SRR & CVR GOVERNMENT DEGREE COLLEGE
(AUTONOMOUS)

VIJAYAWADA

Resolutions

for

B.Voc. Aquaculture Technology

SEMESTER-I and II

SYLLABUS AND MODEL QUESTION PAPERS

(AS *PER CBCS AND SEMESTER SYSTEM*)

(W.E.F.2020-21)

S.R.R. & C.V.R. GOVT. DEGREE COLLEGE
Autonomous & ISO900: 2015 Certified Institution,
NIRF -2020 ranked 101-150 band and NIRF - 2019: 151-200 rank band Institution
NAAC accredited with 'B+' Grade
Machavaram, VIJAYAWADA - 520 004. Krishna District.
Cell : 9440630271 Ph : 0866-2430060, Fax : 0866-2441092, www.srrcvr.org, srrandcvr@gmail.com

Minutes of the meeting of the Monitoring Committee in the Subject of B.Voc Aquaculture Technology

The monitoring Committee for B.Voc Courses constituted vide the Proceedings of The Principal, SRR & CVR Government Degree College (A) Vijayawada, dated-19-11-2020, Rc. No. UGC –A/IQAC/C-2/2020-21, met on 18.03.2021 for the ratification of **B.Voc Aquaculture Technology course** syllabus of the subjects that are already approved in their respective departmental BoS for Semester I & II **AY 2020-21** under the chairmanship of Sri. G. V. Swaroop Singh, Lecturer in Chemistry, B. Voc Course Coordinator.

The following monitoring Committee members attended the meeting:

1. **Sri. G.V. SWAROOP SINGH** **(Course Coordinator)**
   Lecturer in Chemistry
   SRR & CVR GDC (A), VIJAYAWADA

2. **Sri. MVN Murthy** **(Member)**
   Lecturer in Commerce
   SRR & CVR GDC (A), VIJAYAWADA

3. **Sri K.Durga Rao** **(Member)**
   Lecturer in Zoology
   SRR & CVR GDC (A), VIJAYAWADA

4. **Sri.B.Rama Krishna** **(Member)**
   Lecturer in Commerce
   SRR & CVR GDC (A), VIJAYAWADA

AGENDA

1. To ratify the syllabus of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
2. To ratify the Blue print of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
3. To ratify the Question papers of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
4. To approve the credits for various subjects in B.Voc Aquaculture Technology course.
5. To approve the evaluation pattern for B.Voc Aquaculture Technology course.

S.R.R. & C.V.R. GOVT. DEGREE COLLEGE

Autonomous & ISO 9001: 2015 Certified Institution
NIRF 2020 ranked 101–150 band and NIRF 2019 151-200 rank band institution
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Machavaram, VIJAYAWADA - 520 004, Krishna District
Cell. 9440830271, Ph. 0866 2430063, fax. 0866 2441092, [illegible]

Minutes of the meeting of the Monitoring Committee in the Subject of B.Voc Aquaculture Technology

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The following monitoring Committee members attended the meeting:

1. **Sri. G.V. SWAROOP SINGH** — (Course Coordinator)
   Lecturer in Chemistry
   SRR & CVR GDC (A), VIJAYAWADA
2. **Sri. P VN Murthy** — (Member)
   Lecturer in Commerce
   SRR & CVR GDC (A), VIJAYAWADA
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   Lecturer in Commerce
   SRR & CVR GDC (A), VIJAYAWADA

AGENDA

1. To ratify the syllabus of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
2. To ratify the Blue print of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
3. To ratify the Question papers of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
4. To approve the credits for various subjects in B.Voc Aquaculture Technology course.
5. To approve the evaluation pattern for B.Voc Aquaculture Technology course.

Resolutions:

1. Resolved to approve the syllabus of subjects - **Skill components** -Aquaculture paper 1,II,III, **General Components**-English, Computers, Zoology and Chemistry that were approved in their respective BoS meetings for B.Voc Aquaculture Technology course.
2. Resolved to ratify the Blue print of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
3. Resolved to approve the Model Question papers of various subjects that are approved in their respective BOS meetings for B.Voc Aquaculture Technology course.
4. Resolved to approve the credits of various subjects in B.Voc Aquaculture Technology course.
5. Resolved to approve the evaluation pattern for B.Voc Aquaculture Technology course.
6. Resolved to approve the division of 100 marks into two components as Internal and External for Skill components Aquaculture Paper I, II, III , General components – Zoology and Chemistry.
7. Resolved to approve the division of marks for (Internal) CIA as 40 marks and (External) SEE as 60 marks with the suggested blue print and model paper.
8. External 60 Marks: Section-A consisting 20 Marks, Short Answer questions (Any 5 from given 10), Section-B consisting 40 Marks , Essay Questions (Any 5 with internal choice from given 10)
9. Internal 40 Marks. To evaluate Internal Assessment as follows:- Average of two Internal exams of 10 marks -10 marks, Assignments (two) -10 marks, Project -10 marks, Seminar- 05 marks, Attendance-05 marks .
10. The pass mark is 40% i.e., 24 out of 60 for External and 16 out of 40 for Internal.
11. Resolved to approve and divide the 50 marks into two components for Practicals , External 25 Marks and Internal 25 marks
12. The minimum pass mark is 40% i.e., 10 out of 25 for External and Internal each
13. Resolved to approve the evaluation of General components- English and Computers subject's papers for 50 mark, which is done at the end of the semester.
14. There is no CIA for these courses. Only SEE is conducted for 2 hours for 50 marks. The Question Paper consists of 10 Essay questions and student is required to write any 5 questions: 5X 10 = Total 50 Marks.

PROGRAMME: THREE-YEAR
B.Voc. Aquaculture Technology

The syllabus for B.Voc. Aquaculture Technology is framed at undergraduate level using the Choice Based Credit system. The main objective of framing this syllabus is to give the students a holistic understanding of the subject giving substantial weight age to the Skill Components and General component useful for Aquaculture. The syllabus has also been framed in such a way that the basic skills of subject are taught to the students and may continue higher studies in post graduation and/or secure a job after graduation.

