion principle – Aufbau principle – Hund's rule – Electronic configuration of elements (atomic number 1 to 36)

Lattice energy – Born-Harber cycle–Factors affecting the dissolution of ionic compounds –

M.O. Theory of covalent bond – Bonding, antibonding and non bonding orbital – M.O. Configuration of H2,N2 ,O2-Bond order – Band theory of metallic bond- Conductors, insulators, semi conductors- Hydrogen bonding – types and effects – Vander Wall's London forces.

Unit II Introduction to Organic Chemistry

Definition and importance-Sources of organic compounds-purification of organic compounds-Crystallisation- Fractional crystallisation-Sublimation-Solvent extraction-Soxhlet extraction

Elemental analysis-qualitative analysis of Carbon, Hydrogen, nitrogen, Sulphur and halogen-estimation of Carbon, Hydrogen, Nitrogen-Calculation of empirical formula-Determination of molecular weight by Victor meyer's method, silver salt, Chloroplatinic salt method-Calculation of molecular formula

Unit III Colloids and Emulsions

Definition- Classification of Colloids –comparison of lyophilic and lyophobic colloidsPreparation of sols-Dispersion method(Bredig's Arc method) –Aggregation method(oxidation , reduction, double decomposition)-Properties – Optical(Tyndall effect) – kinetic(Brownian movement) Electrical (electrical double layer) – Coagulation of colloids – Hardy Schulze law- Hoff meister series – protective colloids – gold number – Gels – classification, preparation , properties(imbibition,synerisis and thixotropy). Emulsion – types and their distinction. Emulsifiers – surfactants– applications of colloids-food, medicine, thixotropic paints, clarification of municipal water, formation of delta.

Unit IV Biomolecules

Carbohydrates- classification- configurations of D-glucose, D-fructose, D-mannose and D-galactose (structures only) – interconversions of glucose and fructose- interconversions of arabinose and glucose-epimerisation- muta rotation- general study of starch and cellulose

Amino acids - classification-essential amino acids-isolation from proteins- peptide linkage-polypeptides. Proteins- classification- colour reactions- structure

Unit V Chromatography

Chromatography-Classification-Adsorption Chromatography-Principle – Adsorbents-Characteristics of good Adsorbents- Principle, Experimental method and applications of Column Chromatography- -Thin layer Chromatography- Ion Exchange Chromatography

Text Books:

1. Arun Bahl and B.S.Bahl, *Advanced Organic Chemistry*, S.Chand and Company Ltd., Reprint, 2005.
2. B.R.Puri, L.R.Sharma,K.C.Kalia, *Principles of Inorganic Chemistry*, Milestone publishers and distributers, Delhi, 2010.
3. Arun Bahl,B.S.Bahl,G.D.Tuli, *Essentials of Physical Chemistry*, S.Chand & Company Ltd., New Delhi, 2008.

Books for Reference :

1. Jerry March, *Advanced Organic Chemistry*, Reactions Mechanisms and Structure, 4^{th} Edition. 2013
2. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, *A Text Book of Organic Chemistry*, 2^{nd} Revised Edition, 1998.
3. B.R. Puri. L.R. Sharma, Madan S. Pathania, *Principles of Physical Chemistry*, Vishal Publishing Co., 2008.
4. M.K.Jain and S.C.Sharma , *Modern Organic chemistry*, Vishal Publishing Co., 2012.

Semester III			
Core Skilled Based– Horticulture and Plant breeding			
Code:18UBOS31	**Hrs/week:4**	**Hrs/Semester : 60**	**Credit : 4**

Vision:

- To attain skill in plant breeding and horticultural techniques, for improved production of crop plants and their produce.

Mission:

- To provide broad knowledge on horticulture practices and management.
- To understand the different methods of plant breeding techniques for quality improvement.
- To inform the prospects of horticulture and breeding

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	explain the various divisions of horticulture and importance	1	Un
CO-2	design a landscape and interiorscape project	8	Re
CO-3	apply concept of horticulture science to select, manage and improve plants and their production	7	An
CO-4	demonstrate employability skills in the field of horticulture	6	Re
CO-5	equip the skill in landscaping, gardening and floriculture and enhance sense of beautification and aesthetic values	6	Un
CO-6	demonstrate an understanding of basic plant breeding facts and principles	1	Cr
CO-7	integrate knowledge from different areas into crop improvement problems	1	An
CO-8	describe various selection techniques and methods that can be used in genetic improvement of self and cross pollinated crops	6	Ap

Semester III			
Core Skilled Based – Horticulture and Plant breeding			
Code:18UBOS31	**Hrs/week:4**	**Hrs/Semester : 60**	**Credit : 4**

Unit I : Horticulture – definition, divisions and importance. Propagation of horticultural crops – cuttage, layerage, graftage and budding. Seedage – characteristics of good seed, and seed treatment for germination – Transplanting of seedling.

Unit II : Plant growing structures – objectives and types – green houses, hot beds, cold frames and conservatory. Establishment and cultivation of orchard. Gardening - outdoor garden –types, principles, designing and garden components.

Unit III : Indoor gardening. Terrarium, hanging basket and bonsai. Commercial gardening - cut flowers and economic flowers. Kitchen gardening – selection of site, lay out and choice of plants. Storage and preservation of fruits and vegetables.

Unit IV : Plant breeding:. Nature and scope of plant breeding; Defining - objectives of crop improvement -high yielding variety-disease resistant crops.hybridization techniques - emasculation - bagging. crossing.labellingand harvesting of hybrid seeds and raising F1 generation. Methods of Breeding self pollinated, cross pollinated and asexually propagsted crops, pure line and mass selection.

Unit V : Development of hybrid cultivars - Evalution of combining ability, prediction of double cross hybrid performance, production of hybrid through the use of cytoplasmic-genetic male-sterility system. Breeding for pest resistance: specific resistance vs general resistance, mechanism of resistance, tolerance, use and development of resistance gene.

Text Book :

1. Kumar, N. 1997. Introduction to Horticulture. Rajalakshmi Publications, Nagercoil, India.

Books for Reference:

1. AllardJohn R. W., *Principles of plant breeding* Wiley & Sons, Inc.New York.
2. Choudhri D and Amal Metha 2010. *Flower crops cultivation and management* Oxford book company . Jaipur
3. *Cytology and Evolution* E.N.Willmer.Academic press New York and London.
4. Edmund Senn - Andrew – Halfacre. 1977. *Fundamentals of Horticulture.* Tata Mc. Graw Hill.

5. Evolution Jay M. Savage. Amerind Publishing Co. Pvt.Ltd.
6. Hartmann & Kester, 1989 – *Plant propagation. Prentice* – Hall of India Pvt. Ltd. New Delhi.
7. Kumar, N. 1997. *Introduction to Horticulture*. Rajalakshmi Publications, Nagercoil, India.
8. Mallikarjuna Reddy and Aparna rao 2010. *Plant propagation in horticulture.* Pacific book international. New Delhi.
9. *Plant Breeding Theory and Practice.* V.L.Chopra. Oxford and IBH Publishing Co. Pvt.Ltd. New Delhi.
10. Randahawa 1985. *Floriculture in India.* Allied publishers.
11. Sharma, J. R., *Principles and practice of plant breeding* TataMcGraw-Hill Publishing Company Limited New Delhi.
12. Utpal Banerji 2008. *Horticulture* Mangal Deep Publication. Jaipur

Semester III			
NME I	**Plant Resource Utilization**		
Code: 18UBON31	**Hrs/week:2**	**Hrs/Semester: 30**	**Credit: 2**

Vision

- To appreciate the relevance of crop plants to the economy of the people

Mission

- To know the commercial value of plants resources
- To study the morphology and uses of plants in our day today life

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge of useful plant parts	3	Re
CO-2	to acquire the knowledge on geographical area of cultivation, production and marketing varriable food crops and their finished goods	1	Un
CO-3	able to differentiate importance of tropical and temperate fruits for human well being	3	Ap
CO-4	able to access the value of spices, contiments and beverage crops in international trads and confectionery industries	3	Ev
CO-5	understand the wealth of cash crops in India and their importance in improving trade and industrial growth	3	Ev
CO-6	comment on fibres as an alternative source of plastics	5	Un
CO-7	explain the use of beverages and their production	6	Un
CO-8	able to learn about the cultivation practices and extraction of oil from oil crops	6	Cr

Semester III			
NME I	**Plant Resource Utilization**		
Code: 18UBON31	**Hrs/week:2**	**Hrs/Semester: 30**	**Credit: 2**

Unit I : Botanical description, distribution, cultivation, production, harvesting and marketing of Cereals and millets - Rice, Wheat, Maize, Oat, Pearl millet, Italian millet, Finger millet

Unit II : Botanical description, distribution, cultivation, production, harvesting and marketing of Legumes: Soyabean, black gram, green gram and Bengal gram
Vegetables: Stem – Potato, garlic, Herbage – Cabbage, Cauliflower, Fruit - Tomato, Brinjal

Unit III : Botanical description, distribution, cultivation, production, harvesting and marketing of Fruits: Tropical fruits – Mango, banana, guava and papaya, Temperate fruits– Apple and grape

Unit IV : Botanical description, distribution, cultivation, production, harvesting and marketing of Spices and Condiments: Roots – Asafoetida, stem – ginger, bark – cinnamon, leaf – curry leaves, flower bud –clove, fruit – capsicum, coriander and black pepper.

