

Dr. N.G.P. ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore) Approved by Government of Tamil Nadu & Accredited by NAAC with A++ Grade (3rd Cycle - 3.64 CGPA) Dr. N.G.P. –Kalapatti Road, Coimbatore – 641048, Tamil Nadu, India Web: www.drngpasc.ac.in | Email: info@drngpasc.ac.in | Phone: +91-422-2369100

Regulations 2023 – 24 for Undergraduate Programme

(Outcome Based Education model with Choice Based Credit System)

B.Sc Microbiology Degree

(For the students admitted during the academic year 2023-24 and onwards) **Programme : Microbiology**

Eligibility:

A pass in Higher Secondary Examination with any Academic stream or Vocational stream with Biology/Zoology/Botany /Biotechnology/Microbiology/Life Science as one of the subject and as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **Bachelor of Science (Microbiology)** Degree Examination of this College after a course study of three academic years.

Programme Objectives:

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

- 1. To inculcate practical knowledge in correlation with the theoretical knowledge.
- 2. To equip the students to meet the requirements of the current technology in Microbiology.
- 3. To motivate and train the students in various clinical and industrial sectors.
- 4. To encourage students to involve in research to explore microorganisms for the betterment of mankind.



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PROGRAM OUTCOMES:

PO Number	PO Statement
PO1	To prepare microbiologists who are competent, creative, and highly valued professionals in academia, industry and private/public sector that is capable of excelling in careers of their choice.
PO2	To impart basic knowledge on the theoretical basis of the tools and techniques and to imbibe and demonstrate the practical skills in microbiology.
PO3	To disseminate knowledge in microbiological discipline and to promote and develop competency in microbiology that have enduring value beyond the classroom.
PO4	To instill a pattern of life-long learning and to translate the potentials of microorganisms to the welfare of biosphere.
PO5	To explore the scope of various branches of microbiology to become an entrepreneur.

On the successful completion of the program, the following are the expected outcomes.



Credit distribution

Credit distribution for all UG programmes

Part	Subjects	No.of Papers	Credit	Semester No.
I (12 Credits)	Tamil / Hindi / French/Malayalam	4	4 x 3 = 12	I & IV
II (12 Credits)	English	4	4 x 3 = 12	I & IV
	Core (Credits 2,3,4,5)	17	70	I to VI
	Inter Departmental Course (IDC)	4	16	I to IV
III (108 Credite)	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
Creatisy	Skill Enhancement Course(SEC)	4	8	III ,IV,V& VI
	Industrial Training	1	2	v
	Environmental Studies(AECC)	1	• 2	Ι
IV	Basic Tamil/ Advance Tamil / Human Rights & Women's Rights (AECC)	1	2	II
(8 Credits)	Innovation & IPR/Innovation, IPR &Entrepreneurship (AECC)	1	2	VI
	Generic Elective(GE) (AEEC)	1	2	v
V (2 Credits)	NSS/NCC/YRC/RRC/Yoga/Sports/Clubs		2	I -II
	TOTAL CREDITS		142	



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CURRICULUM B.SC

MICROBIOLOGY

Course Code	Course	Course Name	L	т	р	Exam	N	fax Ma	rks	C 11
sanco s no	Category	course runne	1	1	r	(h)	CIA	ESE	Total	Credit
First Semester			-							
Part - I				-						
231TL1A1TA		Tamil-I								
231TL1A1HA		Hindi-I	1							
231TL1A1MA	Language - I	Malayalam-I	4	1	•	3	25	75	100	3
231TL1A1FA		French -I	1							
Part - II										
231EL1A1EA	Language - II	English - I	4		1	3	25	75	100	3
Part - III			-		-			10	100	
233MB1A1CA	Core - I	Fundamentals of Microbiology	3			3	25	75	100	3
233MB1A1CB	Core - II	Cell Biology	3			3	25	75	100	3
233MB1A1CP	Core Practical - 1	Fundamentals of Microbiology and Cell Biology			5	6	40	60	100	2
233CL1A1IA	IDC - I	Biochemistry	3	•		3	25	75	100	3
233CL1A1IP	IDC Practical - I	Biochemistry	•	•	4	4	40	60	100	2
Part - IV										
233MB1A1AA	AECC-I	Environmental Studies	2	•			50		50	2
Part – V					- 1					
233MB1A1XA	Extension Activity	NSS/NCC/YRC/ RRC/ Yoga/Sports	•		-		50		50	1
	Total		19	1	10				800	22

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E BE								
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	Course					Exam	M	lax Mar	ks	
Course Code	Category	Course Name	L	Т	P	(h)	CIA	ESE	Total	Credits
Second Semest	er									
Part – I							1			
231TL1A2TA		Tamil-II								
231TL1A2HA		Hindi-II	4	1	-	3	25	75	100	3
231TL1A2MA	Language - I	Malayalam- II								
231TL1A2FA		French – II				Martin II				
Part – II										
231EL1A2EA	Language - II	English - II	4	-	1	3	25	75	100	3
Part – III		I								
233MB1A2CA	Core - III	Microbial Physiology	4	-		3	25	75	100	4
233MB1A2CB	Core - IV	Bioinstrumentation	3	-	-	3	25	75	100	3
233MB1A2CP	Core Practical - II	Microbial Physiology and Bioinstrumentation	-	-	5	9	40	60	100	2
232CE1A2EQ	IDC - II	Basic Chemistry	2	-	4	3	40	60	100	4
Part – IV								a starter		Songle Press
231TL1A2AA 231TL1A2AB 235CR1A2AA	AECC-II	Basic Tamil/ Advanced Tamil/ Human Rights and Women's Rights	2	-	-	-	50	-	50	2
Part – V										
233MB1A2XA	Extension Activity	NSS/NCC/YRC/ RRC/Yoga/Sports / Club	-	-	-	-	50	-	50	1
	Total						12.10		700	22

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B.Sc. Microbiology (Students admitted during the AY 2023-24)

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Course Code	Course	Course Name		LT		Exam	N			
course coue	Category		L		P	(h)	CIA	ESE	Total	Credits
Third Semester										
Part - I										
231TL1A3TA 231TL1A3HA 231TL1A3MA 231TL1A3FA	Language - I	Tamil-III/ Hindi-III/ Malayalam-III/ French – III	3	1	-	3	25	75	100	3
Part - II										
231EL1A3EA	Language - II	English – III	3		1	3	25	75	100	3
Part - III				-						
233MB1A3CA	Core - V	Microbial Diversity	4	1	-	3	25	75	100	4
233MB1A3CB	Core - VI	Microbial Genetics	3	1	-	3	25	75	100	3
233MB1A3CP	Core Practical - III	Microbial Diversity and Microbial Genetics	-	-	6	9	40	60	100	3
232MTIA3IF	IDC - III	Principles of Biostatistics	4	•	-	3	25	75	100	4
233MB1A3SA	SEC - I	Food and Water Quality Analysis	2	1	-	3	25	75	100	2
	Total		19	4	7				700	22

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	Course		Ţ	m	ГР	Exam	M	Iax Ma	rks	Credits
Course Code	Category	Course Name	L	1		(h)	CIA	ESE	Total	
Fourth Semeste	er									
Part – I										
231TL1A4TA 231TL1A4HA 231TL1A4MA 231TL1A4FA	Language - I	Tamil-IV/ Hindi-IV/ Malayalam-IV/ French -IV	3	1		3	25	75	100	3
Part – II										
231EL1A4EA	Language - II	English – IV	3	-	1	3	25	75	100	3
Part – III				1						
233MB1A4CA	Core - VII	Immunology	4	•	-	3	25	75	100	4
233MB1A4EP	Core - VIII	Food Microbiology	2		4	6	40	60	100	4
233MB1A4CP	Core Practical - IV	Immunology & Recombinant DNA Technology	-	1	6	6	40	60	100	3
233BT1A4IC	IDC - IV	Bioinformatics	3	•	•	3	25	75	100	3
233MB1A4SA	SEC-II	Recombinant DNA Technology	2	1		3	25	75	100	2
	Total		17	2	11				700	22

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	Course		т	т	D	Exam	N	/lax M	Iarks	Credits
Course Code	Category	Course Manie		1	r	(h)	CIA	ESE	Total	cieuns
Fifth Semester										
Part - III						•				
233MB1A5CA	Core – IX	Bacteriology	4	-	-	3	25	75	100	4
233MB1A5CB	Core - X	Virology	4	-	-	3	25	75	100	4
233MB1A5CC	Core - XI	Mycology and Parasitology	4	-	-	3	25	75	100	4
233MB1A5CD	Core - XII	Rapid Diagnostics in Microbiology	3	-	-	3	25	75	100	3
233MB1A5CP	Core Practical - V	Medical Microbiology		-	6	9	40	60	100	3
233MB1A5SA	SEC-III	Fermentation Technology	2	1	-	3	25	75	100	2
233MB1A5DA		Microbial Technology						75		
	DSE-I	Dairy Microbiology	4	-	-	3	25		100	4
233MB1A5DB					1					
233MB1A5DC		Communicable Diseases								
233MB1A5TA	IT	Industrial Training					40	60	100	2
Part – IV										
233MB1A3GA	GE (AEEC)	Food Sanitation and Public Health	2	-	-	3	50	-	50	2
	Total		23	1	6				850	28



	Course					Exam	N	lax Mai	ks	Credits
Course Code	Category	Course Name	L	Т	Р	(h)	CIA	ESE	Total	Cleans
Sixth Semester					_					
Part – III							r			1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -
233MB1A6CA	Core - XIII	Environmental Microbiology	4			3	25	75	100	4
233MB1A6CB	Core - XIV	Agricultural Microbiology	4			3	25	75	100	4
233MB1A6CC	Core - XV	Downstreaming of Microbial Products	3	•		3	25	75	100	3
233MB1A6CP	Core Practical - VI	Environmental, Agricultural and Industrial Microbiology			6	9	40	60	100	3
233MB1A6SA	SEC-IV	Pharmaceutical Microbiology	2	1	-	3	25	75	100	2
233MB1A6DA	DSE-II	Phytochemical Drug Discovery								
233MB1A6DB		Entrepreneurial Microbiology	4		•	3	25	75	100	4
223MB1A6DC		Medical Laboratory Techniques								
233MB1A6DD		Microbial Fuel Technology								
233MB1A6DE	DSE-III	Perspectives on Microbiology Lab Accreditation	4	1.5	-	3	25	75	100	4
233MB1A6DF		Epidemiology and Public Health								
Part – IV										
235BI1A6AA	AECC-III	Innovation and IPR	2				50	-	50	2
Sign Rowelle	Total		2:	3 1	6				750	26
	*Grand Total				-1				4500	142



GENERIC ELECTIVE COURSES (GE)

The following are the courses offered under Generic Elective

Semester - V (GE)

S. No.	Course Code	Sem	Course Name
1	233MB1A5GA	V	Food Sanitation and Public Health

SELF STUDY COURSES

The following are the courses offered under self study

S. No.	Course Code	Sem	Course Name
1	233MB1ASSA	III	Pedagogy for Biology
2	233MB1ASSB	III	Bio-Marketing

CERTIFICATE PROGRAMMES

The following are the programmes offered

S. No.	Course Code	Course Name
1	3MB5A	Pharmaceutical Quality Control & Testing
2	3MB5B	Biofertilizer Production and its field trial
3	3MB5C	Spirulina Cultivation and its value addition
4	3MB5D	HACCP and Food Safety



UG - REGULATION (R5)

(2023-24 and onwards)

(OUTCOME BASED EDUCATION WITH CBCS)

1.NOMENCLATURE

1.1 Faculty: Refers to a group of programmes concerned with a major division of knowledge Eg. Faculty of Computer Science consists of disciplines like Departments of Computer Science, Information Technology, Computer Technology, Computer Applications, Data Analytics, Cognitive Systems, Artificial Intelligence and Machine Learning and Cyber Security

1.2 Programme: Refers to the Bachelor of Science / Commerce / Arts stream that a student has chosen for study.

1.3 Batch: Refers to the starting and completion year of a programme of study. Eg. Batch of 2023–26 refers to students belonging to a 3 year Degree programme admitted in 2023 and completing in 2026.

1.4 Course: Refers to component of a programme. A course may be designed to involve lectures / tutorials / laboratory work / seminar / project work/ practical training / report writing / Viva- voce, etc., or a combination of these, to meet effectively the teaching learning needs.

- a) Core Course: A course, which should compulsorily be studied by a candidate as a core requirement
- **b) Inter Disciplinary Course (IDC):** A course chosen generally from a related discipline/subject with an intention to seek exposure in the discipline relating to the core domain of the student
- c) Discipline Specific Elective (DSE) Course: Elective courses offered under main discipline/ subject of study.
- d) Skill Enhancement Courses (SEC): Value-based and/or skill-based courses which are aimed at providing hands-on-training, competencies, skills, etc.
- e) Ability Enhancement Compulsory Courses (AECC):Mandatory courses that lead to Knowledge enhancement. Environmental Science, Human Rights and Women's Rights, Basic Tamil/ Advanced Tamil, Innovation and IPR, Innovation, IPR and Entrepreneurship.
- f) Ability Enhancement Elective Course (AEEC)/Generic Elective (GE) An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is Generic Elective.



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1.5 Project Work:

Course involving application of knowledge in problem solving / analyzing / exploring a real life situation / difficult problem. The Project work will be given in lieu of a Core paper.

Internship/Industrial Training

Students must undertake industrial / institutional training for a minimum of 15 days during the IV semester summer vacation. The students will submit the report for evaluation during V semester.

1.6 Extra Credits:

Extra credits shall be awarded for achievements in identified curricular/cocurricular/Extracurricular activities executed outside the regular class hours. Extra credits are not mandatory for completing the programme.

2. STRUCTURE OF PROGRAMME

2.1 PART- I: LANGUAGE- I

Tamil or any one of the languages namely Malayalam, Hindi and French will be offered under Part – I in the first four semesters.

2.2 PART- II: LANGUAGE- II

English will be offered during the first four semesters.

2.3 PART- III:

- Core Course
- Inter Departmental Course (IDC)
- Discipline Specific Elective (DSE)
- Skill Enhancement Course (SEC)
- Industrial Training (IT)

2.4 PART- IV:

2.4.1 Ability Enhancement Compulsory Course (AECC):

The Ability Enhancement Compulsory Courses such as i)Environmental Studies, ii) Human Rights and Womens' Rights, iii) Innovation and IPR/ Innovation, IPR and Entrepreneurship are offered during I,II and VI Semester.

Basic Tamil

a) Those who have not studied Tamil up to XII Std and taken a non-Tamil language under Part-I shall take oneBasic Tamil coursein the second semester.



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(OR)

Advanced Tamil

b) Those who have studied Tamil up to XII Std and taken a non-Tamil language under Part-I shall take one Advanced Tamil course in the second semester.

Note: Students who come under the above a+b categories are exempted from Human Rights and Women's Rights in the second semester.

Ability Enhancement Elective Course (AEEC)/Generic Elective (GE) An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is Generic Elective offered in V semester. (Theory/Practical/Non-Lab Practical)

2.5 PART- V: EXTENSION ACTIVITIES

The following extracurricular activities like NSS/YRC/NCC/RRC/Yoga/Sports/Clubs are offered under extension activities during semester I & II. Students will be evaluated based on their active participation in any one of the above activities. 75% Attendance is compulsory for extension activity.

3. CREDIT ALLOTTMENT

The following is the credit allotment:

- Lecture Hours (Theory)
- 1 credit per lecture hour per week
- Laboratory Hours
- 1 credit for 2 Practical hours per week
- Project Work

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- 1 credit for 2 hours of project work per week
- 4. DURATION OF THE PROGRAMME

The B.A. /B.Com./B. Sc. Programme must be completed within 3 years (6 semesters) and a maximum of 6 years (12 semesters) from the date of acceptance to the programme. If not, the candidate must enroll in the course determined to be an equivalent by BoS in the most recent curriculum recommended for the Programme.

5.REQUIREMENTS FOR COMPLETION OF A SEMESTER

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Every student shall ordinarily be allowed to keep terms for the given semester in a program of his/ her enrolment, only if he/ she fulfills at least seventy five percent (75%) of the attendance taken as an average of the total number of lectures, practicals, tutorials, etc. wherein short and/or long excursions/field visits/study tours organised by the college and supervised by the faculty as envisaged in the syllabus shall be credited to his/her attendance. Every student shall have a minimum of 75% as an overall attendance.



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6. EXAMINATIONS

The end semester examinations shall normally be conducted after completing 90 working days for each semester. The maximum marks for each theory and practical course shall be 100 with the following breakup:

a) Mark distribution for Theory Courses

Continuous Internal Assessment (CIA)	: 25 Marks
End Semester Exams (ESE)	: 75 Marks
Total	: 100 Marks

i) Distribution of Internal Marks

S.No.	Particulars	Distribution of Marks
1	CIA I (2.5 Units) (On completion of 45 th working day)	5
2	Model (All 5 Units) (On completion of 85 th working day)	5
3	Attendance	5
4	Library Usage	5
5	Skill Enhancement *	5
	Total	25

Breakup for Attendance Marks:

S.No	Attendance Range	Marks Awarded
1	95% and Above	5
2	90% - 94%	4
3	85% - 89%	3
4	80% - 84%	2
5	75% - 79%	1

Note:

Special Cases such as NCC, NSS, Sports, Advanced Learner Course, Summer Fellowship and Medical Conditions etc. the attendance exemption may be given by principal and Mark may be awarded.



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Break up for Library Marks:

S.No	Attendance Range	Marks Awarded
1	10h and above	5
2	9h- less than 10h	4
3	8h – less than 9h	3
4	7h - less than 8h	2
5	6h – less than 7h	1

Note:

In exception, the utilization of e-resources of library will be considered.

*Components for "Skill Enhancement" may include the following:

Class Participation, Case Studies Presentation/term paper, Field Study, Field Survey, Group Discussion, Term Paper, Presentation of Papers in Conferences, Industry Visit, Book Review, Journal Review, e-content Creation, Model Preparation, Seminar and assignment.

Components for Skill Enhancement

Any one of the following should be selected by the course coordinator

S.No.	Skill Enhancement	Description
1	Class Participation	Engagement in classListening SkillsBehaviour
2	Case Study Presentation/ Term Paper	 Identification of the problem Case Analysis Effective Solution using creativity/imagination
3	Field Study	 Selection of Topic Demonstration of Topic Analysis & Conclusion
4	Field Survey	 Chosen Problem Design and quality of survey Analysis of survey
.5	Group Discussion	 Communication skills Subject knowledge Attitude and way of presentation Confidence Listening Skill
6	Presentation of Papers in Conferences	 Sponsored International/National Presentation Report Submission
7	Industry Visit	Chosen DomainQuality of the work



		Analysis of the ReportPresentation
8	Book Review	 Content Interpretation and Inferences of the text Supporting Details Presentation
9	Journal Review	 Analytical Thinking Interpretation and Inferences Exploring the perception if chosen genre Presentation
10	e-content Creation	 Logo/ Tagline Purpose Content (Writing, designing and posting in Social Media) Presentation
11	Model Preparation	 Theme/ Topic Depth of background Knowledge Creativity Presentation
12	Seminar	 Knowledge and Content Organization Understanding Presentation
13	Assignment	Content and StyleSpelling and GrammarReferences

ii) Distribution of External Marks (E	ESE)
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 Total	:	75
Written Exam	:	75

Marke Distribution for Practical	course		
Warks Distribution for Financia	Total	:	100
	Internal	:	40
	External	:	60



i) Distribution of Internals Marks

S.No.	Particulars	Distribution of Marks
1	Experiments/Exercises	15
2	Test 1	10
3	Test 2	10
4	Observation Notebook	05
	Total	40

ii) Distribution of Externals Marks

S.No.	Particulars		External Marks
1	Practical	St. 201	40
2	Record		10
2	Viva- voce		10
5	Viva-voce	Total	60

Practical examination shall be evaluated jointly by Internal and External Examiners

Mark Distribution for Project/ Internship/ Industrial Training

Total	:	100
Internal	:	40
External	:	60

i) Distribution of Internal Marks

S.No.	Particulars	Internal Marks
1	Review I	15
2	Review II	20
3	Attendance	. 5
	То	tal 40

ii) Distribution of External Marks

S.No	Particulars	External Marks
1	Project Work /Internship /Industrial training	40
2	Viva -voce	20
	Total	60

Evaluation of Project Work/Internship/ Industrial training shall be shall be done jointly by Internal and External Examiners.



7. Credit Transfer

a. Upon successful completion of 1 NPTEL Course (4 Credit Course) recommended by the department, during Semester I to IV, a student shall be eligible to get exemption of one 4 credit course during the V or VI semester. The proposed NPTEL course should cover content/syllabus of exempted core paper in V orVI semester.

S. No.	Course Code	Course Name	Proposed NPTEL Course	Credit
1			Option – 1 Paper title	4
12, 1			Option – 2 Paper title	
	150,000,000		Option - 3 Paper title	

b. Upon successful completion of **2 NPTEL Courses** (2 Credit each) recommended by the department, during Semester I to IV, a student shall be eligible to get exemption of **one 4 credit course** during the V or VI semester. Out of 2 NPTEL proposed courses, **atleast 1 course** should cover content/syllabus of exempted core paper in V orVI semester.