PROGRAMME OUTCOMES :

On completion of their degree, students will have developed a comprehensive and well-founded knowledge in aquaculture and a range of transferable professional skills. Graduates of the course are expected to be able to:

1 Demonstrate a sound understanding of the biology of aquaculture organisms and of breeding, genetics, nutrition and water quality issues relevant to aquaculture
2 Design aquaculture systems and solve engineering issues in aquaculture
3 Employ knowledge of health and safety issues in aquaculture ventures
4 Employ scientific techniques, practical skills and business management strategies to improve aquatic resource management
5 Understand and interpret critical scientific and ethical issues in aquaculture
6 Employ scientific methodologies such as experimental design, quantitative skills, and the critical analysis of data
7 Communicate and present information clearly and fluently in both written and spoken forms
8 Interact effectively as part of a team in order to work towards a common outcome
9 Reason critically and logically and make independent judgments
10 Engage effectively with information and communication technologies
11 Demonstrate research skills appropriate for further study and employment
12 Appreciate the need for continuing professional development.

LEARNING OUTCOMES:

1. Students will be able to understand types of culture system and economics of different kinds of aquaculture and productivity of culture ponds.
2. Students will be able to understand the transport of fin fish and shell fish and transport of eggs fry, fingerlings and adults.
3. Students will be able to understand the pond preparation and management, pre stocking and post stocking.
4. Students will be able to understand the major carp culture like cat fishes murrels and prawn culture, ornamental fish culture.
5. Students will be able to understand the nutritional requirements of commercially important fin fish and shell fish feed types, feeding techniques and feed management and role of pro biotics in nutrition.
6. Students will be able to understand role of genetics in aquaculture like gynonesis and androgenesis, triploidy, tetroploidy, hybridization, sex reversal breeding, production of transgenic fishes.
7. Students will be able to understand general principles of molluscan , pearl oyster culture, seaweeds.
8. Students will be able to understand environmental impact aquaculture for waste and future development in waste minimization environmental consequences of hyper nitrification.

Levels of Awards

The certification levels will lead to Diploma/Advanced Diploma/B. Voc. Degree in one or more vocational areas and will be offered under the aegis of the University.

AWARD	**DURATION**	**CORRESPONDING NSQF LEVEL**
CERTIFICATE	6 MONTHS (I Semester)	4
DIPLOMA	1 YEAR (I &II semesters)	5
ADVANCED DIPLOMA	2 YEAR (I,II & III,IV semesters)	6
B.Voc. DEGREE	3 YEAR (I,II,III,IV & V,VI semesters)	7

SRR&CVR Govt. Degree College (A) , Vijayawada
B.Voc. (Aquaculture Technology)
Syllabus & Title of the papers

SEMESTER-I						
	GENERAL COMPONENTS					
No.	**TITLE**	**Credits**	**Hours Week**	**Internal marks**	**External marks**	**Total**
1	English (Communication & soft skills)	2	2	-	50	50
2	Computers (Basics of Computer Applications)	2	2	-	50	50
3	Chemistry	3+1	3+2	40	60	100
4	Zoology	3+1	3+2	40	60	100
	TOTAL	12	14			
	SKILL COMPONENTS					
5	Biology of Fin Fish &Shell Fish	4+1=5	4+2	40	60	100
6	Basic Principles of Aquaculture	4+1=5	4+2	40	60	100
7	Fresh water and Brackish water Aquaculture	4+1=5	4+2	40	60	100
8	Field Work/Project	3	4	40	60	100
	TOTAL	18	22			
	GRAND TOTAL	30				

SRR&CVR Govt. Degree College (A) , Vijayawada
B.Voc. (Aquaculture Technology)
Syllabus & Title of the papers

SEMESTER-II						
	GENERAL COMPONENTS					
No.	**TITLE**	**Credits**	**Hours Week**	**Internal marks**	**External marks**	**Total**
1	English (Communication & soft skills)	2	2	-	50	50
2	Computers (Information and Communication Technology)	2	2	-	50	50
3	Chemistry	3+1	3+2	40	60	100
4	Zoology	3+1	3+2	40	60	100
	TOTAL	12	14			
	SKILL COMPONENTS					
5	Capture Fishery	4+1=5	4+2	40	60	100
6	Fish Nutrition and Feed Technology	4+1=5	4+2	40	60	100
7	Fish Health Management	4+1=5	4+2	40	60	100
8	Field Work / Project	3	4	40	60	100
	TOTAL	18	22			
	GRAND TOTAL	30				

S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous), Vijayawada.
B.Voc Programme : Revised CBCS : w.e.f 2020 - 21
I Year: I Semester
Paper: COMMUNICATION AND SOFT SKILLS
SYLLABUS

Today's corporate culture needs human resource from any field to practically deal with the industry practices. The **B.VOC** program is designed with the aim and objective to drive the young minds towards excellence. The Department of Communication and Soft Skills seeks to foster the intellectual development by encouraging study of language and writing skills—whether creative, technical, or other professional writing. It involves students in face-to-face exchanges of ideas with faculty and peers. Communication and Soft Skills learners use the resources of the library.

B.VOC Communication and Soft Skills Program Structure

	Semester I							Semester II						
	Program	**Course Title**	**L**	**T**	**P**	**H**	**C**	**Program**	**Course Title**	**L**	**T**	**P**	**H**	
Year I	B. Voc	Communication and Soft Skills	2	0	0	2	2	B. Voc	Communication and Soft Skills	2	0	0	2	

Legend: L - Lectures, T – Tutorials, P – Practicals/Practice, H - Contact Hours and C -Credits

PROGRAM OUTCOME: PO

The Program Outcomes of the UG courses of the college describe the knowledge, skills, and attitudes that students should have after successfully finishing their BSc/BCom/B. Voc/BA/BCA/BBM degree. These programs develop learners as socially responsible and globally-aware citizens, who value critical thought and ethical action. It provides students with the knowledge and skills that help make their lives meaningful and rewarding, and strengthen their contributions to society. These degrees are expected to prepare them for careers, or for further professional studies, whether at home or abroad. The quality of their educational credentials will be understood and valued by employers.

Course Outcome:

The Department of English seeks to foster the intellectual development of its students by encouraging study of language skills. The mission of the English Department is to develop the reading and writing skills, the interpretive ability, and the cultural awareness of its students by maintaining and enhancing a tradition of strong teaching, good scholarship, and vigorous support of creative literary activity.