Unit V : Beverages : Botanical description, distribution, cultivation, production, harvesting processing and marketing of tea and wine preparation from fruits; Oil –groundnut, coconut and Eucalyptus oil, extraction techniques of oil

Text book:

1. Pandey B. P. 1999. Economic Botany, S. CHAND

Books for Reference:

1. Chrispeels M.J. and Sandava. D. 1977. *Plants, Food and People*. San Fancisco.W.H. Preeman &Co.
2. Kocchar S L. 1998. *Economic Botany of the Tropics*. II Edn. Mac Millan India Ltd.
3. Sammbamurty A.V.S.S., Subrahmanyam N.S. 2008. *A text book of Modern Economic Botany* CBS publisher
4. Sharma O. P. 1996. *Hills Economic Botany*, Tata McGraw Hill. Co. Ltd. New Delhi
5. Sunidhi Miglani, 2016. *Text Book of Economic Botany*, ABS Books. Delhi
6. Swaminathan M and Kochar S. L. 1989. *Plants and Society*, Macmillar Publisher. Ltd.
7. Wickens G E 2004. *Economic Botany.* Principles and Practices, Springer, Kluer Publishers. Dordecht The Netherlands.

Semester – III			
Women's Synergy			
Code : 18UAWS31	**Hrs/ Week : 2**	**Hrs/Sem:30**	**Credits : 2**

Course Outcome

- To know about Women's health issues including menstruation, pregnancy, child birth etc, thereby taking care of themselves.
- Create awareness about their own biases, fears and comfort levels and encourage to dream and fuel their own growth and self development.
- Engage in promoting social justice and women rights
- Create platforms and facilitate the young women to operate symbiotically towards issues affecting their lives and take self initiatives for growth.
- Identify historic and contemporary women of importance as well as crucial moments in Women's history

Unit I - Physical Health

Woman's Structural Organisation – Levels of organisation – Body image - Reproductive health – Hormonal Cycle and its Psycho-somatic implications – Child birth – lactation – Nutritional status of women.

Unit II – Psychological Health

Examining factors determining psychological conditions of women – Depression, anxiety, stress, hysteria – Socio – cultural and familial conditioning of women's minds – Self Image, Discrimination against women.

Unit III – Women and Legal Awareness

Women specific – centered legislations – legal issues – laws to prevent gender based violence National / State Pro-women schemes – educational and Employment schemes. Laws for protection of Women – Women's rights to property – Women's Rights in the Indian Constitution – Maternity benefit act.

Unit IV – Women and Finance

Manager of domestic finance – Budgeting basics – Create a family budget - Set financial goals – Plan for financial emergencies – Budget for travel – Saving strategies – Investment options

Unit V – Women's Empowerment in Various Domain

Introduction - Women created history in sports and music – P. T. Usha, M. S. Subbulakshmi - Women who crossed hurdles in Social Service – Mother Theresa, Muthulakshmi Reddy, Medha Patkar - Role of Women in Indian independence movement and Politics – Indira Gandhi, Aruna Asaf Ali.

Books for Reference:

1. Devi K. Uma. *Women's Equality in India: a Myth or Reality.* New Delhi: Discovery Publishing House, 2000. Print.
2. Forbes, Geraldine. *The New Cambridge History of India: Women in Modern India.* Cambridge: Cambridge University Press, 2007. Print
3. Gonsalves, Lina. *Women and Human Rights.* New Delhi: APH Publishing House, 2011. Print
4. Jeyaraj, Nirmala. (Ed.). *Women and Society.* Delhi, Madurai: ISPCK & Lady Doak College, 2005. Print.
5. Tripathi, Prof. Madhusoodan. *Women Rights in India.* New Delhi: Omega Publications, 2011. Print.

SEMESTER - III	
Self Study (Optional)	**Organic Farming**
Code: 18UBOSS1	**Credits: 2**

Vision:

- To create knowledge on organic farming and practices.

Mission:

- Sensitizes the values and needs of organic farming.
- To develop organic farming management skills.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	to understand overall perspective on organic farming.	7	Un
CO-2	to realize the advantages of traditional organic farming over modern system of organic farming	4, 7	An
CO-3	to identify and formulate mechanical and biological managements of insects/pests/ weeds.	8	An
CO-4	to prioritize good water management system, fertilizer choices and application	7	Un
CO-5	to recognize the importance of composting and bio fertilizers over chemical fertilizers.	7	Ev
CO-6	to understand and implement crop protection methods of fruits and vegetables	4, 6	Un
CO-7	to follow the certification of their produce	6	Ap
CO-8	to enhance self employability and improve their economy	6	Ap

SEMESTER - III	
Self Study (Optional)	**Organic Farming**
Code:18UBOSS1	**Credits: 2**

Unit I	Organic farming-Introduction, Concept, Need of organic farming, Development of organic farming, Scope and status of organic farming in India.
Unit II	Types of organic farming- Pure organic farming, Integrated organic farming and mixed organic farming; Soil management
Unit III	Organic plant protection- Mechanical, Biological pesticides, Bio control agents, Weed management.
Unit IV	Organic plant nutrient management- soil tillage, Crop rotation, Inter cropping: Water management, Green manuring , Composting- methods, Bio fertilizers, Concentrated organic manures.
Unit V	Organic crop protection and organic certification- Organic crop methods of rice, coconut, vegetables and fruits; life stock components and management in organic farming; Organic farming and socio economic impact, guidelines for organic farming certification.

Books for Reference:

1. Arun K Sharma (2005) Hand book of organic farming.
2. Chandrasekaran B, Annadurai K and Somasundaram E., Text book of agronomy.
3. Fred C. Blank, (2006) Essential aspects of agricultural crop production.

SEMESTER IV			
Core VI	**Taxonomy of Angiosperms**		
Coe: 18UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Vision:

To know the basic principles involved in classification, naming and diagnostic features of selected families

Mission:

- To know the principles of classification and nomenclature.
- To recognize and identify the local flora.
- To know the morphological description of angiosperm in technical terms

Course Outcome :

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	describe the general principles of classification	1	Cr
CO-2	Apply binomial nomenclature for species naming	4	Un
CO-3	learn floristic features in technical term and extend an illustrious explanation on floral components of the flower.	6	Ap
CO-4	familiarise and evaluate the economic importance of angiosperms	6	Ev
CO-5	attain field experience and preparation of herbaria	6	An
CO-6	develop skill in plant identification.	6	Ap
CO-7	gain the art of plant collection and preservation.	8	Cr
CO-8	Compare and contrast different families of angiosperms	1	An

SEMESTER IV			
Core VI	**Taxonomy of Angiosperms**		
Code: 18UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Unit I : Taxonomy- definition and scope. Contribution of Mathew and Santappa. Botanical nomenclature - vernacular names, binomial, ICBN – principles of the code, principles of priority, type concept and author citation.

Unit II : Systems of classification- natural - Bentham and Hooker and phylogenetic – Engler and Prantl's system, Angiosperm Phylogeny Group (IV)- characteristics, merits and demerits.BSI. Herbarium techniques – botanical collection, pressing, preservation and role.

Unit III: Vegetative, floral characters and economic importance of: Annonaceae, Rutaceae, Caesalpiniaceae, Myrtaceae, Cucurbitaceae.

Unit IV: Vegetative, floral characters and economic importance of: Rubiaceae, Sapotaceae, Apocynaceae, Asclepiadaceae and Acanthaceae.

Unit V: Vegetative, floral characters and economic importance of: Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Arecaceae and Poaceae,.

Text Books

1. Pandey, B.P. 2005. Taxonomy of Angiosperms. S.Chand & Company LTD., New Delhi.
2. Shukla P. and S.P. Misra. 1997. An introduction to Taxonomy of angiosperms, Vikas Pub. House Ltd., New Delhi.
3. Vashista, P.C. 1985. Taxonomy of Angiosperms. Vikas Publications, New Delhi.

Books for Reference:

1. Gurcharan Singh, 2004. *Plant Systematics.* Oxford & IBH Publishing Co. PVT. Ltd., New Delhi.
2. Naik, V.N. 1984. *Taxonomy of Angiosperms*, R. Chand & Co, New Delhi.
3. Rendle, 1979. *The classification of flowering plants vol. II & I.* Vikas Publishing House Pvt. Ltd. Sahibabad, U.P.
4. Sharma, O.P. 1996. *Plant Taxonomy*. Tata MC Graw – Hill publishing Company Limited, New Delhi.
5. Singh, V. and Jain, 1997. *Taxonomy of Angiosperms*.Rastogi publications, New York.

Practical

Hrs/ week: 2

- Dissect out and display the floral parts of the typical members of the families prescribed in the syllabus.
- Survey of locally available plant species belonging to the families prescribed in the syllabus and preparation of digital herbarium
- Taxonomic field trip under supervision and submission of 2 herbarium sheets and 10 photographs. Field notebook to be submitted for external evaluation.
- Study of various modifications and record of economically important products from the members of the families prescribed in the syllabus.

Submission: Record note book/ Herbarium / Field note book

Books for Reference:

- Ashok Bendre and Ashok Kumar. *Text Book of Practical Botany II*. Rastogi Publications, Meerut.
- Gamble J.S. 1997. *Flora of Presidency of madras, Volume I to III*, Adlard and Son., Ltd., London
- Henry A N , Chitra V and Balakrishnan, NP, 1989. *Flora of Tamil Nadu, India, Volume III.* Botanical Survey of India, Southern circle Coimbatore.
- Henry AN, Kumari GR and Chitra V 1987. *Flora of Tamil Nadu, India, Volume II.* Botanical Survey of India.
- Mathew K M, 1981 to 1984. *The flora of Tamil Nadu, Carnatic. Volume I to III.* Rapinet herbarium, St. Joseph's College, Tiruchirapalli.

