



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.



PROGRAM OUTCOMES:

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



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
III (108 Credits)	Core (Credits 2,3,4,5)	17	70	I to VI
	Inter Departmental Course (IDC)	4	16	I to IV
	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
	Skill Enhancement Course(SEC)	4	8	III ,IV,V& VI
	Industrial Training	1	2	V
IV (8 Credits)	Environmental Studies(AECC)	1	2	I
	Basic Tamil/ Advance Tamil /Human Rights & Women's Rights(AECC)	1	2	II
	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	




CURRICULUM B.SC

MICROBIOLOGY

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
First Semester										
Part - I										
231TL1A1TA	Language - I	Tamil-I	4	1	-	3	25	75	100	3
231TL1A1HA		Hindi-I								
231TL1A1MA		Malayalam-I								
231TL1A1FA		French -I								
Part - II										
231EL1A1EA	Language - II	English - I	4	-	1	3	25	75	100	3
Part - III										
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 - I	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										
233MB1A1XA	Extension Activity	NSS/NCC/YRC/RRC/ Yoga/Sports	-	-	-	-	50	-	50	1
Total			19	1	10				800	22


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

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APPROVED		
BoS - 15th 10/06/2023	AC - 15th 14/07/2023	GB - 20th 05/08/2023



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

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Second Semester										
Part – I										
231TL1A2TA	Language - I	Tamil-II	4	1	-	3	25	75	100	3
231TL1A2HA		Hindi-II								
231TL1A2MA		Malayalam- II								
231TL1A2FA		French – II								
Part – II										
231EL1A2EA	Language - II	English - II	4	-	1	3	25	75	100	3
Part – III										
233MB1A2CA	Core - III	Microbial Physiology	4	-	-	3	25	75	100	4
233MB1A2CB	Core - IV	Microbial Genetics	3	-	-	3	25	75	100	3
233MB1A2CP	Core Practical - II	Microbial Physiology and Microbial Genetics	-	-	5	9	40	60	100	2
232CE1A2IQ	IDC - II	Basic Chemistry	2	-	4	3	40	60	100	4
Part – IV										
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			18	2	10				700	22



Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
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	Bioinstrumentation	3	1	-	3	25	75	100	3
233MB1A3CP	Core Practical - III	Microbial Diversity and Bioinstrumentation	-	-	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



Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
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										
233MB1A4CA	Core - VII	Immunology	4	-	-	3	25	75	100	4
233MB1A4CP	Core - VIII	Food Microbiology	2	-	4	6	40	60	100	4
233MB1A4CQ	Core Practical - IV	Immunology & Recombinant DNA Technology	-	-	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



Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
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	DSE-I	Microbial Technology	4	-	-	3	25	75	100	4
233MB1A5DB		Dairy Microbiology								
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 Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part - III										
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	DSE-III	Microbial Fuel Technology								
233MB1A6DE		Perspectives on Microbiology Lab Accreditation	4	-	-	3	25	75	100	4
233MB1A6DF		Epidemiology and Public Health								
Part - IV										
235BI1A6AA	AECC-III	Innovation and IPR	2				50	-	50	2
Total			23	1	6				750	26
*Grand Total									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	233MB1A3GA	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	Good Laboratory Practices
2	233MB1ASSB	III	Food Sanitation

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



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

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/co-curricular/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 one Basic Tamil course in the second semester.



(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 : 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

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.



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.



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	<ul style="list-style-type: none"> • Engagement in class • Listening Skills • Behaviour
2	Case Study Presentation/ Term Paper	<ul style="list-style-type: none"> • Identification of the problem • Case Analysis • Effective Solution using creativity/imagination
3	Field Study	<ul style="list-style-type: none"> • Selection of Topic • Demonstration of Topic • Analysis & Conclusion
4	Field Survey	<ul style="list-style-type: none"> • Chosen Problem • Design and quality of survey • Analysis of survey
5	Group Discussion	<ul style="list-style-type: none"> • Communication skills • Subject knowledge • Attitude and way of presentation • Confidence • Listening Skill
6	Presentation of Papers in Conferences	<ul style="list-style-type: none"> • Sponsored • International/National • Presentation • Report Submission
7	Industry Visit	<ul style="list-style-type: none"> • Chosen Domain • Quality of the work