Evaluation Scheme:

A comprehensive examination of **two hour-duration** is held at the end of the semester for 50 marks. Entire curriculum is covered in the comprehensive examination. General Structure of the Question Paper for the Comprehensive Examinations is provided below:

S. No.	Pattern	Marks
1.	**Section A:**	**10**
2.	**Section B:**	**10**
3	**Section C:**	**10**
4	**Section D:**	**10**
5	**Section E:**	**10**
	Total	**50**

S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous), Vijayawada.
B.Voc Programme : Revised CBCS : w.e.f 2020 - 21
I Year : I Semester
Paper: COMMUNICATION AND SOFT SKILLS
SYLLABUS

PAPER TITLE	Syllabus	Reference Book
Communication and Soft Skills – I (Sem I)	**Unit I: Vocabulary Building** 1a. Prefixes and Suffixes 1b. Conversion 1c. Compounding 1d. Analogy 2. One-Word Substitutes 3. Words Often Confused 4. Synonyms and Antonyms 5. Phrasal Verbs **Unit II: Grammar – 1** 1. Types of Verbs 2. Subject-Verb Agreement **Unit III: Grammar – 2** 1. Meanings of Modals 2. Common Errors (Correction of Sentences) **Unit IV: Listening Skills** 1. The Importance of Listening 2. Types of Listening 3. Barriers/Obstacles to Effective Listening 4. Strategies for Effective Listening **Unit V: Reading Skills** 1. Skimming 2. Scanning 3. Intensive Reading and Extensive Reading 4. Comprehension	**English in Use – A Course in Communication Skills and Soft Skills -1 published by Orient Black Swan**

S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous), Vijayawada.
B.Voc Programme : Revised CBCS : w.e.f 2020 - 21
I Year : I Semester
Paper: COMMUNICATION AND SOFT SKILLS
MODEL PAPER

Time: 2 Hours **Maximum Marks: 50**

Answer any FIVE of the Following. All Questions Carry Equal Marks 5x10= 50
(TWO essay questions from Q.No.7 to Q.No.10 have to be answered)

1. A. Fill in the blanks using the appropriate Prefix/suffix:

a) Ravana_____(estimate) Rama's strength. (use prefix+ estimate)
b) It is_____(legal) to kill endangered animals. (use prefix+ legal)
c) Don't be _____(use child + suffix)
d) Our team won the hockey _____(use champion + suffix)
e) You need a_____(combine) of hardwork and determination to succeed . (use combine + suffix)

B. Pick out the suitable one word substitute of the following:

i. One who hates woman
a. Misogynist b. Gynecologist

ii. Which cannot be seen
a.I nfallible b. Invisible

iii. One who takes the most hopeful view of life
a. Optimistic b. Obsolete

iv. Pathological fear of high places
a. Acrophobia b. Adulation

v. One who does things for pleasure
a. Amateur b. Astronomer

2.A. Pick out the suitable Antonym of the following :

1 .stern
a. crabby b. lenient c. unreasonable d.tenant

2 . spry
a. Doddering b.young c.agile d. adult

3 . spurn
a.Turn b. weave c. embrace d. sew

4 . sorrow
a.empathy b.woe c.joy d.sympathy

5 .smile
a.laugh b.frown c.joke d.grin

B. Pick out the suitable Synonym of the following:

1. Admonish

a. To warn b.To cajole c. Encourage d.Abdicate

2. Manipulate

a.Display b Gloomy c. To handle or manage d. To mortgage

3. Deteriorate

a. Appreciate b.Recover c.To make worse d.Strengthen

4. Impede

a.Obstruct or hinder b.Recover c.To let free d.To detect

5. Commence

a.To End b.To Begin c.Nearing Finish d.To Run

3. A. Fill in the blanks with suitable articles:

_____old pilgim was making his way to _____Himalayan mountains in _____ cold of winter_____. When it began to snow, he went to _____hotel. Manager said to, "How will you ever get there in this kind of weather?"

B. Fill in the banks with suitable prepositions:

a) The woman_____the car is my neighbor.
b) Did you see the article_____the applications_____biotechnology?
c) The bag is_____ the top rack_____the cupboard.

4. A. Fill in the blanks with the suitable verbs forms given in the brackets.

i. I _ _____(am going, went) Vizag yesterday.
ii. The train_____(left, had left) the station, before I reached there.
iii. He_____(drinks, drank) milk every day.
iv. Raju _____(was doing, is doing) his homework now.
v. Pooja _____(is singing, was singing) when I visited her.

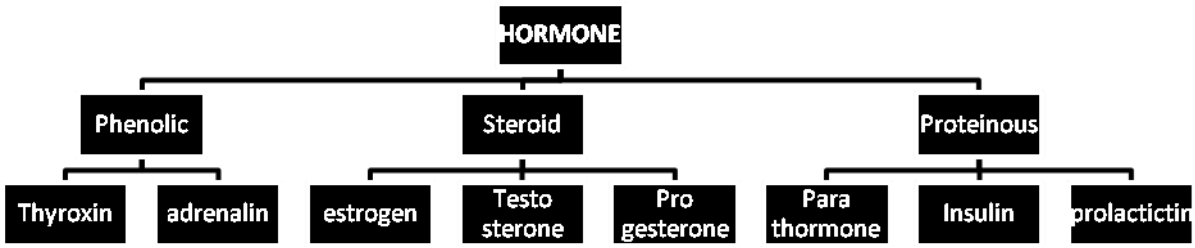
B. Fill in the blanks with the suitable verbs forms given in the brackets.

i. If you go now , you_____(catch) the train.
ii. English_____(spoke) all over the world.
iii. Don't disturb him. He _____(do) his homework.
iv. Ravi_____(be) an actor.
v. The child_____(sleep) here since 8'o clock.