SEMESTER IV			
Allied	**Allied Chemistry - II**		
Code :18UCHA41	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credit : 3**

Vision : Acquire an appropriate knowledge and understanding in Chemistry underlying in metallurgical process and industrial fuels

Mission :

- Knowledge on steps involved in metallurgical process
- Know the important industrial fuels and its uses
- Significance of micro and macro nutrient in plant growth
- Importance of lipids in biochemical process

Course Outcome

CO No.	**Upon completion of this course, students will be able to**	**PSO addressed**	**CL**
CO 1	explain the methods of purification of ores and to differentiate ores and minerals	1	An
CO 2	know the extracting methods , properties and uses of titanium, vanadium ,thorium and their compounds	1	Re,Un
CO 3	synthesise some industrially important organic compounds such as Freon , rayon , polyester , nylon , thiokol Dacron	1, 5	Ev
CO 4	classify fuels and know its industrial uses	1, 4	Ap
CO 5	identify the techniques for sterilising water for domestic use	1, 4	An
CO 6	know the basics of abrasives	1,4	Re
CO 7	describe the role of micro and macro nutrients in plant growth and Identify the implication of biofertilizers on soil	1,5	Un
CO 8	classify fatty acids and analyse Cholesterol and know its biochemical significance	1	Ap, An

SEMESTER IV			
Allied	Allied Chemistry II		
Code :18UCHA41	Hrs/Week : 4	Hrs/ Sem : 60	Credits : 3

Unit I Metallurgy

Ores and Minerals- types of ores – methods of ore dressing- roasting –calcination-reduction(aluminothermic)-smelting-purification by electrolysis and ion exchange method-oxidative refining- zone refining- Kroll process- types of furnaces. Extraction , properties and uses of titanium-vanadium –thorium. Preparation of Titanium tetrachloride, Vanadium pentoxide and Thorium nitrate

Unit II Preparation and Uses of Some Important Organic Compounds

Preparation and uses of Formalin , choloroform , Freon , rayon , polyester , nylon , thiokol Dacron , silicone, Bakelite , polythene , urethane , Teflon , PVC , BHC

Unit III Industrial Chemistry

Fuels-classification-gaseous fuels like water gas ,producer gas, liquefied petroleum gas, gobar gas, compressed natural gas.

Water-Hardness of water-temporary and permanent hardness, disadvantages of hard water-softening of hard water-zeolite process, demineralization process and reverse osmosis-sterilisation of water for domestic use by chlorine, ozone and UV light.

Abrasives-Types of electric furnaces-Manufacture and uses of carborundum, calcium carbide, alundum-Industrial uses of lamp black, carbon black, activated charcoal, wood charcoal, animal charcoal, coke, artificial diamond

Unit IV Agricultural Chemistry

Fertilizers – role of micro and macro nutrients in plant growth – characteristics and importance of manures – preparation and uses of urea, ammonium sulphate, CAN, DAP, super phosphate and mixed fertilizers – biofertilizers.

Pesticides – insecticides – fungicides – rodenticides – bactericides and herbicides – preparation and uses of lead arsenate, Bordeaux mixture, zineb, epsam and aluminium phosphide.

Unit V Lipids

Definition and classification of lipids- Types of fatty acids- saturated, unsaturated, unusual and essential fatty acids- triacyl glycerol number-acid number- RM value-acetyl value-Chemistry of phospholipids-lecithin-cephalin- Cholesterol-tests-structure- (structural elucidation not required)-Biochemical functions of cholesterol-physiological significance

Text Books

1. Arun Bahl and B.S.Bahl, 2005. *Advanced Organic Chemistry,* S.Chand and Company Ltd., Reprint B.R.Puri, L.R.Sharma,K.C.Kalia, 2010. *Principles of Inorganic Chemistry*, Milestone publishers and distributers, Delhi,

2. Arun Bahl,B.S.Bahl,G.D.Tuli, 2008. *Essentials of Physical Chemistry*, S.Chand &Company Ltd.,New Delhi,

Books for Reference

1. K.S.Tewari,N.K.Vishnoi,S.N.Mehrotra, 1998. *A Text Book of Organic Chemistry, 2nd Revised Edition.*
2. B.R. Puri. L.R. Sharma, Madan S. Pathania, 2008. *Principles of Physical Chemistry,* Vishal Publishing Co.
3. M.K.Jain and S.C.Sharma , 2012, .*Modern Organic chemistry,* Vishal Publishing Co.

SEMESTER III & IV			
Allied Chemistry Practicals			
Code:18UCHAR2	**Hrs/Week : 2**	**Hrs/ Sem : 30**	**Credit : 1**

Organic analysis

Analysis of simple organic compounds

a) Nature of the compound - Aromatic / Aliphatic

b) Test for Saturation/ unsaturation.

c) Element present/absent

d) Characterization of functional groups (Acid, phenol (solid), aldehyde, ester, amide, primary amine, carbohydrates).

Volumetric Analysis

I. Acidimetry — Alkalimetry

1. Estimation of H2SO4 /HCl using standard oxalic acid .
2. Estimation of sodium hydroxide using standard sodium hydroxide.
3. Estimation of sodium carbonate using standard sodium carbonate.
4. Estimation of oxalic acid using standard oxalic acid

II. Permanganometry

5. Estimation of ferrous ion using standard ferrous ammonium sulphate.
6. Estimation of sodium oxalate /oxalic acid using standard oxalic acid.

III. Complexometry

7. Estimation of Zinc using standard Zinc sulphate.

Books for Reference

1. Vogel's Textbook of Quantitative Chemical Analysis, 2004 sixth Edition
2. Raghupati Mukhopadhyay, -2007, *Advanced Practical Chemistry* - Pratul Chatterjee Books and Allied (P) Ltd. Third Edition.

SEMESTER IV			
Core Skill Based	**Herbal health care products**		
Code: 18UBOS41	**Hrs/week: 4**	**Hrs/Semester:60**	**Credit: 4**

Vision:

- To give hands on training on preparation of herbal cosmetics and herbal heath care products.

Mission:

- To prioritize the effective utilization of herbal products.
- To give awareness on utilization of herbal drugs.
- To provide knowledge of the basic professional skills in herbal products

Course Outcome

CO.No.	Upon completion of this programme, students will be able to	PSO Addressed	CL
CO-1	recognize and identify the common herbs	1	Un, An
CO-2	perceive knowledge on common herbs and use of herbal products safely.	1, 6	Re
CO-3	know how to integrate knowledge of raw materials to formulate herbal products.	3	Un
CO-4	acquire the skills to establish and maintain an effective herbal practices.	8	Cr
CO-5	formulate and use herbal remedies for personal health and wellness	4,6	Cr
CO-6	develop herbal products for a homespun herbal products business	6,8	Ap
CO-7	to create optimum awareness and interest amongst the common people about medicinal plants	6	Ap
CO-8	to develop awareness for utilization of herbal medicines for home remedies.	6,7	An

SEMESTER IV			
Core Skill Based	**Herbal health care products**		
Code: 18UBOS41	**Hrs/week: 4**	**Hrs/Semester:60**	**Credit: 4**

Unit I: **Herbal drug:** Definition; Importance of Herbal therapies, Herbal verses conventional drugs, Safety in herbal drugs. **Botanicals for hair care:** *Cocos nucifera, Eclipta alba, Acacia concinna, Phyllanthus emblica, Lawsonia inermis and Hibiscus rosa-sinensis* (Botanical name, common name, useful part, family and uses); Preparation of hair oil.

Unit II: **Plants used for skin care:** *Curcuma aromatica, Curcuma zedoaria, Trigonella-foenum graecum, Citrus lemon, Acorus calamus* and *Rosa indica* (Botanical name, common name, useful part, family and uses); Preparation of bathing powder.

Unit III: **Herbs used for dental care:** *Azadirachta indica, Syzygium aromaticum, Eucalyptus globulus, Mentha piperita, Psidum gujava* and *Allium sativum* (Botanical name, common name, useful part, family and uses); Preparation of tooth powder.

Unit IV: **Plants used for eve care:** *Ficus religiosa*, *Aegle marmelos, Achyranthus aspera, Saraca asoca, Asparagus racemosus* and *Boerhaavia diffusa(*Botanical name, common name, useful part, family and uses); Preparation of uterine decoction.

Unit V: **Plants used for pulmonary care**: *Zingiber officinalae, Piper nigrum, Piper longum, Cinnamomum zeylanicum, Elettaria cardamomum* and *Ocimum tenuiflorum* (Botanical name, common name, useful part, family and uses); Preparation of powder and pain balm.

Text book:

1. John Jothi Prakash, E. 2001. Medicinal and Aromatic Plants, JPR Publications, Vallioor.

Books for Reference:

1. Devagi Sanmugam. 2007. A Guide to Indian Home Remedies. Marshall Cavendish Corporation
2. EiRi Board. Herbal Cosmetics & Beauty Products With Formulations. Engineers India Research Instt.
3. John Jothi Prakash, E., K. Venkataraman, 2001. The science of Medicinal Botany, JPR Publications, Vallioor.
4. Kokate C.F., A. P. Purohit and S.R. Gokhale, 2004. Pharmacognosy. NiraliPrakashan.
5. Moshrafuddin Ahmed. 2010. Medicinal Plants. MJP Publishers, Chennai.
6. Panda, H., 2012. The Complete Technology Book on Herbal Perfumes and Cosmetics (2nd Revised Edition). Niir Project Consultancy Services, New Delhi.
7. Ram Rakhsha Pathak. 2014. Therapeutic guide to ayurvedic medicine. Shree Ayurved Bhawan Pvt. Ltd, New Dehi
8. Wallis, T. E. 2000. Test book of Pharmacognosy. CBS Publishers, New Delhi.

Practical

- Preparation of hair oil
- Preparation of bathing powder.
- Preparation of herbal soap
- Preparation of tooth powder
- Preparation of powder for cough
- Preparation of pain balm

SEMESTER IV			
NME II	**Food Technology**		
Code: 18UBON41	**Hrs/week:2**	**Hrs/Semester:30**	**Credit: 2**

Vision

- To offer professional edge by providing hands on training

Mission

- To familiarize the students about the food processing techniques
- To understand the food preservation methods and techniques adopted.