		<ul style="list-style-type: none"> • Analysis of the Report • Presentation
8	Book Review	<ul style="list-style-type: none"> • Content • Interpretation and Inferences of the text • Supporting Details • Presentation
9	Journal Review	<ul style="list-style-type: none"> • Analytical Thinking • Interpretation and Inferences • Exploring the perception if chosen genre • Presentation
10	e-content Creation	<ul style="list-style-type: none"> • Logo/ Tagline • Purpose • Content (Writing, designing and posting in Social Media) • Presentation
11	Model Preparation	<ul style="list-style-type: none"> • Theme/ Topic • Depth of background Knowledge • Creativity • Presentation
12	Seminar	<ul style="list-style-type: none"> • Knowledge and Content • Organization • Understanding • Presentation
13	Assignment	<ul style="list-style-type: none"> • Content and Style • Spelling and Grammar • References

ii) Distribution of External Marks (ESE)

Total	:	75
Written Exam	:	75

Marks Distribution for Practical course

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	40
2	Record	10
3	Viva- voce	10

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

Total **40**

ii) Distribution of External Marks

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

Total **60**

Evaluation of Project Work/ Internship/ Industrial training 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 or VI semester.

S. No.	Course Code	Course Name	Proposed NPTEL Course	Credit
1			Option - 1 Paper title	4
			Option - 2 Paper title	
			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, at least 1 course should cover content/syllabus of exempted core paper in V or VI 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	2
			Option - 2 Paper title	
			Option - 3 Paper title	
2			Option - 1 Paper title	2
			Option - 2 Paper title	
			Option - 3 Paper title	



NPTEL Courses to be carried out during semester I - IV.					
S.No.	Student Name	Class	Proposed NPTEL Course		Proposed Course for Exemption
			Course I	Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title	Any one Core Paper in V or VI semester
			Course II	Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title	
Class 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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A maximum of 1 credit under each category is permissible.

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 celebrations	1
Awards/Recognitions/Fellowships	1

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

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



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.

Distribution of Internal Marks for AECC & AEEC

Theory			Practical	
S. No.	Particulars	Distribution of Marks	Particulars	Distribution of Marks
1	CIA I (2.5 Units) (On completion of 45 th working day)	15	CIA I (Exercise 1-5)	5
2	Model (5 Units) (On completion of 85 th working day)	15	CIA II (Exercise 6 - 10)	5
3	Assignment	05	Class Participation	10
4	Attendance	05	Practical Record	10
5	Library Usage	05	Test -III & Viva-Voce (10+10)	20
6	Skill Enhancement*	05	---	---
Total		50		50



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 to 15 marks
CIA test II/ Model test 1 Hour All five Units	50 x 1 = 50 Marks	MCQ	50 Marks	Marks secured will be Converted to 15 marks

Question paper pattern		Total Marks -50	
<u>Basic Tamil</u>		<u>Advanced Tamil</u>	
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

CIA I : [1 ½ Hours-2.5 Units] - 25 Marks

SECTION	MARKS	DESCRIPTION	TOTAL	Remarks
Section - A	8 x 0.5 = 04 Mark	MCQ	25 Mark	Marks secured will be converted To 5 mark
Section - B	3 x 3 = 09 Mark	Answer ALL Questions Either or Type ALL Questions Carry Equal Marks		
Section - C	2 x 6 = 12 Mark			

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

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



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

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



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COIMBATORE | INDIA

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

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

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடல்களின் 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
CO1	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		✓	✓		✓
CO2	✓			✓	
CO3		✓			✓
CO4			✓		
CO5	✓			✓	✓

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input checked="" type="checkbox"/>	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



231TL1A1TA	TAMIL - I	SEMESTER I
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Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I மறுமலர்ச்சிக் கவிதைகள் 13 h

1. இலக்கிய வரலாறு - மறுமலர்ச்சிக் கவிஞர்களின் தமிழ்ப்பணிகள்
2. பாரததேசம் - பாரதியார்
3. படி - பாரதிதாசன்
4. தமிழரின் பெருமை - நாமக்கல் கவிஞர்
5. தமிழ்க் கொலை புரியாதீர் - புலவர் குழந்தை
6. திரைத்தமிழ்
 - அ) 'விஞ்ஞானத்த வளர்க்கப் போறண்டி' எனத் தொடங்கும் பாடல் - உடுமலை நாராயண கவி
 - ஆ) 'சும்மா கிடந்த நிலத்தை' எனத் தொடங்கும் பாடல் - பட்டுக்கோட்டை கல்யாண சுந்தரனார்
 - இ) 'சமரசம் உலாவும் இடமே' எனத் தொடங்கும் பாடல் - மருதகாசி
 - ஈ) 'உன்னை அறிந்தால்' எனத் தொடங்கும் பாடல் - கண்ணதாசன்