5. A. Read the following chart carefully and answer the following questions:

CLASSIFICATION OF HORMONES

(BASED ON bio- chemical structure)



1. On what is the classification of hormones based?
2. What are the three types of hormones?
3. Thyroxins is a type of_____hormone.
4. Name one proteinous hormone.
5. Which of the following statements is true:

   Testosterone is a phenolic hormone

   Estrogen is a steroid

   Adrenaline is a proteinous hormone

B. Match the following phrasal verbs with their appropriate meaning:

1. make up	a. interrupt
2. pass away	b. explode
3. get over	c. find the solution
4. blow up	d. recover from an illness
5. break in	e. die
	f. invent

6.A. Study the tables given below and answer the questions that follow:

TALLEST BUILDINGS OF THE WORLD

Building	City	Height	Floors	Year
l. Taipei 101	Taipei	509 m	101	2004
2. Petronas Tower 1	Kuala Lumpur	**452** m	88	1998
3. Petronas Tower 2	Kuala Lumpur	452 **m**	88	1998
4. Sears Tower	Chicago	442 m	108	1974
5 Jin Mao Tower	Shanghai	421 m	88	1998
6. Two International Finance Center	Hong Kong	415 m	88	2003
7. CITIC Plaza	Guangzhou	391 m	80	1997
8. Shun Hing Square	Shenzhen	384 m	**69**	1996
9. Empire State Building	New York City	381 m	102	1931
10. Central Plaza	Hong Kong	374 m	**78**	1992

i. What does the table show ?
ii. Which is the oldest building in the table ? /
iii. Which building has the maximum number of floors ?
iv. In which city is the Central Plaza located ?
v. What is the height of the tallest building ?

B. Use the following phrasal verbs in sentences of your own:

i. Look on
ii. Put up
iii. Listen in
iv. Get into
v. Pick at

7. What is active listening? Illustrate.
8. What is intensive reading? Describe it's functions.
9. What is skimming?
10. Describe scanning as one of the important reading skills.

S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous), Vijayawada.
B. Voc Programme : Revised CBCS : w.e.f 2020 - 21
I Year : I Semester
Paper: COMMUNICATION AND SOFT SKILLS
BLUE PRINT

Time: 2 Hours **Maximum Marks: 50**

Answer any FIVE of the Following. All Questions Carry Equal Marks 5x10= 50
TWO questions from each unit have to be given.
Essay questions must be given from Unit-4 and Unit-5 only. (TWO essay questions from Q.No.7 to Q.No.10 have to be answered)
Question Nos 1to 6 are objective and 7 to 10 are descriptive

1. A. Fill in the blanks using the appropriate Prefix/suffix:
(5 sentences to be given)
B. Pick out the suitable one word substitute of the following:
(5 MCQs to be given)
2.A. Pick out the suitable Antonym of the following :
(5 MCQs to be given)
B. Pick out the suitable Synonym of the following :
(5 MCQs to be given)
3. A. Fill in the blanks with suitable articles:
(5 sentences to be given)
B. Fill in the banks with suitable prepositions:
(5 sentences to be given)
4. A. Fill in the blanks with the suitable verbs forms given in the brackets.
(5 sentences to be given with alternative answers)
B. Fill in the blanks with the suitable verbs forms given in the brackets.
(5 sentences to be given with verbs in base form)

5. A. Read the following chart carefully and answer the following questions:
(pie – diagram/Tree diagram with 5 questions to be given)

B. Match the following phrasal verbs with their appropriate meaning:
(5 questions to be given)

6. A. Study the tables given below and answer the questions that follow:
(Tabular form/flowchart/bar graph with 5 questions to be given)
B. Use the following phrasal verbs in sentences of your own:
(5 phrasal verbs to be given)
7. Essay question – Unit :4
8. Essay question – Unit :4
9. Essay question – Unit :5
10. Essay question – Unit :5.

S. R. R.&C. V. R. Govt. Degree College (Autonomous), Vijayawada

II Year, Semester IV : : II B. A. / B. Com. / B. Sc. / B. B. A. / U. G.

COMMUNICATION SKILLS AND SOFT SKILLS (C. S. S.- 3)

FOUNDATION COURSE : : SYLLABUS

Time: 2 Hours. Maximum Marks: 50 M

Unit I: Soft Skills

1. Positive Attitude
2. Body Language
3. SWOT/SWOC Analysis
4. Emotional Intelligence
5. Netiquette

Unit II: Paragraph Writing

1. Paragraph Structure
2. Development of Ideas

Unit III: Paraphrasing and Summarizing

1. Elements of Effective Paraphrasing
2. Techniques for Paraphrasing
3. What Makes a Good Summary?
4. Stages of Summarizing

Unit IV: Letter Writing

1. Letter Writing (Formal and Informal)
2. E-correspondence

Unit V: Job Application, CV and Dialogue Writing

1. Resume and CV
2. Dialogue Writing

Reference Book:
English in Use –A Course in Communication Skills and Soft Skills -3,Published by Orient Black Swan.

S. R. R. & C. V. R. Govt. Degree College (Autonomous), Vijayawada

II Year, Semester II : : II B. A. / B. Com. / B. Sc. / B. B. A. / U. G.

COMMUNICATION SKILLS AND SOFT SKILLS (C. S. S.- 3)

FOUNDATION COURSE : : BLUE PRINT

Time: 2 Hours. Maximum Marks: 50 M

1.	Positive Attitude.	1 x 5 M = 5 M.
2.	Body Language.	1 x 5 M = 5 M..
3.	SWOT / SWOC Analysis.	1 x 5 M = 5 M.
4.	Emotional Intelligence.	1 x 5 M = 5 M.
5.	Netiquette.	1 x 5 M = 5 M.
6.	Paragraph Writing.	1 x 5 M = 5 M.
7.	Jumbled Sentences.	1 x 5 M = 5 M.
8.	Paraphrasing and Summarizing.	1 x 5 M = 5 M.
9.	Letter Writing, E- Correspondence.. . . .	1 x 5 M = 5 M.
10.	Job Application, C V, Dialogue Writing. . . .	1 x 5 M = 5 M.

Note: The Paper Setter is requested to frame theory and application questionsaccording to the Model Question Paper of C. S. S. – 3.

S. R. R. & C. V. R. Govt. Degree College (Autonomous), Vijayawada

Semester II: I B.VOC

COMMUNICATION AND SOFT SKILLS (C. S. S. - 2)

MODEL QUESTION PAPER

Time: 2 Hours. **Maximum Marks: 50 M**

ANSWER ANY FIVE OF THE FOLLOWING. ALL QUESTIONS CARRY EQUAL MARKS

5 x 10 = 50

1. **What is Positive attitude? What are the benefits of Positive attitude?**
2. **How is body language important in communication skills? Explain.**
3. **What are the advantages of SWOT / SWOC analysis for students?**
4. **You have seen an advertisement of a mobile phone on the website. You liked it. You want to buy it and so you want to have some details about it. Write an emailto manager@best buy.com**
5. **What is Emotional Intelligence? What are the four levels of it?**
6. **List out the important rules of Netiquette.**
7. **Write a paragraph on one of the following:**

   (i). Swatcha Bharat (ii). Importance of Games and Sports

8. **Rearrange the following jumbled sentences to make a well written paragraph**

   A. The commercial uses of bamboo are astonishing.
   B. India produces over 3 million tones of bamboo annually.
   C. Nearly, half of it is half of it is turned into paper.
   D. Another important use of bamboo is in housing
   E. Concrete reinforced with bamboo can replace even steel in building, for example, suspension of bridges.
   F. Scientists at the Forest Research Institute, Dehradun, are working on the extraction of diesel fuel from the jointed stem of bamboo.
   G. With its network of rhizomes and roots, bamboo also plays an important role in the prevention of soil erosion.