Course Outcome

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	discuss basic principles of common food preservation methods.	6,8	Un
CO-2	identify and explain nutrients in foods and the specific functions in maintaining health.	6,8	Re
CO-3	recognize the spoilage and deterioration mechanisms in foods and methods to control deterioration and spoilage.	6,8	An
CO-4	manufacture a range of simple food products	6,8	Ap
CO-5	modify recipe for specific purposes such as nutrient enhancement, quality improvement and ingredient substitution.	4	Ap
CO-6	understand the compositional and technological aspects of milk and fish	6,8	Un
CO-7	bakery technology and quality aspects of bakery products	6,8	
CO-8	apply preservation principles in product design	6	Ap

SEMESTER IV			
NME II	**Food Technology**		
Code: 18UBON41	**Hrs/week:2**	**Hrs/Semester:30**	**Credit: 2**

Unit I : **Technology of Vegetables:** Nutritive value of vegetable, storage of vegetable, factors affecting storage life, spoilage of vegetables. **Methods of preservation** : refrigeration, freezing, canning, drying and dehydration, and chemical preservatives. Preparation of pickles and ready to eat vegetable products

Unit II : **Bakery Technology:** Ingredients & processes for breads, cakes, Equipments used, product quality characteristics, faults and corrective measures. Different types of icings.

Unit III : **Dairy Technology:** Milk and dairy products; Pasteurization, sterilization, HTST and UHT processes. Preparation of butter, ghee, ice-cream, paneer.

Unit IV : **Technology of Fruits:** fruit composition and nutritive value of fruits. Spoilage of fruits. Preparation of jam - mixed fruits jam. Fruit juices – pineapple and grapes. Squash –lemon. Sauce- tomato.

Unit V : **Technology of Fish**: Average composition of fish; storage of raw fish; Freshness criteria and quality assessment of fish; Spoilage of fish; **Methods of Preservation of fish:** Canning, Freezing, Drying, Salting, smoking, curing, fermentation. Preparation of fish sauce and fish pickle.

Text Book:

1. Raina, U., Kashyap, S., Narula, V., Thomas, S.,Suvira, Vir S. and Chopra, S. 2007 Basic Food Preparation-A complete Manual. 3rd Ed. Orient Longman Pvt. Ltd. Hyderabad.

Books for Reference:

1. Dubey, S.C. 2007. *Basic Baking 5th Ed*. Chanakya Mudrak Pvt. Ltd. New Delhi
2. Frazier, W.C and West Holf, D.C. 1995. *Food Microbiology*. Tata McGraw Hill publishing Co Ltd., New Delhi.
3. Kulshrestha, S.K. 1994. *Food preservation.* Vikas publishing House, New Delhi.
4. Srivastava,R. P. 1982. *Preservation of fruits and vegetable products***.** Bishen Singh Mahendra Pal Singh, Dehra Dun.
5. Srivastava,R. P. and Kumar, S. 2002. *Fruit and Vegetable Preservation : Principles and Practices.* International Book Distributing Co. Lucknow, India
6. Swaminathan, M., 1992. *Handbook of Food Science and Experimental foods*. The Banglore printing and publishing Co Ltd., Banglore.

SEMESTER- IV			
Ability Enhancement Course: Yoga and Meditation			
Code: 18UAYM41	**Hrs/Week : 2**	**Hrs/Semester : 30**	**Credits: 2**

Course Outcome:

- To learn and practice various meditation, yoga methods to transform the ordinary life into a healthy, harmonious life leading to holistic wellbeing,
- To create an eco-friendly, loving and compassionate world.
- Acquire knowledge and skill in yoga for youth empowerment.
- Increase their power of concentration
- Learn the causes and ways to overcome fear and sadness.
- Create a ecofriendly, loving and compassionate world

Unit I: Meditation (6 Hrs)

Meditation – Purposes of meditation– Major types of meditations: Zazen, Mindfulness, Vipasana, Yoga, Self-inquiry, Listening, Qi Gong, Taoist, Tantra– Health benefits of meditation: physical, psychological, spiritual–Meditation and Silence:Silence of the body, mind, heart,and beyond – General methodology of meditation – Tips for better meditation

Exercises: Practicing Zazen meditation – Self-enquiry meditation exercises

Unit II: Self-Awareness (6 Hrs)

Awareness – Self-awareness – Importance of self-awareness – Shades of self-awareness – Difference between Awareness and Concentration – Power of concentration – Levels of concentration – How to increase concentration? – Beauty of living here and now – Ways to develop your presence – Self-awareness and Ecology: interconnectedness

Exercises: Body Scan exercise – Self-Witnessing exercise – Eating Raisin with full awareness

Unit III: Yoga (6 Hrs)

Meaning and importance of yoga – Yoga and human physical system – Principles of Yoga – Different types of yoga – Yoga and balanced diet – Yoga and energy balance – Pranayama – Surya namaskaram– Basic asanas for healthy life – Therapeutic benefits of simple yogasanas – Naturopathy for common ailments.

Exercises: Practicing basic Asanas – Doing Sun Salutation

Unit IV: Mindfulness (6 Hrs)

Definition of mindfulness – Three components of mindfulness– Benefits of mindfulness – Mindfulness and Brainwave patterns – Myths about mindfulness – Scientific Facts about mindfulness – Formal method to practice mindfulness – Qualities of Mindfulness – Obstacles for mindfulness – informal ways of practicing mindfulness – Mindfulness to get rid of addictions

Exercises: Practice Mindful Walking –Practice Mindful Talking

Unit V: Heartfulness (6 Hrs)

Attitude to life – Power of positive attitude – Techniques to develop positive attitude – Positive vs negative people – Forms of negative attitude – Heartfulness – Managing fear: Basic 5 fears, Ways to overcome fear–Handling anger: Anger styles, Tips to tame anger – Coping with sadness: Causes and ways to overcome sadness, dealing with depression – Ultimacy of compassion: Compassion to oneself, towards others: Forgiveness, to nature: Seeing God in all

Exercises: Practice Loving-Kindness meditation– Doing compassionate actions

Text Book:

1) Thamburaj Francis. *Meditation and Yoga for Holistic Wellbeing.* Trichy:Grace Publication. 2019.

Books References:

1) Osho. *Meditation the Only Way.* New Delhi: Full Circle Publication, 2009.
2) Thamburaj Francis. *Journey from Excellence to Godliness: Zen Meditation for Transformation.* Grace Publication, Trichy, 2017.
3) Osho. *Awareness: The Key to Living in Balance.* New York: St.Martin's Griffin Publication, 2001.
4) Tolle Eckart.*The Power of Now: A Guide to Spiritual enlightenment.* New World Library, 2004.
5) Swami Gnaneswarananda. *Yoga for Beginners.* Calcutta: Sri Ramakrishna Math, 2010.
6) HanhThichNhat. *The Miracle of Mindfulness: An Introduction to the Practice of Meditation.* Beacon Press, 2016.
7) Kamlesh D. Patel and Joshua Pollock. *The Heartfulness Way: Heart-Based Meditations for Spiritual Transformation.* Westland Publications, 2018.

SEMESTER IV	
Self Study (Optional) Botany for Competitive Examinations	
Code: 18UBOSS2	**Credit: 2**

Vision

- To help the students to face the challenges of completive examinations

Mission

- To improve the competency of student at national level.
- To offer basic concepts across the spectrum of Botany.

Course Outcome

CO. No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	answer questions related to biodiversity, origin and their phylogenetics of plants	8	Un
CO-2	get competency in answering cytological aspects and cellular architecture of plants	3	Un
CO-3	attain skills and answer questions related to biochemical functions of cells	6	Re
CO-4	understand the importance of soil nutrients and their absorption and assimilation by plants that will support them to answer various disciplines associated with botany	3	Un
CO-5	answer question based on knowledge and understanding through learning of soil, water and atmosphere continuum	8	Un
CO-6	get competency in answering questions related to molecular mechanism of photosynthesis	3	Ap
CO-7	understand and answer the energy metabolism in biology	8	Un
CO-8	learn morphogenesis that facilitate them to answer question in professional examinations	6	Ap

SEMESTER IV	
Self Study (Optional) Botany for Competitive Examinations	
Code: 18UBOSS2	**Credit: 2**

Unit I : Plant Kingdom Salient features and classification of plants into major groups - Algae, Bryophyta, Pteridophyta, Gymnospermae and Angiospermae (three to five salient and distinguishing features and at least two examples of each category); Angiosperms - classification upto class, characteristic features and examples. tools for study of taxonomy- herbaria, botanical gardens. Morphology of Flowering Plants Morphology and modifications: Internal Morphology of different parts of flowering plants: root, stem, leaf, inflorescence, flower, fruit

Unit II : Anatomy of Flowering Plants Anatomy and functions of different tissues. Cell- The Unit of Life Cell theory and cell as the basic unit of life: Structure of prokaryotic and eukaryotic cells; Plant cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system, endoplasmic reticulum, golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, microbodies; Cell Cycle and Cell Division -mitosis, meiosis and their significance Biomolecules Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids; Enzymes- types, properties, enzyme action.

Unit III : Transport in Plants Movement of water, gases and nutrients; cell to cell transport, diffusion, facilitated diffusion, active transport; plant-water relations, imbibition, water potential, osmosis, plasmolysis; long distance transport of water - Absorption, apoplast, symplast, transpiration pull, root pressure and guttation; transpiration, opening and closing of stomata; Uptake and translocation of mineral nutrients - Transport of food, phloem transport, massflow hypothesis. Mineral Nutrition Essential minerals, macro- and micronutrients and their role; deficiency symptoms; mineral toxicity; elementary idea of hydroponics as a method to study mineral nutrition; nitrogen metabolism, nitrogen cycle, biological nitrogen fixation.