Mandatory

The exempted core paper in the V or VI semester should be submitted by the students for approval before the end of 4th semester

Credit transfer will be decided by equivalence committee

S. No.	Course Code	Course Name	Proposed NPTEL Course	Credit
1			Option – 1 Paper title	
			Option - 2 Paper title	2
			Option – 3 Paper title	
2			Option – 1 Paper title	2
			Option – 2 Paper title	
			Option – 3 Paper title	



S.No.	Student Name	Class	Propo	osed NPTEL Course	Proposed Course for Exemption
			Course I Course II	Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title	Any one Core Paper in V or VI semester
CI	ass Advisor			HoD	Dean

8. Innovations

Upon Successful outcome of Design Thinking / Copy right/Product/ Patent by the end of the V Semester, student shall be eligible to get exemption in AECC: Innovation, IPR & Entrepreneurship / Innovation & IPR offered during VI Semester.

9.Internship/Industrial Training

Students must undertake industrial / institutional training for a minimum of 15 days during the IV semester summer vacation. The students shall submit the report for evaluation during V semester.

10. Extra Credits: 10

Earning extra credit is not essential for programme completion. Student is entitled to earn extra credit for achievement in Curricular /Co-Curricular/ Extracurricular activities carried out other than the regular class hours.

A student is permitted to earn a maximum of Ten extra Credits during the programme period.



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Category	Credit
Proficiency in foreign language	1
Proficiency in Hindi	1
Self study Course	1
Typewriting/Short hand	1
CA/ICSI/CMA (Foundations)	1
CA/ICSI/CMA(Inter)	1
Sports and Games	1
Publications / Conference Presentations (Oral/Poster)	1
Lab on Project	1
Innovation / Incubation / Patent / Sponsored Projects / Consultancy	1
Representation in State / National level	1
Awards/Recognitions/Fellowships	1

A maximum of 1 credit under each category is permissible.

Credit shall be awarded for achievements of the student during the period of study only.

GUIDELINES

Proficiency in foreign language

A pass in any foreign language in the examination conducted by an authorized agency.

Proficiency in Hindi

A pass in the Hindi examination conducted by Dakshin Bharat Hindi Prachar Sabha.

Examination passed during the programme period only will be considered for extra credit.

Self study Course

A pass in the self study courses offered by the department.

The candidate should register the self study course offered by the department only in the III semester.

Typewriting/Short hand

A Pass in short hand /typewriting examination conducted by Tamil Nadu Department of Technical Education (TNDTE) and the credit will be awarded.



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CA/ICSI/CMA(Foundations)

Qualifying foundation in CA/ICSI/CMA / etc.

CA/ICSI/CMA(Inter)

Qualifying Inter in CA/ICSI/CMA / etc.

Sports and Games

Students can earn extra credit based on their achievements in sports in University/ State / National/ International levels.

Publications / Conference Presentations (Oral/Poster)

Research Publications in Journals oral/poster presentation in Conference

Lab on Project (LoP)

To promote the undergraduate research among all the students, the LoP is introduced beyond their regular class hours. LoP is introduced as group project consisting of not more than five members. It consist of four stages namely Literature collection, Identification of Research area, Execution of research and Reporting / Publication of research reports/ product developments. These four stages spread over from III to IV semester.

(Evaluation will be done internally)

Innovation / Incubation / Patent / Sponsored Projects / Consultancy

Development of model/ Products /Prototype /Process/App/Registration of Patents/ Copyrights/Trademarks/Sponsored Projects /Consultancy

Representation in State/ National level celebrations

State / National level celebrations such as Independence day, Republic day Parade, National Integration camp.

Awards/Recognitions/Fellowships

Regional/ State / National level awards/ Recognitions/Fellowships



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GUIDELINES

100 % CIA Courses:

- AECC
- AEEC

S.No	Type of Course
1	Environmental Studies (AECC)
2	Human Rights and Women's Rights, Basic Tamil / Advanced Tamil (AECC)
3	Innovation & IPR/ Innovation, IPR and Entrepreneurship(AECC)
4	Generic Elective (AEEC)

Modalities for Implementing Internal Assessment Marks:

- Student pertaining to 2023 Batch (2023-26) UG programme for the above mentioned courses shall secure a minimum of 40% out of the maximum marks in the continuous internal assessment (CIA) i.e., 20 marks out of 50 marks.
- Students who have not acquired the minimum marks shall be allowed to reappear to improve their marks in the exam components only within the time duration of the programme, in the forthcoming semesters.

Theory		Practical		
S. No.	Particulars	Distributionof Marks	Particulars	Distributionof Marks
1	CIAI(2.5Units) (On completionof45 th workingday)	15	CIA I (Exercise 1-5)	5
2	Model(5Units)(On completionof85 th workingday)	15	CIA II (Exercise 6 - 10)	5
3	Assignment	05	Class Participation	10
4	Attendance	05	Practical Record	10
5	LibraryUsage	05	Test -III & Viva-Voce (10+10)	20
6	SkillEnhancement*	05		
	Total	50		50

Distribution of Internal Marks for AECC & AEEC



Question paper pattern AECC & AEEC

Test	MARKS	DESCRIPTION	TOTAL	Remarks
CIA Test I 1 Hour First 2.5 Units	50 x 1 = 50 Marks	MCQ	50 Marks	Marks secured will be Converted
CIA test II/ Model test 1 Hour All five Units	50 x 1 = 50 Marks	MCQ	50 Marks	to 15 marks Marks secured will be Converted to 15 marks

Question paper pattern	Total Marks -50		
Basic Tamil	Advanced Tamil		
Section -A	Section -A		
Choose the correct answer 10x2=20	Choose the correct answer 10 x1=10		
Section -B	Section -B		
True or false 10x2=20	Fill in the blanks 10x2=20		
Section -C	Section -C		
Answer in one page 1x10=10	Write an essay in two pages 2x10=20		

Question paper pattern for all other courses falling under Part I to Part III

CIAI:	[1 ^{1/2} Hours-2.5	Units]	- 25 Marks
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SECTION	MARKS	DESCRIPTION	TOTAL	Remarks
Section - A	8 x 0.5 = 04 Mark	MCQ		Marks
Section - B	3 x 3 = 09 Mark	Answer ALL Questions	25 Mark	will be
Section - C	2 x 6 = 12 Mark	Either or Type ALL Questions Carry Equal Marks		converted To 5 mark

CIA II /Model: [3 Hours-5 Units] - 75 Mark

SECTION	MARKS	DESCRIPTION	TOTAL	Remarks
Section - A	10 x 1 = 10 Mark	MCQ		Marks
Section - B	5 x 5 = 25 Mark	Answer ALL Questions	75 Mark	will be
Section - C	5 x 8 = 40 Mark	Each Questions Carry Equal Mark		converted To 5 mark



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COIMBATORE | INDIA B.Sc. Microbi

SECTION	MARKS	DESCRIPTION	TOTAL
Section – A	10 x 1 = 10 Mark	MCQ	
Section - B	5 x 5 = 25 Mark	Answer ALL Questions	75 Mark
Section - C	5 x 8 = 40 Mark	Each Questions Carry Equal Mark	

End Semester Examination: [3 Hours-5 Units] - 75 Mark



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Course Code	Course Name	Category	L	Т	P	Credit
231TL1A1TA	TAMIL - I	LANGUAGE-I	4	1	-	03

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு நாகரீகம், பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO CO Statement	
C01	வாழ்க்கைத் திறன்கள் (Life Skills)- மாணவர்களின் செயலாக்கத் திறனை ஊக்குவித்தல்	K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K4
CO3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

	701	PO2	PO3	PO4	PO5
COs/POs	POI	r02	100		1
CO1		1	1		V
CO2	1			~	
CO3		1			~
CO4			1		
CO5	1			v	v

COURSE FOCUSES ON

1	Skill Development	 ✓ 	Entrepreneurial Development
 ✓ 	Employability	1	Innovations
 ✓ 	Intellectual Property Rights	1	Gender Sensitization
1	Social Awareness/ Environment	1	Constitutional Rights/ Human Values/ Ethics



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231TL1A1TA		TAMIL - I	SEMESTER I
		Total	Credits: 3
		Total Instructio	n Hours: 60 h
		Syllabus	
Unit I மற	<u>ற</u> மலர்ச்சிக் கவி	றைகள்	13 h
1. இலக்கிய வரச 2. பாரததேசம் 3. படி 4. தமிழரின் பெ 5. தமிழ்க் கொன 6. திரைத்தமிழ் அ) 'விஞ்ஞான தாராயண ஆ) 'சும்மா கி கல்யாண வ இ) 'சமரசம் உ ஈ) 'உன்னை	லாறு ருமை லை புரியாதீர் கவி டந்த நிலத்தை' சுந்தரனார் _லாவும் இடமே அறிந்தால்' என	- மறுமலர்ச்சிக் கவிஞர்களின் - பாரதியார் - பாரதிதாசன் - நாமக்கல் கவிஞர் - புலவர் குழந்தை போறண்டி' எனத் தொடங்கும் பாடல் எனத் தொடங்கும் பாடல் - பட்டுக்ே ' எனத் தொடங்கும் பாடல் - மருதசு எத் தொடங்கும் பாடல் - கண்	தமிழ்ப்பணிகள் ல் - உடுமலை கோட்டை காசி எணதாசன்
Unit II Це	துக்கவிதைகள்		13 h
1. இலக்கிய வர 2. கடமையைச் 3. மலையாளக் 4. ஒப்பிலாத ச(5. கன்னிமாடம 6. கரிக்கிறது த 7. ஐந்தாம் வகு 8. ஹைகூ கவி	லாறு செய் காற்று மதாயம் ம் ாய்ப்பால் ப்பு 'அ' பிரிவு தைகள்	- புதுக்கவிதையின் தோற்றமும் வக - மீரா - சிற்பி - அப்துல் ரகுமான் - மு.மேத்தா - ஆரூர் தமிழ்நாடன் - நா. முத்துக்குமார் - 10 கவிதைகள்	ளர்ச்சியும்
Unit III ရ	பண்ணியம்		09 h
1. தொலைந்து 2. நீரில் அலை 3. தற்காத்தல் 4. ஏனிந்த வித் 5. புதையுண்ட	போனேன் யும் முகம் தியாசங்கள் ? வாழ்க்கை	- தாமரை - அ. வெண்ணிலா - பொன்மணி வைரமுத்து - மல்லிகா - சுகந்தி சுப்ரமணியன்	



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Course Code	Course Name	Category	L	Т	P	Credit
231TL1A1HA	HINDI-I	LANGUAGE-1	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The writing ability and develop reading skill
- The various concepts and techniques for criticizing literature
- The techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	K3
CO5	Apply the power of creative reading	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~			1	✓
CO2		1			1
CO3				1	
CO4	~		1		
CO5		1	1		1

COURSE FOCUSES ON

✓ Skill Development	Entrepreneurial Development
Employability	✓ Innovations
✓ Intellectual Property Rights	✓ Gender Sensitization
Social Awareness/ Environment	✓ Constitutional Rights/ Human Values/ Ethics



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Unit IV சிறுகதைகள்

1. இலக்கிய வரலாறு	- சிறுகதையின் தோற்றமும் வளர்ச்சியும்	
2. கனகாம்பரம்	- கு.ப.ராஜகோபாலன்	
3. ஆற்றங்கரைப் பிள்ளையார்	- புதுமைப்பித்தன்	
4. பொம்மை	- ஜெயகாந்தன்	
5. காய்ச்சமரம்	- கி. ராஜநாராயணன்	
6. காட்டில் ஒருமான்	- அம்பை	
7. வேட்கை	- சூர்யகாந்தன்	
Unit V பயிற்சிப் பகுதி		10 h

அ. இலக்கணம்

1. வல்லின ஒற்று மிகும்,	, மிகா இடங்கள் - ஒற்றுப்பிழை நீக்கி எழுதுதல்
2. ர,ற-ல,ழ,ள - ண,ந,ன	வேறுபாடு - ஒலிப்பு நெறி, சொற்பொருள் வேறுபாடு அறிதல்)
ஆ. படைப்பாக்கம்	
1. கவிதை - எழுதுதல்	(15 வரிகள் முதல் 30 வரிகள் வரை)
2.சிறுகதை - எழுதுதல்	(குறைந்தது 3 பக்கங்கள்)

Text Book

- தமிழ் மொழிப்பாடம் 2022-2023, தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி.
- 1 கலை அறிவியல் கல்லூரி, கோயம்புத்தூர் 641048, வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 600 098.

References

- 1 பேராசிரியர் புலவர் சோம. இளவரசு , எட்டாம் பதிப்பு 2014, தமிழ் இலக்கிய வரலாறு – மணிவாசகர் பதிப்பகம், சென்னை – 600 108.
- 2 பேராசிரியர் முனைவர் பாக்கியமேரி, முதற் பதிப்பு 2013, இலக்கணம் -இலக்கிய வரலாறு - மொழித்திறன் - பூவேந்தன் பதிப்பகம், சென்னை-600 004.
- 3 இணையதள முகவரி: <u>https://www.tamilvu.org</u>



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B.Sc. Microbiology (Students admitted during the AY 2023-24)

15 h

				29
231	TL1A1HA	HINDI-I	SEMES'	TER I
		Total	Credits:	3
		Total Instruction	Hours:	60 h
		Syllabus		
Uni	t I			13 h
गद्य - पाठ 4	- नूतनगद्यसंग्रह 1- राष्ट्रपितामह	र्(जयप्रकाश)पाठ 1- रजियापाठ 2- मक्रीलपाठ 3- बहतापानीनिर्मल ात्मागाँधी	ता	
Unit	ŧ II			13 h
कहान	गिकुंज- डाँवी.पी	ो. 'अमिताभ'(पाठ 1-4)		
Unit	: III			12 h
व्याक	रण : शब्दविचा	ार (संज्ञा, सर्वनाम,विशेषण)		
Unit	IV			12 h
अनुच्द	<u>ब्रे</u> द लेखन			
Unit	v			10 h
अनुवा	ाद अभ्यास-III	(केवल अंग्रेजी से हिन्दी में) (पाठ 1 to 10)		
Text	Books			
1	प्रकाशक: सुगि	मेत्रप्रकाशन 204 लीलाअपार्ट्मेंट्स, 15 हेस्टिंग्सरोड′अशोकनगरइल	ाहाबाद-21	1001
2	प्रकाशक: गोर्ा	वेन्दप्रकाशनसदरबाजार, मथुराउत्तरप्रदेश-281001		
3	पुस्तक: व्याक	रण प्रदिप – रामदेवप्रकाशक: हिन्दी भवन 36 टेगोर नगर इलाहा	बाद-2110	24
4	पुस्तक: व्याक	रण प्रदिप – रामदेवप्रकाशक: हिन्दी भवन 36 इलाहाबाद-21102	24	

5 प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17



Course Code	Course Name	Category	L	Т	P	Credit
231TL1A1MA	MALAYALAM- I	LANGUAGE - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The writing ability and develop reading skill
- The various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- The competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Apply creative ability	К3
C05	Build the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

			the second s	701	POE
COs/POs	PO1	PO2	PO3	PO4	. FO5
CO1	1			1	
CO2					
CO3		1	✓ .	19.12	
CO4	1			V	
CO5		. 1	•	1	v

COURSE FOCUSES ON

Skill Development	1	Entrepreneurial Development
Employability	V .	Innovations
Intellectual Property Rights	1	Gender Sensitization
Social Awareness/ Environment	1	Constitutional Rights/ Human Values/ Ethics



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231TL1A1	МА	MALAYALAM - I	SEM	ESTER I
			Total Credit	s: 3
		То	tal Instruction Hour	s: 60 h
		Syllabus		
Unit I	Novel			14 h
Pathumma	yude Adu			
Unit II	Novel			10 h
Pathumma	yude Adu			
Unit III	Short Story			14 h
Nalinakant	hi			
Unit IV	Short Story			10 h
Nalinakant	hi			
Unit V	Practical Applicat	ion		12 h
Expansion	of ideas, General Ess	ay and Translation		

Text Books

- 1 Vaikkam Muhammed Basheer, "Pathummayude Adu" (NOVEL), DC Books & Kottayam
- 2 T.Padmanabhan, "Nalinakanthi" (Short Story), DC Books & Kottayam.

References

- 1 Malayala Novel Sahithyam.
- 2 Malayala Cherukatha Innale Innu.



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Course Code	Course Name	Category	L	Т	P	Credit
231TL1A1FA	FRENCH - I	LANGUAGE - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The competence in general communication skills with oral, written and comprehension & expression
- The culture, life style and the civilization aspects of the French people as well as of France
- The students to acquire competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Select the Plural, Articles and the Hobbies	K2
CO4	Measure the Cultural Activity in France	K3
CO5	Evaluate the sentiments, life style of the French people and the usage of the conditional tense	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1				1
CO2					1
CO3					
CO4	1		1		1
CO5	1		1		. Salar

COURSE FOCUSES ON

 ✓ 	Skill Development	1	Entrepreneurial Development
 ✓ 	Employability	 ✓ 	Innovations
 ✓ 	Intellectual Property Rights	 ✓ 	Gender Sensitization
 ✓ 	Social Awareness/ Environment	 ✓ 	Constitutional Rights/Human Values/ Ethics



231TL1A1FA

SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Salut I Page 10

12 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
 Saluer Enter en contact avec quelqu'un. Se presenter. S'excuser 	En cours de cuisine, premiers contacts avec les members d'un groupe	 Comprendre des personnes qui se saluent. Ēchanger pour entrer en contact, se présenter, saluer, s'excuser. Communiquer avec tu ou vous. Comprendre les consignes de classe Ēpeler son nom et son prénom. Computer jusqu'à 10.

Unit II Enchanté I Page 20

12 h

Objectifs de Communication	Tâche	Activités de réception et de production orale		
 Demander de se presenter. Présenter quelqu'un. 	Dans la classe de français, se presenter et remplir une fiche pour le professeur.	 Comprendre les informations essentielles dans un échange en milieu professionnel. Ēchanger pour se presenter et présenter quelqu'un. 		

Unit III J'adore I Page 30

12 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
Exprimer ses gouts. Dr.NGPASC COMBATORE LINDIA	Dans un café, participer à une soirée de rencontres rapides et remplir de taches d'appréciation <u>B.Sc. Microbiology (</u>	 Dans une soirée de recontres rapid comprendre des personnes qui échangent sur elles et sur leurs goût Comprendre une personne qui parler des goûts de quelqu'un d'autre



14 H				
Objectifs de Communication	Tâche	Activités de réception et de production orale		
Présenter quelqu'un	Dans un café, participer à une soirée de rencontres rapides et remplir de taches d'appréciation	 Exprimer ses goûts Comprendre une demande laissée sur un répondeur téléphonique. Parler de ses projets de week-end 		
Autoevaluation du module I Pa	age 40 – Préparation au DELF	A1 page 42		
Demander à quelqu'un de faire quelque chose. Demander poliment.	Organiser un programme d'activités pour accueillir une personne importante	Comprendre une personne demande un service à quelqu'un.		
Parler d'actions passes. Tu veux bien?		Demander à quelqu'un de faire quelque chose.		
		Imaginer et raconter au passé à partir de situations dessinées.		