9. **Paraphrase the passage given below:**
In this effort for development, our motto has been 'Sab Ka Saath Sab Ka Vikas':

> **We are with all citizens and for development of all citizens. This Government is dedicated to the poor. It will remain dedicated to them. In our fight against poverty, our main thrust has been to empower the poor, and make them active participants in the benefits of economic progress.**

10. **Prepare a Curriculum Vitae (CV) for the post of Receptionist – must be a graduate, fluency in English is compulsory – knowledge of computers is preferable – good communication skills.**

SRR&CVR GOVT DEGREE(A) COLLEGE VIJAYAWADA

BASIC COMPUTER APPLICATIONS
SEMESTER-I
FOR ALL GROUPS OF B.Sc. / B.Com / B.A/B.B.A/B.Voc

Revised Syllabus under CBCS w.e.f. 2020-2021

Semester	Course Title	Hours	Credits
I	**BASIC COMPUTER APPLICATIONS**	**30**	**2**

Objectives:

This course aims at providing exposure to students in skill development towards basic office applications.

Course Learning Outcomes:

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

1. Demonstrate basic understanding of computer hardware and software.
2. Apply skills and concepts for basic use of a computer.
3. Identify appropriate tool of MS office to prepare basic documents, charts, spreadsheets and presentations.
4. Create personal, academic and business documents using MS office.
5. Create spreadsheets, charts and presentations.
6. Analyze data using charts and spread sheets.

Unit-I: (08 hrs)

Basics of Computers: Definition of a Computer - Characteristics of computers, Applications of Computers – Block Diagram of a Digital Computer – I/O Devices, hardware, software human ware, application software, system software, Memories - Primary, Auxiliary and Cache Memory.

MS Windows – Desktop, Recycle bin, My Computer, Documents, Pictures, Music, Videos,

Task Bar, Control Panel.

1. Article reference chapters 1,2 from the book by Working in Microsoft Office – Ron Mansfield - TMH.

Unit-II: (08 hrs)

MS-Word : Features of MS-Word - MS-Word Window Components - Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Mail Merge.

1. Article reference chapters 3,4 from the book by Working in Microsoft Office – Ron Mansfield - TMH.

Unit-III: (10 hrs)

MS-Excel : Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Inserting Rows/Columns –Changing column widths and row heights, Formulae, Referencing cells , Changing font sizes and colors, Insertion of Charts, Auto fill, Sort.

MS-PowerPoint: Features of PowerPoint – Creating a Presentation - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and scaling of an Object – Slide Transition – Custom Animation.

1. Article reference chapters 4,5 from the book by Working in Microsoft Office – Ron Mansfield - TMH.

REFERENCE BOOKS:

2. Working in Microsoft Office – Ron Mansfield - TMH.
3. MS Office 2007 in a Nutshell –Sanjay Saxena – Vikas Publishing House.
4. Excel 2020 in easy steps-Michael Price – TMH publications

SRR&CVR GOVT DEGREE(A) COLLEGE VIJAYAWADA
REVISED CBCS-2020-21
BASIC COMPUTER APLLICATIONS
1ST YEAR SEMESTER -1
Common for B.A. / B.Com. / B.Sc. / BBA / B.Voc

MODELPAPER

Time :11/2 hrs **Total : 50 M**

SECTION-A

Answer any **FOUR** of thefollowingquestions **4 X 5 = 20M**

1. DefineComputer.
2. Explain ComputerApplications.
3. Explain RAM and ROM .
4. Explain about Desktop and Recycle bin .
5. Explain the features ofMS-WORD.
6. Explain how to insert Headerand footer inMS-Word.
7. Define Custom animation inMS-POWERPOINT.
8. Explain about Data Sorting inMS-EXCEL.

SECTION-B

Answer ANY THREE OF THE followingquestions: 3 X 10 = 30M

9. Explain about Block diagram of digital Computer.
10. Explain about Input-Output Devices
11. Give a brief description on MS-WORD WindowComponents.
12. Explain various formatting features in MS-WORD
13. ExplaintheProcessforcreatingapresentationinMS-POWERPOINTusingTemplate.
14. Give a brief description on MS-EXCELfeatures.

.....$$.....

Chemistry for I& II Semesters of B.Voc

Structure of the Course

	SEMESTER	COURSE	TITLE	MARKS
	I	I	Inorganic and PhysicalChemistry	100
			Practical – I Analysis of Salt Mixture	50
	II	II	Organic and General Chemistry	100
			Practical – II Volumetric Analysis	50

SEMESTER-I

Course- I (Inorganic &PhysicalChemistry) 30hrs (2hrs/w)

Course outcomes :

At the end of the course, the student will be able to ;

1. Understand the basic concepts of p-blockelements.
2. Explain the difference between solid, liquid and gases in terms of intermolecularinteractions.
3. Apply the concepts of gas equations, pH and electrolytes while studying other chemistry courses.

INORGANICCHEMISTRY *12h*

UNIT - I

Chemistry of p-block elements6h

Group 13 : Preparation & Structure of Borazine

Group 14 : Preparation ,classification and uses of Silicones.

Group 15 : Structures of Phosphonitrilic halides{(PNCl2)n where n=3, 4}

Group 16 : Classification of Oxides of sulphur (Structure only)

Group 17 : Structures of Interhalogen compounds

Reference : Advanced inorganic Chemistry - Dr.S.K.Agarwala
Chemistry for degree students by Dr.R.L.Madan

UNIT - II

Chemistry of d-Block elements: **3h**

Characteristics of d-block elements with special reference to electronic configuration, variable valence, Magnetic properties, Catalytic properties and ability to form complexes,

Chemistry of f- blockelements: **3h**

Chemistry of lanthanides - Lanthanide contraction, Consequences of Lanthanide contraction.
Seperation of lanthanides and actinides (Ion exchange method) .