Unit IV : Photosynthesis in Higher Plants Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C3 and C4 pathways; factors affecting photosynthesis.

Unit V : : Respiration in Plants Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient. Plant - Growth and Development Seed germination; phases of plant growth and plant growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA; seed dormancy; vernalisation; photoperiodism.

Books for Reference:

1. UG question bank from Botany department

SEMESTER V			
Core VII	**Biotechnology (Common Core)**		
Code: 18UBCC51	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credits: 3**

Vision:

- To gain knowledge and develop skill in the field of about the importance of biotechnology in different fields
- To create graduates who endeavor for the welfare of mankind.
- Create opportunities for multi-disciplinary education, training and research in biotechnology

Mission:

- Impart quality education for lifelong professional growth and opportunity in a wide range of Careers.
- To create awareness towards socio-ethical implications of potentials of biotechnology
- To provide a platform for biotechnology education, training and research at the interface of multiple disciplines

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	describe different cloning vehicles and learn the different type of vectors	1	Kn, Un
CO-2	gain knowledge about techniques of biotechnology.	2	Un
CO-3	summarise the different techniques in animal biotechnology	2	Un, An
CO-4	compare the various techniques in plant and animal biotechnology	4	Cr
CO-5	enumerate cell culture, organ culture and stem cell culture and point out implications in health care	6	Kn, An
CO-6	distinguishes methods of alleviating environmental pollution and understand the synthesis of industrial products	5	An
CO-7	relate biotechnology and its benefits to mankind	6	Ap, Ev
CO-8	design, conduct experiments, analyze and interpret data for investigating problems in biotechnology and allied fields	7,8	Ap

SEMESTER V			
Core VII	**Biotechnology (Common Core)**		
Code: 18UBCC51	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credits: 3**

Unit I Cloning Vectors

Introduction – Scope and importance of biotechnology – Gene cloning techniques - cloning vehicles – bacterial plasmid vectors – pBR322 and Ti plasmid – bacteriophage vectors – lambda – M13 – Plant viral vector – CaMV- Gemini virus and tobamovirus – animal viral vector – SV40- Role of restriction and modification enzymes

Unit II Gene Cloning and Screening

Gene cloning – methods of introduction of cloned genes into host cells – transformation – liposome mediated transfer – electroporation – particle bombardment gun – viral vector method – DNA library – PCR – hybridization technique – blotting techniques – Southern, Northern and Western.

Unit –III Cell, Tissue and Organ culture

Culture media – cell culture techniques – monolayer culture and immobilized culture of cell lines –callus culture – suspension culture and anther culture – techniques and applications of human embryonic stem cell culture – plant embryo culture- invitro pollination – organ culture – techniques – tissue engineering of artificial skin and cartilage.

Unit – IV Environmental and Bioprocess technology

Biotechnological methods for sewage and waste water treatment – bioremediation – degradation of xenobiotic (hydrocarbons and pesticides) – role of genetically engineered microbes – biomining – bioleaching – industrial production of penicillin and ethanol – Biodiesel – Biofertilizer – mass cultivation and application of Azola

Unit –V Health care biotechnology

DNA probes and diagnosis of genetic disorders – DNA fingerprinting technique – gene therapy and treatment of genetic diseases – vaccines – recombinant DNA vaccines and viral vaccines – edible vaccines- Bt cotton – Golden rice- Human Genome Project – types – methods of sequencing – potential benefits of mankind

Text Books

Dubey R.C, S *A text book of Biotechnology* .Chand and Comp.Ltd, New Delhi, 2004.
Kumaresan, V., Biotechnology . - Saras Publication , Nagercoil - 2010

Books for Reference

1. Clark and J. Pazdernik. 2009. *Biotechnology*, Elsevier Academic Press, California, USA.
2. Dubey, R.C. 2006. *Text Book of Biotechnlogy*, 4th edition, S. Chand and Co Ltd, New Delhi.
3. Ramadass, P. 2009. *Animal Biotechnology – Recent Concepts and Development*. MJP Publishers, Chennai
4. Rema, L.P. 2009. *Applied Biotechnology*, MJP Publishers, Chennai.

5. Shailendra Singh, 2007. *Applied Biotechnology*, 1st edition, Campus Books International New Delhi.
6. Singh, B.D. 2005. *Biotechnology, Revised edition*, Kalyani Publishers, Chennai.

Practicals 18UBCCR5

Hours/Week :2 **Credits : 1**

1.Isolation of Blue Green Algae
2. Preparation of synthetic seed
3. Estimation of dissolved oxygen and BOD
4. DNA Estimation by Spectrophotometric method
5. Preparation of plant and animal tissue culture media
6. Preparation of SDS – PAGE (Gel mould only)
7. Isolation of protoplast
8. Estimation of protein by column chromatography
9. Demonstration :
   Electrophoresis – full technique
   Blotting technique
   PCR – DNA Amplification
   Mushroom cultivation / Vermiculture
10. Models and Charts pertaining to theory

Book for Reference:

1. Aneja,K.R., *Experiments in Microbiology, Plant Pathology and Tissue Culture*, Wishwa Prakashan, (A Division of Wiley Eastern Ltd), New Delhi.

SEMESTER V			
Core VIII	**Microbiology**		
Code: 18UBOC52	**Hrs/week: 5**	**Hrs/semester: 75**	**Credits: 4**

Vision:

- To provide information on various techniques to culture different microbial strains and recent advances in the field of microbiology

Mission:

- To know the characteristic features of microbes including their mode of nutrition
- To make the students aware of symptoms and preventive measures of common human diseases.
- To exploit the potentialities of microorganisms in food and industries.

Course Outcome

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	realise the history and scope of microbiology	3	Un
CO-2	understand the structure and growth characteristics of microorganism that enabling the learner to identify and classify microorganisms by themselves	4	Cr
CO-3	use various microbiological techniques to isolate, characterize and identify bacterial and viral pathogens of plants.	6	An
CO-4	provide a thorough knowledge about the microbes causing human diseases , their symptoms and preventive measures	4	Ap
CO-5	understand the role of microorganisms in biotechnology, fermentation, medicine and other industries for human well being	4	Ap
CO-6	discuss the role of microorganism in food, milk and water	4	An
CO-7	identify and control food borne disease and food spoilage	4	An
CO-8	test the quality of milk and enumerate microorganisms found in milk and soil	6	Ev

SEMESTER V			
Core VIII	**Microbiology**		
Code: 18UBOC52	**Hrs/week: 5**	**Hrs/semester: 75**	**Credits: 4**

Unit I:

Brief history and scope of microbiology. Morphology and ultra structure of Bacteria. Reproduction – binary fission, conjugation, transduction and transformation. Nutrition types - chemosynthetic, photosynthetic, saprophytic, parasitic and symbiotic.

Unit II

Culture of microorganisms – sterilization (dry, heat, moist heat and filtration), media for micro organisms (NA, Czapek-Dox and PDA), Methods of culturing bacteria – broth culture, agar plate and agar slant culture, pure culture, batch culture and continuous culture. Growth – phases of growth.

Unit III

Virus – general characteristics, structure and multiplication of TMV and T_4 phage. Microbes and human diseases –typhoid, cholera, tuberculosis and influenza

Unit IV

Fermentation technology- fermentors- stirred tank, tower and air lift. Commercial production of vinegar, citric acid, penicillin and vitamin B_{12}.

Unit V

Food microbiology – types of food spoilage and methods of food preservation. Microorganisms as food -single cell protein –bacteria, fungi and yeast.
Milk microbiology - bacterial flora in milk, types of contamination and pasteurization of milk.
Water microbiology – testing potability of water and methods of purification of potable water.

Text Book

1. Dubey, R.C. and D.K. Maheswari, 2003. A textbook of Microbiology. S. Chand company Ltd. New Delhi.

Books for Reference:

1. Adams, M.R. and M.O. Moss, 2005. Food Microbiology. New Age International publishers.
2. Kalaichelvan, P.T. 2005. Microbiology. Biotechnology - Lab Manual – MJP Publishers, Chennai.
3. Patel, A.H. 2004. Industrial Microbiology. Mac Milan India Ltd., New Delhi.
4. Pelzar, M.H., E.C.S Chan and N.R. Krieg. 2005. Microbiology. Tata MC. Graw Hill Pub. Co. Ltd., New Delhi.
5. Purohit, S.S. 1988. Microbiology. Agro Botanical publishers India.

Practical

Hrs/ week: 2

- Sterilization (dry, heat, moist heat and filtration)
- Preparation of media- NA, PDA
- Demonstration of plating and serial dilution technique
- Pure culture technique – streak plate method
- Staining of Bacteria (Gram's staining)
- Analysis of milk – dye reduction test

Spotters

- Ultra structure of bacterial cell, T_4 phage, TMV and HIV-EM
- Colony counter
- Fermentors- stirred tank, tower and air lift,
- Agar slant/ stab/plate
- Milk samples
- Spoiled food

Submission: Record note book

Book for Reference: Lakshmanan M, Kunthala Jeyaraman, Jeyaraman and Gnanam, 1971. Laboratory experiments in microbiology and molecular biology, Higginbothams Pvt. Ltd.

Semester V			
Core IX	**Biochemistry**		
Code: 18UBOC53	**Hrs/week: 5**	**Hrs/ Semester: 75**	**Credit: 4**

Vision:

- To familiarize with the biomolecules and their role in vital activities of plants

Mission:

- To understand the structure of biomolecules and their role in plant metabolism
- To develop skill in detection and estimation of bio-molecules from plant tissues.
- To understand the operation of the thermodynamic principles in plant metabolism.