Unit II புதுக்கவிதைகள் 13 h

1. இலக்கிய வரலாறு - புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
2. கடமையைச் செய் - மீரா
3. மலையாளக் காற்று - சிற்பி
4. ஒப்பிலாத சமுதாயம் - அப்துல் ரகுமான்
5. கன்னிமாடம் - மு.மேத்தா
6. கரிக்கிறது தாய்ப்பால் - ஆரூர் தமிழ்நாடன்
7. ஐந்தாம் வகுப்பு 'அ' பிரிவு - நா. முத்துக்குமார்
8. ஹைகூ கவிதைகள் - 10 கவிதைகள்

Unit III பெண்ணியம் 09 h

1. தொலைந்து போனேன் - தாமரை
2. நீரில் அலையும் முகம் - அ. வெண்ணிலா
3. தற்காத்தல் - பொன்மணி வைரமுத்து
4. ஏனிந்த வித்தியாசங்கள்? - மல்லிகா
5. புதையுண்ட வாழ்க்கை - சுகந்தி சுப்ரமணியன்



Course Code	Course Name	Category	L	T	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	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input checked="" type="checkbox"/>	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



Unit IV சிறுகதைகள்

15 h

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 செஞ்சரி 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: <https://www.tamilvu.org>



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COIMBATORE | INDIA

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

231TL1A1HA	HINDI-I	SEMESTER I
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Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I 13 h

गद्य - नूतनगद्यसंग्रह(जयप्रकाश)पाठ 1- रजियापाठ 2- मक्रीलपाठ 3- बहतापानीनिर्मला
पाठ 4- राष्ट्रपितामहात्मागाँधी

Unit II 13 h

कहानीकुंज- डॉ.पी. 'अमिताभ'(पाठ 1-4)

Unit III 12 h

व्याकरण : शब्दविचार (संज्ञा, सर्वनाम,विशेषण)

Unit IV 12 h

अनुच्छेद लेखन

Unit V 10 h

अनुवाद अभ्यास-III (केवल अंग्रेजी से हिन्दी में) (पाठ 1 to 10)

Text Books

- 1 प्रकाशक: सुमित्रप्रकाशन 204 लीलाअपाटर्मेंट्स, 15 हेस्टिंग्सरोड' अशोकनगरइलाहाबाद-211001
- 2 प्रकाशक: गोविन्दप्रकाशनसदरबाजार, मथुराउत्तरप्रदेश-281001
- 3 पुस्तक: व्याकरण प्रदिप - रामदेवप्रकाशक: हिन्दी भवन 36 टेगोर नगर इलाहाबाद-211024
- 4 पुस्तक: व्याकरण प्रदिप - रामदेवप्रकाशक: हिन्दी भवन 36 इलाहाबाद-211024
- 5 प्रकाशक: दक्षिण भारत प्रचार सभा चेन्नई -17



Course Code	Course Name	Category	L	T	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	K3
CO5	Build the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input checked="" type="checkbox"/>	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



231TL1A1MA	MALAYALAM - I	SEMESTER I
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Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I	Novel	14 h
	Pathummayude Adu	
Unit II	Novel	10 h
	Pathummayude Adu	
Unit III	Short Story	14 h
	Nalinakanthi	
Unit IV	Short Story	10 h
	Nalinakanthi	
Unit V	Practical Application	12 h
	Expansion of ideas, General Essay 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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B.Sc. Microbiology (Students admitted during the AY 2023-24)

Course Code	Course Name	Category	L	T	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	✓				✓
CO2					✓
CO3					
CO4	✓		✓		✓
CO5	✓		✓		

COURSE FOCUSES ON

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input checked="" type="checkbox"/>	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/Human Values/Ethics



231TL1A1FA	FRENCH - I	SEMESTER I
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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
<ul style="list-style-type: none"> • Saluer • Enter en contact avec quelqu'un. • Se presenter. • S'excuser 	En cours de cuisine, premiers contacts avec les members d'un groupe	<ul style="list-style-type: none"> • Comprendre des personnes qui se saluent. • Échanger pour entrer en contact, se présenter, saluer, s'excuser. • Communiquer avec <i>tu</i> ou <i>vous</i>. • Comprendre les consignes de classe • Épeler 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
<ul style="list-style-type: none"> • Demander de se presenter. • Présenter quelqu'un. 	Dans la classe de français, se presenter et remplir une fiche pour le professeur.	<ul style="list-style-type: none"> • Comprendre les informations essentielles dans un échange en milieu professionnel. • Échanger 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
<ul style="list-style-type: none"> • Exprimer ses goûts. 	Dans un café, participer à une soirée de rencontres rapides et remplir de taches d'appréciation	<ul style="list-style-type: none"> • Dans une soirée de rencontres rapid comprendre des personnes qui échantent sur elles et sur leurs goût • Comprendre une personne qui parler des goûts de quelqu'un d'autre



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Unit IV J'adore I Page 30

14 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
<ul style="list-style-type: none"> Présenter quelqu'un 	Dans un café, participer à une soirée de rencontres rapides et remplir de tâches d'appréciation	<ul style="list-style-type: none"> Exprimer ses goûts Comprendre une demande laissée sur un répondeur téléphonique. Parler de ses projets de week-end
Autoévaluation du module I Page 40 – Préparation au DELF A1 page 42		
Demander à quelqu'un de faire quelque chose. Demander poliment. Parler d'actions passées. Tu veux bien?	Organiser un programme d'activités pour accueillir une personne importante	Comprendre une personne demande un service à quelqu'un. Demander à quelqu'un de faire quelque chose. Imaginer et raconter au passé à partir de situations dessinées.