Reference : Inorganic chemistry by Gurudeep raj
Advanced inorganic Chemistry - Dr.S.K.Agarwala

PHYSICALCHEMISTRY **18 h**

UNIT- III

Solid state3h

The Laws of symmetry, Miller and Weiss indices .

Bragg's Law- Derivation

Defects in crystals, stoichiometric and non-stoichiometric crystal defects.

References: Physical chemistry by RakeshBharadwaj
A text book of Physical chemistry for B.sc students by Dr.Haqnawaz Bhatti

UNIT-IV

1. **Gaseous State4h**

Vander waal's equation of state.

Critical phenomenon, Relation between critical constants and Vander waal'sconstantsLawof Corresponding states ,Joule Thomson effect ,Inversion temperature.

2. **LiquidState2h**

Liquid crystals, Mesomorphicstate , Classification of liquid crystals into smectic ,nematic and cholesteric liquid crystals, Application of liquid crystals as LCDDevices.

*References: Chemistry for degree students by Dr.R.L.Madan***UNIT- V**

Solutions, Ionic equilibrium & dilute solutions

1. **Solutions**

4h

Azeotropes- HCl-H2O system.

Partially miscibleliquids-phenol- water system.

Critical solution temperature (CST), Effect of impurity onconsolute temperature.

Nernst Distributionlaw. Calculation of the partition coefficient.

Applicationsofdistributionlaw.

2. **Ionic equilibrium** **2h**

Ionic product, common ion effect, solubility and solubility product and their applications.

3. **Dilutesolutions** **3h**

Colligative properties- RLVP, Osmotic pressure, Elevation in boiling point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile solute using osmotic pressure.

References: Chemistry for degree students by Dr.R.L.Madan

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student'slearning
2. ClassTests, Worksheetsand Quizzes

3. Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality

4. Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout thesemester.

List of Reference Books

1. Principles of physical chemistry by PruttonandMarron
2. Solid State Chemistry and its applications by Anthony R.West
3. Text book of physical chemistry by K LKapoor
4. Text book of physical chemistry by SGlasstone
5. Advanced physical chemistry by BahlandTuli

6. Inorganic Chemistry byJ.E.Huheey
7. Basic Inorganic Chemistry by Cotton andWilkinson
8. A textbook of qualitative inorganic analysis by A.I.Vogel
9. Atkins, P.W. & Paula, J.de Atkin's Physical Chemistry ,Oxford University Press 10thEd(2014).
10. Castellan, G.W.PhysicalChemistry4thEd.Narosa(2004).
11. Mortimer,R. G.PhysicalChemistry3rdEd.Elsevier:NOIDA,UP(2009).
12. Barrow,G.M.PhysicalChemistry

Internal Assessment for Theory

Internal (mid Test average)	**Assignments**	**Attendance**	**Seminar**	**Project**	**Total marks**
10	10	05	05	10	40

LABORATORYCOURSE-I **15hrs(2h/w)**

Practical-I

Analysis of Salt Mixture (At the end of semester-I)

Qualitative inorganic analysis

(Minimum of three mixtures should be analysed) 50M

Course outcomes:

At the end of the course student will be able to:

1. Understand the basic concepts of qualitative analysis of inorganicmixture.
2. Use glassware, equipment and Chemicals and follow experimental procedures in the laboratory.
3. Apply the concepts of common Ion effect, solubility product and concepts related to qualitativeanalysis.

ANALYSIS OFSALTMIXTURE 50Marks

Analysis of mixture salt containing two anions and two cations (From two different groups) from following

Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate, and Phosphate

Cations: Lead, Copper, Iron, Aluminium, Zinc, Nickel, Manganese, Calcium,Strontium, Barium, Potassium and Ammonium.

PRACTICAL SCHEME OF VALUATION

Time : 3 hrs **Marks : 25**

Scheme for External Examination

Systematic procedure should be adopted.

Part- A	
Preliminary Tests	
Colour and appearance &odour	1M
Solubility	1M
ActionofHeat	1M
Part-B	
Test foreachanion	4M
TwoAnions	2 x 4 = 8M
Dry test with acids	2M
Sodium carbonate Extract preparation	1M
Confirmation with extract	1M
Part- C	
Test for each Cation	5M
Twocations	2 x 5 =10M
Identification of correct group in separation	1M
Colour oftheprecipitate	1M
General groupseparationtable	1M
Confirmation test inthegroup	2M
For ammoniumCation	
TestwithNaOH	2M
Test withNessler'sreagent	3M
Part - D	
Report fortwo Anions &twocations	2M
TotalMarks	25 Marks

Internal assessment for Practical

Record	Project/viva	Fieldnotes /field trip	Total
10 M	10M	05M	25M

B.Voc (Aquaculture Technology) , Course -I, Semester -I
Blueprint

	Units	**Name of the chapter**	**8M**	**4M**
		Inorganic chemistry		
	Unit-I	Chemistry of p-block elements	**2**	**2**
	Unit- II	Chemistry of d &f-block elements	**2**	**2**
		Physical chemistry		
	Unit-III	Solid state	**2**	**2**
	Unit-IV	Gaseous state& Liquid state	**1** **1**	**1** **1**
	Unit-V	Solutions, ionic equilibrium Dilute solutions	**2**	**2**

SEMESTER – II

Course II – (Organic & General Chemistry)

30 hrs (2h/w)

Course outcomes:

At the end of the course, the student will be able to;

i) Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt.
ii) Formulate the mechanism of organic reactions by recalling and correlating the fundamental Properties of the reactantsinvolved.
iii) Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.
iv) Correlateanddescribethestereochemicalpropertiesoforganiccompoundsandreactions.

ORGANIC CHEMISTRY 18 h

UNIT-I

Recapitulation of Basics of Organic Chemistry

Carbon-Carbon sigma bonds (AlkanesandCycloalkanes)6h

General methods of preparation of alkanes- Wurtz and WurtzFittig reaction, Corey House synthesis.

Free radical substitutions; Halogenation(Mechanism),

Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of ethane and butane).

General molecular formula of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane Conformations with energy profile diagram.

References: Chemistry for degree students by Dr.R.L.Madan

UNIT-II

Carbon-Carbon piBonds(AlkenesandAlkynes) 6h

Mechanism of E1, E2, reactions, Saytzeff Rule,

Electrophilic Additions, mechanism (Markownikoff/Antimarkownikoff addition)with suitable examples, Addition of H_2, X_2, HX.

Diels Alder reaction,1,2- and1,4-addition reactions in conjugated dienes.

References: Chemistry for degree students by Dr.R.L.Madan

UNIT-III

Benzene andits reactivity 6h

Concept of aromaticity, Huckel's rule - application toBenzenoid (Benzene, Naphthalene and Anthracene) and Non - Benzenoid compounds (cyclopropenylcation, cyclopentadienyl anion and tropyliumcation)

Reactions - General mechanism of electrophilic aromatic substitution, mechanism of nitration, Friedel- Craft's alkylation and acylation.

Orientation of aromatic substitution - ortho, para and meta directing groups.

References: Chemistry for degree students by Dr.R.L.Madan

GENERALCHEMISTRY **12h**

UNIT-IV

Surfacechemistry4h

Colloids- Coagulation of colloids- Hardy-Schulze rule. Stability of colloids,Protection of Colloids, Gold number.

Adsorption-Physical and chemical adsorption, Langmuir adsorption isotherm.

ChemicalBonding **4h**

Valence bond theory, VB theory as applied toClF_3**,** $Ni(CO)_4$,

Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO).

References: Chemistry for degree students by Dr.R.L.Madan

UNIT-V

Stereochemistry ofcarboncompounds **4h**

Molecular representations- Wedge, Fischer, Newman and Saw-Horseformulae. Optical isomerism: optical rotation and specificrotation.

Definition of enantiomers and diastereomers – Explanation of optical isomerism with reference to Lactic acid and Tartaric acid

Definition of Racemic mixture

References: Chemistry for degree students by Dr.R.L.Madan

Co-curricular activities and Assessment Methods

Continuous Evaluation: Monitoring the progress of student's learning Class Tests, Worksheets and Quizzes. Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality. Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

Internal Assessment for Theory

Internal (mid Test average)	Assignments	Attendance	Seminar	Project	Total marks
10	10	05	05	10	40

LABORATORY COURSE-II

15hrs (2 h / w)

Practical-II Volumetric Analysis

(At the end of Semester-II)

Course outcomes:

At the end of the course, the student will be able to:

1. Use glassware, equipment and chemicals and follow experimental proceduresinthe laboratory.
2. Understand and explain the volumetricanalysis based on fundamental concepts learnt in ionic equilibria.
3. Learnandidentifythe concepts of a standard solutions, primary and secondarystandards.
4. Facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles;Defining concentration; Dilution of Solutions; Making different molar concentrations.

Volumetricanalysis50M

1. Estimation of sodium carbonate and sodium hydrogen carbonate present in amixture.
2. Determination of Fe (II) using KMnO4 with oxalic acid as primary standard.
3. Determination of Cu (II) using Na2S2O3 with K2Cr2O7 as primarystandard.
4. Estimation of water of crystallization in Mohr's salt by titrating withKMnO4.

Practical External Scheme of Valuation

Time : 3 hrs **Marks : 25**

Titrimetric analysis (25 M) :

1.Systematic procedure	05M
2.Balanced chemical equation	02M
3.Table with details	03M
4.Burette reading	Error of < 1 % = 10M Error of 1 to 2 % = 7 M Error of > 3% = 3 M
5. Calculations	03 M
6. Result	02 M

Internal assessment for Practical

Record	Project /viva	Fieldnotes /field trip	Total
10 M	10M	05M	25 M

B.Voc (Aqua Culture Technology) , Course -I, Semester -II

Blueprint

S.No	Units	Name of the chapter	8M	4M
		Organic chemistry		
1	Unit-I	**Carbon-Carbon sigma bonds (AlkanesandCycloalkanes)**	2	2
2	Unit- II	**Carbon-Carbon piBonds (AlkenesandAlkynes)**	2	2
3	Unit-III	**Benzene andits reactivity**	2	2
		GeneralChemistry		
4	Unit-IV	**Surface chemistry and Chemicalbonding**	1 1	1 1
5	Unit-V	**Stereochemistry ofcarboncompounds**	2	2

PROGRAMME: B.Voc.

(Zoology)

(With effect from 2020-21 Academic Year)

Programme Educational Objectives (PEOs):

- **PEO1Higher Education**: Empower students to pursue higher studies in various fields of Biology and Chemistry.
- **PEO2Career**: Enable students to pursue careers in Chemical, Biological and related fields as demonstrated by professional success at positions within industry, government, or academia.
- **PEO3Social responsibility**: Enable students to exhibit professionalism, ethical attitude, communication skills and team work in their profession.

Program Outcomes (POs):

The Learning Outcomes of the programme could be in consonance with the Bloom's Taxonomy, which includes –

1. Remember (Lower order)
2. Understand (Lower Order)
3. Apply (Lower Order)
4. Analyze (Higher Order)
5. Evaluate& Problem Solving (Higher Order)
6. Create (Higher Order)

PO1Critical thinking: Able to understand and utilize the principles of scientific enquiry, think analytically, clearly and evaluate critically while solving problems and making decisions during biological study.

PO2Effective communication: Able to formally communicate Scientific ideas and investigations of the biology discipline to othersusing both oral and written communication skills.

PO3Social interaction:Able to develop individual behaviourandinfluence society and social structure.

PO4Effective citizenship: Able to work with a sense of responsibility towards social awareness and follow the ethical standards in the society.

PO5Ethics: Ability to demonstrate and discuss ethical conduct in scientific activities.

PO6Environment and Sustainability:Able to understand the impact of biological science in societal and environmental contexts and demonstrate the knowledge for sustainable development.

PO7Self-directed and life-long learning: Able to recognize the need of life-long learning and engage in research and self-education

GENERAL CURRICULAR ACTIVITIES

- **Lecturer-based**:

1) **Class-room activities**: Organization of Group discussions, question-answer sessions, scientific observations, use of audio-visual aids, guidance programmes, examination and evaluation work (scheduled and surprise tests), quizzes, preparation of question banks, student study material, material for PG entrance examinations etc.
2) **Library activities**: Reading books and magazines taking notes from prescribed and reference books and preparation of notes on lessons as per the syllabus; Reading journals and periodicals pertaining to different subjects of study; Making files of news-paper cuttings etc.
3) **Lab activities**: Organization of practicals, maintenance of lab attendance registers/log registers, maintenance of glassware and chemicals
4) **Activities in the Seminars, workshops and conferences**:Organization of at least one seminar/workshop/conference per academic year either on academic/research aspects and inculcate research spirit among students
5) **Research activities**: Student study projects (General / RBPT model), Minor or Major research projects, Research guidance to research scholars, Publication of research articles/papers (at least one in 2 years) in UGC-recognized journals, Registration in Vidwan/Orcid/Scopus/Web of Science
6) **Smart Classroom Activities**: Organization of Departmental WhatsApp groups, Ed Modo groups/Google Class Rooms/Adobe Spark groups for quick delivery of the subject; Preparation of Moocs content & presentation tube lessons by trained lecturers; Using smart/digital/e- class rooms (mandarory) wherever present; Utilization of youtube videos (subject to copy rights) etc.

- **Student-based**:

1) **Class-room activities**: Power point presentations, seminars, assignments
2) **Library activities**: Visit to library during library hour and preparation of notes
3) **Lab activities**: Maintenance of observation note book and record, keeping lab clean and tidy
4) **Activities in the Seminars, workshops and conferences**:Participation/presentation in seminar/workshop/conference

CO-CURRICULAR ACTIVITES

OBJECTIVES:

The co-curricular activities are aimed at strengthening the theoretical knowledge with an activity related to the content taught in the class room. The aesthetic development, character building, spiritual growth, physical growth, moral values, creativity of the student.

The different types of co-curricular activities relevant to Zoology domain are listed below:

- **Academic - based**

- Preparation of Charts/Clay or Thermocol Models
- Debates, Essay Writing Competitions
- Group Discussions
- Departmental (Zoology) magazine
- Formation of Book clubs
- Animal album-making
- Viva-Voce

- **Lab/Research –based**

- Digital dissections
- Field Visit/Excursions/Zoological Tours and submission of report
- Training at research centres (aquaculture/apiculture/sericulture etc.)
- Exposure to scientific instruments and hands-on experience

- **Value - based**

- Organization of first-aid camp, swachhbharat, cleanliness week, girl-child importance, Nutrition and health awareness etc.

- **Observation of Days of National/International Importance**

World Cancer Day (February 4th)	International Biological Diversity Day (May 22nd)
Darwin Day (February 12th)	World Turtle Day (May 23rd)
National Science Day (Feb 28th)	World blood Donor Day (June 14th)
World Wildlife day (March 3rd)	World Zoonoses Day (July 6th)
National Vaccination Day (March 16th)	World Mosquito Day (August 20th)
World Health Day (April 7th)	World Turtle Day (May 23rd)
Earth Day (April 22nd)	World Mosquito Day (August 20th)
Malaria Day (April 25th)	World Animal day (October 4th)
World Hepatitis Day (May 19th)	World Immunization Day (November 10th)

Structure of ZOOLOGY Syllabus with credits

(Under CBCS for B.Sc. Programme)

YEAR	SEM	PAPER	TITLE	MARKS (100)		CREDITS
				MID SEMESTER	END SEMESTER	
I	I	I	Animal Diversity – I- Biology of Non-Chordates	40	60	04
			Practical – I	25	25	01
	II	II	Animal Diversity – II- Biology of Chordates	40	60	04
			Practical – II	25	25	01

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc BZC

ZOOLOGY SYLLABUS

(w.e.f. 2020-21)

SEMESTER I

PAPER – I: ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES

HOURS: 60 **Max. Marks: 100**

Course Outcomes: By the completion of the course the graduate should able to –

CO1: Describe general taxonomic rules on animal classification

CO2 : Classify Protozoa to Coelenterata with taxonomic keys

CO3 : Classify Phylum Platy helminthes to Annelida phylum using examples from parasitic adaptation and vermin composting

CO4 : Describe Phylum Arthropoda to Mollusca using examples and importance of insects and Molluscans

CO5 : Describe Echinodermata to Hemi chordata with suitable examples and larval stages in relation to the phylogeny

Learning objectives:

1. To understand the taxonomic position of protozoa to helminthes.
2. To understand the general characteristics of animals belonging to protozoa to hemichordata.
3. To understand the structural organization of animals phylum from protozoa to hemichordata.
4. To understand the origin and evolutionary relationship of different phyla from protozoa to hemichordata.
5. To understand the origin and evolutionary relationship of different phylum from annelids to hemichordates.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc BZC

ZOOLOGY SYLLABUS

(w.e.f. 2020-21)

SEMESTER I

PAPER – I: ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES

HOURS: 60 **Max. Marks: 100**

UNIT I

Phylum Protozoa

1.1 General Characters and classification of protozoa up to classes with suitable examples

1.2 Locomotion, nutrition and reproduction in Protozoans

UNIT –II

Phylum Porifera

2.1 General characters and classification up to classes with suitable examples

2.2 Canal system in sponges

Phylum Coelenterata

2.4 General characters and classification up to classes with suitable examples

2.5 Polymorphism in coelenterates

2.6 Corals and coral reefs

Unit – III

PhylumPlatyhelminthes

3.1 General characters and classification up to classes with suitable examples

3.3 Parasitic Adaptations in helminthes

Phylum Nemathelminthes

3.4 General characters and classification up to classes with suitable examples

Unit – IV

Phylum Annelida

4.1 General characters and classification up to classes with suitable examples

4.2 Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost

Phylum Arthropoda

4.4 General characters and classification up to classes with suitable examples

4.5 Vision and respiration in Arthropoda

4.6 Metamorphosis in Insects

Unit – V

Phylum Mollusca

5.1 General characters and classification up to classes with suitable examples

5.2 Pearl formation in Pelecypoda

5.3 Sense organs in Mollusca

Phylum Echinodermata

5.4 General characters and classification up to classes with suitable examples

5.6 Larval forms of Echinodermata

Phylum Hemichordata

5.7 General characters and classification up to classes with suitable examples

5.8 *Balanoglossus* - Structure and affinities

Co-curricular activities (suggested)

- Preparation of chart/model of phylogenic tree of life, 5-kingdom classification, *Elphidium* life cycle etc.
- Visit to Zoology museum or Coral island as part of Zoological tour
- