

B Sc
PLANT BIOLOGY &
PLANT BIOTECHNOLOGY
SYLLABUS (2007-2010)

under
CHOICE BASED CREDIT SYSTEM
(CBCS)



ST. JOSEPH'S COLLEGE (AUTONOMOUS)
(Nationally Reaccredited with A+ Grade / College with Potential for Excellence)
TIRUCHIRAPPALLI - 620 002

Features of Choice Based Credit System (CBCS)

The Autonomous St. Joseph's College (1978) Reaccredited with A+ Grade from NAAC (2007) has introduced the choice based credit system (CBCS) for UG and PG courses from the academic year 2001-2002.

OBJECTIVES of Credit System:

- * To provide mobility and flexibility for students within and outside the parent department
- * To provide broad based education
- * To help students learn at their own pace
- * To provide students scope for acquiring extra credits
- * To impart more job oriented skills to students
- * To make any course multi-disciplinary in approach

What is a credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. However, there could be some flexibility because of practicals, field visits and tutorials. The following Table shows the relation between credits and hours.

Hours in a week	Hours (2-3)	Hours (4)	Hours (5-6)
Theory Credits	1	3	4
Practicals Credits	1	2	3

For UG courses a student must earn a minimum of 140 credits to get a pass. The 140 credits are split as follows:

	BA	BSc	BCom
English	16	16	8
Languages	12	12	12
Allied: Compulsory - 2 courses	10	10	10
Allied: Optional - 2 courses	10	8	10
Computer Literacy	2	2	2
Foundation Courses	3	3	3
Environmental Studies	3	3	3
Electives	9	9	9
SHEPHERD	3	3	3
Core Courses	<u>72</u>	<u>74</u>	<u>80</u>
Total	<u>140</u>	<u>140</u>	<u>140</u>

A student can acquire credits more than 140 by taking electives offered by departments in the free hours available to him in 5th and 6th semesters.

Allied Courses:

The allied courses are of two categories.

Allied Compulsory and Allied Optional: The student has choice in allied optional as two courses are offered simultaneously. The department must offer two courses. The student has to choose one.

Electives

A student should take at least three electives.

A least one elective should be from Arts Department for a student of Science Department and vice versa for Arts students.

A student cannot take more than one elective from his parent department.

Credit System Codes - Subject Code Fixation

The various papers in the different courses are coded. The following code system is adopted.

- The code number of the subject should be as **07UPH1XX** where
 - a) 07 refers to year of revision
 - b) U refers to Undergraduate
 - c) PH refers to Physics*
 - d) 1 refers to Semester 1
 - e) 0X refers to Languages (Part 1)
 - f) 1X refers to General English (Part 2)
 - g) 2X refers to Core Major (Part 3)
 - h) 5X refers to Core Allied Compulsory (Part 3)
 - i) 7X refers to Core Allied Optional (Part 3)
 - j) 8X refers to Elective (Part 3)
 - k) 9X refers to Foundation Course (Part 4)
- } X - Paper number
- The code number of the subject should be as **07PEC1XX** where
 - a) 07 refers to year of revision
 - b) P refers to Postgraduate
 - c) EC refers to Economics*
 - d) 1 refers to Semester 1
 - e) 2X refers to Core
 - f) 4X refers to Optional
 - g) 6X refers to EDC
- } X-Paper number

Codes for Departments:

Sl. No.	Course	Subject Code
1.	Biochemistry	BI
2.	Biotechnology	BT
3.	Business Administration	BU
4.	Chemistry	CH
5.	Commerce	CO
6.	Computer Applications	CA
7.	Computer Science	CS
8.	Information Technology	IT
9.	Economics	EC
10.	English	EN
11.	English - General	GE
12.	Electronics	EL
13.	Foundation Course	FC
14.	French	FR
15.	Hindi	HI
16.	History	HS
17.	Human Resource Management	HR
18.	Mathematics	MA
19.	Physics	PH
20.	Plant Biology & Plant Biotechnology	PB
21.	Personnel Management & Industrial Relations	PM
22.	Sanskrit	SA
23.	Statistics	ST
24.	Tamil	TA
25.	Tamil - General	GT
26.	Transport Management	TM

Evaluation

For each course there is formative Continuous Internal Assessment (CIA) and Semester Examinations (SE) in the weightage ratio 50:50. The following table illustrates how one evaluates the **Overall Percentage Marks (OPM)** for a student in Part I (English) in the four papers put together.

$$\text{OPM} = \frac{a_1b_1 + a_2b_2 + a_3b_3 + a_4b_4}{(b_1 + b_2 + b_3 + b_4)}$$

Where a_1, a_2, a_3 and a_4 indicate the marks obtained in the 4 semesters for English and b_1, b_2, b_3 and b_4 indicate the corresponding credits for the 4 courses. For example let us consider the following marks scored by a student in the 4 semesters in English.

Part II-General English

S. No.	Sem.	Subject	CIA	SE	Total	Avg	Credit	Cr.pts
1.	I	GE-I	50	48	98	49.0	4	196.0
2.	II	GE-II	50	48	98	49.0	4	196.0
3.	III	GE-III	50	50	100	50.0	4	200.0
4.	IV	GE-IV	50	48	98	49.0	4	196.0
TOTAL								788.0

$$\text{OPM} = 788 / \text{total number of credits} = 788.0 / 16 = 49.25$$

This percentage corresponds to III class.

If OPM is between 50 and 60 the student gets II class. If OPM is 60 and more then the student is placed in I class.

If scores OPM=75 and more he gets first class with distinction.

Similarly we can compute OPM for part II and Part III using the marks in various subjects and the corresponding credits.

Part IV consists of foundation courses, computer literacy, SHEPHERD programme, Service Organisation and only a pass is indicated for these and Part IV is not taken into account for computing OPM.

Declaration of result:

_____ has successfully completed B.Sc. degree course with FIRST CLASS. His overall average percentage of marks in part III is _____. He has acquired 11 more credits in the course by taking Foundation Courses, Environmental Studies, Computer Literacy, and SHEPHERD programme.

B. Sc. PLANT BIOLOGY & PLANT BIOTECHNOLOGY - COURSE PATTERN

Sem	Part	Code	Subject Title	Hrs	Credit	
I	I	*	Tamil-I / Hindi-I / French-I / Sanskrit-I	4	3	
	II	07UGE111	General English-I	5	4	
	III	07UPB121	Plant Diversity - I	7	5	
	III	07UPB122	Practical-I (Algae, Fungi, Lichen and Pathology)	3	2	
	III	07UPB151	Allied: Zoology-I (General Zoology)	5	3	
	III	07UPB152	Allied: Practical-I (Zoology-I)	3	2	
	IV	07UFC191	Foundations of Humanity	2	1	
Total for Semester I				29	20	
II	I	*	Tamil-II / Hindi-II / French-II / Sanskrit-II	4	3	
	II	07UGE212	General English-II	5	4	
	III	07UPB223	Plant Diversity - II	6	5	
	III	07UPB224	Practical-II (Bryophy, Pterido and Gymno)	3	2	
	III	07UPB253	Allied: Zoology-II (Agricultural Entomology)	5	3	
	III	07UPB254	Allied: Practical-II (Zoology-II)	3	2	
	IV	07UFC292	Social Analysis	2	1	
IV	07UFC293	Computer Literacy	2	2		
Total for Semester II				30	22	
III	I	*	Tamil-III / Hindi-III / French-III / Sanskrit-III	4	3	
	II	07UGE313	General English-III	5	4	
	III	07UPB325	Taxonomy, Anatomy & Embryology	6	5	
	III	07UPB326	Practical-III (Taxonomy, Anatomy & Embry)	3	2	
	III	07UCH371	Allied: Chemistry for Biologist-I	} or		
	III	07UCH372	Allied: Practical-I (Chemistry)			
	III	07UST371	Allied: Biometrics & Computer Applications - I	4	3	
	III	07UST372	Allied: Computer Lab-I (Excel)	2	1	
	IV	07UFC394	Social Ethics/ (or)			
	IV	07UFC395	Religious Doctrine – I	2	1	
IV	07UFC396	Environmental Studies	4	3		
Total for Semester III				30	22	
IV	I	*	Tamil-IV / Hindi-IV / French-IV / Sanskrit-IV	4	3	
	II	07UGE414	General English-IV	5	4	
	III	07UPB427	Cell Biology and Genetics	6	5	
	III	07UPB428	Practical-IV (Cell Biology & Genetics)	3	2	
	III	07UCH473	Allied: Chemistry for Biologist-II	} or		
	III	07UCH474	Allied: Practical-II (Chemistry)			
	III	07UST473	Allied: Biometrics & Computer Applications II	4	3	
			07UST474	Allied: Comp Lab-II (Statistical Software Pack)	2	2
			*	Elective-I	4	3
	IV	07UFC497	Moulding Men for Others / (or)			
	IV	07UFC498	Religious Doctrine – II	2	1	
Total for Semester IV				30	23	
V	III	07UPB529	Biodiversity and Conservation	5	5	
	III	07UPB530	Microbiology	5	4	
	III	07UPB531	Practical-V (Biodiv. and Conserva. & Microbio.)	3	2	
	III	07UPB532	Molecular Biology	5	5	
			07UPB533	Genetic Engineering	5	5
	III	07UPB534	Practical-VI (Molecular Biol. & Genetic Engg)	3	2	
		*	Elective-II	4	3	
Total for Semester V				30	26	

VI	III	07UPB635	Biochemistry & Physiology	5	5
	III	07UPB636	Practical-VII (Biochemistry & Physiology)	3	2
	III	07UPB637	Biotechnology	5	5
	III	07UPB638	Immunology	5	4
	III	07UPB639	Bioinformatics & Nanobiotechnology	5	4
	III	07UPB640	Practical-VIII (Biotechnology & Immunology)	3	2
		*		Elective-III	4
Total for Semester VI				30	25
I-V	IV		Extension Service: SHEPHERD		2
Total Credits for All Semesters					140

* Code numbers according to the subjects chosen

Sem:I
07UGT101

Hours : 5
Credits: 4

பொதுத்தமிழ் - 1

நோக்கங்கள்:

1. சமூக மாற்ற உணர்வை ஊட்டும் தலைசிறந்த தற்காலக் கவிஞர்கள், உரைநடை ஆசிரியர்களது படைப்புகளின் இலக்கியநயம் பாராட்டல்.
2. சந்திப்பிழையின்றி எழுதப் பயிற்றுவித்தல்

பயன்கள்

1. சமூக உணர்வுட்டும் படைப்புகளை அழகியல் நுகர்ச்சி வாயிலாக மாணாக்கர் கற்றுக்கொள்வர்.
2. சந்திப்பிழை நீக்கி எழுதும் திறன் பெறுவர்.

செய்யுள் திரட்டு

1. மகாகவி பாரதியார் கவிதைகள்
2. பாரதிதாசன் கவிதைகள்
3. சுத்தானந்த பாரதியார், தமிழ்க்கனல் ஷஎன்னருமைத் தமிழர்களே'
4. கவிமணி கவிதைகள்
5. கவிஞர் கண்ணதாசன் - இயேசு காவியம்
6. பெருஞ்சித்திரனார் பாடல்கள்
7. அப்துல் ரகுமான் - ஆலாபனை
8. கவிஞர் அறிவுமதி கவிதைகள்
9. மொழிபெயர்ப்புக் கவிதைகள்
10. இலக்கணம்: வல்லினம் மிகும் - மிகா இடங்கள்

இலக்கிய வரலாறு - மூன்றாம் பாகம்

சிறுகதை

உரைநடை : முதல் ஆறு கட்டுரைகள்

பாடநூல்

1. செய்யுள் திரட்டு - தமிழ்த்துறை வெளியீடு, 2004-2007
2. இலக்கணம் - மேற்குறித்த நூலில் உள்ளது.
3. சமூகவியல் நோக்கில் தமிழ் இலக்கிய வரலாறு, தமிழ்த்துறை வெளியீடு
4. உரைநடை நூல் - திறன் வளர்க்கும் கட்டுரைகள், தமிழ்த்துறை வெளியீடு, 2004-05 (அறக்கட்டளைச் சொற்பொழிவு நீங்கலாக 12 கட்டுரைகள்)
5. சிறுகதை: உறவு, நியுசெஞ்சரி புத்தகநிலையம், சென்னை, 2007 முதற்பதிப்பு

Sem.: I
Code: 07UGE111

GENERAL ENGLISH - I

Hours : 5
Credits : 4

Objectives

1. To enable students develop their communication skills.
2. To inculcate in students the four basic skills: Reading, Writing, Listening and Speaking.

Unit I

1. Prose : At the College
2. Shakespeare : The Merchant of Venice
3. Essential English Grammar : Units 1 to 5
4. Reading Comprehension

Unit II

5. Poetry : The Passionate Shepherd to his Love
6. Shakespeare : The Taming of the Shrew
7. Essential English Grammar : Units 6 to 10
8. Letter Writing : Informal

Unit III

9. Prose : Outside the Class
10. Shakespeare : The Tempest
11. Essential English Grammar : Units 11 to 15
12. Letter Writing : Formal

Unit IV

13. Prose : For Business and Pleasure
14. Poetry : Daybreak
15. Shakespeare : Julius Caesar
16. Essential English Grammar : Units 16 to 22

Unit V

17. Poetry : I love to see it lap the miles
18. Shakespeare : King Lear
19. Shakespeare : Macbeth
20. Essential English Grammar : Units 23 to 29

Required Reading

1. Krishnaswamy, N. & T. Sriraman: Creative English for Communication (Macmillan)
2. Raju, A.K. (ed.) : Pegasus (Macmillan)
3. Murphy, R. : Essential English Grammar (CUP)
4. Dodd, E.F. : Six Tales from Shakespeare (Macmillan)

Sem.I
07UPB121

Hours/week: 7
Credits: 5

PLANT DIVERSITY-I
(Algae, Fungi, Lichens and Pathology)

Objectives

1. To study the characteristics of Algae, Fungi and Lichens.
2. To study the various plant diseases and the control measures.

Unit-I Algae

General characteristics of algae, Classification (Fritsch and De Silva), General characteristics of the various divisions (as per Fritsch's system). Thallus organization, prokaryotic and eukaryotic algae (cyanophyceae cell and chlorophyceae cell), pigment, reserve food, flagella characteristics and life cycle patterns. Economic importance of algae.

Unit-II

Detailed study of the following genera: *Oscillatoria*, *Chlorella*, *Oedogonium*, *Caulerpa*, *Cyclotella*, *Sargassum* and *Gracilaria*.

Unit-III Fungi

General characteristics of Fungi; classification according to J. Alexopoulos and G.C. Ainsworth; General characteristics of the various divisions; Economic importance of Fungi.

Unit-IV

Detailed study of morphology and reproduction of *Plasmodiophora*, *Albugo*, *Peziza*, *Puccinia* and *Cercospora*.

Lichens

General characteristics, classification, reproduction and economic importance of Lichens. Detailed study of *Usnea*.

Unit-V Plant Pathology

Classification of diseases – general symptoms. penetration and disease development. Morphological and biochemical defense mechanisms in plants. A detailed study of the following plant diseases – Mosaic disease of tobacco, Citrus canker, Late blight of potato, White rust of crucifers, Red rot of sugarcane, Tikka disease of groundnut (causal organisms, symptoms, disease cycle and control measures).

Text Books

1. Pandey, BP. 2005. Simplified course in Botany. S. Chand and Company Ltd., New Delhi.

Books for Reference

1. Alexopoulos, CJ.1952. Introduction to Mycology, John Wiley & Sons, New York.
2. Gangulee, HC. & Kar, AK.1989. College Botany, Vol-II, Books & Allied Pvt. Ltd. Calcutta.
3. Mehrotra, RS & Aneja, KR. 1999. An introduction to Mycology, 2nd Ed. New Age International Publishers, New Delhi.
4. Sharma, OP. 1989. Text Book of Fungi, Tata Mc Graw Hill, New Delhi.
5. Smith, GM. 1955. Cryptogamic Botany Vol-1&II, Mc Graw Hill, New York
6. Vasishta BR & Sinha AK. 2003. Botany for degree students Fungi. S Chand and Company Ltd., New Delhi.

Sem-I
07UPB122

Hours/week: 3
Credits: 2

PRACTICAL-I
(Plant Diversity-I)

Detailed study of the types mentioned in the theory

Algae

Oscillatoria, Chlorella, Oedogonium, Caulerpa, Cyclotella, Sargassum and Gracilaria.

Fungi

Plasmodiophora, Albugo, Peziza, Puccinia and Cercospora.

Lichen

Usnea.

Plant Pathology

Mosaic disease of tobacco, Citrus canker, Late blight of potato, White rust of crucifers, Red rot of sugarcane, Tikka disease of groundnut.

Visit to mushroom culture farm / study of campus flora (Algae & Fungi).

Sem-I
07UPB151

Hours/week: 5
Credits: 3

**Allied: ZOOLOGY-I
(General Zoology)**

Objectives

1. To understand the animal organization, their structure and function
2. To understand the various physiological processes in human beings

Animal Organization

Unit-I

General classification of the animal kingdom upto phylum with examples. (Acellular, multicellular, bilateral symmetry, radial symmetry, acoelomate, pseudocoelomate, eucoelomate). Salient features of the 10 major phyla with examples, general features of the subphyla: Urochordata, Cephalochordata, Hemichordata and Vertebrata (Classes: Pices, Amphibia, Reptilia, Aves, Mammalia)

Unit-II

A detailed study of the morphology; physiology of digestion and reproduction- and life cycle of: *Plasmodium vivax*, *Leucosolenia*, *Aurelia aurita*, *Taenia solium* and *Ascaris lumbricoides*
General topics-canal systems of sponges and human disease caused by protozoans.

Unit-III

A detailed study of the morphology, physiology of digestion and reproduction and life cycle of: *Megascolex mauritii*, *Periplanata americana*, *Pila globosa*, *Asterias rubens*, *Rana hexadactyla*. General topics-water vascular system and larval forms of Echinodermates.

Principles of Human Physiology

Unit-IV

Physiology of digestion. Respiration: transport of oxygen and carbon dioxide, cellular oxidation, respiratory quotient, oxygen debt. Excretion: structure of nephron, physiology of urine formation, physical characteristics and chemical composition of urine. Hormonal control and general mode of action of water soluble and steroid hormones, physiology of reproduction.

Unit-V

Physiology of circulation-arterial and venous-heart. Blood: structure of haemoglobin, types of white blood cells, blood clotting, haemopoiesis, function of plasma proteins, blood grouping. Nervous control: nerve impulse transmission, synaptic transmission, muscle contraction, proteins involved in muscle contraction.

Text Books

1. Rajan K & McConnell, MS. 2006. Manual of Zoology. Theory and practicals, Dept. of Plant Biology and Plant Biotechnology, St. Joseph's College, Tiruchirappalli.

Books for Reference

2. Ekambaranatha Ayyar & Ananthkrishnan. 1985. Outlines of Zoology - Vol.I, S.Viswanathan Pvt. Ltd., Chennai.
3. Gerard, J. Tortord, R.L.Evans & Anagnostakos, NP. 1982. Principles of Human Physiology, Harpor Roul Publishers, New York.
4. Jordan, E.L. & Verma, P.S. 1976 Invertebrate Zoology, S.Chand & Co. Ltd., 6th Edn., New Delhi.
5. Kotpal, RL 1976. Modern text book of Zoology (Invertebrate), Rastogi Publications, Meerat.
6. Nagabhushan & Kodarkar. 1976. Text Book of Animal Physiology, Oxford & IBH.
7. Paul B. Weisz. 1975. The Science of Biology, Tata McGraw Hill, 4th Edn., New Delhi.

Sem.I
07UPB152

Hours/week: 3
Credits: 2

Allied : PRACTICAL-I
(Zoology - I)

Earthworm:

External features and dissection of digestive and nervous systems – Mounting of body and Penial setae, Ovary and Spermatheca

Pila:

Structure of shell – Dissection of mantle cavity and radula, dissection of digestive system.

Representative animal for each class in vertebrate, and invertebrate phyla. Different tissues. human blood cell identification. Campus fauna identification.

Visit to a vermicompost farm and submission of report.

Sem:II
07UGT202

Hours : 5
Credits: 4

பொதுத்தமிழ்-2

நோக்கங்கள்

1. சமயநல்லிணக்க உணர்வை வளர்த்தல்
2. தமிழ்க்காப்பியங்களில் அழகும் அறிவுணர்வும் ஊட்டும் பகுதிகளைப் படித்துப் புரிந்து கொள்வர். உரைநடைக்கட்டுரை எழுதும் திறன் பெறுவர்.

பயன்கள்

தமிழைத் திருத்தமாகப் படிக்கவும் பேசவும் பிழையின்றி எழுதவும் தேர்ச்சி பெறுதல்.
தம் படைப்புக்களில் படித்தவற்றை முறையாகப் பயன்படுத்தல்

1. செய்யுள் திரட்டு

1. சிலப்பதிகாரம்
2. மணிமேகலை
3. சீவகசிந்தாமணி
4. கம்பராமாயணம்
5. தேம்பாவணி
6. சீறாப்புராணம்
7. இரட்சணிய சரிதம்
8. இலக்கணம்: எழுத்து, சொல்

2. இலக்கணம் - எழுத்து, சொல் (தமிழ்த் துறை வெளியீடு)

இலக்கிய வரலாறு - இரண்டாம் பாகம் (தமிழ்த்துறை வெளியீடு,2001)
உரைநடை நூல்-7 முதல் இறுதிக்கட்டுரைகள் வரை, திறன்வளர்க்கும் கட்டுரைகள் (7-12) (தமிழ் ஆய்வுத்துறை வெளியீடு, 2001)

பாடநூல்:

செய்யுள் திரட்டு - தமிழ்த்துறை வெளியீடு, 2004-07

Sem. : II
Code : 07UGE212

Hours : 5
Credits : 4

GENERAL ENGLISH - II

Objectives

1. To enable students develop their communication skills.
2. To inculcate in students the four basic skills: Reading, Writing, Listening and Speaking.

Unit I

1. Prose : Are you Smart?
2. Jules Verne : Around the World in 80 Days (Chap. 1 to 5)
3. Essential English Grammar : Units 30 to 35
4. Reading Comprehension

Unit II

5. Poetry : Gitanjali (Song 36)
6. Jules Verne : Around the World in 80 Days (Chap. 6 to 10)
7. Essential English Grammar : Units 36 to 40
8. Note-making

Unit III

9. Prose : Are you Creative?
10. Jules Verne : Around the World in 80 Days (Chap. 11 to 15)
11. Essential English Grammar : Units 41 to 45
12. Note-taking

Unit IV

13. Prose : How to Win?
14. Poetry : The Pond
15. Jules Verne : Around the World in 80 Days (Chap. 16 to 20)
16. Essential English Grammar : Units 46 to 50

Unit V

17. Poetry : The Tree
18. Jules Verne : Around the World in 80 Days (Chap. 21 to 26)
19. Essential English Grammar : Units 51 to 57
20. Dialogue Writing

Required Reading

1. Krishnaswamy, N. & T. Sriraman : Creative English for Communication (Macmillan)
2. Raju, A.K. (ed.) : Pegasus (Macmillan)
3. Murphy, R. : Essential English Grammar (CUP)
4. Verne, J. (Retold by M. Green) : Around the World in Eighty Days (Macmillan)

Sem.II
07UPB223

Hours/week: 6
Credits: 5

PLANT DIVERSITY-II
(Bryophytes, Pteridophytes & Gymnosperms)

Objectives

1. To study the salient features of plants belonging to Bryophytes, Pteridophytes and Gymnosperms.
2. To study the fossilization process and formation of different types of fossils.

Unit-I Bryophytes

General characteristics of Bryophytes, Classification based on Rothmaler (1951), vegetative reproduction methods, economic importance of bryophytes. A detailed study of the following genera: *Marchantia*, *Anthoceros* and *Funaria*.

Unit-II Pteridophytes

General characteristics, stelar evolution, economic importance, homosporous, heterosporous and seed habit. Classification (Reimer's System, 1954). General characteristics of major divisions, *Psilophyta*, *Lycophyta*, *Sphenophyta* and *Pterophyta*.

Unit-III

A detailed study of the following genera –*Lycopodium*, *Isoetes*, *Equisetum*, *Adiantum* and *Marsilea* (developmental details not required).

Unit -IV Gymnosperms

General characteristics, distribution, classification (Sporne, K.R).

Salient features of *Pteridospermales*, *Bennettitales*, *Cycadales*, *Cordaitales*, *Coniferales* and *Gnetales* –A detailed study of the following genera: *Cycas*, *Araucaria* and *Gnetum* (developmental details not required)

Unit-V Paleobotany

Fossils, fossilization process, different types of fossils (compression, impression, petrification, coal balls). Geological time table. A detailed study of external and internal morphology and reproduction in *Rhynia*, *Lepidodendron*, *Calamites*, *Williamsonia* and *Cordaites*.

Text Books

1. Vasishta PC, Sinha AK & Anilkumar. 2005. Botany for degree students Gymnosperms. S Chand And Company Ltd., New Delhi.
2. Pandey *et al.*, 1998. A text book of Botany Vol. II. S. Chand & Co. Ltd. 1980

Books for Reference

1. Bierhorst. Morphology of Vascular Plants.
2. Parihare, N.S. An introduction to Embryohyta, Vol. I.
3. Prem Puri. 1973. Bryophytes-A broad perspective, Atma Ram & Sons, New Delhi.
4. Sporne, KR.1967. The Morphology of Gymnosperms, Hutchinson & Co., London.
5. Sporne, KR.1975. The Morphology of Pteridophytes, Hutchinson & Co., London.
6. Watson, E.V. The structure and Life of Bryophytes.

Sem.II
07UPB224

Hours/week: 3
Credits: 2

PRACTICAL II
(Plant Diversity-II)

Detailed study of the types mentioned in the theory.

Bryophytes

Marchantia, Anthoceros and Funaria.

Pteridophytes

Lycopodium, Isoetes, Equisetum, Adiantum and Marsilea.

Gymnosperms

Cycas, Araucaria and Gnetum.

Fossils

Rhynia, Lepidodendron, Calamites, Williamsonia and Cordaites.

Sem –II
07UPB253

Hours/week: 5
Credits: 3

**Allied: ZOOLOGY-II
(Agricultural Entomology)**

Objectives

1. To study the classification of insects
2. To study beneficial and harmful insects and various control measures of harmful insects

Unit – I

Insect morphology: head, external structure, tentorium, compound eye, types of antennae- thorax- tergum, sternum, pleuron. Wing structure and coupling mechanism, wing venation, Legs and their modification, Abdomen- abdominal appendages, Male and female external genitalia.

Unit – II

Physiology of digestive, respiratory, circulatory, nervous and reproductive systems, Immature stages of insects-metamorphosis – types- hormonal regulation.

Unit – III

Economically important insect orders – Coleoptera, Dictyoptera, Diptera, Hemiptera, Hymenoptera, Isoptera and Lepidoptera, - general characters and classification upto order, social behavior/life of insects.

Unit – IV

Economic classification of insects – Beneficial (predators, parasites, pollinators, weed killers and scavengers) . Destructive insects, a general knowledge of Apiculture, sericulture, lac culture. Recent trends in Integrated Pest Management. Plant protection-physical, chemical and biological methods of pest control.

Unit – V

Pests of stored food materials (*Sitophilus oryzae*, *Rhizopertha dominica*, *Tribolium castaneum*, *Sitotroga cerealella*, *Oryzaephilus surinamensis*, *Trogoderma granarium*) and their control, Study of Bionomics and control of pests of Paddy (*Tryporyza incertulas*, *Chilo polycharysa*, *Spodoptera mauritia*), Sugarcane (*Chilo infuscatellus*, *C. sacchariphagas*, *T. nivella*), Cotton (*Aphis gossypii*, *Amarasca biguttula*, *Thrips tabaci*, *Earis insulana*, *Platyedra gossypiella*) and Coconut (*Oryctes rhinoceros*, *Rhycholophorus ferrugineus* , *Nephanthis serinopa*)

Text Books

1. Ambrose, PD. 2004. The Insect: Structure, function and biodiversity, First edition. Kalyani Publishers, New Delhi.

Books for Reference

1. Imms, AD. 1963. General Text Book of Entomology, Asia Publishing House, New Delhi.
2. Daly, HV., Doyen, JT. & Ehrlich, PR. Introduction to Insect Biology Diversity, First Edition, McGraw Hill Book, New York.
3. Rajan, K & McConnell, MS. 2006. Manual of agricultural entomology-theory and practicals, Dept. of Plant biology & Plant biotechnology, St.Joseph's College, Trichy.
4. Nayar, KK., Ananthkrishnan, TN. & David, BV. 1976 General and Applied Entomology, Tata McGraw Hill, New Delhi.
5. Vasantharaj David, B & Kumaraswami, T. 1978. Elements of Economic Entomology, Popular Book Department, Chennai.

Sem-II
07UPB254

Hours/week: 3
Credits: 2

**Allied: PRACTICAL-II
(Zoology – II)**

- ✧ Study of distinguishing features of insects belonging to the above orders and making sketches.
- ✧ Collection, identification and preservation of insects of agricultural importance, predators, pollinators, and weed killers – plant galls.
- ✧ Study of different categories of insect pests and types of damage done by them in the field, godowns and warehouses.
- ✧ Dissection of Cockroach to study the mouthparts, digestive, nervous and reproductive systems, Salivary gland, Haemocytes. Modification of Antenna, legs, mouth parts.
- ✧ Light trap collection and identification.
- ✧ Visit to a sericulture center and submission of report.

Sem:III
07UGT303

Hours : 5
Credits: 4

பொதுத்தமிழ்-3

நோக்கங்கள்

1. தமிழ்ச்செய்யுள்களைப் படித்துப் பொருள் புரிந்து கொள்ளுதல்
2. செய்யுள்களில் அமைந்துள்ள சமூகக்கருத்துக்களை உணர்தல்
3. படைப்புத்திறனை வளர்த்தெடுத்தல்

பயன்கள்

1. புரிந்து கொண்ட கருத்துக்களில் பயனுள்ளவற்றைத் தெளிவாக, இனிமையாக எடுத்துச்சொல்லும் திறனைப் பெறுதல்.
2. தமிழ் மொழியின் சிறப்பை அறிதல்.

செய்யுள் திரட்டு

1. குறுந்தொகை
2. பதிற்றுப்பத்து
3. கலித்தொகை
4. புறநானூறு
5. சிறுபாணாற்றப்படை
6. பதினெண் கீழ்க்கணக்கு - திருக்குறள்
7. இலக்கணப் பகுதி: யாப்பு, அணி

இலக்கணம் : யாப்பு, அணி

புதினம் - சூரியகாந்தன், *அம்மன் பூவோடு*, பாவைபதிப்பகம், சென்னை, 2003
இலக்கிய வரலாறு - முதல் பாகம்.

பாடநூல்

செய்யுள் திரட்டு - தமிழ்த்துறை வெளியீடு 2004-07
சமூகவியல் நோக்கில் இலக்கிய வரலாறு - தமிழ்த்துறை வெளியீடு

Sem. : III
Code : 07UGE 313

Hours : 5
Credits : 4

GENERAL ENGLISH - III

Objectives

1. To enable students to acquire reading habit and thus develop their reading skills.
2. To make them activate their passive vocabulary and sentence structures through prescribed texts.
3. To enhance their taste for reading that will naturally develop their vocabulary power and sentence structures.
4. To develop the listening, speaking and writing skills of students through the prescribed texts.

Unit – I

1. Guy de Maupassant : The Diamond Necklace
2. Emile Gaboriou : The Accursed House
3. Sheila Kaye-Smith : Mrs. Adis
4. Anton Tchekov : The Bet
5. Reading Comprehension

Unit – II

6. O. Henry : After Twenty years
7. Leonard Merrick : The Judgement of Paris
8. Stephen Leacock : The Conjuror's Revenge
9. A.E. Coppard : The Halfyard Ham
10. Expansion of a Maxim

Unit – III

11. Far From the Madding Crowd : Chapters 1 to 4
12. Far From the Madding Crowd : Chapters 5 to 8
13. Far From the Madding Crowd : Chapters 9 to 11
14. Far From the Madding Crowd : Chapters 12 and 13
15. Essential English Grammar : Units 58 to 72

Unit – IV

16. P.G. Wodehouse : The Prize Poem
17. Mulk Raj Anand : The Barber's Trade Union
18. R.K. Narayan : Wife's Holiday
19. Kushwant Singh : The Mark of Vishnu
20. Essential English Grammar : Units 73 to 91

Unit - V

21. Far From the Madding Crowd : Chapters 14 to 15
22. Far From the Madding Crowd : Chapters 16 to 18
23. Far From the Madding Crowd : Chapters 19 to 21
24. Far From the Madding Crowd : Chapters 22 to 24
25. Précis Writing

Required Reading

1. Ramesh, K.P. (Ed.) : The Diamond Necklace and Other Stories (Macmillan)
2. Hardy, T. (Retold by EF Dodd) : Far From the Madding Crowd (Macmillan)
3. Murphy, Raymond : Essential English Grammar (CUP)

Sem-III
07UPB325

Hours/week: 6
Credits: 5

TAXONOMY, ANATOMY AND EMBRYOLOGY

Objectives

1. To demonstrate proficiency with the basic terminology of plant morphology and to recognize and identify major families of plants and their economic importance.
2. To impart knowledge about the various components and characters of wood.
3. To study the basic principles of embryo.

Unit-I

Contemporary systems of classification Bentham & Hooker and Takhtajan systems – merits and demerits. Taxonomic hierarchy. ICBN – principles, rules and recommendations. Type concept and various types. Effective and valid publications. Citation of author.

Unit-II

Biosystematics. Introduction to sources of taxonomic informations. Study of the general characteristics and economic importance of Annonaceae, Tiliaceae, Rutaceae, Myrtaceae.

Unit-III

Study of the general characteristics and economic importance of Cucurbitaceae, Apiaceae, Rubiaceae, Sapotaceae, Apocynaceae, Asclepiadaceae, Lamiaceae, Amaranthaceae, Orchidaceae, Amaryllidaceae, Pontederiaceae and Poaceae.

Unit-IV

Anomalous secondary growth in dicots and monocots. Nodal anatomy – unilacunar, trilacunar and multilacunar types. Wood Anatomy – Ultrastructure and basic properties of wood. Chemical composition of wood elements. Classification of wood. Commercial wood species of South India.

Unit -V

Structure and development of anther – microsporogenesis – male gametophyte. Structure and development of megasporangium – megasporogenesis – female gametophyte. Fertilization – endosperm types – development of typical dicot (*Capsella*) and monocot (*Najas*) embryos. Polyembryony - Apomixis.

Text Books

1. Bhojwani, S S. & Bhatnagar, SP. 1994. Embryology of Angiosperms, Vikas Publishing House (P) Ltd., New Delhi.
2. Brown *et al.*, 1981. Text book of Wood Technology, Mc Graw Hill Inc. New York.
3. Jeffrey, C. 1982. An Introduction to Plant Taxonomy, Cambridge University Press, UK.
4. Pandey, BP. 1999. Taxonomy of Angiosperms, S.Chand & Co. Ltd., New Delhi.

Books for reference

5. Clive AS.1989. Plant Taxonomy and Biosystematics, Chapman and Hall Inc. New York.
6. Harborne, JB & Turner, BL. 1984. Plant Chemosystematics, Acad. Press, London.
7. Lawrence, GH. 1955. Taxonomy of Vascular Plants, MacMillan Co., USA.
8. Samuel, BJ & Arlene, EL. 1987. Plant Systematics, Mc Graw Hill Inc. New York.

Sem.III
07UPB326

Hours/week: 3
Credits: 2

PRACTICAL-III
(Taxonomy, Anatomy and Embryology)

Taxonomy

Classification and identification (upto genus with the help of flora) of at least two species each of the families covered in theory with reference to local flora,. Annonaceae, Tiliaceae, Rutaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Sapotaceae, Apocynaceae, Asclepiadaceae, Lamiaceae, Amaranthaceae, Orchidaceae, Amaryllidaceae, Pontederiaceae, and Poaceae.

At least two field trips to be planned to study the flora of various hills and plain.

Herbal medicine (Visit to a herbal garden and submission of the report).

Anatomy

Anomalous secondary thickening in *Aristolochia*, *Bignonia*, *Boerhaavia*, *Thunbergia* and *Dracaena*.

Nodal anatomy.

Preparation of keys to identify any five important timbers of South India on the basis of anatomical characters.

Embryology

TS of young and mature anther, ovule, endosperm types and dissection and isolation of developmental stages of embryos.

Semester III
07UCH371

Hrs/Week: 4
Credit: 3

Allied: CHEMISTRY FOR BIOLOGISTS-I

UNIT I INORGANIC CHEMISTRY

Covalent bond – Properties of covalent molecules, Structures of BCl_2 , BF_3 , NH_3 , H_2O , CH_4 , SiH_4 , ClF_3 , SF_4 , SF_6 , PCl_3 , PCl_5 . Ionic bond – Ionization energy, electronegativity, electron affinity, lattice energy, properties of ionic molecules crystalline structure of ionic molecules. BCC, FCC, NaCl, CsCl. Coordinate bond – ligands, classification of ligands, nomenclature of complexes, oxalate, citrate, tartrate, DMG, EDTA ligands and their importance. Structure of $[\text{Ag}(\text{NH}_3)_2]^+$ linear; $[\text{Cu}(\text{NH}_3)_4]^{2+}$ square planar; $[\text{Ni}(\text{Cl})_4]^{2-}$ Td; $[\text{Pt}(\text{CN})_4]^{2-}$ square planar; $[\text{Fe}(\text{CN})_6]^{2-}$ octahedral. Hydrogen bond – Kinds-intra and inter consequences of H-bond mp, bp, dimer formation, importance of it in biopolymers (proteins and Nucleic acid).

UNIT II ORGANIC CHEMISTRY

Hydrocarbons: Classification (Aliphatic / Aromatic, Saturated/Unsaturated, cyclic/acyclic) nomenclature. Elimination Reactions: 1. Dehydrohalogenation of alkyl halides to alkenes. 2. Dehydration of alcohols to alkenes. Substitution Reaction: 1. Aliphatic nucleophilic substitution. 2. Aromatic electrophilic substitution. Addition Reaction: 1. Electrophilic addition of HX to alkene. 2. Nucleophilic addition of NH_3 to aldehyde or ketone. Condensation Reaction: 1. Aldol Condensation. 2. Condensation to polymerization (phenol to bakelite)

UNIT III QUANTITATIVE ANALYSIS

Error Analysis: accuracy, precision, errors, determinate and indeterminate errors, eliminating and minimizing error, relative error, absolute error. Quantitative Analysis: titrimetry, gravimetry, colorimetry. Titrimetric analysis: acid-base, redox, complexometric, precipitation. And example each with indicators used. Concentration units: mole, molarity, molality, formality, normality, ppb, ppm, mole fraction, %W/V, V/V. Acid-base titration: primary standard, secondary standard, $V_1N_1=V_2N_2$, acid-base titration, indicators in the illustration

UNIT IV AGRICULTURAL CHEMISTRY

Soil types- red soil, black soil, alluvial soil, desert soil, red soil; role of humus: Manures and their importance. Chemical fertilizers: Natural and synthetic fertilizers: NPK fertilizers: manufacture of NPK fertilizers, mixed fertilizers; role of macronutrients and micronutrients; Pesticides: classification-insecticides, herbicides and fungicides; Structure of important pesticides: DDT, BHC, 2,4-D, 2,4,5-T; biomass and its utilization; triple revolution India(Green, Blue and White).

UNIT V: BIOINORGANIC CHEMISTRY

Chemistry of chlorophyll, porphyrin unit and photosynthesis. Nitrogen fixation, carbon cycle. Chemistry of haem proteins: haemoglobin, myoglobin. Oxygen transport and respiration. Metallo enzymes, vitamins containing metals

References:

1. Puri B.R., Sharma L.R., Kalia K.K., *Principles of Inorganic Chemistry*, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co.,(1993)
2. Puri B.R., Sharma L.R., Pathania M.S., *Principles of Physical Chemistry*, (23rd edition)New Delhi, Shoban Lal, Nagin Chand & Co., (1993).
3. Tiwari, *Organic Chemistry*, S. Chand & Company Pvt. Ltd., New Delhi.
4. R. Gopalan, *Elements of Analytical Chemistry*, S. Chand & Company Pvt. Ltd., New Delhi.
5. Jayashree Ghosh, *Text Book of Pharmaceutical Chemistry*, S. Chand & Company Pvt. Ltd., New Delhi, 1999.

Sem-III
01UST371

Hours/week: 4
Credits: 3

Allied:
BIOMETRICS AND COMPUTER APPLICATIONS – I

Unit-I

Types of measurements – (interval, ratio, rank order, ordinal) logarithm, permutation and combination.

Unit-II

Set theory – operation on sets – Venn diagram – logical diagram. Simple problems. Function (concept) - Simple functions and their graphs.

Unit-III

Solving a simple linear equation involving one variable and two variables. Matrices – operations on matrices – Determinants – Inverse – solving a system of equations of order 3 x 3 using Cramer's rule, inverse method – Gauss Elimination method.

Unit-IV

Mathematical modeling: The simple function and their graphs revisited – principle of least squares (concepts only) – normal equations for curves, straight line, parabola – power curves, exponential curves, $y = a + bx$, $y = ax^2 + bx + c$, $y = ab^x$, $y = ae^x$ – Solving the above system of equation.

Unit-V

Statistics – meaning – population and samples – reasons for using samples – Types of sampling (SRS, Stratified, systematic) – Describing a sample – Frequency table – Frequency graphs – Diagrammatic representation of data.

Books for Reference

1. Nageswara Rao G.: Statistics for Agricultural Science, Oxford & IBH publishing Co.
2. Olive Jean Dunn: Basic Statistics: A primer for the Biomedical Sciences, John Wiley and sons.

Sem-III
07UST372

Hours/week: 2
Credits: 1

**Allied: COMPUTER LAB – I
(EXCEL)**

Using the Excel packages the students are asked to solve the following exercises.

1. Solving a system of equations – Inverse Matrix, Cramer's rule.
2. Curve fitting – Straight line, Regression line and second degree.
3. Construction of frequency table – Univariate, Bivariate and Cross tabs.
4. Drawing frequency graphs.
5. Pictorial presentation – Bar diagrams, Pie diagrams etc.

Sem: IV
07UGT404

Hours : 5
Credits: 4

பொதுத்தமிழ்-4

நோக்கம்

1. நாடகத்தின் நோக்கம், அதன் போக்கு, உத்திகள், பாத்திரப்பாங்கு, உரையாடல் முறை, கற்பனைத்திறம் போன்றவற்றை வெளிப்படுத்தல்
2. புதிய நாடகங்களைப் படைக்கும் திறனை மாணவர்களிடையே உருவாக்குதல்.

பயன்கள்

1. நாடகவழி அழகியல் உணர்வுகளை வளர்த்தல்.
2. நாடகங்களைச் சமூகப் பயன்பாட்டிற்கு ஏற்ப உருவாக்குதல்

செய்யுள் நாடகம் :

மனோன்மணியம், பேராசிரியர் சுந்தரனார்

- அலகு 1: மனோன்மணியம், பாயிரம், அங்கம் 1, களம் 1-5 வரை
 அலகு 2: மனோன்மணியம், பாயிரம், அங்கம் 2, களம் 1-3 வரை
 அலகு 3: மனோன்மணியம், பாயிரம், அங்கம் 3, களம் 1-4 வரை
 அலகு 4: மனோன்மணியம், பாயிரம், அங்கம் 4, களம் 1-5 வரை
 அலகு 5: மனோன்மணியம், பாயிரம், அங்கம் 5, களம் 1-3 வரை

உரைநடை நாடகம் :

முனைவர் ஆ. சிவக்கண்ணன், பேராசிரியர் பிரம்மச்சாரி, நியூசெஞ்சுரி புத்தகநிலையம், 2005. (உரைநடை நாடகம் முழுமையும்)

பாடநூல்

1. பேராசிரியர் சுந்தரனார் , மனோன்மணியம் - (பதி) தமிழ்த்துறை, தூய வளனார் கல்லூரி, திருச்சிராப்பள்ளி
2. முனைவர் சிவக்கண்ணன், பேராசிரியர் பிரம்மச்சாரி, பாவைப்பதிப்பகம்.

மதிப்பெண் பகிர்வு

மனோன்மணியம்	- 80
உரைநடை நாடகம்	- 20

உரைநடை பாகம் 3-இல் நாடகம் கட்டுரை வினாவில் மட்டும் இடம் பெற வேண்டும்.

Sem. : IV
Code : 07UGE414

Hours : 5
Credits : 4

GENERAL ENGLISH - IV

Objectives

1. To enhance reading skills towards developing vocabulary power and composition skills.
2. To create in students a taste for enjoying English One-Act Plays thus making them imbibe dramatic skills.
3. To develop the listening, speaking and writing skills of students through the prescribed texts.

Unit – I

1. A. Ball : The Seven Slaves
2. R.H. Wood : Post Early for Christmas
3. Reading Comprehension
4. Essential English Grammar : Units 92 to 98

Unit – II

5. Monica Thorne : The King Who Limped
6. A.E.M. Bayliss : One Good Turn
7. A Tale of Two Cities : Part I
8. Essential English Grammar : Units 99 to 106

Unit – III

9. A Tale of Two Cities : PART II: Chapters 1 to 3
10. A Tale of Two Cities : PART II: Chapters 4 to 7
11. A Tale of Two Cities : PART II: Chapters 8 to 10
12. General Essay

Unit – IV

13. Allan Monkhouse : Night Watches
14. Ella Adkins : The Unexpected
15. A Tale of Two Cities : PART II: Chapters 11 to 13
16. Essential English Grammar : Units 107 to 114

Unit – V

17. Josephina Niggli : Sunday Costs Five Pesos
18. A Tale of Two Cities : PART III: Chapters 1 to 5
19. A Tale of Two Cities : PART III: Chapters 6 to 9
20. Report Writing

Required Reading

1. K.S. Ramamurthy (Ed.) : Seven One-Act Plays (OUP)
2. Dickens, C. (Retold by P. Atkinson): A Tale of Two Cities (Macmillan)
3. Murphy, Raymond : Essential English Grammar (CUP)

Sem-IV
07UPB427

Hours/week: 6
Credits: 5

CELL BIOLOGY AND GENETICS

Objectives

1. To study the progress made in the field of cell, cell organelles and their functions.
2. To understand the principle, the hereditary mechanism, the structure and functions of genetic materials.

Unit-I

Cell cycle, regulation and mechanism. Structure of cytoplasm, cytoskeleton and microtubules. Cellular mechanisms in development and differentiation, factors, basic principles of cell signaling and the machinery.

Unit-II

Cytoplasmic organelles: basic membrane structure, organization and functions of nucleus, mitochondria, chloroplasts, ER, ribosomes, golgi complex, lysosome and vacuole.

Unit-III

Laws of heredity, gene interaction and chromosome basis of heredity. DNA is the genetic material: proof: Griffith's, Avery *et al.*, and Hershey and Chase. RNA as genetic material, Sanger's Proof. Sex linked inheritance, sex determination mechanism.

Unit-IV

Structure of DNA and RNA. Nucleosides and nucleotides. Primary, secondary and tertiary structures. Chromatin nucleosomes and chromosomal proteins, protamines and histones, organization of prokaryotic genome. Special types – polytene & Lamp brush.

Unit-V

Population genetics : gene frequency, gene pool, Hardy–Weinberg equilibrium. Gene frequencies – conservation and changes. Decline of human gene pool and eugenics. Basic knowledge and applications of genomics and proteomics. Genomics: plant, animal and structural and functional genomics, human genome project.

Text Books

1. Verma, P.S. & V.K. Agarwal, 2002, Cytology. S. Chand & Co.Ltd., New Delhi-55.
2. Verma, P.S. & V.K. Agarwal, 2003, Genetics. S. Chand & Co.Ltd., New Delhi-55.

Books for Reference

3. Freifelder, D.1987. Essentials of Molecular Biology, Jones & Bartlett, Boston.
4. Gardner, E.J., Simmons, M.J. & Snustad, D. 1991. Principles of Genetics, John Wiley & Sons Inc., 8th Edn., New York.
5. Sinnott, E.W., Dunn, L.L. & Dobzhansky, T. 1997. Principles of Genetics, Tata Ma Graw Hill Publishing Co., New Delhi.

Sem-IV
07UPB428

Hours/week: 3
Credits: 2

PRACTICAL-IV
(Cell Biology and Genetics)

1. Ultra structure of cell organelles.
2. Study of mitosis in root tips
3. Study of meiosis in stamen
4. Salivary gland chromosome.
5. Methods in plant breeding – bagging, emasculation, selfing and crossing
6. Monohybrid and dihybrid crosses
7. Inheritance patterns
8. Gene interactions and modified ratios
9. Estimation of gene frequency (Hw).

Semester IV
O7UCH473

Hrs/Week: 4
Credit : 3

Allied: CHEMISTRY FOR BIOLOGISTS-II

UNIT I PHYSICAL CHEMISTRY

Thermodynamics of a chemical reaction – Terms ΔE , ΔH , ΔS , ΔG , endothermic, exothermic reactions, conditions for spontaneity of reactions, calorific value of food substances. Chemical Kinetics - rate, order, molecularity of reactions. Importance of kinetic study, activation energy, activated complex, factors affecting rate of the reactions, the order of biological reactions.

Catalysis - Effect of catalysis, kinetics of enzyme catalysis, Michaelis - Menten constant, active sites, turn over number, factors affecting enzyme catalysis-concentration of substrate, temperature, pH and inhibitors.

UNIT II PHARMACEUTICAL CHEMISTRY

Classification of drugs: Definitions of: Drug, pharmacophore, pharmacognony, pharmacy, pharmacokinetics, pharmacodynamics, pharmacopoeia (IP, BP, USP). Antibiotics: Penicillin, chloramphenicol, tetracyclins, streptomycin (Only the structure properties and SAR): Analgesics, Antiinflammatory agents: General and local anaesthetics; Inhalation anaesthetics (N_2O , $CHCl_3$, haloethane, ethylchloride). Intravenous anaesthetics (thiopental sodium); Sedatives and hypnotics. Cardiovascular Drugs: Classification and examples: cardiac glycosides, anti-hypertensive and anti-hypotensive drugs, antiarrhythmic agents, vasodepressor drugs. Antimalarials & sulphonamides

UNIT III CHEMISTRY OF NATURAL PRODUCTS

Structural Elucidation of the functional groups in natural products by chemical methods (-OCH₃, -OH, -COOH, -COOR, oxidation, reduction). Alkaloids: Classification, occurrence: structure, physical properties and uses of: papaverine, nicotine, coniine. Terpenes: Classification, isolation, structure, properties and uses of camphor, citral and α -pinene. Importance and uses of anthocyanins, flavones and flavonoids.

UNIT IV ORGANIC ANALYSIS

Qualitative analysis of organic substances: test for saturation and unsaturation; aliphatic & aromatic; acidic, basic, and neutral nature; elements test for N, S and halogens; functional groups like acid, phenol, aldehyde, ketone, carbohydrate, amine, ester, amide and diamide.

UNIT V CHROMATOGRAPHY

Chromatographic Techniques: Principle, instrumentation, sampling and applications of Paper, thin layer, column chromatography - gas chromatography and High performance liquid - chromatographic techniques.

References:

1. Puri B.R., Sharma L.R., Kalia K.K., *Principles of Inorganic Chemistry*, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993)
2. Puri B.R., Sharma L.R., Pathania M.S., *Principles of Physical Chemistry*, (23rd edition) New Delhi, Shoban Lal, Nagin Chand & Co., (1993).
3. Tiwari, *Organic Chemistry*, S. Chand & Company Pvt. Ltd., New Delhi.
4. R. Gopalan, *Elements of Analytical Chemistry*, S. Chand & Company Pvt. Ltd., New Delhi.
5. Jayashree Ghosh, *Text Book of Pharmaceutical Chemistry*, S. Chand & Company Pvt. Ltd., New Delhi, 1999.

Semester III & IV
O4UCH372

Hrs/Week : 2
Credit : 3

Allied: PRACTICAL CHEMISTRY FOR BIOLOGISTS-II

I. Volumetric Analysis

1. Estimation of HCl (Std. oxalic acid x NaOH x HCl)
2. Estimation of NaOH (Std. NaCO₃ x HCl x NaOH)
3. Estimation of oxalic acid (Std. FAS x KMnO₄ x oxalic acid)
4. Estimation of FAS (Std. oxalic acid x KMnO₄ x FAS)
5. Estimation of KMnO₄ (Std. K₂Cr₂O₇ x FAS x KMnO₄)
6. Estimation of ascorbic acid (iodimetry)
7. Estimation of phenol / aniline (iodimetry)
8. Estimation of copper (iodimetry)
9. Estimation of zinc (edta titration)
10. Estimation of magnesium (edta titration)
11. Estimation of hardness of water (edta titration)

II. Organic Analysis

- a. Identification of acidic, basic, phenolic and neutral organic substances
- b. Test for aliphatic and aromatic nature
- c. Test for saturation and unsaturation
- d. Detection of N, S and halogens.
- e. Identification of functional groups
 - i. Carboxylic acid (mono-, di- & unsaturated)
 - ii. Phenol
 - iii. Aldehyde
 - iv. Ketone
 - v. Ester
 - vi. Carbohydrates
 - vii. Primary amine
 - viii. Amide (mono- & di-)

References

1. Experimental Chemistry, J. N. Gurtu and Kapoor, S. Chand and Co. 1987.
2. N. S. Gnanapragasam and G. Ramamurthy, Organic Chemistry – Lab Manual, S. Viswanathan & Co. Pvt. Ltd., 1998.

Sem-IV
07UST473

Hours/week: 4
Credits: 3

Allied: BIOMETRICS AND COMPUTER APPLICATIONS – II

Unit-I

Measures of location – idea on parameter and statistics – mean, median. Measures of variability – Range, Mean deviation, variance. Sampling properties of mean and variance – unbiasedness of the sample mean and variance.

Unit-II

Correlation and Regression : Correlation: Types of correlation – scatter diagram – Pearson's coefficient of correlation – Rank correlation.

Simple Regression: Meaning of regression lines – Regression equations Y on X and X on Y only – Regression Coefficient – Simple problems.

Unit-III

Normal distribution – Definition – Properties – areas under normal curve – Interpreting areas as probabilities – importance of normal distributions. Estimating a single mean – Confidence interval: Confidence interval for mean. Estimating the difference between two means unpaired data. Confidence interval for $\mu_1 - \mu_2$ (known/unknown σ^2), Estimating the difference between two means: paired comparisons. Confidence interval for population proportions.

Unit-IV

Testing of hypothesis: Null hypothesis – Two kinds of errors – Testing of 2 hypothesis based simple mean – difference between mean – population proportion – Difference between the population proportion – The Chi-square test – Goodness of fit – Test for independence – Equality of variances.

Unit-V

Non parametric tests. Parametric and Non-parametric tests – Measurements (Nomial, Ordinal, Interval and Ratio scales) – One sample test: Binomial, Kolmogorov-Smirnov test, Run test – Two related sample tests – Test for two independent samples Wilcoxon-signed Rank U test.

(No derivations – Conceptual and applications understanding are to be tested).

Books for Reference

1. Nageswara Rao G.: Statistics for Agricultural Science OXFORD & IBH publishing Co.
2. Olive Jean Dunn: Basic Statistics: A primer for the Biomedical Sciences – John Wiley and Sons.

Sem-IV
07UST474

Hours/week: 2
Credits: 1

**Allied: COMPUTER LAB – II
(Statistical Software Package)**

1. Finding Mean and Variance.
2. Finding correlation coefficient, Rank Correlation.
3. T - test
4. F - test
5. Chi-square test
6. Non-parametric tests.

Sem-V
07UPB529

Hours/week: 5
Credits: 5

BIODIVERSITY AND CONSERVATION

Objectives

1. To understand the concept of Environment, biodiversity and conservation.
2. To study the effective utilization and conservation of Bio resources.

Unit-I

Biodiversity: Definition and types: species, genetic, ecosystem and habitat diversity. Origin of genetic diversity and cultivated crops. Genetic wealth of the Third World.

Unit-II

Indigenous peoples : their contribution to biodiversity. World's major gene banks of plant genetic resources, methodology of gene banking, control of gene banks. India's biodiversity richness: plant, animal, marine and human diversity.

Unit-III

Threats to biodiversity: exotics, uniformity vs diversity, impact of green revolution, and deliberate release of GMOs. Climate change and habitat loss. Carbon emissions ,carbon credit, carbon trading and CDMs.

Unit-IV

Global biodiversity: Conservation of biodiversity, endangered species, conservation strategies for plant diversity: *In situ* approach, biosphere reserves, reserve forests, national parks and sanctuaries. *Ex situ* approach, collection gardens, seed storage, tissue culture and cryopreservation.

Unit-V

Conservation of animal diversity: gene banks, captive breeding and *in vitro* technologies. Eco tourism and Wild life trade, Convention on Biodiversity (CBD) and international efforts on biodiversity conservation.

Text Books

1. Krishnamurthy KV. 2003. An advanced text book on Biodiversity - Principle and Practice. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Melchias, G., 2001. Biodiversity and Conservation, Science Publishers Inc. USA.
3. Sharma, PD. 1999. Ecology and Environment, Rastogi Publishers, Meerut.

Books for Reference

4. Asthana, DK & Meera Asthana. 2006. A text book of Environmental studies. S. Chand & Company Ltd. New Delhi.
5. Brian Groombridge. 1992. Global Biodiversity, Chapman and Hall, UK.
6. IUCN, 1985. The World Conservation Strategy, IUCN, Switzerland.
7. Odum, EP. 1970. Fundamentals of Ecology, 3rd edn, W.B.Saunders Ltd., UK
8. Simmons *et al.*, 1980, Conservation of Threatened Plants, NATO Scientific affairs, New York.

Sem-V
07UPB530

Hours/week: 5
Credits: 4

MICROBIOLOGY

Objectives

1. To study the different types of micro-organisms and their activities.
2. To understand and exploit their potentialities in agriculture, industry and other environmental aspects.

Unit-I

Histry and scope of microbiology, characterization and classification of microorganisms. – Whittaker's five kingdom concept – Bergey's manual of systematic bacteriology - Morphology, growth, nutrition and reproduction of bacteria. Viruses – structure, classification and reproduction. A general account on Rickettsias, Chlamydias and Mycoplasmas.

Unit-II

Culture of microorganisms: Pure cultures, batch and continuous cultures. Preservation of microorganisms. Microorganisms and Human diseases. Food borne (Botulism and Gastroenteritis), water borne (Typhoid & Cholera) Air borne (Small pox and Tuberculosis), vector borne (Plaque and malaria) and contact diseases (Mycoses and Candidiasis). Control of microorganisms – physical, chemical and biological methods.

Unit-III

Soil Microbiology – role of microbes in Biogeochemical cycles (carbon, nitrogen and sulphur). Aquatic Microbiology - Microbiology of air. Food microbiology, types of food spoilage and methods of food preservation. Microbiology of milk & dairy products.

Unit-IV

Industrial microbiology – role of microbes in various industries - Fermentors and fermentation technology. – large scale production of ethanol, single cell protein, lactic acid, glutamic acid, amylase, penicillin, insulin, vaccines and interferons.

Unit-V

Role of microbes in agriculture – microbes in nitrogen fixation and phosphate solubilization – Biofertilizers – algal (BGA), bacterial (*Azospirillum*, *Rhizobium*) and mycorrhizal (VAMF). Biopesticides - their types and applications – *Bacillus thuringiensis* and Baculoviruses. Microbes and biogas production – sewage treatment – primary, secondary and tertiary treatments. Biodegradation of cellulose, lignin, petroleum wastes and heavy metals.

Text Books

1. Pelczar, J., Chan, ECS & Krieg, R.1999. Microbiology, Tata McGraw Hill, New Delhi.
2. Sullia, SB & Shantharam, S. 2005. General microbiology. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Books for Reference

3. Casida, LE.1989. Industrial microbiology, Wiley Eastern, New Delhi.
4. Dubey, RC & Maheshwari, DK. 2004, A text book of microbiology. S. Chand & Company Ltd., New Delhi.
5. Frazier, NC.1974. Food Microbiology, II Edn., Tata McGraw Hill, New Delhi.
6. Martin Alexander. 1978. Introduction to Soil Microbiology, Wiley Eastern, New Delhi.
7. Purohit, SS. 1997. Microbiology, (Bikanar)

Sem-V
07UPB531

Hours/week: 3
Credits: 2

PRACTICALS-V
(Biodiversity and Conservation & Microbiology)

Biological Diversity

Study of community structure:

1. Quadrat method
2. Line transect method
3. Study of soil texture and porosity

Study of aquatic environment:

4. Dissolved Oxygen
5. Total hardness
6. Chlorides
7. Carbonates and bicarbonates
8. Environmental adaptations of mangroves, xerophytes and hydrophytes

Visit to Anglade institute (Kodaikanal) and submission of report.

Microbiology

1. Preparation of common media (Nutrient agar & Potato agar)
2. Staining of Bacteria (Simple & Grams staining)
3. Isolation and enumeration of microbes in soil and water
4. Study of motility by Hanging Drop
5. Pure cultures of bacteria – Streak plate, Pour plate and Spread plate
6. Microbiology of milk (Qualitative and Quantitative tests)
7. Antibiosis

Visit to TNAU or Dairy farm and submission of report.

Sem-V
07UPB532

Hours/week: 5
Credits: 5

MOLECULAR BIOLOGY

Objectives

1. To study basic molecular mechanism in organisms
2. How the genes unravel themselves in conferring the traits on the organism.

Unit-I

DNA replication : semi conservative model, proof, DNA polymerase, chemistry of synthesis, mechanism of replication in *E. coli*. Differences in eukaryotes, replication of RNA genome – replicase and reverse transcriptase.

Unit-II

Mutation : types of mutations. Mutagenic agents: physical, chemical and biological, mutagenesis and its applications, chemical basis of mutations, DNA repair – mismatch and proof reading, photoreactivation, excision, recombination and SOS mechanisms in bacteria.

Unit-III

Gene expression and the Central Dogma, transcription: RNA polymerase, signals, chemistry of RNA synthesis, mechanism of initiation, elongation and termination in *E. coli*. Differences in eukaryotes, post-transcriptional processing, spliceosomes.

Unit-IV

Translation – organization of mRNA, genetic code and its characterization, ribosome and rRNA, amino acyl synthetase, tRNA and amino acid activation. Mechanism of initiation, elongation and termination. Translation factors, post-translation processing.

Unit-V

Regulation of gene expression: The principles, cooperative and on-off regulations. Molecular mechanism : negative and positive, repressors and inducers. Mechanism of *Lac* operon and *trp* operon in *E.coli*. Differences in gene expression regulation in eukaryotes. Principle of RNA interference and RNA silence.

Text Books

1. Freifelder, D. 1987. Essentials of Molecular Biology, Jones Bartlett, Boston, USA.

Books for Reference

1. De Robertis & De Robertis. 1990. Cell and Molecular Biology, Saunders College, Philadelphia, USA.
2. Gardner, E.J., Simmons, M.J. & Snustad, D. 1991. Principles of Genetics, 8th Edn., John Wiley & Sons Inc., New York.
3. Internet Search: Genomics and Human Genome Research.

Sem-V
07UPB533

Hours/week: 5
Credits: 5

GENETIC ENGINEERING

Objectives

1. To understand the basic mechanism involved in the production of transgenic microbes, plants and animals
2. To know the role of advanced techniques such as PCR, RFLP and RAPD in molecular biology.

Unit-I

Basic principles – genetic engineering by *Agrobacterium* in nature; Steps in RDT, methods to generate foreign genes and strategies of joining DNA molecules – ligases, linkers and homopolymers.

Unit-II

Enzymes used in genetic engineering: restriction enzymes:- types, properties and cleavage sites. Gene cloning strategies, cDNA and Genomic libraries.

Unit-III

Plasmids and vectors, their properties and types - Ti, pBR, cosmids and shuttle vectors. Screening of recombinants. Expression of cloned genes and the problems, selectable markers and reporters.

Unit-IV

Methods of gene transfer to animals, plants and bacteria: Microinjection, *Agrobacterium* mediation, Ca-transfection, electroporation, shotgun, lipofection, scrape fection, nuclear transplantation, embryonic stem cells and infection by recombinant viruses. Fate of introduced genes.

Unit-V

Principles and applications of molecular techniques: DNA sequencing strategies, gene mapping and nucleic acid hybridization techniques (Southern, northern, western, southwestern blotting) – DNA fingerprinting, PCR, RFLP, RAPD and microarrays.

Text Books

1. Bernard R Glick & Jack J Pasternak. 2001. Molecular biotechnology-principles and applications of recombinant DNA, (2nd Edition), ASM Press, Washington, D.C.
2. Jogdand, SN. 1997. Gene biotechnology, Himalaya Publishig House, New Delhi.

Books for Reference

3. Ernst L. Winnaccker, 2002. From Genes to Clones-introduction to gene technology, VCR Pub., Weintein.
4. James D Watson *et al.*, 1992. Recombinant DNA (2nd Edition), WH Freeman and Co., New York.
5. Maniatis & Sambrook. 2003. Molecular Cloning- A lab manual Vol.I, II & III, Coldspring Harbor Laboratory Press, New York.
6. Old, RW & Primrose, SB. 2001. Principles of Gene Manipulation-an introduction to genetic engineering, Black Well Science Ltd., New York.

Sem-V
07UPB534

Hours/week: 3
Credits: 2

PRACTICAL-VI
(Molecular Biology and Genetic Engineering)

- ✧ Isolation of human genome
- ✧ Home made DNA from onion.
- ✧ Isolation of DNA from coconut milk.
- ✧ Separation of DNA using AGT
- ✧ Separation of protein using PAGE
- ✧ Spotters related to PAGE, genetic engineering technique.

SEM-VI
07UPB635

Hours/week: 5
Credits: 5

BIOCHEMISTRY AND PHYSIOLOGY

Objectives

1. To understand the structure and properties of Biomolecules.
2. To study the various physiological processes in plants related to metabolism, growth and reproduction .

Unit-I

Biochemistry – definition and scope. Basic principle, instrumentation and working of pH meter, colorimeter, spectrophotometer, chromatography, centrifuge and electrophoresis. Enzyme classification, structure, mechanism of action, Factors affecting enzyme activity, Enzyme inhibitors (competitive, uncompetitive, noncompetitive and Feedback Inhibitions).

Unit-II

Carbohydrates, classification, structure and properties of monosaccharides, disaccharides and polysaccharides (starch, glycogen, cellulose, inulin and pectin). Amino acids – basic structure, classification and properties. Proteins – classification, different levels of organization (primary, secondary, tertiary and quaternary structures). Lipids – classification, saturated and unsaturated fatty acids. Elementary study of secondary plant substances (porphyrins, phenols, terpenoids, alkaloids).

Unit-III

Water: importance to life – molecular structure – properties. Water potential – solute potential – and pressure potential. Absorption and transport of water, mineral ion uptake, Transpiration: Types, role, Stomatal physiology, factors affecting transpiration. Guttation, Translocation of organic solutes: – source-sink relationship. Mineral nutrition, role, deficiency symptoms of macro and micro elements, hydroponics and its applications., Nitrogen cycle – sources of nitrogen – Biological nitrogen fixation – Physiology of nodule formation – Biochemistry of nitrogen fixation – leghaemoglobin, lectin and nif genes. Nitrate assimilation – amino acid synthesis by reductive and transamination reactions – GDH and GS/GOGAT pathways.

Unit-IV

Photosynthesis: Photosynthetic apparatus and pigments. Pigment systems, Emerson Effect – photochemical reactions – cyclic and noncyclic electron transports, CO₂ fixation cycles (C₃ cycles), C₃, C₄ and CAM pathways – factors affecting photosynthesis. C₂. PCO cycle (Photorespiration) – its significance and regulation

Respiration: Respiratory substrates, RQ, Anaerobic and aerobic respirations. Glycolysis pathway and regulation. TCA cycle: discovery, pathway, regulation. Mitochondrial electron transport – Oxidative phosphorylation by chemiosmotic mechanism. Pentose Phosphate Pathway – its significance.

Unit-V

Growth: Stages of growth, factors affecting vegetative growth. Auxins, Gibberellins, cytokinins, ethylene and abscisic acid, applications of phytohormones in agriculture and horticulture. Photoperiodism and vernalization, seed dormancy – causes and methods of breaking dormancy, Physiology of seed germination, Irritability and movements.

Text Books

1. Jain, JL. 1979. Fundamentals of Biochemistry, Chand & Co. Ltd., New Delhi.
2. Jain, VK. 2006. Fundamentals of Plant Physiology, S.Chand&Company Ltd., New Delhi
3. Verma, SK. 2006. A Textbook of Plant Physiology, S.K.Chand & Co., New Delhi

Books for Reference

1. Bajjal, BD & Ravisharma, 1981. A Textbook of Plant Physiology, Shiva Lal Agarwal & Co., Agra.
2. Conn, E & Stumpf, PK. 1979. Outline of Biochemistry Niley Easdtern Ltd., New Delhi.
3. Metz, ET. 1960. Elements of Biochemistry. V.F & S (P) Ltd., Bombay.
4. Noggle and Fritz, 1976. Introductory Plant Physiology, Prentice Hall, New Delhi.
5. Pandey, SN & Sinha, BK. 1989. Plant Physiology, Vikas Publishing House Ltd., New Delhi
6. Robert M. Devlin. 1970. Plant Physiology, East West Press, New Delhi.
7. Salisbury, F.B. & Ross, CN. 1995. Plant Physiology. CBS Publishers, New Delhi

Sem-VI
07UPB636

Hours/week: 3
Credits: 2

PRACTICAL-VII
(Biochemistry & Physiology)

Biochemistry

1. Qualitative tests for carbohydrates
2. Isolation of starch from potato.
3. Quantitative estimation of lipids
4. Estimation of amino acids- Formal titration method
5. Separation of leaf pigments – Column chromatography
6. Separation of compound lipids - TLC
7. Assay of Peroxidase activity
8. Assay of amylase activity

Physiology

1. Determination of water potential
2. Determination of solute potential
3. Osmosis – Thistle funnel
4. Effect of temperature on membrane permeability
5. Separation of leaf pigments by paper chromatography
6. Effect of light and CO₂ on photosynthesis
7. Aerobic respiration and fermentation
8. Transpiration - Ganong's photometer

Sem-VI
07UPB637

Hours/week: 5
Credits: 5

BIOTECHNOLOGY

Objectives

1. To study the emerging trends in biotechnology such as gene therapy, DNA finger printing and molecular cloning
2. To enumerate the role of 21st century science, biotechnology in increasing productivity of crop plants, to enhance the production of high value metabolites.

Unit-I

Tissue culture techniques – micro propagation, culture of callus and embryoids, somaclonal variations, culture of haploids, protoplast fusion and culture of cybrids . Applications of plant tissue culture.

Unit-II

Transgenic plants – Bt crops. GM crops resistant to fungal and viral diseases, herbicide, drought and salinity. GURTs and technology protection systems: Terminator technology.

Unit-III

Anti-sense RNA technology and the flavr savr tomato.RNAi, gene silencing, Plantibodies, monoclonal antibodies and hybridoma technology. Gene therapy, immunotoxins and recombinant vaccines.

Unit-IV

Cloning – therapeutic and reproductive. Xenografting and animal organ donors. Embryonic stem cell research. Biotechnology in aquaculture – ploidy induction, gynogenesis, and androgenesis. Transgenic fishes.

Unit-V

Control of pests: juvenile hormone analogues. Hazards of biotechnology – deliberate release, biosafety issues of GMOs and GM foods, genetic erosion. IPRs, patents and the issues.

Text Books

1. Anon. 1988. Animal cell Biotechnology, Academic Press, New York.
2. Bernard R Glick & Jack J Pasternak. 2001. Molecular biotechnology-principles and applications of recombinant DNA, (2nd Edition), ASM Press, Washington, D.C.

Books for Reference

3. Butler, M. 1987. Animal cell technology, Principles and Products, Open University Press, New York.
4. Epplen, JT & Lubjuhn, T. 1999. DNA Profiling and DNA Fingerprinting, Birkhauser Verlag, Basel.
5. Gamborg, OL & Phillips, GC. 1995. Plant cell, Tissue and Organ culture a Funtamental methods, Narosa publishing House, New Delhi.
6. George, EF & Sherrington, PD. 1984. Plant propagation by Tissue culture, Exegetics Limited, London.
7. Ghosh, SP. 1999. Biotechnology and its Application in Horticulture, Narosa Publishing House, New Delhi.

Sem - VI
07UPB638

Hours/week: 5
Credits: 4

IMMUNOLOGY

Objectives

1. To understand the basic immune system of the human beings
2. To understand the mechanism of antigen and antibody interaction

Unit-I Introduction

Immune system - adaptive, innate, humoral and cellular immunity. Origin, structure and immunological role of primary lymphoid organs (bone marrow, thymus, Bursa of Fabricius) and Secondary lymphoid organs (Spleen, lymph nodes, Payer's patches, tonsils, appendix).

Unit-II

Origin, structure and immunological role of immune cells (Leucocytes and lymphocytes)
Lymph- composition and functions
Antibody types - study of Ig G, its structure and immunological role.

Unit-III

Characteristic features of antigens – Immunogen – Hapten – Adjuvant – Epitope – Paratope – Antigen – Antibody interactions – Affinity, Avidity, Cross reactivity, precipitation, agglutination. Production of B & T lymphocytes in the body – Antibody production by plasma cells.

Unit-IV

Primary and secondary immune responses. Vaccines – Definition, Types; Vaccination schedule. Immune response against intracellular pathogens (virus & bacteria) and extra cellular pathogens (bacteria, fungi, protozoans and worms).

Unit-V Basic Immunological Techniques and their applications.

Principle, protocol, and applications of Blood grouping (ABO/Rh) – Total Lymphocyte count- Isolation of T & B lymphocytes- Raising antibodies in rabbit- VIDAL test for Typhoid- VDRL test for Syphilis- Latex agglutination test for RA- ELISA (types)- Sandwich ELISA for pregnancy. Immunoelectrophoresis .

Text Book

1. Chakravarty, AK. 2000. Immunology, Tata McGraw Hill Publication Co. Ltd., New Delhi.

Books for Reference

1. Daniel P. Stites & Abba I. Jerr. 1998. Medical Immunology, 9th Ed., Prentice-Hall International Inc.
2. Janeway, CA & Travers, P. Immunobiology, Third Edition, Garland Publishing Inc. New York.
3. Janis Kuby, 2000. Immunology – 5th edition, W.H.Freeman.
4. Roitt, IM. 1990. Essential immunology, 6th Edition, Black Well Scientific Publications, Oxford.

Sem-VI
07UPB639

Hours/week: 5
Credits: 5

BIOINFORMATICS AND NANOBIO TECHNOLOGY

Objectives

1. To introduce the students to the modern explorations of advanced sciences.
2. To engage them in self-search of futuristic sciences.

Unit-I

Web browsing – basic information, Introduction to bioinformatics anatomy and working of computer, internet concepts. Nucleic acids database – NCBI, alignment techniques – pairwise multiple, BLAST & FASTA.

Unit-II

Protein Database – SWISS - PROT, GenBank and DDBJ, TrEMBL, PROSITE, BLOCKS, PDB & MMDB. Phylogenetic analysis, SCOP and OWL.

Unit-III

Drugs – basic information: classification & metabolism. Phase I & II. Receptor interactions. Detoxification role of cytochrome P450 system. Clinical trials. Pharmacogenomics, principles of drug designing.

Unit-IV

Nanotechnology – an introduction, scope of nanobiotechnology and nanomedicines. Cellular nano structures: nanomotors. Nanoparticles. Nanocomposites and quantum dots.

Unit-V

Bio-micro-electromechanical system (BioMEMS) and nanotubes interactions with proteins & DNA. Applications of bioinformatics and nanotechnology in biology and medicines.

Text Books

1. Niemeyer, CM & CA Mirkin. 2004. Nanobiotechnology – concepts, applications and perspectives, Wiley –VCH Verlag GMBH & Co.
2. Mehrotra et al., 2005. The new handbook of bioinformatics. Vikas publishing house.

Books for Reference

1. Andreas D Baxevanis & Francis, BF. 2001. Bioinformatics, John Willy & Sons.
2. Bryan Bergeron, 2003. Bioinformatics computing, Prentice – Hall of India private Ltd., New Delhi.
3. David E Mount. 2001. Bioinformatics sequence and genome analysis, Cold spring harbor laboratory press, New Delhi.
4. Gautham, N. 2006. Bioinformatics database and Algorithms. Narosa publishing house, New Delhi.
5. Ignacimuthu, S. 2005. Basic Bioinformatics, Narosa publishing house.
6. Murthy, CSV. 2003. Bioinformatics. Himalaya publishing house. New Delhi.
7. Ranga. 2003. Bioinformatics. Agrobios. India.
8. Shanmugavel, 2005. Principles of Bioinformatics. Pointer publisher, India.
9. Westhead *et al.*, 2003. Bioinformatics, Viva books Pvt.

Sem-VI
07UPB640

Hours/week: 3
Credits: 2

PRACTICAL-VIII
(Biotechnology & Immunology)

Biotechnology

1. Culture media and sterilization techniques
2. In vitro seed germination
3. Embryo rescue and culture
4. Callus culture from leaf explants
5. Somatic embryo culture.
6. Callus differentiation and organogenesis
7. Isolation of yeast from grapes and other sources.
8. Ethanol production
9. Biofertilizers:
 - a) *Blue green algae*,
 - b) *Rhizobium*,
 - c) *Azotobacter*
 - d) *Azospirillum*
 - e) *Phosphobacteria*
 - f) *Endomycorrhizae*(Isolation, cultivation and large scale production and application)
10. Methanogenesis (Production of methane from Gobar Gas Plant (Model))

Immunology

1. Blood grouping ABO and Rh
2. Total lymphocyte count
3. Isolation of T & B lymphocytes
4. Raising antibodies in rabbit
5. WIDAL test – (rapid slide) for Typhoid
6. VDRL test for Syphilis
7. Latex agglutination test for rheumatoid factor (RF)
8. Sandwich ELISA for pregnancy
9. ELISA – demonstration
10. Immunoelectrophoresis- demonstration

**ELECTIVES OFFERED BY VARIOUS DEPARTMENTS FOR
UG COURSES**

Sem	Code No.	Title of the Paper	Hours	Credits
Department of Business Administration				
IV	07UBU481	Soft Skills Development	4	3
V	07UBU582	Advertisement and Sales Promotion	4	3
VI	07UBU683	Personal Growth Programme	4	3
Department of Chemistry				
IV	07UCH481	Food and Nutrition	4	3
V	07UCH582	Everyday Chemistry	4	3
VI	07UCH683	Soil Testing	4	3
Department of Commerce				
IV	07UCO481	Elements of Business Process Outsourcing (BPO)	4	3
	07UCO482	Accounts for Executives	4	3
V	07UCO583	Soft Skills Development	4	3
	07UCO584	Fundamentals of Investment Management	4	3
VI	07UCO685	Small Scale Business Development	4	3
	07UCO686	Hotel Management	4	3
Department of Computer Science				
IV	07UCS481	Office Automation	4	3
	07UCS482	Internet Concepts	4	3
V	07UCS583	Fundamentals of Computer Networks	4	3
	07UCS584	Information Technology	4	3
VI	07UCS685	E-Commerce	4	3
	07UCS686	Foundations of Computer Science	4	3
Department of Computer Application (BCA) (SFS)				
IV	07UCA481	Personal Soft Skills	4	3
Department of Economics				
IV	07UEC481	Indian Economy	4	3
V	07UEC582	Tamil Nadu Economy	4	3
VI	07UEC683	Economics of Social Issues	4	3
Department of Electronics				
IV	07UEL481	Computer Electronics	4	3
V	07UEL582	Radio and Television	4	3
VI	07UEL683	DVD Player Assembling and Troubleshooting	4	3

Department of English

IV	07UEN481	English for Competitive Exams	4	3
	07UEN482	Film Studies	4	3
V	07UEN583	English for Communication	4	3
	07UEN584	Public Speaking in English	4	3
VI	07UEN685	English of Literature	4	3
	07UEN686	English for Empowerment	4	3

Department of History

IV	07UHS481	Tourism and Travel Agency	4	3
V	07UHS582	Tourism and Automation	4	3
VI	07UHS683	Indian History for Competitive Examinations	4	3

Department of Mathematics

IV	07UMA481	Mathematics for Competitive Examinations	4	3
V	07UMA582	Graph Theory	4	3
VI	07UMA683	Operations Research	4	3

Department of Physics

IV	07UPH481	Everyday Physics	4	3
V	07UPH582	Photography	4	3
VI	07UPH683	Cell Phone Servicing	4	3
	07UPH684	Electrical Wiring	4	3

Department of Plant Biology & Plant Biotechnology

IV	07UBO481	Mushroom Culture	4	3
V	07UBO582	Everyday Biology	4	3
VI	07UBO683	Remote Sensing	4	3

Department of Statistics

IV	07UST481	Statistics for Management	4	3
V	07UST582	Data Analysis for Competitive Examination	4	3
VI	07UST683	Actuarial Statistics	4	3

Department of Tamil

IV	07UTA481	மைய அரசுப்பணித்தேர்வுத் தமிழ்	4	3
V	07UTA582	தமிழ் இலக்கியத்தில் மனித உரிமைகள்	4	3
VI	07UTA683	சித்த மருத்துவம்	4	3
VI	07UTA684	மக்கள் தகவல் தொடர்பியல்	4	3