Unit V Practical Application

10 h

Make in Own Sentences

Text Book

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



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

Course Code	Course Name	Category	L	T	P	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	K3

MAPPING WITH PROGRAMME OUTCOMES

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

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input checked="" type="checkbox"/>	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



231EL1A1EA	ENGLISH- I	SEMESTER I
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Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies 12 h

Nissim Ezekiel: The Worm- Author's Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques- Annotations

Niyi Osundare: Our Earth Will Not Die- Author's Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques- Annotations

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

Unit II Listening Skills 12 h

Listening vs. hearing- Types of listening, Tips to enhance Listening Skills, Non-verbal 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 14 h

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 10 h

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



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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)
- 2 Ezekiel, Nissim. "The Worm," Crazy Romantic Love, www.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)
- 6 Prabha, Dr. R. Vithya & S. Nithya Devi. 2019. Sparkle. (1st Edn.) McGraw - Hill Education, Chennai, India. (Unit III- V)

References

- 1 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/2019/03/08/on-superstitions-by-a-g-gardiner. Accessed 3 Aug. 2022.
- 3 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	T	P	Credit
233MB1A1CA	FUNDAMENTALS OF MICROBIOLOGY	CORE	3	-	-	3

PREAMBLE

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
CO1	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	✓				
CO2	✓	✓	✓		✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓	
CO5	✓				

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



233MB1A1CA	FUNDAMENTALS OF MICROBIOLOGY	SEMESTER I
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Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I History of Microbiology 8 h

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 7 h

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 7 h

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 7 h

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).



Text Books

- 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.*
- 2 *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.*



Course Code	Course Name	Category	L	T	P	Credit
233MB1A1CB	CELL BIOLOGY	CORE	3	-	-	3

PREAMBLE

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	K3

MAPPING WITH PROGRAMME OUTCOMES

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

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



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233MB1A1CB	CELL BIOLOGY	SEMESTER I
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Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Prokaryotes - Eubacteria 8 h

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 7 h

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 7 h

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 7 h

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 7 h

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).



Text Books

- 1 *Joanne Wiley, Linda Sherwood, Christopher J Woolverton, 2017, Prescott's Microbiology, 10th edition, McGraw Hill Company, New Delhi, India*
- 2 *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*



233MB1A1CP	CORE PRACTICAL: FUNDAMENTALS OF MICROBIOLOGY AND CELL BIOLOGY	SEMESTER I
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Total Credits: 3
Total 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



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.*



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

PREAMBLE

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	CO Statement	Knowledge Level
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.	K3
CO4	Describe the structure, types and properties of nucleic acids.	K3
CO5	Understand the types and significance of vitamins, minerals and hormones.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



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233CL1A1IA	BIOCHEMISTRY	SEMESTER I
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Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Carbohydrates 8 h

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 derivatives - glycosaminoglycan, proteoglycan and glycoprotein and Bacterial cell wall polysaccharides.

Unit II Lipids 6 h

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 7 h

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.

Unit IV Nucleic Acids and Enzymes 8 h

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 7 h

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.



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Text Books

- 1 Jain J L, Jain S and Jain N, 2012, "**Biochemistry**", 1st Edition, S. Chand and Company Pvt 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.



233CL1A1IP	IDC PRACTICAL - I BIOCHEMISTRY	SEMESTER I
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Total Credits: 2
Total 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	Quantification 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 Pvt. 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	T	P	Credit
233MB1A1AA	ENVIRONMENTAL STUDIES	AECC	2	-	-	2

PREAMBLE

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	✓	✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓		
CO5	✓	✓	✓	✓	✓

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
<input type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



233MB1A1AA	ENVIRONMENTAL STUDIES	SEMESTER I
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Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Environmental studies & Ecosystems 5 h

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 5 h

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 5 h

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.

Unit IV Environmental Pollution, Environmental Policies & Practices 5 h

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;

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

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



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.

[Signature]
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BoS- 15th 10/06/2023	AC - 15th 14/07/2023	GB - 20th 05/08/2023