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the types of chemical bonds involved in the structure of biomolecules and basic concepts of acid, base and buffer	2	Un
CO-2	classify carbohydrates of different domain based on their physical and chemical organization	2	An
CO-3	understand the structure and properties of amino acids	2	Un
CO-4	describe the structural details and properties of protein	2	Un
CO-5	explain the nomenclature, mechanism of enzyme activity	2,4	Un
CO-6	discuss the sources of vitamins and symptoms specific to vitamin deficiency in human begins.	4	Re
CO-7	categorize lipids based on their structure	2	Un
CO-8	acquire skill in qualitative and quantitative estimation of the biomolecules	6	Ap

Semester V			
Core IX	**Biochemistry**		
Code: 18UBOC53	**Hrs/week: 5**	**Hrs/ Semester: 75**	**Credit: 4**

Unit I : **Biomolecules:** Introduction. **Chemical Bonds:** Covalent bond, non - covalent bond, Ionic bond, Van der Waals forces, hydrogen bond. **pH:** Acid – base concept, Henderson-Hasselbach equation. **Buffers:** Biological buffer Systems in body fluids

Unit II : **Carbohydrates:** Definition, classification and functions. **Monosaccharides:** structure and properties, chirality and optical activity, stereoisomerism, absolute and relative configuration (D & L and R & S), open and cyclic structure of glucose and fructose (pyranose and furanose). **Disaccharides:** structure and properties - reducing sugar (maltose), non-reducing sugar (sucrose). **Polysaccharides:** structure and properties – Homopolysaccharide: structural polysaccharide (cellulose), storage polysaccharide (starch).

Unit III : **Amino acids:** Structure, classification (based on composition and polarity of R group), physical properties and chemical reactions of amino acids. **Proteins**: peptide bond, Psi and Phi angle, Ramachandran plot. **Structural organization of proteins**: primary, secondary, tertiary and quaternary structure. Properties of protein

Unit IV : **Enzymes:** Structure of enzyme: holoenzyme, apoenzyme, prosthetic group (cofactors, coenzymes). Classification and nomenclature of enzymes. Mechanism of action (activation energy, lock and key hypothesis, induced fit theory). Factors affecting enzyme activity. **Vitamins:** source and deficiency symptoms of vitamin A, B,C,D,E and K.

Unit V : **Lipids:** Structure, classification: simple lipids (waxes and triglycerides), compound lipids (phospholipid and glycolipid) and derived lipids (steroids, carotenoids and terpenes). Properties of lipids.

Text Book:

1. Jain, J.L. 2005. Fundamentals of Biochemistry. S. Chand & Co., New Delhi.

Books for Reference:

1. Conn, E.J. and P.K. Stumpf. 1996. Outlines of Biochemistry, Wiley Eastern Ltd., Bombay.
2. Lehninger, A.L. 1987. Biochemistry. CBS Publishers, New Delhi.

3. Philip, W., Kuchel and G.B. Ralston. 2003. Biochemistry. Tata McGraw – Hill publishing company Ltd. New Delhi.
4. Salil Bose. 1982. Elements of Biophysics. Jjothi Books, Madurai.
5. Stryer, L. 1986. Biochemistry.CBS. Publishers, New Delhi.

Practicals

Hrs/Week: 2

- Titration of weak acid
- Preparation of acetate buffer
- Estimation of starch in plant tissues by colorimetry
- Estimation of soluble sugar in plant tissues by colorimetry
- Separation of amino acids from a mixture by paper chromatography
- Estimation of protein in plant tissues by colorimetry
- Estimation of ascorbic acid
- Determinaion of saponification number
- Estimation of carotenoids
- Qualitative tests: Carbohydrates-Glucose and starch, proteins and amino acids

Submission: Record note book

Book for Reference:

1. Jayaraman. J. 2001. Laboratory manual in Biochemistry. New Age International publisher, New Delhi.

SEMESTER - V			
Core Integral I	**Biostatistics and Biological Techniques**		
Code: 18UBOI51	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Vision:

- To understand the basic statistical principles and techniques used in biology.

Mission:

- To introduce the common statistical techniques and terminology.
- To familiarize the students with different instruments to carry out basic research.

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the fundamentals of statistical analysis	4	Un
CO-2	apply the learned procedure for collecting data, presenting data and analyze the same.	6	An
CO-3	able to interpret the results and find solution to the problems.	8	Ev
CO-4	understand the principles, working methodology and applications of instruments used in biology	4	Cr
CO-5	apply micro techniques for permanent mounting of biological samples.	8	Cr
CO-6	apply the learned techniques to carry out basic research in biology.	4	Ap
CO-7	understand the importance of data collection and their organization	8	Un
CO-8	communicate the results of statistical analyses accurately and effectively	8	Ev

SEMESTER - V			
Core Integral I	**Biostatistics and Biological Techniques**		
Code:18UBOI51	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Unit I: Introduction and scope of biostatistics. types of data – primary and secondary, Collection of data, sampling - random sampling methods and sampling error. Classification of data, preparation of frequency distribution table (discrete and continuous series).

Unit II: Presentation of data: Tabular (parts of table, types); diagrammatic – bar, pie diagram and pictogram; graphic – line graph, histogram, cumulative frequency curve.

Unit III: Measures of central tendency: simple arithmetic mean, median and mode (direct method). Measures of dispersion: standard deviation (direct method), standard error. Chi-square test (goodness-of-fit, independence of attributes). Student t-test (comparison of means of two small samples).

Unit IV: Principle and working mechanism of simple, compound and electron microscope (TEM). Microtomy – fixation, dehydration, infiltration, embedding, sectioning and staining (safranin, fast green, haematoxylin only) mounting.

Unit V: Principle, working mechanism and applications of - pH meter, spectrophotometry – colorimeter and UV spectrophotometer. Separation techniques – clinical centrifuge, electrophorosis and adsorption chromatography.

Text Books:

1. Gurumani N. 2005. *An Introduction to Biostatistics. II Edition*. M.J.P. Publishers, Chennai.
2. Gurumani N. 2006. *Research Methodology for Biological Sciences*. M.J.P. Publishers, Chennai.

Books for Reference:

1. Bryan C. Williams Keith Wilson, 1983. *A biologists guide to practical techniques of practical biochemistry second edition.* Edward Arnold publications.
2. Jayaraman J., 1985. *Laboratory manual in biochemistry,* Wiley Eastern Ltd., New Delhi.
3. Johansen,M., 1940. *Plant Microtechnique* Mc. Graw Hill.
4. Kothari C.R., 2004. *Research Methodology – Methods and techniques* New age International (P) Ltd., Publishers. New Delhi.
5. Palanisamy, S. and Manoharan, 1991. *Statistical methods for biologists*. Palani paramount publishers.

6. Plummer, D., 1987. *An introduction to practical Biochemistry*, Tata Mc. Graw Hill.
7. Pranab Kumar Banerjee, 2004. *Introduction to Biostatistics*. S. Chand & Company Ltd., New Delhi.
8. Satguru Prasad, 2003. *Fundamentals of Biostatistics*. 4th edition. Emkay Publications.
9. Subramanian, 2005. *Biophysics principles and Techniques.* MJP Publishers, Chennai.
10. Veera Bala Rastogi, 2009. *Fundamentals of Biostatistics*. II Edition. Ane Books Pvt. Ltd. Chennai.
11. Veerakumari, L., 2004. *Biochemistry* M.J.P. Publishers, Chennai.
12. Wilson, K. and J. Walker, 1997. *Practical biochemistry IV edition*, Cambridge university press.

SEMESTER V			
Core Integral II	**Pharmacognosy**		
Code:18UBOI52	**Hrs/week:4**	**Hrs/semester: 60**	**Credit: 4**

Vision:

- To provide knowledge on significance of medicinal plants and their medicinal potency.

Mission

- To understand the characterization , production and standardization of crude drugs
- To deal with methods for sustainable production of crude drugs and their therapeutic value.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define and identify the more valuable medicinal plants based on their pharmaceutically active compounds	3	Ap
CO-2	formulate medicinal product and apply the knowledge for proper storage and distribution	8	Ap
CO-3	assess and evaluate the purity of herbal medicine.	7	Ev
CO-4	elaborate the cultural practices of important medicinal plants.	6	Re
CO-5	assess the trade opportunities of medicinal plants.	6	Ap
CO-6	define, classify and explain the importance of herbal medicine.	6	Re
CO-7	identify the crude drugs by morphological, organoleptic and histological characters.	6	Un
CO-8	know and expain the important phytoconstituents of therapeutic value.	6	Un

SEMESTER V			
Core Integral II	**Pharmacognosy**		
Code:18UBOI52	**Hrs/week:4**	**Hrs/semester: 60**	**Credit: 4**

Unit I : Definition, scope and applications of herbal medicine. Classification (morphological. therapeutic, chemical. taxonomical and chemotaxonomic classifications) and identification of drugs

Unit II : Drug adulteration. Methods of drug evaluation (morphological, micoroscopic, physical, chemical and biological).

Unit III : Botanical name, family, useful part, chemical constituents, adulterants and uses of the following drug.

Glycosides – Senna, Aloe, Digitalis, Liquorice
Terpenoids – Coriander, Fennel, Lemon, Cinnamom
Alkaloids – Datura, Opium, Vinca, Pepper
Lipids - Castor, Neem, Sesame oil.

Unit IV Methods of collection, process and storage of medicinal plants; purification of raw drugs; factors causing drug contamination, methods of storage of drugs

Unit V Extraction methods and medicinal uses of *Eucalyptus*, Castor and Lemon grass oil. Conservation of medicinal plants – *in-situ* and *ex-situ* methods

Text book:

Roseline. A. 2011. *Pharmacognosy*, MJP Publishers, Chennai.

Books for Reference

1. Anonymous. 1978. *The Ayurvedic Formulary of India.* Govt. of India, New Delhi
2. Anonymous. 1989. *Formulary of Siddha Medicine.* The Indian Medical Practitioners' Co-operative Pharmacy and Stores Ltd., Chennai
3. Anonymous. 1999. *The Ayurvedic Pharmacopoeia of India. Vol. I (1 & 2).* Ministry of Health and Family Welfare, Govt. India, New Delhi.
4. Chauhan, M.G. and A.P.G. Pillai. 2005. Microscopic Profile of Powdered Drugs Used in Indian Systems of Medicine. *Institute of Ayurvedic Medicinal Plant Sciences,* Jamnagar.
5. Daljithsimha, K. 1974. *Unani Dravyaguna Darshana*. Ayurvedic and Tibbi Academy, Lucknow
6. Kumar, N.C. 1993. *An Introduction to Medicinal Botany and Pharmacognosy*. Emkay Publications, Delhi.
7. Gokhale, S.B., Kokate, C.K. and Purohit, A.P. 2004. *A Text book of Pharmacognosy*. Nirali Prakashan, Pune.
8. Murugesh, N. 2002 *A Concise Text Book of Pharmacognosy*. Sathya Publishers, Madurai.

Semester V	
Self Study (Compulsory)	**Economic Botany**
Code: 18UBOSS3	**Credit: 2**

Vision

- To understand the utilization of crop plants as food and their commercial application

Mission

- To study the cultivation practices and uses of crop plants as food
- To know the commercial value of plants resources

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge of useful plants	3	Re
CO-2	describe the distribution, cultural practices and processing of harvested products for commercial purpose of cereals	1	Un
CO-3	know the nutrient potential of legumes	3	Ap
CO-4	discuss the types, production, keeping quality and marketing of tropical and temperate fruits	3	Ev
CO-5	evaluate the medicinal and confectionery value of spices and condiments	3	Ev
CO-6	understand the chemical composition of plant products and their application both as food and medicine	5	Un
CO-7	explain the use of beverages and their production	6	Un
CO-8	Learn about extraction of oil from oil crops	6	Cr

Semester V	
Self Study (Compulsory)	**Economic Botany**
18UBOSS3	**Credit: 2**

Unit I : Botanical description, distribution, cultivation, production, harvesting and marketing of Cereals and millets - Rice, Wheat, Maize, Oat, Pearl millet, Italian millet, Finger millet

Unit II : Botanical description, distribution, cultivation, production, harvesting and marketing of Legumes: Soyabean, black gram, green gram and Bengal gram
Vegetables: Stem – Potato, garlic, Herbage – Cabbage, Cauliflower, Fruit - Tomato, Brinjal

Unit III : Botanical description, distribution, cultivation, production, harvesting and marketing of Fruits: Tropical fruits – Mango, banana, guava and papaya, Temperate fruits – Apple and grape

Unit IV : Botanical description, distribution, cultivation, production, harvesting and marketing of Spices and Condiments: Roots – asafoetida, stem – ginger, bark – cinnamon, leaf – curry leaves, flower bud –clove, fruit – capsicum, coriander and black pepper.

Unit V : Bevarages - botanical description, distribution, cultivation, production, harvesting, processing and marketing of tea; wine preparation from fruits; Oil –groundnut, coconut and Eucalyptus oil, extraction techniques of oil

Books for Reference:

1. Chrispeels M.J. and Sandava. D. 1977. *Plants, Food and People*. San Fancisco.W.H. Preeman &Co.
2. Kocchar S L. 1998. *Economic Botany of the Tropics. II Edn.* Mac Millan India Ltd.
3. Pandey B. P. 1999. *Economic Botany*, S. CHAND
4. Sammbamurty A.V.S.S., Subrahmanyam N.S. 2008. *A text book of Modern Economic Botany* CBS publisher
5. Sharma O. P. 1996. *Hills Economic Botany*, Tata McGraw Hill. Co. Ltd. New Delhi
6. Sunidhi Miglani, 2016. *Text Book of Economic Botany*, ABS Books. Delhi
7. Swaminathan M and Kochar S. L. 1989. *Plants and Society*, Macmillar Publisher. Ltd.
8. Wickens G E 2004. *Economic Botany. Principles and Practices*, Springer, Kluer Publishers. Dordecht The Netherlands.

Semester VI			
Core X	**Plant Physiology**		
Code: 18UBOC61	**Hrs/week: 5**	**Hrs/ Semester: 75**	**Credit : 4**

Vision:

- To provide knowledge on orderly metabolic activities in plant to sustain life

Mission:

- To understand the plant functions such as transpiration, photosynthesis and respiration.
- To recognize the intermediary metabolism of plants.

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the water relation and root structure and functions that influence the transfer of inorganic nutrients from the soil into the plants	2,3	Un
CO-2	assess the symptom specific nutritional deficiencies and discuss the need of fertilisers for crop improvement	2	An,Ap
CO-3	analyse the mechanism of their assimilation of inorganic molecules into organic molecular components.	3	Un
CO-4	analyse light enhanced photochemical reactions that culminates in the synthesis of ATP and NADPH and fixation of carbon dioxide into organic compounds	3	Un
CO-5	describe respiration with its associated carbon metabolism and releasing of energy stored in chemical bonds in a controlled manner for cellular use	3	Re,Cr
CO-6	investigate plant's functions and adaptations under altered environmental conditions	2	Cr
CO-7	comment on the hormone controlled and light mediated morphogenetic events in plants	2	An
CO-8	design and conduct scientific experiments and analyse the data critically	4,8	Cr

Semester VI			
Core X	**Plant Physiology**		
Code: 18UBOC61	**Hrs/week: 5**	**Hrs/ Semester: 75**	**Credit : 4**

Unit I : **Plant - Water Relations:** Importance of water to plant life. **Physical properties of water:** Imbibition, Diffusion, Osmosis, Plasmolysis and Water potential. **Absorption and transport of water:** active and passive absorption, ascent of sap – path and mechanism (Dixon's cohesion theory). **Transpiration:** types, mechanism of stomatal movement (starch- sugar interconversion theory and proton transport and hormonal regulation theory), factors affecting transpiration, importance of transpiration

Unit II : **Solute relations: Mineral nutrition** – role of essential macro elements in plant nutrition, deficiency and toxicity symptoms. **Translocation of organic solutes:** mechanism of phloem transport, source-sink relationship, factors affecting translocation. **Nitrogen metabolism:** Nitrogen fixation: symbiotic fixation - importance of nitrate reductase and its regulations - ammonia assimilation.

Unit III : **Photosynthesis:** photosynthetic apparatus, pigment systems, red drop and Emerson enhancement effect. **Photochemical reaction:** cyclic and non cyclic photophosphorylation. **CO_2 fixation:** C_3 and C_4 cycles. Factors affecting photosynthesis.

Unit IV : **Respiration:** Respiratory substrates, **types of respiration:** aerobic – glycolysis, Krebs cycle, ETC and oxidative phosphorylation. **Anaerobic respiration:** lactic acid fermentation, alcohol fermentation. Pentose Phosphate Pathway (PPP).Factors affecting respiration.

Unit V : **Growth:** definition, phases of growth- factors affecting growth. **Plant growth regulators:** occurrence, physiological effects and practical applications of auxin, gibberellin and cytokinin. **Physioloy of flowering:**Photoperiodism and vernalization. **Seed dormancy:** causes and methods of seed dormancy, physiology of seed germination.

Text Book:

1. Jain, V.K. 2004. *Fundamentals of Plant Physiology*. S. Chand & Company Ltd. NewDelhi.

Books for Reference:

1. Noggle, G. R. and G. J. Fritz, 2008. *Introductory Plant Physiology*. Prentice Hall of India, Pvt. Ltd., New Delhi.
2. Pandey, K.K. and B.K. Sinha, 2005. *Plant Physiology*. Vikas publications, New Delhi.
3. Salisbury, F.B. and C.W. Ross 2007. *Plant physiology*. Thompson. Asia. Pvt. Ltd. Singapore.

Practical
Hrs/week - 2

- Imbibition by direct weight method
- Determination of water potential by Chardakov's method
- Determination of differential transpiration of leaf surface using cobalt chloride method
- Estimation of magenisum in plant tissue
- Determination of effect of light intensity on photosynthesis
- Rate of photosynthesis in different concentration of bi-carbonate (bubble count method)
- Extraction and separation of chloroplast pigments by ascending paper chromatography
- Demonstration of aerobic respiration by Retort's method
- Demonstration on fermentation
- Determination of growth curve by leaf area method
- Estimation of auxin

Submission: Record note book

Books for Reference: Francis H Witham, David F Blaydes and Robert N Devlin, 1970. *Experiments in Plant Physiology*.VanmostrandRainhold Company, New Delhi

SEMESTER VI			
Core XI	**Marine Botany**		
Code:18UBOC62	**Hrs/week: 5**	**Hrs/semester: 75**	**Credits: 4**

Vision:

- To give elaborate account on marine environment and its role in controlling the Earth's climate.

Mission:

- To understand the different types of marine habitats and the adaptation of life there in.
- To understand the role of marine products and their socio economic and environmental significance

Course Outcome

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	analyze how marine organism adapt to their dynamic environment	5	Un
CO-2	understand the marine environment and classify them	7	Un
CO-3	able to signify the characteristic feature of sandy shore and sand dunes and their economic importance	1	An
CO-4	achieve practical skills in processing, preserving and culturing marine plants	6	Ev
CO-5	evaluate the uses of marine resources and realize the role of marine plants in the economy of the ocean	5	Ap
CO-6	able to signify the characteristic feature of coral reefs and their role in biodiversity conservation	1	An
CO-7	able to identify and understand the role of mangroves in coastal protection and their adaptation to its hostile environment	5	Ap
CO-8	explain the ecological relationship between organisms and their environment	2	An

SEMESTER VI			
Core XI	**Marine Botany**		
Code: 18UBOC62	**Hrs/week: 5**	**Hrs/semester: 75**	**Credits: 4**

Unit I : Marine environment- classification, physical and chemical properties of sea water, characteristics and adaptations of pelagic (planktonic), benthic (littoral and deep sea) organisms.

Unit II : Introduction to marine plants - Phytoplankton – sea weeds and sea grasses - introduction, adaptation, biology, ecology, economic and medicinal significances.

Unit III : Coastal vegetation – sandy shore and sand dunes - introduction, adaptation, biology, ecology, economic and medicinal significances.

Unit IV : Coastal shore vegetation – salt marshes and mangroves - introduction, adaptation, biology, ecology, economic and medicinal significances.

Unit V : Laboratory culture of marine algae, commercial cultivation of seaweeds – general methods – *Gracilaria* and *Porphyra*. Economic importance of marine algae – in food and agriculture. Phycocolloids – agar agar, algin, alginate, carrageenan – commercial production, properties and uses, diatomite, antibiotics and vitamins. Conservation of coastal ecosystem with special reference to coral reef and mangroves.

Text Books:

1. Bilgrami, K.S. and L.C. Saha, 2004. *Textbook of Algae.* CBS publishers & Distributors, New Delhi.
2. Tait, 1978. *Elements of marine ecology*. Butterworth & Co. (Publishers) Ltd. London.

Books for Reference:

1. Boaden P.J.S. and R. Seed 1985. *An Introduction to coastal ecology.* Thomas Press Limited, New Delhi.
2. Chapman, V.J. and Chapman, 1980. *Seaweeds and their uses* – Chapman and Hall, London.
3. Dawes, C.J. 1981. *Marine Botany*. John Wiley & Sons, New york.
4. Lobban, C.S. and M. J. Wynne. 1981. *The biology of Seaweeds*. Blackwell Scientific publications. Oxford, London.
5. Newell and Newell.1977. *Marine Plankton a practical guide.* Hutchinson and Co. Ltd.
6. Sinha, P. C. 1998. *Marine pollution*, Anmol publications Pvt. Ltd. New Delhi.
7. Sverdrup H.U. 1972. *The Oceans* – Modern Asia Edition.
8. Venkataraman, G.S. 1969. *The cultivation of algae*, IARI.

Practical

Hrs/week: 2

- Phytoplanktons - Collection and identification
- Culture of micro algae
- Seaweeds- *Ulva, Sargassum, Hypnea* and *Gracilaria*
- Study of sand dune, salt marsh and mangrove vegetation in their natural habitat,
- Submission of photographs and field report for internal evaluation.

Books for Reference:

Murugesan A.G. and Rajakumari 2005. *Environmental Science and Biotechnology and Biotechnology, Theory and Techniques,* MJP Publishers.

Semester VI			
Core XII	**Ecology and Phytogeography**		
Code;18UBOC63	**hrs/week:4**	**Hrs/semester: 60**	**Credit : 4**

Vision:

- To learn about the interconnectedness of life with the environment

Mission:

- To understand the structure and function of ecosystem
- To analyze the different types of vegetation and their distribution pattern.

Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	reveal the range of plant diversity in terms of structure, function and their environmental relationships.	5	Un
CO-2	describe the climatic and edaphic factors and ecological succession	5	Un
CO-3	categorize the plants based on adaptation	3	An
CO-4	address the global environment crisis and the strategies applicable for environmental problem mitigation	7	Ev
CO-5	learn the global level environmental summit organized that focused for sustainable future	7	Cr
CO-6	know the importance of remote sensing in finding the current status of global health	7	Cr
CO-7	recognize the causes of environmental problems	7	Un
CO-8	discuss ecological issues and concept	5	Re

Semester VI			
Core XII	**Ecology and Phytogeography**		
Code:18UBOC63	**hrs/week:4**	**Hrs/semester: 60**	**Credit : 4**

Unit I : Introduction. Ecological factors: Climatic factor – light, temperature, wind, precipitation and humidity. Biotic factors – Interaction between plants and animals, interaction between plants growing in a community and interaction between plants and microorganisms. Edaphic factors – soil temperature, soil nutrients and soil organisms.

Unit II : Plant adaptations – morphological, anatomical and physiological adaptations of hydrophytes, xerophytes and halophytes.

Unit III : Plat communities – Characteristic features, methods of analysis- quadrats and transect methods, units of vegetation.

Unit IV : Plant succession - types, causes, processes. Hydrosere and xerosers. Climax and its concepts.

Unit V : Geographical regions of India. Vegetational types of Tamil Nadu. Structure and distribution of evergrren and deciduous forests, mangroves, scrub jungle and grassland, Endemism.

Text Books:

1. Sharma, P.D1999.*Elements of ecology*. Rastogi Publications, Shivaji Road, Meerut.
2. Shukla, R.S. and Chandal, S.S 1991. *Plant Ecology*. S, Chandal and Co. New Delhi

Books for Reference:

1. Asthana and Meera Asthana, 2001. *Environmental problems and solutions*. S.Chand and Co. Ltd., New Delhi.
2. Balasubramanian,D; C.F.a. Bryee, K.Dharmalingam, J.Green and K. Jeyaraman, 2005. *Concepts in Biotechnology*. Universities Press.
3. Dash, M.C.2001.*Fundamentals of ecology*. Tata McGraw Hill publishing Co. Ltd., New Delhi.
4. Murugesan, A.G.and Rajakumari , 2005. *Environmental Science and Biotechnology, theory and Techniques.* M.J.P. Publishers, chennai.
5. Trivedi P.R, P.L Sharma and KN Sundarshan 1994. *Natural environment and Constitution of India,* Efficient offset printers, New Delhi.
6. Tyller Miller G., 2004. *Environment Science* Thompson Brooks/Cole. Singapore.
7. Varshney C.K 1989. *Water pollution and management*, S.P. Printers, Noida.

Practical
Hrs /week: 2

- Determination of soil pH (at least 3 types of soil)
- Determination of soil texture.
- Determination of soil moisture.
- Determination of soil bulk density.
- Determination of soil porosity.
- Determination of soil organic matter content.
- Estimation of dissolved O_2 in water samples.
- Estimation of BOD in water samples.
- Estimation of COD in water samples.
- Adaptation of plants- hydrophytes, xerophytes and halophytes,

Submission - Record Note Book

Books for Reference : Murugesan A.G. and Rajakumari 2005.Environmental Science and Biotechnology and Biotechnology, Theory and Techniques, MJP Publishers

SEMESTER - VI			
Core Integral III	**Molecular Biology and Bioinformatics**		
Code:18UBOI61	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Vision:

- To apply modern techniques in biological studies.

Mission:

- To upgrade the knowledge about the latest concepts of prokaryoti and eukaryotic genome and expression
- To make venture into plant genomic research.

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know chemistry of genetic material and details of its replication at molecular level	2	Un
CO-2	understand the general principles of chromosome organization at different phases of cell cycle	2	Un
CO-3	explain gene regulation mechanisms at various levels by which she can learn how it controls growth and development of an organism	4	Cr
CO-4	know complexity of gene expression in eukaryotes over prokaryotes	3	Un
CO-5	understand vector mediated gene transfer techniques including screening and identification of recombinants	6	Un
CO-6	know the gene cloning tools and their mysteries in success of gene cloning technology	8	Un
CO-7	attain hands on experiences in the techniques associated there of	4	Cr
CO-8	practice the advanced techniques in genetic engineering such as dna sequencing, blotting, dna amplification and fingerprinting	3	Ap

SEMESTER - VI			
Core Integral III	**Molecular Biology and Bioinformatics**		
Code18UBOI61	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Unit I: DNA as genetic material, structure and replication of DNA- semi conservative method. Molecular mechanism of Replication of DNA Gene mutations- molecular basis. Mutagens and their mode of action.

Unit II: Structure of gene- intron, exon, muton, recon and cistron. Transcription in prokaryotes- molecular mechanism - initiation, elongation and termination. Role of RNA polymerase and role of initiation and transcription factors. Types of RNA and their functions (brief). Translation - initiation, elongation and termination.

Unit III: Genetic code. Properties Gene regulation in prokaryotes. Operon concept – regulation of lac operon. Methods of gene transfer in bacteria - conjugation, transformation and transduction

Unit IV: Bioinformatics – definition, scope. Biological databases - Nucleotide databases – NCBI, EMBL, Genbank, DDBJ. Protein databases – PDB, SWISS PROT.

Unit V: DNA sequence analysis – variants of biosequences -global alignment, local alignment, gap penalty alignment, affine gap penalty alignment. Bioinformatics tools – BLAST, FASTA.

Text Book:

1. Verma Agarwal. *Genetics, Molecular Biology, Ecology and Evolution*. Chand Publications, Multi colour edition

Books for Reference:

1. Benjamin Lewin, 2004. *Genes* VII. Pearson Prentice Hall.
2. Channarayappa, 2006, *Molecular Biology*. *Principles and Principles and practices.* Universities Press (India), Pvt. Ltd. 3.5.819. Hyderabad, 500 029.
3. Jin Xiong, 2006. *Essential Bioinformatics* Cambridge University Press.
4. Nicholl DST, 2001. *An Introduction of genetic engineering*. Cambridge University press.

5. Old R.N. and Primrose, S.B. 2004. *Principle of gene manipulation*. Blackwell scientific publication, USA.
6. Power C. B. 2007. *Genetics Vols. I and II*. Himalaya publishing House. Kundanal chandak. Industrial Estate. Ghat Road. Nagpur- 440 018.
7. Rastogi, S.C., Namitta Mendriata & Parag Rastogi, 2005. *Bioinformatics concepts, Skills and applications*.
8. Robert H. Tamarin. 2006 *Principles of Genetics*. Tata Mc. Graw - Hill publishing company Ltd., New Delhi
9. Sathyanarayana, U.2006. *Biotechnology*. Book and Allied (P). LTD. Kolkatha.