Unit IV J'adore I Page 30

Unit V **Practical Application**

10 h

Make in Own Sentences

Text Book

Regine Merieux, Yves Loiseau. 2012. LATITUDES – 1: Méthode de français (Page No: 9-55) Les Editions Dider, Paris, Imprime en Roumanie par Canale en 1 Janvier



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Course Code	Course Name	Category	L	т	Р	Credit
231EL1A1EA	ENGLISH - I	LANGUAGE- II	4	-	1	3

PREAMBLE

This course has been designed for students to learn and understand

- the effect of dialogue, imagery and varied genres
- any spontaneous spoken discourse and respond to them with proper sentence structure
- the transactional concept of English language

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level	
CO1	Identify the various aspects in poetry	K2	
CO2	Infer linguistic and non-linguistic features of the context for understanding and interpreting	K3	
CO3	Construct sentences and convey messages effectively in real life situations	K3	
CO4	Apply different reading strategies with varying speed	K3	
CO5	Prepare modules with their own ideas and present them coherently in a grammatically correct form	КЗ	

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓		1	1	~
CO2		1			V
CO3	~	1		1	
CO4			1		
CO5	1	1			1





231EL1A1EA	ENGLISH- I

SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies

Nissim Ezekiel: The Worm- Author's Biography- title indications- outlineparaphrasing the poem- context of poem- form- poetic devices- enjambmenttechniques- Annotations

Niyi Osundare: Our Earth Will Not Die- Author's Biography- title indicationsoutline- paraphrasing the poem- context of poem- form- poetic devicesenjambment- techniques- Annotations

A. G. Gardiner: On Superstitions- Author's biography- Narrative structure-Exploration of the text- passage analysis- insight of ideas- cohesion and contextstyle- language techniques- Annotation

Nancy Bella: Clever Thief- Author's Biography- Plot Summary- Detailed summary and Analysis- Themes- Important Quotations- Characters- Description - analysis-Terms- Symbols- Critical analysis

H. G. Wells: The Truth about Pyecraft- Author's Biography-narrative structurepassage analysis- insight of ideas- cohesion and context- style- language techniques

Unit II Listening Skills

Listening vs. hearing- Types of listening, Tips to enhance Listening Skills, Nonverbal and Verbal signs of active listening - Comprehensive Listening - Listening to pre-recorded audios on speeches, interviews and conversations - Listening Activities- Listening and responding to complaints (formal situation), Listening to problems and offering solutions (informal)

Unit III Speaking Skills

Formal occasions- Introducing oneself, Introducing others, Enquiries and Seeking permission, Making short presentations- Informal occasions- Requests, Offering help, Congratulating, Farewell party, graduation speech- Giving instructions to do a task and to use a device, Giving and asking directions

Unit IV Reading Skills

Study Skills: Skimming and Scanning- Reading different kinds of texts- Types of reading-Developing a good reading speed, reading aloud, Referencing skill - Word



B.Sc. Microbiology (Students admitted during the AY 2023-24)

36

14 h

10 h

12 h
Power (Denotation and Connotation) - Reading comprehension, Data interpretation –Charts, Graphs, Advertisements

Unit V Writing Skills

12 h

Sentence patterns, Note- making and note taking-Strategies - Paragraph writing: Structure and Principles - Academic Writing - Formal and Informal Letters, Report, Book / Movie Review

Text Books

- 1 Gardiner, A. G. 1926. Alpha of the Plough: Second series, J.M. Dent & Sons Ltd., London, United Kingdom. pg.no-151-156. (Unit I)
- Ezekiel, Nissim. "The Worm," Crazy Romantic Love, www.
 2 mianmawaisarain.live/2020/05/poem-worm-nissim-ezekiel.html. Accessed 3 Aug. 2022. (Unit I)
- 3 < http://livros01.livrosgratis.com.br/ln000835.pdf /> (Unit I)
- 4 Mithra, S. M. 1919. Hindu Tales from the Sanskrit, Macmillan & Co Ltd., London, United Kingdom. pg.no-127-142. (Unit I)
- 5 Nation, I. S. P and Jonathan Newton. 2009. Teaching ESL/EFL Listening and Speaking. Routledge, New York, United States. (Unit II)
- Prabha, Dr. R. Vithya & S. Nithya Devi. 2019. Sparkle. (1st Edn.) McGraw -
- Hill Education, Chennai, India. (Unit III-V)

References

- Our Earth Will Not Die By Niyi Osundare." Studocu.Com, studocu.com
- /in/document/bangalore-university/bachelor-of-computer-applications /1586771577-our-earth-will-not-die/27675462. Accessed 3 Aug. 2022.
- 2 OnSuperstitions."THEHISTORIAN,thehistorian1947.wordpress.com/2019/0 3/08/on-superstitions-by-a-g-gardiner. Accessed 3 Aug. 2022.
- Swales, John M. & Feak, Christine B. 2012. Academic Writing for Graduate
 Students: Essential Tasks and Skills, University of Michigan Press, Michigan, United States.
- 4 Rudzka, Brygida -Ostyn, 2003. Word Power: Phrasal Verbs and Compounds: A Cognitive Approach, Mouton de Gruyter, New York, United States.

Course Code	Course Name	Category	L	Т	P	Credit
233MB1A1CA	FUNDAMENTALS OF MICROBIOLOGY	CORE	3	1	1	3

This course has been designed for students to learn and understand

- History and scope of microbiology
- Microscopy, staining, sterilization methods and culture media
- General characteristics of Fungi, Algae and protozoa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
C01	Describe the emergence of systematic microbiology Provide details about the history of microbiology	K1
CO2	Gives technical ideas about the handling of microscopes Develop route map for bacteriological study	K1
CO3	Understand the aseptic techniques which are applicable in day today life.	K2
CO4	Describes the cultivation of various types of microbes and their handling.	K2
CO5	Interpret the knowledge of fungi and algae for human welfare.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	States and a second	n original - Sigaritation		
CO2	1	✓	1		✓
CO3	1	1	1	1	✓
CO4	1	1	1	~	
CO5	1				

 ✓ 	Skill Development	Entrepreneurial Development
1	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics



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Total Credits: 3

SEMESTER I

Total Instruction Hours: 36 h

Syllabus

Unit I History of Microbiology

History and Scope of Microbiology – Spontaneous generation theory and its disproval – Contribution of Leuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Joseph Lister, John Tyndall, Salmon A .Waksman, Martinus W.Beijerinck, Elie Metchnikoff, Fannie Eilshmius Hesse, Paul Ehrlich. Scope of Microbiology.

Unit II Microscopy and Staining

Microscopy – Principles and application – Bright field, Dark field, Phase contrast, confocal, Fluorescence, SEM & TEM. Stains - Staining reactions – Types of staining – Simple, Differential (Gram's, Spore, AFB), Capsule and fungal staining.

Unit III Methods of Sterilization

Sterilization and Disinfection- Principles- Methods of Sterilization – Physical methods: Dry Heat, Moist heat, Filtration and Radiation. Chemical methods - Formaldehyde, Alcohol, Phenol and Gaseous sterilizing agents. Sterility Testing.

Unit IV Culture Methods

Culture Media - Types of Media - Enriched, Selective, Differential and Special Purpose Media, Transport media (Stuart's medium), Media for Anaerobes(Robertson cooked meat medium) - Pure culture techniques - Maintenance and Preservation of microbial cultures.

Unit V General characteristics of Fungi, Algae and Protozoa 7 h

Morphology, General Characteristics, and economic importance of Fungi (Aspergillus, Penicillium), Algae (Anabena, Spirogyra), Protozoa – (Euglena and Nostoc).

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8 h

7 h

7 h

7 h

- 1 Joanne Wiley, Linda Sherwood, Christopher J Woolverton, 2016, **Prescott's Microbiology**, 10th Edition, McGraw Hill Company & New York, United States
- 2 Michael J Pelczar, JR Chan ECS, Noel R Krieg, 1985, Microbiology, 5th Edition, McGraw Hill Company & New York, United States.

References

- 1 Salle AJ, 2014, Fundamental Principles of Bacteriology, 7th edition, Tata Mcgraw-Hill Publishing Company & New York, United States.
- Michael Madigan, John Martinko, Kelly Bender, Daniel Buckley and David Stahl, 2015, Brock
 Biology of Microorganisms, 14th edition, Pearsons Education Ltd & London, United Kingdom.
- 3 Atlas RM, 1997, Principles of Microbiology, 2nd edition, Tata Mcgraw-Hill Publishing Company & New York, United States.
- 4 Jeffrey C Pommerville, 2013, Alcamo's Fundamentals of Microbiology, 10th Edition, Blackwell Publications & New Jersey, United States.



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Course Code	Course Name	Category	L	Т	Р	Credit
233MB1A1CB	CELL BIOLOGY	CORE	3	-	-	3

This course has been designed for students to learn and understand

- The complexity and harmony of cell structure and functions of prokaryotic and eukaryotic life forms
- The cellular changes occur during different phases of life cycle
- To understand the different modes of cellular differentiation and division

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the structure and functioning of the internal organelles of an prokaryotic cell	K2
CO2	Decipher the structure and functioning of the internal organelles of an eukaryotic cell	K2
CO3	Cognize the interactions in an eukaryotic and prokaryotic system and the changes that occurs inside the cell upon receiving a chemical / hormonal signal	K2
CO4	Understand the mode of transport of extracellular proteins from the cytoplasm to the exterior	K2
CO5	Decipher the reproduction methods or cell division strategies in a prokaryotic and eukaryotic system	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	1	√	✓	1
CO2	√	1	√	~	1
CO3	1	1	✓	1	1
CO4	√	1	√	✓	1
CO5	✓	1	1	√	1

✓	Skill Development	Entrepreneurial Development
	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics



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233MB1A1CB	CELL BIOLOGY	SEMESTER I
		Total Credits: 3
	Total In	nstruction Hours: 36 h

Syllabus

Unit I Prokaryotes - Eubacteria

Definition - Shape, arrangement and Size - Cell Organization - Structure and function - Cell wall-Gram positive and Gram negative - Cell membrane - Nuclear material - plasmids - ribosomes inclusion bodies- Flagella - Pili - Capsule - Slime - Endospore formation

Unit II Eukaryotes

Eukaryotic Cell Organization - Structure and Function of – Cell wall - Cell membrane – Nucleus (organization of genetic material) – Mitochondria – Endoplasmic reticulum – Ribosomes - Golgi Apparatus - Lysosomes - Extra cellular matrix - Chloroplast & Cytoskeleton - actin filaments, intermediate filaments, microtubules - flagella - cilia

Unit III Cell Signaling & Cell-Cell Interaction

Cell-cell interactions in eukaryotes - adhesion junctions, tight junctions, gap junctions, and plasmodesmata - Quorum sensing (in prokaryotes) Cell Signaling - Signalling molecules and their receptors Function of cell surface receptors, Cyclic AMP pathway

Unit IV Protein Sorting and Transport

Extracellular protein transport - targeting and insertion of proteins in the ER, export of proteins to Golgi apparatus, Protein sorting and export from Golgi apparatus to Lysosomes

Unit V Cell Division

Prokaryotes - Binary fission in Bacteria – Eukaryotic Cell cycle and Cell division - Mitosis: Mitotic Spindle - Centromere - Centrioles (Prophase - Metaphase - Anaphase - Telophase). Meiosis: Stages and Synapsis (Crossing Over).

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B.Sc. Microbiology (Students admitted during the AY 2023-24)

42

8 h

7 h

7 h

7 h

7 h

¹ Joanne Wiley, Linda Sherwood, Christopher J Woolverton, 2017, **Prescott'sMicrobiology**, 10th edition, McGraw Hill Company, New Delhi, India

Karp G, 2010, Cell and Molecular Biology: Concepts and Experiments. 6th edition. John Wiley & Sons. Inc.

References

- 1 Hardin J, Bertoni G and Kleinsmith LJ, 2010, Becker's World of the Cell, 8th edition, Pearson, New Delhi, India
- ² Tortora, Funke and Case, 2018, Microbiology, 13th edition, Pearson Education, New Delhi, India
- 3 De Robertis, EDP and De Robertis EMF. 2006, Cell and Molecular Biology, 8th edition. Lipincott Williams and Wilkins, Philadelphia
- 4 Cooper, G.M. and Hausman, R.E. 2009, **The Cell: A Molecular Approach**, 5th Edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
- 5 Arumugam N, 2014, Cell biology and molecular biology. 8th edition. MJP publishers



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CORE PRACTICAL: FUNDAMENTALS OF MICROBIOLOGY AND CELL BIOLOGY

SEMESTER I

Total Credits:3Total Instructions Hours:60 h

S.No	Contents
1	Preparation of cleaning solutions - Chromic acid
2	Media preparation – Nutrient Broth, Nutrient Agar (Plate, Deep, Slant and semisolid media)
3	Preparation of differential medium and selective medium
4	Decimal Dilution Technique
5	Pure culture techniques - Streak plate, Pour plate and Spread plate method.
6	Isolation and Enumeration of bacteria, fungi and actinomycetes from soil
7	Bacterial staining Techniques - Simple Staining & Differential staining - Gram's Staining, Acid Fast, Capsule and Spore staining
8	Fungal staining – Lacto phenol Cotton Blue Mount
9	Slide culture Technique (DBT Star Scheme)
10	Fungal Cell Observation by Stereo Microscope - Under DBT Star Scheme
11	Screening of PHB production - (DBT Star Scheme)
12	Microscopic studies of cell organelles - Plant and Animal cells
13	Observation of permanent slide for stages of mitosis and meiosis, Algae, Fungi and Protozoa

Note: 12 Experiments mandatory out of 14



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References

- 1 James.C.Cappuccino. 2017. Microbiology A laboratory manual. 11th edition, Pearson education publishers.
- 2 Aneja. K.R. 2012. Experiments in Microbiology, plant pathology and biotechnology, 4th Edition. New age publishers.
- 3 Kannan, N. 2003. Hand book of Laboratory culture media. 1st edition, Panima publishing house.



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Course Code	Course Name	Category	L	Т	P	Credit
233CL1A1IA	BIOCHEMISTRY	IDC	3		-	3

This course has been designed for students to learn and understand

- The structure and properties of carbohydrates and lipids.
- The structure and properties of amino acids, proteins and nucleic acids.
- The essentials of minerals and vitamins and role of hormones.

COURSE OUTCOMES

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

CO Number	er CO Statement	
CO1	Outline carbohydrate structure, classification and function.	K3
CO2	Know the structure and properties of lipids.	K3
CO3	Understand the structural and functional aspects of aminoacids and proteins.	К3
CO4	Describe the structure, types and properties of nucleic acids.	К3
CO5	Understand the types and significance of vitamins, minerals and hormones.	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	1	Nu _{l and S}	~	1
CO2	1	1		~	~
CO3	1	1		~	✓ · · ·
CO4	1	1	1	~	✓
CO5	1	n ng √n si gan	1	1	1

 Image: A start of the start of	Skill Development	1	Entrepreneurial Development
1	Employability	~	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics



233CL1A1IA	BIOCHEMISTRY	SEMESTER I

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Carbohydrates

Carbohydrates - classification, structure, properties and chemical reactions of monosaccharide -Glucose, Fructose, Galactose, Mannose, Arabinose. Disaccharides - Maltose, Lactose and Sucrose. Polysaccharides - Homo polysaccharides - Starch, Glycogen and Cellulose and Hetero polysaccharides - Hyaluronic acid, Heparin, Chondroitin sulphate. Biological importance of sugar derivates - glycosaminoglycan, proteoglycan and glycoprotein and Bacterial cell wall polysaccharides.

Unit II Lipids

Lipids - Definition, classification of lipids, physiochemical properties. Storage lipids - types. Structural lipids - phospholipids, glycolipids and sphingolipids. Structure and biological role of cholesterol.

Unit III Amino acids and Proteins

Amino acids - Classification of amino acids, general properties, non protein amino acids. Peptide bond - structure and conformation, Proteins - classification and physiochemical properties. Organization of protein Structure - Primary, secondary tertiary, quaternary structure. Protein denaturation.

Nucleic Acids and Enzymes Unit IV

Nucleic acids - Structures of Purines, Pyrimidines, Nucleoside and Nucleotides. Properties of nucleic acids. DNA - Double helical structure, Isoforms. DNA denaturation and renaturation. RNA - Types, structure and function. Enzymes - Concepts of enzymes, classification, characteristic features, clinical and industrial applications.

Unit V Micronutrients

Micronutrients - Minerals in biological system and their importance - Iron, calcium, phosphorous, iodine, copper, zinc. Vitamins - Definition, classification - Fat soluble Vitamins - A, D, E and K. Water Soluble vitamins - Vitamin B Complex, Vitamin C - sources, functions and deficiencies. Hormones involved in regulatory metabolism- Insulin, Glucagon and thyroid hormones.



Dr.NGPASC COIMBATORE | INDIA 8 h

6 h

7 h

8 h

7 h

- 1 Jain J L, Jain S and Jain N, 2012, "Biochemistry", 1st Edition, S. Chand and Company Pot Ltd, New Delhi.
- 2 Satyanarayana U and Chakrapani U, 2013, "Biochemistry", 4th Edition, Elsevier, India.

References

- 1 Deb AC, 2001, "Fundamentals of Biochemistry", 7th Edition New central Agency, Calcutta.
- 2 Cooper, G M and Hausman R E, 2013, The cell: A Molecular Approach, 6th Edition, Sinauer Associates, Inc.Publishers, Sunderland, Massachusetts.
- 3 DM. Vasudevan, Sreekumari S., Kannan Vaidyanathan, 2019. Textbook Of Biochemistry For Medical Students, 9th Edition, Jaypee Brothers Medical Publishers, India.
- 4 https://www.khanacademy.org/search?page_search_query=biochemistry.



SEMESTER I

Total Credits:2Total Instructions Hours:48 h

S.No	Contents
1	Qualitative analysis of Mono saccharides – Pentose - Arabinose
2	Qualitative analysis of Hexoses - Glucose, Fructose
3	Qualitative analysis of Disaccharides - Sucrose, Maltose and Lactose
4	Qualitative analysis of Polysaccharide - Starch
5	Qualitative analysis of Histidine
6	Qualitative analysis of Tyrosine
7	Qualitative analysis of Tryptophan
8	Qualitative analysis of Arginine
9	Estimation of Acid Number
10	Estimation of Iodine Number
11	Quantification of Protein by Lowry's method
12	Ouantification of Carbohydrate by DNSA method

Note: Out of 12-10 Mandatory



References

- **1** Sadasivam S and Manikam A, 1996, **Biochemical methods**, 2nd Edition, New Age International publishers, New Delhi
- 2 Plummer D T, 2004, An Introduction to practical Biochemistry, 3rd Edition, Tata McGraw-Hill Education Pot. Ltd, New Delhi
- 3 Jayaraman J, 2015, Laboratory manual in Biochemistry, 5th Edition, New Age International (P) Ltd.
- 4 Pattabiraman T N and SitaramaAcharya U, 2015, Laboratory Manual in Biochemistry, 4th Edition., All India Traveller Book Seller



Course Code	Course Name	Category	L	Т	Р	Credit
233MB1A1AA	ENVIRONMENTAL STUDIES	AECC	2	-	-	2

This course has been designed for students to learn and understand

- Multi disciplinary aspects of Environmental studies
- Importance to conserve the Biodiversity
- Causes of Pollution and its control

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	To understand the importance of natural resources in order to conserve for the future	K1
CO2	To impart knowledge on Natural resources and its conservation	K2
CO3	To impart knowledge on Biodiversity and its conservation	K3
CO4	To create awareness on effects, causes and control of air, water, soil and noise pollution etc.,	K4
CO5	To build awareness about sustainable development and Environmental protection	K1

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	1	✓ ✓		1
CO2	~	1	1	1	1
CO3	1	~	1	1	1
CO4	1	1	1		
CO5	1	1	~	✓	1





SEMESTER I

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Environmental studies & Ecosystems

Introduction to Environmental studies& Ecosystems: Multidisciplinary nature of environmental studies; components of environment - atmosphere, hydrosphere, lithosphere and biosphere. Scope and importance; Concept of sustainability and sustainable development. Ecosystem- Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession.

Unit II Natural Resources: Renewable and Non-renewable Resources

Natural Resources: Renewable and Non-renewable Resources: Land Resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and overexploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs.

Unit III **Biodiversity and Conservation**

Biodiversity and Conservation: Levels of biological diversity: genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots. India as a mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

5 h Unit IV Environmental Pollution, Environmental Policies & Practices

Environmental Pollution, Environmental Policies & Practices: Environmental pollution: types, causes, effects and controls; Air, water, soil, chemical and noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measures of urban and industrial waste. Pollution case studies. Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment Laws: Environment Protection Act; Prevention & Control of Pollution Act - Air & Water. Wildlife Protection Act; Forest Conservation Act;

Human Communities and the Environment& Field Work Unit V 4h

Human Communities and the Environment & Field Work: Human population and growth: Impacts on environment, human health and welfares. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness. Visit to an area to document environmental assets; river/forest/flora/fauna, etc. Population explosion - Family Welfare Programmes. Role of Information Technology in



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B.Sc. Microbiology (Students admitted during the AY 2023-24)

5 h

5 h

5 h

Environment and human health. Role of the Colleges, Teachers and Students in village adoption towards clean, green and make in villages in various aspects.

Text Books

- 1 Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt
- 2 Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press.

References

- 1 Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
- 2 Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
- 3 Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. 2006, Principles of Conservation Biology. Sunderland: Sinauer Associates.
- 4 Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
- 5 McCully, P.1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books.
- 6 *McNeil, John R.* 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
- 7 Odum, E.P., Odum, h.T. & Andrews, J.1971. Fundamentals of Ecology. Philadelphia: Saunders.

BoS Chairman/HOD Department of Microisielogy Dr. N. G. P. Arts and Science College Coimbatore - 641 048

	D	Dr.N.G.P. Arts and Science College				
CONTRACTOR .		APPROVED				
BOS- 15 M		AC- 15th	GB- 20th			
10/06/2023		14/07/2023	05/08/2023			





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Course Code	Course Name	Category	L	т	Р	Credit
231TL1A2TA	TAMIL- II	LANGUAGE- I	4	1	-	3

•

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடுநாகரீகம் செய்தல்
 - கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
C01	வாழ்க்கைத்திறன்கள் (Life Skills) மாணவர்களின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2
CO3	பாடஇணைச்செயல்பாடுகள் (Co-curricular activities)	K2
CO4	சூழலியல் ஆக்கம் (Ecology)	К3
CO5	மொழி அறிவு (Tamil knowledge)	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	\checkmark	\checkmark	en Vran altria a	production of the second second
CO2	\checkmark			\checkmark	
CO3	\checkmark	\checkmark			
CO4	\checkmark		~		
CO5	\checkmark			1	

COURSE FOCUSES ON

1	Skill Development	1	Entrepreneurial Development
~	Employability	\checkmark	Innovations
V	Intellectual Property Rights	 ✓ 	Gender Sensitization
~	Social Awareness/ Environment	 ✓ 	Constitutional Rights/ Human Values/ Ethics



Dr.NGPASC COIMBATORE | INDIA ,பகுத்தறிவு ஆகியவற்றை அறியச்

231TL1A2TA	TAMIL- II SEMES	STER II
	Total Credits	: 3
	Total Instruction Hours	60 h
	Syllabus	
Unit I 9	<u> ற</u> இலக்கியம்	13 h
1. இலக்கிய வரவ	லாறு- பதினெண்கீழ்க்கணக்குநூல்கள்	
2.திருக்குறள்		
அ. அறன்வலியுற	<u>ற</u> த்தல்- அ. எண் 04	
ஆ. நட்பாராய்தவ்	் - அ. எண் 80	
இ. நாடு - அ. என்	ът 74	
ஈ. குறிப்பறிதல்-	அ. எண் 110	
Unit II அ	ற இலக்கியம்	13 h
1. நாலடியார்	- அறிவுடைமை	
2. மூதுரை	- ஔவையார் - 10 பாடல்கள் 6, 7, 9, 10, 14, 16, 17, 23, 26, 30	
3. இனியவைநாற்	ற்பது- பூதஞ்சேந்தனார் - முதல் 10 பாடல்கள்	
Unit III ക	றநெறிக் கட்டுரைகள்	09 h
1. இலக்கியவரல	ாறு - தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்	
2. கலைகள்-உ.ே	வ.சா	
3. சங்க நெறிகள்-	வ.சுப.மாணிக்கம்	
Unit IV ക	றநெறிக் கட்டுரைகள்	15 h
1. வீர வணக்கம் ·	- க.கைலாசபதி	
2. தமிழர் பண்பா 3. இணையத் தமி	டு - டாக்டர் சோ.நா.கந்தசாமி ழ் வளர்ச்சி - முனைவர் ப.அர.நக்கீரன்	
Unit V ப	யிற்சிப் பகுதி	10 h
1.இலக்கணம்-வர	ழ, வழுவமைதி,வழாநிலை	
2.அலுவலகம் சா	ர்ந்த கடிதம் -விண்ணப்பங்கள், வேண்டுகோள்,முறையீடு	
3.படைப்பாக்கம்-	பொதுத்தலைப்பில் கட்டுரைகள் எழுதுதல்	



தமிழ் மொழிப்பாடம்-2023-2024,தொகுப்பு: தமிழ்த்துறை , டாக்டர் என்.ஜி.பி. கலை

1 அறிவியல் கல்லூரி,கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ் ,சென்னை. (Unit I to V)

References

- 1 பேராசிரியர் புலவர் சோம. இளவரசு,எட்டாம் பதிப்பு. 2014. தமிழ் இலக்கிய வரலாறு-மணிவாசகர் பதிப்பகம்,சென்னை.
- 2 பேராசிரியர் முனைவர் பாக்கியமேரி ,முதற் பதிப்பு. 2013. இலக்கணம்-இலக்கிய வரலாறு- மொழித்திறன்- பூவேந்தன் பதிப்பகம்,சென்னை. .
- 3 தமிழ் இணையக் கல்விக்கழகம் TAMIL VIRTUAL ACADEMY. வலைதள முகவரி : https://www.tamilvu.org



Course Code	Course Name	Category	L	Т	Р	Credit
231TL1A2HA	HINDI- II	LANGUAGE- I	4	1	-	3

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature
- the techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	К2
CO4	Build creative ability	К3
CO5	Apply the power of creative reading	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1			1	\checkmark
CO2	1	· · · ·			\checkmark
CO3	\checkmark		~	1	~
CO4	1	States in the second	~		\checkmark
CO5	\checkmark	1	~		\checkmark

COURSE FOCUSES ON

✓ Skill Development	✓ Entrepreneurial Development
✓ Employability	✓ Innovations
✓ Intellectual Property Rights	✓ Gender Sensitization
Social Awareness/ Environment	✓ Constitutional Rights/ Human Values/ Ethics



		and a second a
231TL1A2HA	HINDI- II SEMES	TER II
	Total Credits:	3
	Total Instruction Hours:	60 h
	Syllabus	
Unit I		13 h
आधुनिकपद्य – शब	तरी(श्रीनरेशमेहता)	
Unit II		13 h
उपन्यासः सेवासदन	-प्रेमचन्द	
Unit III		12 h
कहानी-किरीट- डा	उषा पाठक / डा अचला पाण्डेय	
पाठ 1.कफ़न <i>,</i> 3. र्च	ोफ़ की दावत	
Unit IV		12 h
पत्र लेखन: (औपचा	रिक या अनौपचारिक)	
Unit V		10 h
अन्वाद अभ्यास-II	l (केवल हिन्दी से अंग्रेजी में) (पाठ 1 to 10)	

- प्रकाशक: लोकभारती प्रकाशन पहली मंजिल , दरबारी बिल्डिंग,महात्मा गाँधी मार्ग, इलाहाबाद.
 (Unit I)
- प्रकाशक: सुमित्र प्रकाशन 204 लीला अपार्ट्मेंट्स , 15 हेस्टिंग्स रोड 'अशोक नगर इलाहाबाद . (Unit II)
- 3 प्रकाशक: राधाकृष्ण प्रकाशन दिल्ली. (Unit III)
- 4 पुस्तक: व्याकरण प्रदिप रामदेवप्रकाशक: हिन्दी भवन 36 इलाहाबाद. (Unit IV)
- 5 प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई. (Unit V)



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Course Code	Course Name	Category	L	Т	P	Credit
231TL1A2MA	MALAYALAM- II	LANGUAGE - I	4	1	-	3

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	К2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	К3
CO5	Apply the power of creative reading	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓			\checkmark	1
CO2	\checkmark				1
CO3	\checkmark	\checkmark	✓		1
CO4	\checkmark		1	\checkmark	~
CO5	\checkmark	\checkmark	1		1

COURSE FOCUSES ON

 ✓ 	Skill Development	 ✓ 	Entrepreneurial Development
~	Employability	\checkmark	Innovations
 ✓ 	Intellectual Property Rights	\checkmark	Gender Sensitization
\checkmark	Social Awareness/ Environment	 ✓ 	Constitutional Rights/ Human Values/ Ethics



231TL1A2	MA	MALAYALAM-II SEMES	ГER II
		Total Credits:	3
		Total Instruction Hours:	60 h
		Syllabus	
Unit I	Nov	zel	12 h
Enmakaje:	Chapt	ter1- Chapter5	
Unit II	Nov	vel	10 h
Enmakaje:	Chap	ter 6- Chapter 10	
Unit III	Nov	vel	12 h
Enmakaje:	Chap	ter 11- Chapter 15	
Unit IV	Aut	tobiography	14 h
Neermatha	alamP	oothaKalam: Chapter 1- Chapter 10	
Unit V	Aut	tobiography	12 h
Neermatha	alamP	ootha Kalam: Chapter 11- Chapter 20	

1 Ambika SuthanMangad, Enmakaje (Novel), DC Books Kottayam, Kerala, India. (Unit I to III)

2 Madhavikkutty, NeermathalamPootha Kalam (Autobiography), DC Books Kottayam, Kerala, India. (Unit IV & V)

References

- 1 MalayalaNovelSahithyam, DC Books Kottayam, Kerala, India.
- 2 MalayalaSahithyaCharithram, National Books Kottayam, Kerala, India.



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Course Code	Course Name	Category	L	Т	P	Credit
231TL1A2FA	FRENCH- II	LANGUAGE - I	4	1	-	3

This course has been designed for students to learn and understand

- the Competence in General Communication Skills Oral + Written- Comprehension & Expression
- the Culture, life style and the civilization aspects of the French people as well as of France
- the students to acquire Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Select the Plural, Articles and the Hobbies	K2
CO4	Measure the Cultural Activity in France	К3
CO5	Evaluate the sentiments, life style of the French people and the usage of the conditional tense	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~			the second strong to	\checkmark
CO2	~	\checkmark			\checkmark
CO3			~	\checkmark	\checkmark
CO4	~		✓		\checkmark
CO5	~	\checkmark	1	\checkmark	\checkmark

COURSE FOCUSES ON





231TL1A2FA	FRENCH- II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I12 hProposer, accepter,
refuserune invitation.
Indiquer la date.Organiser une soirée au
cinéma avec des amis,
par téléphone et par
courriel.Comprendreunemessage
d'invitationsurunréponde
urtéléphonique.
Inviter quelqu'un
accepter
ourefuserl'invitation.

Unit II

Prendreet fixer un rendez-vous. Demander etindiquerl'heure.	Organiser une soirée au cinéma avec des amis, par téléphone et par courriel.	Comprendre des personnes qui fixentunrendez-vous par téléphonique. Prendreun rendez-vous
		par telephone

Unit III

12 h

12 h

Exprimer son point de vue positif et négatif.	En groupes, choisir un cadeau pour un ami.	Exprimer son point de vuesur des idées de
S'informersur le prix.		cadeau.
S'informersur la quantitité.		Faire des achatsdans un magasin
Exprimer la quantitité.		

Unit IV

-1991 ->

14 h

Demander etindiquerune	Suivre un itinéraire à	Comprendre des
direction.	l'aided'indications par	indications de direction.
Localiser (près de, en face	telephone et d'un plan.	Comprendre des
de).	Par courrierélectronique,	indications de lieu.
Exprimerl'obligationl'	donner des informations et des conseils à un ami	Comprendreune chanson.
Interdit.Conseiller.	qui veut vovager.	Comprendre de courts
	qui veut veyagen	messages qui experiment
		l'obligationoul'interdictio
Dr.NGPASC		n.
COMBATORE LINDIA	B.Sc. Microbiology (St	udents admitted during the AY 2023-24)

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Donner des conseils à des
personnesdans des situations données.

Unit V

10 h

. 1

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Make in Own Sentences

Text Book

1

Regine Merieux, Yves Loiseau, "LATITUDES - 1" (Page No: 56-101) (Methode de Français), Goyal Publisher & Distributors Pvt.Ltd., 86 UB Jawahar Nagar (Kamala Nagar), New Delhi-7 Les Editions Dider, Paris, 2008- Imprime en

Roumanie par Canale en Janvier 2012. (Unit I to IV)



Course Code	Course Name	Category	L	Т	Р	Credit
231EL1A2EA	ENGLISH- II	LANGUAGE- II	4	-	1	3

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PREAMBLE

This course has been designed for students to learn and understand

- the language for specific purposes through various literary manuscripts
- the process of communicative competencies in academics through authentic contexts
- the different formats of business correspondence with lucidity and accuracy via various media

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Identify and appreciate the eminent writers' works of various genres	K1
CO2	Infer and comprehend complex situational talks	K2
CO3	Relate formal and informal communicative contexts to speak fluently	K2
CO4	Construct the denotative and connotative meanings while reading specialized texts	КЗ
CO5	Develop the skill of writing through descriptions, narrations and essays	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	\checkmark	\checkmark	\checkmark	\checkmark	
CO2		~			✓
CO3	a chiatract	1			1
CO4	\checkmark	1	\checkmark		V
CO5			\checkmark	and the same	✓

COURSE FOCUSES ON

Image: A state of the state	Skill Development	1	Entrepreneurial Development
	Employability	1	Innovations
\checkmark	Intellectual Property Rights	1	Gender Sensitization
I	Social Awareness/ Environment	~	Constitutional Rights/ Human Values/ Ethics



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231EL1A2EA	ENGLISH- II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies

John Keats: To a Friend Who Sent Me Some Roses - Author's Note - title indicationsoutline-paraphrasing the poem- context of poem- form- poetic devices- techniques-Style

A. G. Gardiner: On Habits - Author's Note- Title indications- Outline -Passage Analysis - context of the Prose - Narrative techniques- Style

Sudha Murthy: The Enchanted Scorpions- Author's Note - title indications-Plot summary- Outline of the story -devices- Narrative techniques- Style

David Pinski: A Dollar- Author's Note- Title indications -Plot Summary- Critical Analysis-Themes- Character analysis - Terms- Symbols

Unit II Listening Skills

Listening to Talks/Lectures by Specialists on selected subject-specific topics-Listening to Public Announcements- Listening to Instructions and Directions-Listening to Speeches-Listening to process/event descriptions to identify causes & effects

Unit III Speaking Skills

Small Talk- Mini Presentations and Making Recommendations- Group Discussions, Debates, and Expressing opinions through Role play- Picture Description-Giving Instruction to Use a Product- Presenting a Product- Summarizing a Lecture-Narrating Personal Experiences/ Events- Interviewing a Celebrity- Scientific Lectures-Educational Videos- Debates- Different Viewpoints on an Issue

Unit IV Reading Skills

Reading Biographies, Newspaper Reports, Technical Blogs- ReadingAdvertisements -Gadget Reviews- Newspaper Articles - Journal Reports – Reading Editorials & Blogs-Case Studies- Excerpts from Literary Texts

Unit V Writing Skills

Inferring & Interpreting- Predicting Reorganizing Material- Summary Writing Based on the Reading Passages- Writing - Emails & Essay Writing (Descriptive or Narrative)-Grammar - Tenses- Question Types: Wh/ Yes or No/ and Tags



11 h

12 h

12 h

10 h

15 h

- Keats, John. To a Friend Who Sent Me Some Roses. https://www.Poets.org , 1820, poets.org/poem/ friend-who-sent-me-some-roses.html/> (Unit I)
- 2 Gardiner, Alfred George. On Habits (n.d.). <<u>Https://Www. Gutenberg. Org/</u> Files/47429/47429-H/47429-H.Html/> (Unit I)
- Murthy, Sudha. The Enchanted Scorpions. (n.d.). <u><https://www.</u>
 <u>ssgopalganj.in/online/EBooks/CLASS%20VI/Grandma's%20Bag%20of%20</u>
 <u>Stories%20by%20Sudha%20Murthy.pdf/</u>> pp-34-39. (Unit I)
- 4 Pinski, David. A Dollar a One-act Play.<<u>www.one-act-plays.com/</u> <u>comedies/dollar.html/</u>>(Unit I)
- 5 Hart, Steve, Aravind R. Nair, Veena Bhambhani. 2016. Embark: English for Undergraduates. Cambridge University Press, New Delhi, India. (Unit II)
- 6 Lakshminarayan. 2012. A Course Book On Technical English. Scitech Publications Pvt. Ltd., New Delhi, India. (Unit III)
- Raman, Meenakshi & Sangeeta Sharma. 2016. Technical Communication Principles And Practice, Oxford University Press, New Delhi, India. (Unit IV)
- 8 Viswamohan, Aysha. 2017. English For Technical Communication (With CD), McGraw Hill (India) Private Limited, New Delhi, India. (Unit V)

References

- 1 Bajwa and Kaushik. 2010. Springboard to Success- Workbook for Developing English and Employability Skills. Orient Black Swan, Chennai, India.
- 2 Chellammal, V. 2003. Learning to Communicate. Allied Publishing House, New Delhi, India
- Krishnaswamy. N, LalithaKrishnaswamy& B.S. Valke. 2015. Eco English,
 Learning English through Environment Issues. An Integrated, Interactive Anthology. Bloomsbury Publications, New Delhi, India.
- 4 Syamala. V. 2002. Effective English Communication for You. Emerald Publishers, Chennai, Tamil Nadu, India.



Course Code	Course Name	Category	L	Т	Р	Credit
233MB1A2CA	MICROBIAL PHYSIOLOGY	CORE	4	-	-	4

This course has been designed for students to learn and understand

- Fundamentals of microbial nutritional requirements and transport
- Growth pattern and energy generation during microbial metabolism
- Diversity of metabolic processes and techniques used to elucidate physiological processes

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the nutritional requirements, modes of nutrient uptake and classification of microorganisms	K2
CO2	Analyze the growth conditions and metabolism of microbes	K3
CO3	Apply the pathways of energy generation and Biosynthetic process for characterization of microbes	К3
CO4	Understand the ecological significance of anaerobic microbes	K2
CO5	Commercially synthesize essential amino acids by using microbes	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~	✓	1		~
CO2	~	\checkmark		\checkmark	~
CO3	1	~	1	\checkmark	1
CO4	~	~	\checkmark		~
CO5	\checkmark		\checkmark	\checkmark	

~

COURSE FOCUSES ON

Skill Development

Entrepreneurial Development

Employability

Gender Sensitization

Innovations

Social Awareness/ Environment

✓ Intellectual Property Rights

Constitutional Rights/ Human Values/ Ethics



SEMESTER II MICROBIAL PHYSIOLOGY 233MB1A2CA **Total Credits:**

Total Instruction Hours: 48 h

Syllabus

Nutritional requirement Unit I

Common nutritional requirement-macro elements, micro elements and trace elements. Nutritional requirements of Microorganisms- Autotrophs, Heterotrophs ,Chemotrophs, Copiotrophs and Oligotrophs- Nutrition uptake by cell wall-Passive and Facilitated diffusion, Active transport, Group translocation

Growth of Bacteria Unit II

Growth factors-Growth curve- Microbial growth-Batch culture, Continuous, Semi continuous, Synchronous and Biphasic growth - Calculation of generation time -Estimation of Microbial growth: Microscopic count, Turbidometric assay and TVC -Factors influencing microbial growth

10 h **Respiration & Energy Production** Unit III

Aerobic respiration - EMP and its alternative pathways (HMP shunt & ED pathways) - TCA cycle - Electron transport - Energy generation via Oxidative and Substrate level phosphorylation - Calculation of ATP in aerobic cellular processes -Glyoxylate cycle - β oxidation of fatty acids

Unit IV Anaerobic Respiration

Anaerobic respiration - Methanogens - Sulphur and nitrogenous compounds and CO2 as final electron Acceptor - Fermentation - Alcoholic, Propionic, lactic and Mixed acid fermentation - Oxygenic and anoxygenic photosynthesis in bacteria

9hBiosynthesis of amino acid, Lipid and Cell wall Unit V

Biosynthesis of amino acids (Pyruvate family - Alanine, Leucine and Glutamic acid family) - Lipids (Phospholipids and Archeal lipids) -Biosynthesis of bacterial cell wall

Case study

Consider that you have isolated a rod shaped bacterium from a water sample that has the potential of producing a valuable compound. You have to identify the nutritional requirement of the organism that could enable a faster multiplication of the organism that could make the organism having potential for commercialization.

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4

10 h

9h

10 h

- 1 Joanne Wiley, Linda Sherwood, Christopher J Woolverton, 2017, Prescott's Microbiology, 7th edition, McGraw Hill Company, New Delhi, India.
- 2 *Reddy, S. M, and Ram Reddy S, 2007,* **Microbial Physiology**, *Scientific Publisher, India.*

References

- 1 Gerhard Gottschalk, 1986, Bacterial Metabolism, 2nd Edition, SpringerVerlag, New York
- 2 Moat A G, Foster J W, 1988, Microbial Physiology, 4th edition, John Wiley & Sons, New Jersey, United States
- 3 Stanbury P T and Whitaker, 1984, **Principles of Fermentation Technology**, 1st Edition, Adithya Books Pvt Ltd. New Delhi
- ⁴ Doelle HW, 1975, **Bacterial Metabolism**, 2nd edition, Academic Press, United States.



Course Code	Course Name	Category	L	Т	Р	Credit
233MB1A2CB	BIOINSTRUMENTATION	CORE	3	-	-	3

This course has been designed for students to learn and understand

- The basic principles of buffer, pH and biochemical calculations
- The working principles of instruments used in microbiology
- The techniques in separation, purification & quantification of Biomolecules

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic calculations used in solution preparation	К1
CO2	Demonstrate the instruments used in microbiology laboratory	К1
CO3	Separate the biomolecule in a solution based on their density	K3
CO4	Estimation of micro and macromolecules by Beer and Lambert's law	КЗ
CO5	Examine the presence of biomolecules using suitable separation techniques	КЗ

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~	✓	✓		1
CO2	1	\checkmark	n der stander bei	~	~
CO3	~	\checkmark	~	\checkmark	~
CO4	~	~	~		1
CO5	1		~	1	

\checkmark	Skill Development	~	Entrepreneurial Development
\checkmark	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics



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Total Credits: 3

SEMESTER II

7 h

8 h

Total Instruction Hours: 36 h

Syllabus

Unit I Buffers and pH Meter

Basic concepts –Solute, Solvent, Molarity, Molality, Normality. Preparation of solutions - Molar and Normal- Calculation methods. Buffers - Types of Buffers. pH meter - Instrumentation - calomel and glass electrode – Applications - Biosensor - Principle, types and applications

Unit IIBasic Microbiology Instruments7 h

Principle, Instrumentation, and Applications of Autoclave, Hot air oven, Incubator,

Laminar air flow, metabolic shaker, Lyophilizer. Biosafety cabinets – Introduction and types- Soxhlet Apparatus- Rotary vacuum evaporator- Distillation unit-Membrane filtration unit

Unit III Centrifugation

Centrifugation: Principle- Types and Applications of Centrifuges –Low speed, High speed, Microfuge-Ultra centrifuge- Analytical and Differential Centrifuge- Types of rotors -Methods of centrifugation- Differential centrifugation - Density gradient centrifugation-Zonal centrifugation, Isopycnic centrifugation.

Unit IV	Spectrophotometer	7 h
---------	-------------------	-----

Colorimetry- Beer and Lambert's law- Principle, Instrumentation and Applications-Spectrometry – UV -Visible Spectrophotometer. Spectrofluorimeter.

Unit VChromatography and Electrophoresis7 h

Chromatography-principles and applications- Paper, Thin layer, Column and HPLC. Electrophoresis –SDS – PAGE and Agarose gel electrophoresis

Case study: The organism was isolated from the stream of the Velliangiri hill which produced pleasant pigment and has significant antimicrobial properties. Separate the pigment using chromatography techniques and identify the structure of the compound.



- 1 Veerakumari L, 2011, "Bioinstrumentation", 1st Edition. MJB Publishers, New Delhi.
- 2 BajpaiPK (2010). "Biological Instrumentation and Methodology". Revised edition, S.Chand & Co. Ltd., New Delhi.

References

- 1 Palanivelu P, 2004, "Analytical Biochemistry and Separation techniques". 3rd edition, MKU Coop, Press Ltd., Palkalai Nagar, Madurai.
- Keith Wilson and John Walker, 2010, "Principles and Techniques of
 Biochemistry and Molecular Biology", 1st Edition, Cambridge University
 Press, UK
- ³ Plummer T David, 2004, "An Introduction to Practical Biochemistry", 3rd Edition, Tata McGraw Hill Publishers, New Delhi.
- 4 Cromwell, 2015, "Biomedical Instrumentation And Measurement", 2nd Edition, Pearson Publishers India.

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1

CORE PRACTICAL : MICROBIAL PHYSIOLOGY AND BIOINSTRUMENTATION

SEMESTER II

Total Credits:2Total Instructions Hours:60 h

S.No	Contents
1	Measurement of Microbial growth – Haemocytometer
2	Measurement of Microbial growth – Bacterial growth Curve
3	IMViC Test
4	Catalase test and Oxidase test
5	Preferential sugar utilization and H2S production test – TSI
6	Starch hydrolysis, Casein hydrolysis test, Gelatin liquefaction
7	Urease, Citrate utilization test and Nitrate Reduction Test
8	Effect of pH and Temperature on microbial growth (DBT Star Scheme)
9	Preparation of Buffers-Acidic, neutral and alkaline range
10	Density Gradient Centrifugation – Sucrose Gradient
11	Separation of amino acids -Thin Layer & paper Chromatography
12	Extraction of chlorophyll pigments from plant/algae (DBT Star Scheme)
13	Estimation of Protein - Lowry et al., method
14	Estimation of sugars - DNSA method

Note: End Semester Practical Examination requires completion of 12 experiments out of 14.



References

- 1 James.C.Cappuccino. 2017, Microbiology A laboratory manual, 11th edition, Pearson education publishers.
- 2 Aneja. K.R. 2012, Experiments in Microbiology, plant pathology and biotechnology, 4th Edition. New age publishers.
- 3 Maniatis, T. Tritsch E F and Sambrook J, 2010, Molecular Cloning. A Laboratory manual, Cold Spring Harbor Laboratory, New York.
- 4 Plummwer D.T. 1977, An Introduction to practical biochemistry, Tata McGraw Hill, Bombay



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Course Code	Course Name	Category	L	Т	P	Credit
232CE1A2EQ	BASIC CHEMISTRY	IDC	3	-	4	4

This course has been designed for students to learn and understand

- The concept of expressing concentration of solutions
- The concept and principles of volumetric analysis
- About the bonding and basic organic chemistry

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of concentration of the solutions	K2
CO2	Infer the acid and basic properties of solutions	K2
CO3	Interpret the concept of the bonding in molecules	K2
CO4	Summarize the basic concepts of the organic compounds and analysis	K2
CO5	Explain the methodology of volumetric estimations	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~		\checkmark	~	~
CO2		1	\checkmark		~
CO3	1			\checkmark	
CO4		1		~	~
CO5	1	×	\checkmark		\checkmark

\checkmark	Skill Development	Entrepreneurial Development
\checkmark	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics



232CE1A2EQ

BASIC CHEMISTRY

SEMESTER II

Total Credits: 4

Total Instruction Hours: 72 h

Syllabus

Unit I Solutions

Normality -Molarity -Molality -Mole fraction -Mole concept. Primary and secondary standards – Preparation of standard solutions. Principle of volumetric analysis (with simple problems)

Practical

1 Estimation of oxalic acid by KMnO₄ using a standard oxalic acid solution

2 Estimation of KMnO₄ by thiosulphate using a standard potassium dichromate solution

Unit II Acids and Bases

Acid base theories – Strength of acids and bases – Equilibrium constant and ionic constant of water- pH, pKa, pKb, buffer solution, pH and pOH simple calculations

Practical

- 3 Estimation of HCl by NaOH using a standard oxalic acid solution
- 4 Estimation of Na₂CO₃ by HCl using a standard Na₂CO₃ Solution

Unit III Chemical Bonding

Types of bonding - Ionic Bond: Nature of ionic bond, factors influencing the formation of ionic bond, covalent and coordinate bond

Practical

5 Preparation of Inorganic Complexes: Tetraamminecopper(II)sulphate

6 Preparation of Inorganic Complexes: Preparation of Hexathiourealead(II) nitrate

Unit IV Basic Organic Chemistry

Nomenclature -Physical and chemical properties -Preparation of carboxylic acid,



16 h

16 h

17 h

16 h

amine, phenol, amide

Practical

7 Test for Phenols

8 Test for Amines& Acids

Unit V Volumetric Estimations

17 h

Chemistry of oxidation and reducing agents and its applications - KMnO₄, K₂Cr₂O₇, LiAlH₄, NaBH₄

Practical

- 9 Estimation of Iron(II) by potassium dichromate using standard Mohr's salt solution
- 10 Preparation of Prussianblue

Text Books

- 1Bahl Arun and Bahl B. S., 2016, "Organic Chemistry", 22nd Edition, S. Chand
& Company& New Delhi
- 2 Jain M. K and Sharma S. C, 2007 "Organic Chemistry", Shoban Lal Nayin Chand& Company & New Delhi

References

- 1 Gopalan R, 2004, "Elements of Analytical Chemistry", Sultan Chand & Sons& New Delhi
- 2 Puri, Sharma, Pathania, 2017, "**Principles of Physical Chemistry**", 47th Edition, Vishal Publishing Company& New Delhi
- 3 Madan R. D, 2020, "**Modern Inorganic Chemistry**, 2ndEdition, S. Chand & Company& New Delhi
- 4 Gurdeep Raj, 2014, "Advanced Inorganic Chemistry"2nd Edition, Krishna's Educational Publishers&Uttar Pradesh
- ⁵ https://ncert.nic.in/ncerts/1/kech205.pdf
- 6 https://unacademy.com/content/wp-content/uploads/sites/2/2022/10/4.-Chemical-bonding-Notes-min.pdf



231TL1A2AA	PART- IV: BASIC TAMIL	SEMESTER II
	T	otal Credits: 2
	Total Instruc	ction Hours: 24 h
இளங்கவ	லை 2023–24ஆம் கல்வியாண்டு முதல் சேர்வோர்	ர்க்குரியது
 (10 மற்றும் 12	– ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயி	லாதவர்களுக்கு)
	(பருவத் தேர்வு இல்லை)	
	Syllabus	0.5.1
Unit I தமிழ் பெ	மாழியின் அடிப்படைக் கூறுகள்	05 h
எழுத்துகள் அறிமுகம்	and the set of the spectrum to the set	
1. உயிர் எழுத்துக்கள் -	குறில் , நெடில் எழுத்துகள்	
2. மெய் எழுத்துக்கள் -	. வல்லினம், மெல்லினம், இடையினம்	
3. உயிர்மெய் எழுத்துக்க 4 பயிற்சி	கள	
IInit II கொற்க	ഷിണ് _ ചനിധ്രങ്ങ	05 h
	÷т.;. (ст. т.т.)	
2.வினைச்சொல் – விள்	க்கம் (ர.சுர.)	
Unit III குறிப்பு	எழுதுதல்	05 h
1. பெயர், முகவரி, பாட	டப்பிரிவு , கல்லூரியின் முகவரி	
2. தமிழ் மாதங்கள்(12),	வாரநாட்கள்(7)	
3. எண்கள் (ஒன்று முக	ல் பக்து வரை), வடிவங்கள், வண்ணங்கள்	
Unit IV குறிப்பு	எழுதுதல்	05 h
1. ஊர்வன, பறப்பன, எ	விலங்குகள்	
2.மனிதர்களின் உறவுப்	பபெயர்கள்	
3. ஊர்களின்பெயர்கள்	(எண்ணிக்கை 10)	
Unit V பயிற்சி	ப் பகுதி	04 h
பயிற்சிப் பகுதி (உரை	யாடும் இடங்கள்)	
வகுப்பறை, பேருந்து நீ	லையம், சந்தை– பேசுதல்,எழுதுதல்.	



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Notes:

அகமதிப்பீட்டுத்தேர்வு – வினாத்தாள் அமைப்புமுறை- மொத்த மதிப்பெண்கள் - 50

		பகுதி –அ
சரியான விடையைத் தேர்வு செய்தல் ி சரியா? தவறா?		x2=20
		பகுதி –ஆ
		10x2=20
		பகுதி – இ
ஒரு பக்க அளவில் விடையளிக்க		1x10=10

குறிப்பு:

- அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ–க்கான வினாக்கள் இதுஅல்லது அதுஎன்ற அடிப்படையில் அமைதல் வேண்டும்

Text Book

அடிப்படைத் தமிழ் - 2023-2024,தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,கோயம்புத்தூர்.வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ்,சென்னை. (Unit I to IV)

References

- 1 ஒன்றாம் வகுப்பு பாடநூல் தமிழ்நாடு அரசு பாடநூல் கழகம், சென்னை.
- 2 தமிழ் இணையக் கல்விக்கழகம் TAMIL VIRTUAL ACADEMY வலைதள முகவரி: <<u>https://www.tamilvu.org</u>/>



231TL1A2AB

PART-IV: ADVANCED TAMIL

SEMESTER II

Total Credits: 2

80

	Total Instruction Hours: 24 h
இளங்கலை 2023– 2024 ஆம் கல்வியா	ண்டு முதல் சேர்வோர்க்குரியது
(10 மற்றும் 12– ஆம் வகுப்புகளில் தமிழ் மெ (பருவத் தேர்வு இ Syllabu	ாழிப்பாடம் பயின்றவர்களுக்கு உரியது) இல்லை) IS
Unit I கவிதைகள்	06 h
1. தமிழ்நாடு - பாரதியார் 2.மனதில் உறுதி வேண்டும் - பாரதியார் 3. இன்பத்தமிழ் - பாரதிதாசன்	
4.வேலைகளல்லவேள்விகள் - தாராபாரதி	
5.தமிழா! நீ பேசுவது தமிழா! - காசியானந்தன்	
6. நட்புக் காலம்(10 கவிதைகள்)- அறிவுமதி கவிதைகள்	r
Unit II கட்டுரை	05 h
கட்டுரைத் தொகுப்பு -நல்வாழ்வு - டாக்டர் மு.வரதரா	சன்
1. நம்பிக்கை	
2. புலனடக்கம்	
3. பண்பாடு	
Unit III இலக்கணம்	04 h
1.வல்லினம் மிகும் மற்றும் மிகா இடங்கள்	
2. ர,ற,ல,ழ,ள,ந,ண,ன – வேறுபாடு அறிதல்	
Unit IV கடிதங்கள்	05 h
1. பாராட்டுக் கடிதம் 2. நன்றிக் கடிதம் 3. அழைப்புக் கடிதம் 4. அலுவலக விண்ணப்பங்கள்	
Unit V பயிற்சிப் பகுதி	04 h
படைப்பாக்கப் பகுதி	

பொதுத் தலைப்புகளில் கவிதை,கட்டுரை எழுதச்செய்தல்



1

Notes

அக மதிப்பீட்டுத் தேர்வு - வினாத்தாள் அமைப்பு முறை- மொத்த மதிப்பெண்கள் 50

0 0 · a · o · ·	10	பகுதி –அ
சரியான விடையைத் தோவு செய்தல	10	X1=10
		பகுதி –ஆ
கோடிட்ட இடங்களை நிரப்புக.		10x2=20
		பகுதி –இ
இரண்டு பக்க அளவில் விடையளிக்க		2x10=20

குறிப்பு:

- அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ–க்கான வினாக்கள் இதுஅல்லது அதுஎன்ற அடிப்படையில் அமைதல் வேண்டும்

Text Book

சிறப்புத் தமிழ் - 2023-2024, தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் 1 கல்லூரி, கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. (Unit- I to IV)

References

- 1 பேராசிரியர் புலவர் சோம. இளவரசு ,எட்டாம் பதிப்பு. 2014 . தமிழ் இலக்கிய வரலாறு மணிவாசகர் பதிப்பகம்,சென்னை.
- 2 டாக்டர் மு.வரதராசன். 2010. நல்வாழ்வு, பாரி நிலையம், சென்னை.
- 3 பேராசிரியர் முனைவர் பாக்கியமேரி, முதற் பதிப்பு. 2013. இலக்கணம் இலக்கிய வரலாறு -மொழித்திறன்- பூவேந்தன் பதிப்பகம், சென்னை..
- 4 தமிழ் இணையக் கல்விக்கழகம் TAMIL VIRTUAL ACADEMY. வலைதள முகவரி : <<u>https://www.tamilvu.org</u>/>



Course Code	Course Name	Category	L	Т	Р	Credit
235CR1A2AA	HUMAN RIGHTS AND WOMEN'S RIGHTS	AECC	2	1	1	2

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PREAMBLE

This course has been designed for students to learn and understand

- Concepts of Human Rights.
- Human Right Violations and Redressal Mechanism.
- Rights to Women and Child.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Human Rights.	K1
CO2	Describe the Fundamental Rights.	K2
CO3	Relate Human Right Violations and Redressal Mechanism.	К3
CO4	State the Rights to Women and Child.	K2
CO5	Apply Civil and Political Rights of Women.	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1		~		\checkmark	\checkmark
CO2		~	~	\checkmark	\checkmark
CO3				\checkmark	\checkmark
CO4	a starting at	~		\checkmark	\checkmark
CO5	~	\checkmark	~	\checkmark	~

COURSE FOCUS ON

	Skill Development		Entrepreneurial Development
	Employability	d s Sarah	Innovations
	Intellectual Property Rights	1	Gender Sensitization
\checkmark	Social Awareness/ Environment	 ✓ 	Constitutional Rights/ Human Values/ Ethics



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235CR1A2AA	HUMAN RIGHTS AND WOMEN'S RIGHTS	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Human Rights

Meaning - Definition - Nature - Content - Legitimacy of Human Rights - Origin and Development of Human Rights - Theories - Principles of Magna Carta - Modern Movements of Human Rights - The Future of Human Rights. Case studies related to human rights.

Unit II Human Rights in India

The Constitution of India: Fundamental Rights - Right to Life and Liberty -Directive Principles of State Policy - Fundamental Duties - Individual and Group Rights - Other facets of Human Rights - Measures for Protection of Human Rights in India.

Unit III Human Right Violations and Redressal Mechanism 05 h

Human Rights: Infringement of Human Right by State Machinery and by Individual - Remedies for State action and inaction - Constitutional Remedies -Public Interest Litigation (PIL) - Protection of Human Rights Act, 1993 - National Human Rights Commission - State Human Rights Commissions - Constitution of Human Right Courts.

Unit IV Rights to Women and Child

Matrimonial protection - Protection against dowry - Protection to pregnancy -Sexual offences - Law relating to work Place - Directive principles of Constitution (Article 39 a, d, e & Article 42, 43 & 46) - Trafficking of women - Constitutional Rights - Personal Laws - Protection of children against Sexual Offences Act, 2012 (POCSO).Case studies related toSexual offences.

Unit VCivil and Political Rights of Women05 h

Right of Inheritance - Right to live with decency and dignity - The Married women's Property Act, 1874 - Women's right to property - Women Reservation Bill - National Commission for Women - Political participation -Pre-independent political participation of women - Participation of Women in post independent period. Kavalan App.Case studies related to women rights.



04 h

05 h

05 h

Text Books

- 1 Lalit Parmar, 1998, "Human Rights", Anmol Publications Pvt. Limited, New Delhi.
- 2 Krishna Pal Malik, 2009, "Women & Law ", Allahabad Law University, New Delhi.

References

- 1 Mandagadde Rama Jois, 2015, "Human Rights", Bharatiya Values, Bharatiya Vidya Bhavan Publications, Mumbai.
- 2 Paras Diwan and Piyush Diwan, 1994, "Women and Legal Protection", South Asia Books, Andhra Pradesh.
- 3 Venkataram and Sandhiya. N, 2001, "Research in Value Education", APH Publishing Corporation, New Delhi.
- 4 Anand A S, 2008, "Justice for Women: Concerns and Expressions", Universal Law Publishing Co., New Delhi.

Microbiology

Department of Microbiology Dr. N. G. P. Arts and Science C Coimbatore - 641 048

	Dr.N.G.P. Arts and Science Cole					
	APPROVED					
BOS- 16th	NC-16th GB-21St					
18.10.23	13.12.23 05.01.24					





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Course Code	Course Name	Category	L	T	P	Credit
231TL1A3TA	TAMIL- III	LANGUAGE- I	3	1	-	3

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடுநாகரீகம்,பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills)- மாணவர்களின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2
CO3	பாடஇணைச்செயல்பாடுகள் (Co-curricular activities)	K2
CO4	சூழலியல் ஆக்கம் (Ecology)	K3
CO5	மொழி அறிவு(Tamil knowledge)	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	\checkmark	\checkmark	1	Band Summer	
CO2	\checkmark	\checkmark	V	\checkmark	
CO3	\checkmark	\checkmark	\checkmark		
CO4	\checkmark	\checkmark	\checkmark		1.1.1.1
CO5	\checkmark	\checkmark		\checkmark	

COURSE FOCUSES ON

Skill Development	✓ Entrepreneurial Development
✓ Employability	✓ Innovations
✓ Intellectual Property Rights	Gender Sensitization
Social Awareness/ Environment	✓ Constitutional Rights/ Human Values/ Ethics



Dr.NGPASC

COIMBATORE | INDIA

231TL1A3TA	TAMIL- III	SEMESTER III
	Total	Credits: 3
	Total Instructio	n Hours: 48 h
	Syllabus	
Unit I கா	ப்பியங்கள்	10 h
1.சிலப்பதிகாரம்	் –வழக்குரை காதை	
2. மணிமேகலை	–ஆதிரை பிச்சையிட்ட காதை	
Unit II கா	ப்பியங்கள்	10 h
1. கம்பராமாயன	னம் -கும்பகர்ணன் வதைப்படலம்: பா. எண் : 60 முத	5ல் – 100 வரை
2. பெரிய புராண	πம் - அதிபத்த நாயனார்புராணம்	
Unit III சிற்	றிலக்கியங்கள்	10 h
1 சிருச்சுற்றாலச்	முறவன்சி - வசந்தவல்லி பந்தரமுய சிறப்பட(6: 4தண்ணித	ள்)
1.தருக்குற்றால்க		
2.கலிஙகததுபபர	ணி-களம்பாடியது: போர்க்களக் காட்சி- பா.எண்: 472 முத	5ல- 302 வரை
Unit IV இல	லக்கிய வரலாறு	10 h
1.காப்பியம் – வ	ரையறை,ஐம்பெருங் காப்பியங்கள்,ஐஞ்சிறு காப்பிய	பங்கள்
2.கம்பராமாயண	ாம், பெரிய புராணம் – குறிப்பு	
3. சிற்றிலக்கியங்	ங்களின் தோற்றமும் வளர்ச்சியும்	
Unit V இல	லக்கணம் &பயிற்சிப் பகுதி	08 h
அ. இலக்கணம்		
1.'பா' வகைகள் :	வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பா - பொது இ	லக்கணம் மட்டும்.
2. அணி: உவமை	மயணி, உருவக அணி, இல்பொருள் உவமையணி விளச்	கம், உதாரணம்.
ஆ. பயிற்சிப் பகுத	தி	
1.வாசகர் கடிதம்:	நாளிதழ், வானொலி, செய்தி ஊடகங்களுக்கு விமர்சனம்	எழுதுதல்
2.திரைக்கதை எ திரைப்படங்கள் ப	விமர்சனம்: மத்திய மற்றும் மாநில அரசு விருது மட்டும்	பெற்ற தமிழ்த்



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Text Book

1

தமிழ் மொழிப்பாடம்-2023 -2024 ,தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ்,சென்னை. (Unit I to V)

References

- 1 பேராசிரியர் புலவர் சோம. இளவரசு,எட்டாம் பதிப்பு-2014,தமிழ் இலக்கிய வரலாறு-மணிவாசகர் பதிப்பகம்,சென்னை.
- 2 பேராசிரியர் முனைவர் பாக்கியமேரி,முதற் பதிப்பு- 2013,இலக்கணம்-இலக்கிய வரலாறு- மொழித்திறன்- பூவேந்தன் பதிப்பகம்,சென்னை. .
- 3 தமிழ் இணையக் கல்விக்கழகம் TAMIL VIRTUAL ACADEMY. வலைதள முகவரி: https://www.tamilvu.org



Course Code	Course Name	Category	L	Т	Р	Credit
231TL1A3HA	HINDI- III	LANGUAGE- I	3	1	-	3

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature
- the techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	К3
CO5	Apply the power of creative reading	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	~	~	~	1
CO2	1	\checkmark	1		\checkmark
CO3	~	\checkmark	~	~	
CO4	×	\checkmark			✓
CO5	\checkmark	\checkmark	~		\checkmark

COURSE FOCUSES ON





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231TL1A3HA	HA HINDI-III SEMES	
	Total	Credits: 3
	Total Instructio	n Hours: 48 h
	Syllabus	
Unit I		10 h
पद्य – काव्य पराश (प्राचीन- कबीर, तु	र (भोलानाथ) लसी, सुर, मीरा, आधुनिक- मैथिलीशरण गुप्त, अरूण कमल)	ioniesessa Annor set Annor set
Unit II		10 h
हिन्दी साहित्य का इ	तिहास: (साधारण ज्ञान)	
Unit III		10 h
अलंकार:अनुप्रास,य	ामक, श्लेष, वक्रोक्ति, उपमा,रूपक	
Unit IV		10 h
संवादलेखन		
Unit V		08 h
अनुवादअभ्यास-III	(केवलहिन्दीसेअंग्रेजीमें)	
(पाठ10 to 20)		
Text Books		
1 प्रकाशक: ज	वाहर पुस्तकालय सदर बाजार, मथुराउत्तर प्रदेश-281001(Unit	I)
2 आचार्य राम	चन्द्र शुक्ललोकभारती प्रकाशन इलाहाबाद. (Unit II)	
3 प्रकाशक: वि	नोद पुस्तक मंदिरआगरा-282002 (Unit III)	
4 पुस्तक: व्या	करणप्रदिप–रामदेवप्रकाशक: हिन्दीभवन36 इलाहाबाद-2110	24(Unit IV)
5 प्रकाशक: दा	क्षेण भारत प्रचार सभा चेनैई -17(Unit V)	



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Course Code	Course Code Course Name		L	т	Р	Credit
231TL1A3MA	MALAYALAM- III	LANGUAGE-I	3	1	-	3

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PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	K3
CO5	Apply the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
• CO1	\checkmark	\checkmark	√	~	1 1 Mar 1
CO2	~	~	\checkmark	的动物的	~
CO3	1	\checkmark	\checkmark		
CO4	×	\checkmark	\checkmark	× .	×
CO5	1	\checkmark			~

COURSE FOCUS ON

~	Skill Development	\checkmark	Entrepreneurial Development
✓	Employability	\checkmark	Innovations
\checkmark	Intellectual Property Rights	\checkmark	Gender Sensitization
 ✓ 	Social Awareness/ Environment	\checkmark	Constitutional Rights/ Human Values/ Ethics



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231TL1A3N	/IA	MALAYALAM- III SEMES	TER III
		Total Credits:	3
		Total Instruction Hours:	48 h
		Syllabus	
Unit I	Poetry		10 h
Kumaranasa	an		
Unit II	Poetry		10 h
Kumaranasa	an		
Unit III	Poetry		10 h
Kumaranasa	an		
Unit IV	Poetry		10 h
VayalarRam	navarma	entre a superior superior de state vel construites ant to prove a	
Unit V	Poetry		08 h
VayalarRan	navarma		

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Text Books

- 1 Kumaranasan. 1998. Chinthavishtayaya Sitha. DC Books Kottayam, Kerala, India.(Unit I to III)
- 2 Ayisha (Poem), National Book Stall Kottayam, Kerala, India. (Unit IV & V)

Reference

1 Dr.M.Leelavathy.Kavitha Sahithya Charithram. Sahithya Academy Thrissur, Kerala, India.



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Course Code	Course Name	Category	L	Т	P	Credit
231TL1A3FA	FRENCH- III	LANGUAGE- I	3	1	-	3

This course has been designed for students to learn and understand

- the Competence in General Communication Skills Oral + Written- Comprehension & Expression
- the Culture, life style and the civilization aspects of the French people as well as of France
- the students to acquire Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Select the Plural, Articles and the Hobbies	K2
CO4	Measure the Cultural Activity in France	К3
CO5	Evaluate the sentiments, life style of the French people and the usage of the conditional tense	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	~	\checkmark		~
CO2	\checkmark	~	✓		
CO3	~	\checkmark	~	\checkmark	
CO4	✓	√	✓		\checkmark
CO5	V	\checkmark	al ad lanoth 2	\checkmark	✓

COURSE FOCUSES ON

\checkmark	Skill Development	~	Entrepreneurial Development
\checkmark	Employability	1	Innovations
\checkmark	Intellectual Property Rights	~	Gender Sensitization
√	Social Awareness/ Environment	 ✓ 	Constitutional Rights/ Human Values/ Ethics



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231TL1A3FA

SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I

0	Décrireun lieu.	Α	Comprehendre la description	Comprendreune
0	Situer	partird'unerecherche	d'un lieu.	presentation de catalogue
		de documents,	Décrireunevilleouunerégionq	touristique.
		composer une	u'onaime.	Comprendre des
		presentation	Interrogersur la situation of	pictogrammes.
		touristique pour un	d'un lieu.	Comprendre la
		magazine ou un site	Comprendre des indications	description d'un lieu et
		internet.	sur la fréquenced'actions.	d'une situation precise
		in the second		dans un message
				électronique.

Unit II

10 h

Se situerdans le	А	Comprehendre la	Comprendreune
temps.	partird'unerecherc	description d'un lieu.	presentation de
	he de documents,	Décrireunevilleouunerégio	catalogue touristique.
	composer une	nqu'onaime.	Comprendre des
	presentation	Interrogersur la situation	pictogrammes.
	touristique pour un	of d'un lieu.	Comprendre la
	magazine ou un	Comprendre des	description d'un lieu et
	site internet.	indications sur la	d'une situation precise
		fréquenced'actions.	dans un message
			électronique.

Unit III

10 h

Raconter.	Raconterune scene	Comprehendre le récit d	Ecrire une biographie a
° Décrire les	insolite à l'oreal et à	ún voyage.	partir d'eléments écrits.
étapesd'une	l'écrit.	Raconterses actions	
action.		quotidiennes.	

Unit IV

10 h

08 h

Exprimer	Raconterune scene	Comprehendre le récit d	Ecrire une biographie a
l'intensité et la	insoliteà l'oreal et à	ún voyage.	partir d'eléments écrits.
quantité.	l'écrit.	Raconterses actions	
° Interroger.		quotidiennes.	

Unit V

Make in Own Sentences based on the above Lessons

Text Book

 LATITUDES 1 (Méthode de français) Pages from 102-127, Author : RegineMérieux, Yves Loiseau(Unit I to IV)



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Course Code	Course Name	Category	L	Т	Р	Credit
231EL1A3EA	ENGLISH - III	LANGUAGE- II	3	1	-	3

This course has been designed for students to learn and understand

- the basics of English grammar and specific usage
- the importance of the vocabulary and its use in different contexts
- the necessity of communication and composition writing skills

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Infer the specific usage of while-listening process	K2
CO2	Organize the various abilities and sub-skills involved in reading	К3
CO3	Utilize the importance of speaking skills and developing it through various practices	K3
CO4	Master diverse business communication formats and skills	K4
CO5	Acquire all-round mature outlook to function effectively in different context	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~	\checkmark	~		~
CO2	~	\checkmark	\checkmark	✓	
CO3	~	\checkmark	\checkmark	neger - Ekerne	\checkmark
CO4	\checkmark	\checkmark	\checkmark		- <u>10</u> 114
CO5	✓	\checkmark		\checkmark	WT 1993

COURSE FOCUSES ON

\checkmark	Skill Development	✓ Entrepreneurial Development
\checkmark	Employability	✓ Innovations
\checkmark	Intellectual Property Rights	✓ Gender Sensitization
\checkmark	Social Awareness/ Environment	✓ Constitutional Rights/ Human Values/ Ethics



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Total Credits: 3

SEMESTER III

Total Instruction Hours: 48 h

Syllabus

Unit I Listening and Reading

Listening in casual conversation, Small group and Conference setting - Listening for Factual Information- Barriers of Listening- Developing Listening skills- Poor listening vs Effective Listening - Basics of Reading- Efficient and Inefficient Readers- Advantages of Reading- Four Basic steps of Effective Reading- Stumbling blocks in becoming an effective Reader- Strategies for Comprehending and Retaining content- Effective Note Taking while Reading

Unit II Speaking

Purpose of General Conversations- Advantages, Features of a good conversation-Tips for improving Conversation- Public Speaking- Importance of Public Speaking-Benefits, Tips, Overcoming fear of Public Speaking- Preparatory steps - Structuring the contents- Audience Awareness- Mode of Delivery

Unit III Writing Skills

Preparing an Effective CV or a Resume with Job Applications- Employers expectation - Organize the material- Useful suggestions- Cover Letter- Content to be included- Tone of the letter- Report Writing- importance- features- Types main parts- Feasibility report- Accident report- Scientific report- Memos -Introduction- Structure- Proposal Writing

Unit IV English for Communication & Skill for Employment 12 h

Notices, Agendas and Minutes- Business correspondence- Speeches- Meetings, Vocabulary Development- Editing Skills, and Reference Skills- Reading and Replying to E-Mails- Making Presentations- Interview Techniques- Group Discussion, and Oral Presentation Skills- Interacting with Superiors, and Listening to Reports and Customer Complaints- Preparing the minutes of a meeting-Presenting Data in Verbal and Non-verbal modes- The Correct Attitude of Employment

Unit V Soft Skills

Importance of soft skills- Attributes- Social Skills- Thinking- Negotiating-Exhibiting- Identifying - Soft Skills training -Train Yourself- Practicing soft skills-Measuring attitude – Self-Discovery: Importance of knowing yourself- Process -SWOT analysis – Benefits – Usage – SWOT Analysis grid- Art of Negotiation



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09 h

10 h

09 h

08 h

Text Books

Camp and Satterwhite. 1998. College English and Communication. 7th Edition
Glencoe Mchrawttill Publishers, New York, Unites States of America. (Unit I, II, III)

- 2 Kumar, Sanjay and Lata Pushp. 2018. Language and Communication Skills for Engineers. First Edition, Oxford University Press, India. (Unit I, II, III)
- Mohan, Krishna and Banerji, Meera. 2009. Developing Communication skills. 2nd Edition, Macmillcan, India. (Unit I, II, III, IV)
- 4 Alex. Soft Skills. 2009. S. Chand Publishing, New Delhi, India. (Unit V)

References

- 1 Ghosh, B.N. Editor. 2017. Managing Soft Skills for Personality Development. McGraw- Hill Education, Chennai, India.
- 2 Miles Craven. 2008. Cambridge English Skills Real Listening and Speaking. First Edition, Cambridge University Press, United Kingdom.
- 3 Mishra, Gauri and Ranjana Kaul.2016. Language Through Literature. Primus Books, India.
- 4 Pillai G, Radhakrishna. 2000. English for Success. Emerald Publishers, Chennai, India.



Course Code	Course Name	Category	L	Т	P	Credit
233MB1A3CA	MICROBIAL DIVERSITY	CORE	4	1	-	4

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PREAMBLE

This course has been designed for students to learn and understand

- The fundamentals of microbial classification
- The kingdoms of microbial diversity
- General properties of Archaea, actinomycetes, fungi, algae, protozoa and virus.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of microbial classification.	K2
CO2	Classify microbes based on their desired properties.	K2
CO3	Exemplify the physiology and metabolism of Archaebacteria and actinomycetes.	K2
CO4	Summarize the classification of fungi and algae	K2
CO5	Categorize the divisions of protozoa and virus	K2

MAPPING WITH PROGR6AMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	\checkmark	\checkmark	\checkmark	~
CO2	in Long Stand	\checkmark	1		~
CO3	✓	\checkmark	1	\checkmark	V
CO4	~	\checkmark	\checkmark	~	1
CO5	~	~	1	\checkmark	\checkmark

COURSE FOCUS ON:

Skill Development	Entrepreneurial Development
🗹 Employability	Gender Sensitization
Intellectual Property Rights (IPR)	Social Awareness / Environment
Innovations	Constitutional Rights / Human Values / Ethics

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SEMESTER III

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Concept of microbial classification

Introduction – Natural, Phenetic, Phylogenetic, Genotypic and Numerical Taxonomy – Taxonomic ranks. Classical, Morphological, Physiological and Metabolic, Ecological characteristics – Genetic analysis – Molecular characteristics – Nucleic acid base composition, Nucleic acid hybridization, Nucleic acid sequencing, Genomic finger printing, Amino acid sequencing. Phylogenetic tree.

Unit II Divisions of life

Whittaker Five kingdom – Cavalier & Smith eight kingdom – Higher level classification of Eucarya. Outline of Bergey's Manual of Systematic Bacteriology – Volume 1to 5.

Unit III Archaea and Actinomycetes

Introduction – Ecology- classification – cell wall and membranes – Genetics and molecular biology – metabolism. General properties of Extremophiles. Actinomycetes –general characteristics-classification- importance.

Unit IV Fungi and Algae

Fungi – Alexopolus classification –Myxomycota – Eumycota. Algae - Fritsch classification of Algae – Chlorophyceae, Xanthophyceae, Chrysophyceae, Bacillariophyceae, Cryptophyceae, Dinophyceae, Chloromonadineae, Eugleninae, Phaeophyceae, Rhodophyceae, Myxophyceae.

Unit V Protozoa and Virus

Protozoa- general characteristics-classification - Sarcomastigophora, Sporozoa, Cnidospora, Ciliospora. Viruses - General properties –Baltimore classification.

Case study

The organism is predominantly aquatic, photosynthetic that lacks true roots, stems, leaves, and free living as well as symbiotic. It is used as a source of fuel, fertilizer, and nutritional supplements for living organisms. Explore the characteristics of the organism which supports for classification.



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12 h

12 h

12 h

12 h

12 h

Text Books

Joanne Wiley, Linda Sherwood, Christopher J Woolverton, 2016, "Prescott's

- 1 Microbiology", 10th Edition, McGraw Hill Company & New York, United States.
- 2 Michael J Pelczar, 2023, "Microbiology", Fifth Edition, McGraw Hill Company & New York, United States.

References

- 1 Salle AJ, 2014, "Fundamental Principles of Bacteriology", 7th Edition, Tata Mcgraw-Hill Publishing Company & New York, United States.
- Michael Madigan, John Martinko, Kelly Bender, Daniel Buckley and
 DavidStahl, 2015, "Brock Biology of Microorganisms", 14th Edition, Pearsons Education Ltd & London, United Kingdom.
- 3 Atlas RM, 1997, "Principles of Microbiology", 2nd Edition, Tata Mcgraw-Hill Publishing Company & New York, United States
- 4 Jeffrey C Pommerville, 2013, "Alcamo's Fundamentals of Microbiology", 10th Edition, Blackwell Publications & New Jersey, United States



Course Code	Course Course Name		L	т	Р	Credit
233MB1A3CB	MICROBIAL GENETICS	CORE	3	1	-	3

This course has been designed for students to learn and understand

- The concept of genetic material, Storage of genetic information, expression of genetic information.
- Regulation of Gene expression.
- Mutation and recombination of genes.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of genetic material and its replication.	K2
CO2	Apply the principles of transcription and translation in gene expression.	K2
CO3	Understand the adaptive strategies evolved among microbes by gene regulation in varied environment.	K2
CO4	Understand the mutational types and DNA repair mechanism.	K2
CO5	Apply the horizontal gene transfer concepts in mapping of genes.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1	\checkmark	√	V	\checkmark
CO2	\checkmark	\checkmark	V	\checkmark	\checkmark
CO3	1	1	\checkmark		\checkmark
CO4	1	\checkmark	√	\checkmark	\checkmark
CO5	[~]	[~]	[~]	[√]	[]

COURSE FOCUS ON:

☑ Skill Development

☑ Employability

☑ Innovations

- ☑ Intellectual Property Rights (IPR)
- ☑ Entrepreneurial Development
- □ Gender Sensitization
- □ Social Awareness / Environment
- □ Constitutional Rights / Human Values / Ethics



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Total Credits: 3

SEMESTER III

10 h

10 h

8 h

Total Instruction Hours: 48 h

Syllabus

Unit I Genetic Material: Properties and Replication 10 h

DNA as genetic material: Transformation in Pneumococcus, Transforming principle DNA and Hershey and Chase Experiment- Structure of DNA and RNA (mRNA, rRNA, tRNA) - DNA Replication: Semi conservative by Meselson and Stahl's Experiment, Enzymology and Mechanism of DNA replication.

Unit II Gene Expression

Central Dogma - Transcription - Genetic Code: codon and anti-codon, Wobble hypothesis, post transcriptional modification - Translation: Initiation, Elongation and Termination.

Unit III Regulation of Gene Expression 10 h

Induction - Repression - The operon model: lac (Inducible operon), trp (Repressible operon) Ara Operon - Quorum Sensing – Biofilm formation - Gene regulation in Eucarya.

Unit IV Mutation and Repair

Mutation: Spontaneous and Induced - Effects of Mutations - Types of Mutation: Base substitution, Deletion, Insertion - DNA Repair: Nucleotide Excision repair, Direct Repair, Mismatch repair, Recombination repair, SOS reponse.

Unit V Recombination in Bacteria

Transformation - Transposable elements - Bacterial plasmids - Conjugation: F+ and F- Mating, Hfr conjugation and F' conjugation - Transduction: Generalized transduction, Specialized Transduction

Case study - You have collected water sample from a nearby lake. When you observe the sample, some organisms were able to fluoresces after a week in your lab. When you observe it was found that fluoresces initiated only after three days. Explain the principles and the phenomena behind the process.



Text Books

- Joanne M Willey, Linda M Sherwood and Christopher J Woolverton, 2019, 1 "Prescott, Harley and Klein's Microbiology", 7th Edition McGraw Hill Higher Education, USA.
- 2 Eldon John Gardner, Michael J Simmons and D Peter Snustard, 2015 "Principles of Genetics", 8th Edition Wiley India Pvt Ltd., New Delhi.

References

- 1 David Freifelder, 2000, "Microbial Genetics", 7th Edition Narosa Publishing House, New Delhi.
- 2 Monroe W Strick Berger, 2015, "Genetics", 3rd Edition Pearson Education India, New Delhi.
- ³ https://onlinecourses.swayam2.ac.in/cec22_bt05/preview



233MB1A3CP MICROBIAL DIVERSITY AND MICROBIAL GENETICS SEMESTER III Total Credits: 3 Total Instructions Hours: 72 h

S.No

Contents

- Measurement of Microbial cell size by Micrometry using LCD Microscope 1 - Under DBT Star scheme Isolation and observation of algae from water sample by inverted 2 microscope - Under DBT Star scheme morphological characterization of fungus from Isolation and 3 environmental samples - Under DBT Star scheme Isolation of antibiotic producing organisms from soil samples-Crowded 4 plate technique Effect of ultraviolet radiation on the growth of bacteria 5 Isolation and identification of bacteria from skin and oral cavity - Under 6 **DBT** Star scheme 7 Extraction and quantification of chromosomal DNA from bacteria Estimation of DNA by Nanodrop - Under DBT Star scheme 8 Separation of DNA using agarose gel electrophoresis - Under DBT Star 9 scheme 10 Extraction of plasmid DNA from bacteria 11 Bacterial transformation by Calcium chloride method
- 12 Isolation of antibiotic resistant bacterial colonies through gradient plate technique

Note: 10 Experiments mandatory out of 12



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References

- 1 *James. C. Cappuccino, 2017.* **Microbiology A Laboratory manual.** *11th edition, Pearson education publishers.*
- 2 Aneja K. R. 2012, Experiments in Microbiology, plant pathology and biotechnology, 4th edition, New age publishers.
- 3 *Kannan. N 2003.* Hand book of Laboratory culture media. 1st edition, Panima publishers house.
- 4 *Maniatis, T. Tritsch E F and Sambrook J, 2010,* **Molecular Cloning: A laboratory manual,** *Cold Spring Harbor Laboratory, New York.*



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Course Code	Course Name	Category	L	Т	Р	Credit
232MT1A3IF	PRINCIPLES OF BIOSTATISTICS	IDC	4	-	-	4

This course has been designed for students to learn and understand

- concepts of estimation
- various concepts of Probability distribution
- basic concept of Chi square distribution

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	explain the concept of probability distribution	K1
CO2	discuss the basics of sampling distribution	K2
CO3	explain the concept of estimation	K1
CO4	apply the concept of hypothesis testing	К3
CO5	analyze the effect of Chi-square test	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1		1	1	1
CO2	1	1		1	
CO3	1		1		1
CO4	1	1	1	1	
CO5		1			1

COURSE FOCUSES ON

Skill Development	Entrepreneurial Development
Employability	Innovations
Intellectual Property Rights	Gender Sensitization
Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics



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Synabus	
Probability Distributions	
stributions of discrete variables - Binomial distribu	ution - Pois

son distribution Probability dis - continuous probability distributions - Normal distribution - applications.

Unit II Sampling distributions

Hypothesis testing

Sampling distributions - distribution of the sample mean and the difference between two sample means - distribution of the sample proportion and the difference between two sample proportions.

Unit III Estimation

Unit IV

Unit V

232MT1A3IF

Confidence interval for a population mean and difference between two population means t distribution - confidence interval for a population proportion and the difference between two population proportions - determination of sample size for estimating means and proportions.

Hypothesis testing: A single population mean and the difference between two population means - paired comparisons - single population proportion and the difference between two population proportions.

Mathematical properties - tests of goodness-of-fit - tests of independence - tests of

The Chi-square distribution and the analysis of frequencies

homogeneity - Fisher exact test - relative risk - odds ratio and the Mantel -Haenszel statistic - survival analysis.

Note: Theory 20% and problem 80%



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Total Credits:

SEMESTER III

4

10 h

9h

Total Instruction Hours: 48 h

Sullahus

PRINCIPLES OF BIOSTATISTICS

Unit I

9h

10 h

10 h

Text Books

 Wayne W. Daniel, 2006, "Biostatistics - A Foundation for Analysis in the Health Sciences", Seventh edition, Wiley India Pvt. Ltd, New Delhi

References

- 1 Bernard Rosner, 2015, "Fundamentals of Biostatistics", United States of America Print, Harvard University, New York
- 2 Parabhakara G.N., 2006, "Bio Statistics", First Edition, Medical Publishers Pvt Ltd, New Delhi.
- 3 Annadurai B., 2015, "A Text Book of Bio Statistics", First Edition, New Age International Pvt. Ltd, New Delhi
- 4 Veer Bala Rastogi, 2011, "Fundamentals of Bio-Statistics", 2nd Edition, Ane Books Pvt. Ltd, New Delhi



Course Code	Course Name	Category	L	Т	P	Credit
233MB1A3SA	FOOD AND WATER QUALITY ANALYSIS	SEC	2	1	-	2

This course has been designed for students to learn and understand

- Analysis of food and water quality
- System of Quality Assurance
- Food safety and standards

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level		
CO1	Understand the quality of food products	K2		
CO2	Analyze and evaluate the quality of water	K2		
CO3	Cognize and implement specific QA systems for industries	K2		
CO4	Learn methods of food and water quality	K2		
CO5	Explain the Food Safety Programs	K2		

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	\checkmark	\checkmark	\checkmark		\checkmark
CO2		\checkmark	\checkmark	\checkmark	\checkmark
CO3	\checkmark	\checkmark		\checkmark	\checkmark
CO4	\checkmark	\checkmark			
CO5	\checkmark	\checkmark			\checkmark

Course Focuses on

Skill Development	✓ Entrepreneurial Development
Employability	Innovations
Intellectual Property Rights	Gender Sensitization
DINGPASC Social Awareness/ Environment COIMBATORE INDIA B.Sc. Microl	Constitutional Rights/ Human Values/ Ethics biology (Students admitted during the AY 2023-24)
233MB1A3SA FOOD AND WATER QUALITY ANALYSIS

Total Credits: 2

SEMESTER III

Total Instruction Hours: 36 h

Syllabus

Unit I Food Quality Control

Food Quality control- Principle. Food quality indices-meat and meat products, fish and fish products, milk and dairy products, vegetables and fruit products, pulses, spices, coffee and tea.

Unit II Water Quality

Quality of surface waters, Water quality in flowing waters, Water quality in impounded waters, Groundwater quality, Water quality standards, Microbiological quality of drinking water (MPN technique), and Chemical quality of drinking water.

Unit III Quality Assurance

Quality assurance- definition, Different systems- GAP, GMP, TQM, ISO and FSSA. Indian food standards- Voluntary and Obligatory standards (PFA, FPO, MMPO, AGMARK etc.,) Codex alimentarius.

Unit IV Quality determination

Sensory evaluation: Requirement and methods. Sensory parameters: colour, flavour, texture, taste, aroma, general acceptability. Subjective and Objective test of sensory parameters. (Differential test, Descriptive test, rating test, Sensitivity threshold test)

Unit V Food Safety

Food safety- characterization and risk analysis- food hazards: Physical, chemical and biological systems. Hazard Analysis Critical control Point (HACCP) and its implementation.

Case study: Study the food safety measures and analyze food quality in an institutional food units.

7h

7h

7h

8h

- Frazier. W.C and D.C Westhoff, (2008). Food Microbiology. (5th Edn.) Delhi: McGraw Hill publishing Co.
- Hammer, M.J., and Hammer, M.J., Jr., "Water and Wastewater Technology,"
 7 th Edition, Prentice- Hall, Inc., Englewood Cliffs, New Jersey, 2012.

References

- 1 Early R.1995 Guide to quality Management Systems forFood Industry. Blackie Academic.
- 2 Macrae R Roloson R &Sadlu MJ 1994. Encyclopedia of food Science &Technology & Nutrition Vol XVI. Academic Press.
- 3 Amerine MA, Pangborn RM &Rosslos EB 1965. Principles of Sensory evaluation of food. Academic Press.
- 4 Adams. M. R and M. D Moss, (2008). Food Microbiology. (3 Edn.) New Delhi: Panama Publishers.
- D Kumar Bhatt, Priyanka Tomar,. (2010). An Introduction to Food Science Technology and Quality Management. (Edn.) New Delhi: Kalyani Publishers..
- 6 www.fssai.gov.in



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SEMESTER III

Total Credits: 1

Syllabus

Unit I Methods and Techniques of Teaching Biology

Traditional Methods of Teaching – Lecture, project, field trip and discussion – Demonstration and Experimentation in Teaching Biology – Advantages and disadvantages - Modern Techniques of Teaching Biology – Concept mapping, Constructivism, group discussion and use of analogy.

Unit II Resources and Planning for Biology Teaching

Resources for Teaching Biology- Chalkboard, charts, models and specimens. Textbooks in Teaching Biology: Selection and use - Improvisation in Biology -Teaching Units and Unit Planning - Lesson Preparation and Lesson Plan.

Unit III Laboratory Design, Management and Safety

Laboratory Design – Space, ventilation, sign and labels- Managing the Biology Lab – accidents and first aid record, stock record, damage and breakage record - Safety in the Biology laboratory – Hazard and risk management, safe handling of all chemicals.

Unit IV Evaluation in Biology Teaching

Evaluation of Theory - Evaluating the Cognitive Skills – Essay and objective type questions -Six Categories of Cognitive Behaviour – Knowledge, comprehension, application, analysis, synthesis and evalution.

Unit V Professional Development of Biology Teachers

Professional developmental programmes -Training, seminars and conferences, membership of professional organizations, field visits to laboratories, practices in ICT based on-line platforms.



- 1 Payal Bhola Jain, 2016, "Pedagogy of Biological science". Lakmi publications.
- Rama Chandra Dhir and Sunakar Das, 2019, "Pedagogy of Biological science", Kalyani publications.

References

- 1 Dr. P. Ameeta and J. Kamakshi, 2016, "Methods of Teaching Biological Science", 1st Edition, Bookman Publications, Delhi.
- 2 Fergie Ellison, 2012, "Handbook of Biological Science", 1st Ed., Pragun publications.



Total Credits: 1

113

h

h

h

h

h

Total Instruction Hours: h

Syllabus

Unit I Introduction and Scope of Bio-Entrepreneurship

Scope of bio-entrepreneurship, Introduction to Bio-business, from the Indian context, SWOT analysis of bio-business. Ownership, Development of Entrepreneurship; Stages in entrepreneurial process; Role of entrepreneurs in Economic Development; Entrepreneurship in India; Entrepreneurship - its barriers.

Unit II Basics of Small-Scale Industries

Small scale industries: Definition; Characteristics; Need and rationale; Objectives; Scope; Market Feasibility Study; Technical Feasibility Study; Financial Feasibility Study & Social Feasibility Study. Global bio business and industry future trends.

Unit III Strategies in Bio-entrepreneurship

Strategy and operation of bisector firms, Business implications and communication of innovations and entrepreneurship in biosectors - lab to market activities, IPR and Challenges in bio-marketing.

Unit IV Business Plans in Bio-entrepreneurship

Basic contracts and agreements for joint ventures and development, Business plan preparation including strategy and legal requirements, Business feasibility study, financial management, collaborations and partnerships. 4 P's of Marketing – Product, Price, Place and Promotion.

Unit V Information Technology & Government Schemes to Bioentrepreneurship

Information technology in Biobusiness; Assessment, development and upgradation of technology, Technology transfer, Quality control. Regulatory Compliances and procedures [ISO, GMP], Public private agencies for bio-entrepreneurship (MSME, BIRAC).



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1 Craig Shimasaki. 2014. "Biotechnology Entrepreneurship: Starting, Managing, and Leading Biotech Companies", 1st Edition, Academic Press, USA.

Alberto Onetti, Antonella Zucchella. 2014. "Business Modeling for Life Science

2 and Biotech Companies: Creating Value and Competitive Advantage with the Milestone Bridge", 1st Edition, Routledge, United Kingdom.

References

- 1 Jordan JF. 2014. "Innovation, Commercialization, and Start-Ups in Life Sciences", 1st Edition, London, CRC Press.
- 2 Desai V. 2011. "The Dynamics of Entrepreneurial Development and Management", 6th Edition, Himalaya Pub. House, New Delhi.
- 3 Ganguli P. 2017. "Intellectual Property Rights: Unleashing the Knowledge Economy", 1st Edition, Tata McGraw-Hill Pub. New Delhi.
- 4 https://www.bio.org/policy/human-health/vaccinesbiodefense/coronavirus/bio-digital-sessions/best-bio-marketing-toolkit
- ⁵ https://www.emerald.com/insight/publication/issn/1750-6123

BoS Chairman/HOD Department of Microbiology Dr. N. G. P. Arts and Science College Coimbatore - 641 048

	Dr.N.G.P. Arts and Science College			
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Course Code	Course Name	Category	L	Т	P	Credit
231TL1A4TA	TAMIL - IV	LANGUAGE- I	3	1	-	3

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு நாகரீகம், பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
C01	வாழ்க்கைத் திறன்கள் (Life Skills)- மாணவர்களின் செயலாக்கத் திறனை ஊக்குவித்தல்	K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K4
CO3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1		1	1		v
CO2	V			\checkmark	
CO3		\checkmark			~
CO4	J. A.		\checkmark		
CO5	\checkmark			\checkmark	\checkmark

COURSE FOCUSES ON

\checkmark	Skill Development		Entrepreneurial Development
• ✓	Employability	_	Innovations
_	Intellectual Property Rights	_	Gender Sensitization
	Social Awareness/ Environment	_	Constitutional Rights/ Human Values/ Ethics



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B.Sc. Microbiology (Students admitted during the AY 2023-24)

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231TL1A4TA	TAMIL - IV	SEMESTER IV
	То	tal Credits: 3
	Total Instruct	tion Hours: 48 h
	Gullahua	
	Syllabus	
Unit I எட்டு)த்தொகை	10 h
1. நற்றிணை – கு	தறிஞ்சித் திணை	
	l.பா.எண் : 01 – கபிலர்	
	ll.பா.எண் : 88 – நல்லந்துவனார்	
	III.பா.எண் : 102 – செம்பியனார்	
2. குறுந்தொகை	– முல்லைத்திணை	
	l.பா.எண் : 65 <i>–</i> கோவூர்கிழார்	
	ll. பா.எண் : 167 – கூடலூர்கிழார்	
	மருதத்திணை	
	l.பா.எண் : 08 <i>–</i> ஆலங்குடி வங்கனார்	Enclosed
	ll.பா.எண் : 61 <i>–</i> தும்பிசேர்கீரனார்	
	III.பா.எண் :196 – மிளைக் கந்தன்	
	நெய்தல் திணை	<u></u>
	1.பா.எண் : 57 – சாலற்க்குடி ஆநலதா	лп й
Unit II எட்டு	த்தொகை	08 h
1. கலித்தொகை	– பாலைக்கலி	
	l.பா.எண் : 09 <i>–</i> பெருங்கடுங்கோ	
2. அகநானூறு	- மருதத்திணை	
	l.பா.எண் : 86 <i>–</i> நல்லாவூர்கிழார்	
3. புறநானூறு	- l.பா.எண் : 188 – பாண்டியன் அ	றிவுடை நம்பி கார்
	யிபா எண் · 279 – ஒக்கர் மாசாக்கியா	т т
	IV பா எண் : 312 – பொன்மும் பார்	

Unit III பத்துப்பாட்டு

1. பட்டினப் பாலை – கடியலூர் உருத்திரங் கண்ணனார் -1முதல் 218 வரிகள் வரை மட்டும்.

Unit IV இலக்கிய வரலாறு

1. எட்டுத் தொகை நூல்கள் 2. பத்துப்பாட்டு நூல்கள்

Unit V இலக்கணம் மற்றும் திறனாய்வுப் பகுதி 10 h

l. இலக்கணம்

1. அகத்திணை – அன்பின் ஐந்திணை - விளக்கம்

2. புறத்திணை – 12 திணைகள் – விளக்கம்

II. பயிற்சிப் பகுதி

சங்கப் பாடல்கள் குறித்து திறனாய்வு செய்தல்.

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது.

Text Book

செய்யுள் திரட்டு - மொழிப் பாடம் - 2023- 24

1 தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,(Unit I - V)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு, எட்டாம் பதிப்பு -2014, தமிழ் இலக்கிய வரலாறு - மணிவாசகர் பதிப்பகம், சென்னை.

பேராசிரியர் முனைவர் பாக்கியமேரி, முதற் பதிப்பு- 2013,

- 2 இலக்கணம் இலக்கிய வரலாறு மொழித்திறன் பூவேந்தன் பதிப்பகம், சென்னை.
- 3 தமிழ் இணையக் கல்விக்கழகம்.<http://www.tamilvu.org/>



Course Code	Course Name	Category	L	Т	Р	Credit
231TL1A4HA	HINDI - IV	LANGUAGE- I	3	1		3

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature
- the techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	K3
CO5	Apply the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	1			1	1
CO2		~			1
CO3	~		1	1	
CO4					1
CO5	~	\checkmark	1		✓ .

COURSE FOCUSES ON

✓	Skill Development	-	Entrepreneurial Development
\checkmark	Employability	_	Innovations
_	Intellectual Property Rights	-	Gender Sensitization
-	Social Awareness/ Environment	-	Constitutional Rights/ Human Values/ Ethics



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231TL1A4HA	HINDI- IV SEI	MESTER IV
	Total Cre	dits: 3
	Total Instruction Ho	ours: 48 h
	Syllabus	
Unit I		10 h
नाटक		
Unit II		10 h
एकांकी		
Unit III		10 h
काव्य मंजरी		
Unit IV		10 h
सूचना लेखन		
Unit V		08 h
अनुवाद अभ्यास-।		

- 1 लडाई सर्वेश्वरदयाल सक्सेना प्रकाशक: वाणी प्रकाशन 21-A, दरियागंज नई दिल्ली-110002. (Unit I)
- 2 एकांकी पंचामृत – डॉं राम कुमार (भोर और तारा छोड्कर) प्रकाशक: जवाहर पुस्तकालय सदर बाजार, मथुरा उत्तर प्रदेश-281001. (Unit II)
- 3 काव्य मंजरी- (डा मुन्ना तिवारी) मैथिलीशरण गुप्त- मनुष्यता, जयशंकर प्रसाद- बीती विभावरी जागरी सूर्यकान्त त्रिपाठी निराला- तोडती पत्थर और भिक्षुक. (Unit III)
- 4 सूचना लेखन पुस्तक: व्याकरण प्रदिप रामदेव प्रकाशक: हिन्दी भवन 36 इलाहाबाद -211024. (Unit IV)
- 5 अनुवाद अभ्यास (केवल अंग्रेजी से हिन्दी में) (पाठ 10 to 20) प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17 (पाठ10 to 20). (Unit V)



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Course Code	Course Name	Category	L	Т	Р	Credit	
231TL1A4MA	MALAYALAM- IV	LANGUAGE - I	3	1	-	3	

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	К3
CO5	Apply the power of creative reading	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~			1	
CO2	\checkmark				\checkmark
CO3		\checkmark	×		reside Banker
CO4	~			\checkmark	\checkmark
CO5	\checkmark	\checkmark	\checkmark		\checkmark

COURSE FOCUS ON

\checkmark	Skill Development	-	Entrepreneurial Development
×	Employability	_	Innovations
-	Intellectual Property Rights	_	Gender Sensitization
-	Social Awareness/ Environment	_	Constitutional Rights/ Human Values/ Ethics



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231TL1A4M	A	MALAYALAM- IV		SEMEST	FER IV
			Total	Credits:	3
			Total Instruction	n Hours:	48 h
		Syllabus			
Unit I	Drama				10 h
Saketham- Sr	eekandan Nair				
Unit II	Drama				10 h
Saketham- Sr	eekandan Nair				
Unit III	Drama				10 h
Saketham- Sr	eekandan Nair				
Unit IV	Screen Play				10 h
Perumthacha	n- Vasudevan Nair				
Unit V	Screen Play				08 h
Perumthacha	n- Vasudevan Nair				

- 1 Nair, Sreekandan C.N. 2023. Saketham, Drama. DC Books Kottayam, Kerala, India. (Unit I to III)
- 2 Nair, Vasudevan M.T. 1994. Perumthachan- Screenplay. DC Books Kottayam, Kerala, India. (Unit IV & V)

Reference

1 Sankarapillai. 2005. Malayala Nataka Sahithya Charithram, Kerala Sahithya Akademi Publishers, Kerala, India.



Course Code	Course Name	Category	L	T	Р	Credit
231TL1A4FA	FRENCH - IV	LANGUAGE- I	3	1	-	3

This course has been designed for students to learn and understand

- the Competence in General Communication Skills Oral + Written- Comprehension & Expression
- the Culture, life style and the civilization aspects of the French people as well as of France
- the students to acquire Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
C01	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Select the Plural, Articles and the Hobbies	K2
CO4	Measure the Cultural Activity in France	К3
CO5	Evaluate the sentiments, life style of the French people and the usage of the conditional tense	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~				~
CO2	~	~			
CO3			~	1	
CO4	\checkmark	~		and the second	1
CO5	\checkmark		~	\checkmark	\checkmark

COURSE FOCUSES ON

\checkmark	Skill Development	_	Entrepreneurial Development
\checkmark	Employability		Innovations
	Intellectual Property Rights	_	Gender Sensitization
_	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics



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231TL1A4FA	FRENCH - IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I

°Décrirequelqu'un.	En milieu	S'exprimersur les styles	Comprendre	la
° Comparer	professional,	de vêtemantReconnaitre	description	de
1	recruiter	des personnes à partit	personnesdans	un
	quelquún et	de descriptions.	extrait de roman.	
	justifier sonchoix.			

Unit II

ExprimerPaccord	En milieu	Décrire des personnes.	Comprendre des
ou le désaccord.	professional,	Comprendre des	différences de points
° Se situerdans le	recruiter	personnes qui	de
temps.	quelquún et	experiment leur accord	vueexprimétesdans
1	justifier sonchoix.	ouleurdésaccord.	de message
			électronique.
	North Carport Company	A Start and a start of the second	Raconter
			unsourvenir.

Unit III

° Parler de	Discuter de	Comprendreune	Comprendre le
Pavenir.	l'organisation d'un	chanson.	message d'une
	voyage de	Echangersursesprojets	carte
	groupepuispréparerune	de vacancy	d'anniversaire
	fiche projet et la		
	templit.		

Unit IV

0	Exprimer des	Discuter	de	Discuter	du	Comprendre le
	souhaits. °	l'organisation	d'un	programme	de la	message d'une
	Décrirequelq	voyage	de	soire à	venir.	carte
	u'u n	groupepuisprépa	arerune	Addresser	des	d'anniversaire
		fiche projet	et la	souhaits	à	
		templit.		quelqu'un.		

Unit V

08 h

Make in Own Sentences based on the above Lessons

Text Book

 LATITUDES 1 (Méthode de français) Pages from 128-151, Author : Regine Mérieux, Yves Loiseau (Unit I to IV)



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10 h

10 h

10 h

Course Code	Course Name	Category	L	Т	P	Credit
231EL1A4EA	ENGLISH - IV	LANGUAGE II	3	1	-	3

This course has been designed for students to learn and understand

- how language shapes society, enhancing critical reading, writing, and thinking skills through various literary forms
- the fundamentals of writing, including essay composition, persuasive communication, and creative expression
- the process of critical thinking through the analysis of literature

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
C01	Summarize main points and supporting details from listening to public addresses and demonstrate poem comprehension.	K2
CO2	Demonstrate clear and expressive speech while engaging in role-play and dramatization activities.	К3
CO3	Interpret textual elements such as themes, tone, and authorial intent in various reading materials.	K4
CO4	Develop clear summaries and paraphrases, maintaining the essence of the original text.	K5
C05	Prepare for job interviews by employing appropriate interview techniques, confidence, and professionalism.	К3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~	\checkmark		\checkmark	\checkmark
CO2		\checkmark		\checkmark	
CO3	\checkmark		V		and the state of the
CO4		\checkmark			\checkmark
CO5	\checkmark		\checkmark		\checkmark

COURSE FOCUSES ON

✓ Ski	1 Development		Entrepreneurial Development
✓ Em	ployability).	Innovations
Inte	ellectual Property Rights		Gender Sensitization
✓ Soc	ial Awareness/ Environment	·	Constitutional Rights/ Human Values/ Ethics

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SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

ENGLISH - IV

Unit I Listening

231EL1A4EA

Nissim Ezekeil - Goodbye Party for Miss Pushpa T.S. D.H. Lawrence - Last Lessons of the Afternoon Dr. APJ Abdul Kalam's speech at European Union

Listening for subtext – Tone and Emotion – Vivid Language and Pacing – Listening for Vision and Hope – Use of Storytelling

Punctuations: Periods, Commas, Semicolons, Colons, Apostrophes, Ellipses, Exclamation Points

Unit II Speaking

Oscar Wilde - The Importance of Being Earnest

Direct Speech and Indirect Speech - Commands and Requests, Exclamations and Wishes, Conversion of Indirect to Direct

Rules for changing direct speech into indirect speech

Unit III Reading

Gita Hariharan - The Remains of the Feast -

Langston Hughes - Thank You M'am

Making Inferences and Predictions - Identifying Author's Purpose and Tone- Contextual Vocabulary Building

Tenses: The Uses of Present, Past and Future Tenses

Unit IV Writing Skills

George Orwell - Why I Write

Summarizing vs. Paraphrasing - Expressing Purpose and Intent in Writing- Constructing Strong Arguments and Opinions

Grammar - Paraphrasing - Use of Paraphrasing, Characteristics of a good paraphrase, The Paraphrase of Poetry, Special Hints, Method of Procedure

Unit V Soft Skills

Steve Jobs - 2005 Stanford Commencement Address - Effective Communication - Presentation Skills

Business Corporate Soft Skills - Six common corporate conversation faux pas, Decision making Techniques, Negotiation Styles Job Interviews - Preparatory Steps for Job Interviews - Interview Skill Tips



09 h

10 h

09 h

10 h

10 h

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- Straus, Jane, Lester Kaufman, and Tom Stern, editors. The Blue Book of Grammar and
 Punctuation: An Easy-to-Use Guide with Clear Rules, Real-World Examples, and
 Reproducible Quizzes. 12th ed., Jossey-Bass, 2021. (Unit I)
- 2 Wilde, Oscar. The Importance of Being Earnest. Edited by Norman Page, 2nd ed., Penguin Classics, 2000. (Unit II)
- 3 Hariharan, Gita. The Remains of the Feast. 1st ed., Penguin Books India, 1992. (Unit III)
- 4 Orwell, George. "Why I Write." George Orwell: An Anthology of His Prose, edited by John Carey, Harcourt, 2000. pp. 232-237. (Unit IV)
- 5 Meyer, John. The Soft Skills Handbook for Corporate Success: Essential Strategies for Business Professionals. 2nd ed., Business Insights, 2020. (Unit V)

References

- 1 Lawrence, D.H. The Complete Poems of D.H. Lawrence. Edited by V.J. Harding, 1st ed., Heinemann, 1992.
- 2 Buczynski, Mark. Soft Skills for the Workplace: How to Build Successful Relationships and Advance Your Career. 2nd ed., Wiley, 2018.
- 3 Hughes, Langston. "Thank You, M'am." The Penguin Anthology of American Poetry, edited by Rita Dove, Penguin Books, 2006, pp. 530-533.
- 4 Nelson, Brian. The Soft Skills Handbook: Essential Skills for the Workplace. 3rd ed., Business Publishing, 2019.



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Course Code	Course Name	Category	L	Т	Р	Credit
233MB1A4CA	IMMUNOLOGY	CORE	4	-	-	4

This course has been designed for students to learn and understand

- The immune system, its interaction with pathogens.
- The Concept of Allergy and Hypersensitivity reactions.
- Responses to stimulation and vaccines.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the process of inflammation and Immunity and importance of cell and organs of the immune system.	K2
CO2	Understand the cellular pathways of humoral/cell- mediated adaptive responses.	K2
CO3	Analyses the four types of hypersensitivity for the Immunologic mechanism involved.	K3
CO4	Perform various diagnostic processes	К3
CO5	Interpret different antigenic determinants within the system	K3

MAPPING WITH PROGR6AMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	~	\checkmark	\checkmark	\checkmark	\checkmark
CO2		\checkmark	\checkmark	\checkmark	\checkmark
CO3	~	\checkmark	\checkmark	\checkmark	\checkmark
CO4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
CO5	\checkmark	\checkmark	1	\checkmark	\checkmark

COURSE FOCUS ON:



kill	Devel	lopment	

Intellectual Property Rights

Social Awareness/ Environment



Entrepreneurial Development



Employability



Innovations

Gender Sensitization

Constitutional Rights/ Human Values/ Ethics



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B.Sc. Microbiology (Students admitted during the AY 2023-24)

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233MB1A4CA	IMMUNOLOGY	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I History and Scope of Immunology

History and Scope of Immunology. The basis of defence mechanisms. Cells of immune system- Hematopoiesis, Lymphoid cells and Myeloid cells and Organs of immune system- Primary and Secondary lymphoid organs (Thymus, Bone marrow, Lymph node, Spleen). Phagocytosis

Unit II Types of immunity

Types of immunity- Cell mediated immunity, humoral immunity, Antigen and Antibody types, Complement pathways -Classical, alternate and lectin pathway; Apoptosis-types, inflammation. Immunoglobulin – structure, Isotypes, and functions.

Unit III Allergy and Hypersensitivity

Allergy and Hypersensitivity - Classification types and Mechanisms. Autoimmunity mechanisms and autoimmune response diseases: cell specific: Systemic Lupus Erythematosis and Organ Specific: Myasthenia Gravis

Unit IV Antigen-Antibody reactions

Antigen-Antibody reactions - Agglutination: Direct, indirect, RPR and Hemagglutination. Precipitation: Counter Current electrophoresis, rocket electrophoresis, Double Immuno Diffusion. ELISA. Radio immune assay (RIA). Monoclonal antibodies and its applications.

Unit V Immuno hematology

Immuno hematology - Blood transfusion - ABO grouping - Rh factor. Tissue transplantation - HLA typing - Mechanism of acceptance and rejection. Immunodeficiency disease: primary (Bruton disease), secondary (AIDS).

Case study - The patient 24 years old had significant swelling of multiple joints including the right wrist, right elbow, and left ankle. The joints were erythematous and tender to touch.



9 h

10 h

10 h

- 1Roitt I M, 2011, Roitt's Essential Immunology, 12th Edition, John Wiley and
Sons Ltd, USA.
- 2 Basir F, 2012, **Text Book of Immunology**, 2nd edition, Prentice Hall India Learning Private Limited.

References

- 1 Tizard I R, 1998, **Immunology an Introduction**, 4th Edition, Thomson publishers, Australia
- 2 Kuby J, 2002, **Immunology**, 5th Edition, W.H.Freeman publishers, New York.
- 3 Rao C V, 2008, An Introduction to Immunology, Narosa Publishing House, Chennai.
- 4 Nandhini Shetti, 2009, **Immunology an Introductory Text Book**, 1st Edition, New Age International Ltd, New Delhi..
- 5 https://youtu.be/SyvOPXeg4ig?feature=shared
- 6 https://youtu.be/yIMz9pkT9xQ?feature=shared
- 7 https://archive.nptel.ac.in/content/storage2/courses/102103038/download /module2.pdf

Course Code	Course Name	Category	L	Т	P	Credit
233MB1A4EP	FOOD MICROBIOLOGY	CORE	2	-	4	4

This course has been designed for students to learn and understand

- The importance of microorganisms in food
- The food borne diseases and outbreaks
- General properties of food sanitation

COURSE OUTCOMES

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

CO	CO Statement	Knowledge			
Number	Level				
CO1	CO1 Understand the importance of microorganisms in food.				
CO2	CO2 Know the procedures involved in food borne diseases				
CO3	K3				
CO4	K3				
CO5	Apply the principles of food sanitation	K3			

MAPPING WITH PROGRAMME OUTCOMES

COs/Pos	PO1	PO2	PO3	PO4	PO5
CO1	\checkmark	\checkmark	\checkmark	\checkmark	. ✓
CO2		\checkmark	\checkmark	\checkmark	\checkmark
CO3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
CO4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
CO5	✓ · ·	\checkmark	\checkmark	\checkmark	\checkmark

COURSE FOCUS ON:



Skill Development

Employability

Intellectual Property Rights



Social Awareness/ Environment



Entrepreneurial Development

Innovations

Gender Sensitization

Constitutional Rights/ Human Values/ Ethics



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FOOD MICROBIOLOGY

Total Credits: 4

SEMESTER IV

Total Instruction Hours: 72 h

Syllabus

Unit I Importance of microbes in food

Food and Microorganisms - Important microorganisms in food (Bacteria, Mold, Yeast and Black fungus); Factors affecting the growth of microorganisms in food - pH, temperature moisture, Osmotic pressure, Nutrient content, Inhibitory substances andbiological structure.

1. Factors affecting growth of microbes in food - pH, temperature, osmotic pressure

Food borne diseases Unit II

233MB1A4EP

Food borne diseases - Food poisoning -- Food borne infections -Bacterial and Mycotoxins-Investigation of food poisoning outbreaks.

- 1. Evaluation of milk quality Resazurin test
- 2. Microbial Limit test

Unit III Spoilage of food

Spoilage of food - meat - canned foods.

- 1. Isolation of microbes from spoiled meat.
- 2. Isolation of microbes from canned foods.

Fermented food and dairy products Unit IV

Fermented food - Bread, fermented fish and meat products - Fermented dairy products -Yoghurt and cheese, Prebiotics and Prebiotics. Fermented beverages: Wine and sauerkraut.

- 1. Preparation of Wine from fruits
- 2. Isolation of Lactobacillus from curd
- 3. Preparation of Sauerkraut

Microbiology in Food Sanitalition Unit V

Bacteriology of Water - Microbiology of Food Product - Good Manufacturing Practices -Hazard Analysis - Critical Control Points

1. Isolation of indicator in water- E. coli

2. Isolation of indicator organisms in food-Salmonella sp. and Shigella sp.



16 h

14 h

14 h

14 h

- 1Frazier. W.C and Westhoff. D.C, 2017, Food Microbiology, 5th edition,
Tata Macgraw Hill publishing Co., New Delhi.
- 2 Adams M.R. and Moss M. O., 2015, Food Microbiology 4th Edition, Panima Publishers, New Delhi.

References

- 1Roger Y Stainer, 2003, Basic Food Microbiology, 5th Edition, CBS
Publishers, India.
- 2 Jay J M, 2006, Modern Food Microbiology, 6th Edition, Van Nostra And Rainhokdd Co, USA.
- 3 Dubey R C, and Maheswari D K, 2023, A Textbook of Microbiology, 4th Edition, S. Chand Publishing. New Delhi.



CORE PRACTICAL: IMMUNOLOGY & RECOMBINANT DNA TECHNOLOGY

Total Credits:3Total Instructions Hours:72h

S.No	Contents
1	Blood Profiling- Estimation of Total Blood count and Differential Blood count, Hemoglobin, ESR
2	Preparation of serum and plasma.
3	Agglutination slide test - Blood grouping
4	Agglutination tube test - WIDAL test
5	Precipitation - Rocket immunoelectrophoresis (Under DBT Star scheme)
6	Double Immunodiffusion - Outcherlony method
7	Isolation of drug resistant organism - gradient plate technique
8	Isolation of Auxotrophic mutants using replica plating.
9	Isolation and Quantification of RNA (Under DBT Star scheme)
10	Carcinogenicity testing - AMES Test
11	Detection of beta galactosidase - ONPG Test
12	Transformation of bacteria with recombinant DNA- blue white screening



233MB1A4CP

References

- 1T.A. Brown, 2023, Gene Cloning and DNA Analysis: An Introduction, 7th
edition, Wiley-Blackwell Publications & New Jersey, United States.
- 2 Walt Ream, Katharine G. Field, 2021, Molecular Biology Techniques: An Intensive Laboratory Course, 5th Edition, Academic Press (Elsevier).
- 3 Sheedy, F. J., & Walker, K. T. 2016. Practical Immunology. Wiley-Blackwell
- 4 Chapel, H., Haeney, M., & Misbah, S. 2014. Essentials of Clinical Immunology. John Wiley & Sons.



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Course Code	Course Name	Category	L	T	Р	Credit
233BT1A4IC	BIOINFORMATICS	IDC	3	-	-	3

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PREAMBLE

This course has been designed for students to learn and understand

- The biological databases and their applications
- The applications of various Bioinformatics tools
- The biology better in terms of computer algorithms

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the biological databases with applications.	K2
CO2	Explain the concept of genomes and gene prediction.	K2
CO3	Distinguish the types of protein structures and its implications in functions.	K3
CO4	Comprehend the molecular modelling and visualization for drug designing.	K3
CO5	Apply and comprehend the tools used in Bioinformatics and phylogenetic analysis.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
CO2		\checkmark	\checkmark	~	V
CO3	\checkmark		\checkmark	\checkmark	\checkmark
CO4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
CO5	\checkmark	\checkmark	\checkmark	e la	\checkmark

COURSE FOCUSES ON

☑ Skill Development	Entrepreneurial Development
🗹 Employability	□ Gender Sensitization
☑ Intellectual Property Rights (IPR)	Social Awareness / Environment
☑ Innovations	□ Constitutional Rights / Human Values / Ethics



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233BT1A4IC	BIOINFORMATICS	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Introduction to Bioinformatics

Basics of Cell-Chromosome-Genome-Genes and DNA-Central Dogma. Introduction to DNA sequencing - Illumina, Pyro 454 and Ion torrent. Biological Databases: DNA sequence Database-Protein Database and Sequence analysis tools.

Unit II Genomics

Genome Mapping-Assembly and Comparison. Structural and Functional Genomics. RNA sequencing and Transcriptomics. Gene Prediction: Computational Methods of Gene Prediction, difficulties and application of gene prediction.

Unit III Proteomics

Introduction to protein structure, visualization, comparison and classification. Secondary and tertiary protein structure prediction using bioinformatics tools and methods of protein modeling.

Unit IV Bioinformatics in Computer-Aided Drug Design 7 h

Introduction to CADD and drug discovery process. Structural Bioinformatics in drug discovery-SAR and QSAR techniques in drug design. Molecular docking and AutoDock tools.

Unit V Applied Bioinformatics Tools

Introduction to Bioinformatics search tools-Entrez and ExPASy. Sequence alignment: DNA Sequence analysis-Protein sequence analysis-Pairwise and Multiple sequences Alignment. Database search-Motif Search (Protein Motifs and Domain Prediction)-Molecular Modeling and Phylogenetic tree construction and analysis.



8 h

7 h

7 h

Rastogi SC , Mendiratta N and Rastogi P, 2013, "Bioinformatics: Methods and
Applications: Genomics, Proteomics", 4th Edition, Prentice Hall India Learning Private Limited.

Zhumur Ghosh and Bibekan and Mallick, 2009, "Bioinformatics: Principles
and Applications", OUP India; Illustrated, 2nd Edition, Oxford University Press.

References

- Rui Jiang, Xuegong Zhang and Michael Q. Zhang, 2013, "Basics of
 Bioinformatics", 1st Edition, Tsinghua University Press, Beijing and Springer-Verlag Berlin Heidelberg.
- 2 Teresa Attwood, 2007, "Introduction to Bioinformatics", 1st Edition, Pearson Education.
- 3 Campbell, A.M. and L. J. Heyer, 2007,"Discovering Genomics, Proteomics and Bioinformatics", 2nd Edition, Pearson Education
- 4 Siddiqui AA, 2020, "Computer Aided Drug Design", 1st Edition, CBS publishers, USA.

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Course Code	Course Name	Category	L	Т	P	Credit
233MB1A4SA	RECOMBINANT DNA TECHNOLOGY	SEC	2	1	-	2

This course has been designed for students to learn and understand

- The utilization of different DNA manipulating enzymes and its exploitation for beneficial applications
- The development of clones and transform them into organisms, making them to produce new products
- On how to utilize the microbial system in developing products of commercial importance

COURSE OUTCOMES

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

CO	CO Statement	Knowledge				
Number	mber					
001	Apply the ideas on restriction modification system,	K3				
COI	towards evolution of recombinant DNA technology					
COD	Reframe different vectors in the development of new	K3				
02	recombinants					
C02	Deploy the specific type of vector in recombination	K3				
03	experiments					
001	Have an idea on the transmission of recombinant vectors	K3				
CO4	inside the organisms					
COF	Deploy techniques in identifying microorganisms having	K3				
0.05	recombinant polynucleotide	NJ				

MAPPING WITH PROGRAMME OUTCOMES

COs/Pos	PO1	PO2	PO3	PO4	PO5
CO1	· · · · ·	\checkmark	\checkmark	~	\checkmark
CO2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
CO3	×	✓	~	\checkmark	\checkmark
CO4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
CO5	\checkmark	\checkmark	\checkmark	\checkmark	~

COURSE FOCUS ON:





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233MB1A4SA RECOMBINANT DNA TECHNOLOGY

Total Credits: 2

Semester IV

Total Instruction Hours: 36h

Syllabus

Unit I Introduction to rDNA Technology

History and Scope of rDNA technology - Restriction modification system - Gene manipulating enzymes – Restriction Enzymes – Discovery, types and mode of action, DNA Polymerases I,II & III, Taq polymerase, Klenow fragment - Ligases - Methylases - Reverse transcriptase. Applications of Gene cloning.

Unit II Isolation of Purified Polynucleotide

Isolation and Purification of DNA(Chromosomal and Plasmid)- Isolation and Purification of RNA - Chemical Synthesis of DNA – Development of Genomic DNA Library and cDNA Library.

Unit III Vectors

Plasmid based Vectors - Natural vectors - pSC101, pSF2124 and pMB1.Artificial vectors - pBR322 & pUC. Phage based Vectors- *λ* phageandM13. Hybrid Vectors - Phagemid, Phasmid and Cosmid. Artificial chromosomes - BACs; - Eukaryotic vectors -YAC, Shuttle vectors.

Unit IV Gene Transfer Techniques

Biochemical methods - calcium phosphate, DEAE dextran mediated, Lipofection. Physical methods - Electroporation, Microinjection, Particle bombardment, Ultra. Biological - Viral mediated transduction.

Unit V Screening and Characterization of recombinant DNA 7 h

Screening: Direct - Antibiotic resistance, lacZ complementation (Blue-white selection), plaque phenotype; Indirect: Immunochemical detection - Nucleic acid hybridization, Blotting - Dot and Colony Blotting. Chromosome walking. Chromosome jumping.

Case study: In 2020 there was a viral pandemic disease that shook the entire world. Design a recombinant product that could have tackled the virus by developing immunity in individuals, in the form of an active or passive vaccine.

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8 h

7 h

7h

- Brown, T.A. 2020, Gene Cloning and DNA Analysis: An Introduction, Wiley-Blackwell. 8th Edition, New Jersey, United States.
- Thieman, W.J. and Palladino, M.A. 2019, Introduction to Biotechnology,
 Books a la Carte. 4th Edition, Pearson Education, Noida.

References

- 1 Krebs, J.E., Goldstein E.S. and Kilpatrick S.T. 2018. Lewin's Gene XII, Jones &Bartlelt Publishers, Boston. United States.
- Primrose, S.B. and Twyman, R.M. 2016. Principles of Gene manipulation
 and Genomics, 8th Edition, John Wiley and Sons Ltd, Wiley-Blackwell.
 United Kingdom.
- Bernard R. Glick, Jack J. Pasternak, Cheryl L. Patten. 2010. Molecular
 Biotechnology. Principles and Applications of Recombinant DNA. 4th Edition. ASM Press. University of Michigan. United States.
- 4 Susan, R.B. 2008. Biotechnology, Cengage Learning Pvt. Ltd., New Delhi.
- 5 https://archive.nptel.ac.in/courses/102/103/102103013/#downloads

BoS Chairman/HOD

Department of Microbiology Dr. N. G. P. Arts and Science Coilege Coimbatore - 641 048

	Dr.N.G.P. Arts and Science College				
APPROVED					
BOS- 18th		AC-18th	GB -		
08/11/2024		26/11/2024	Carolines		





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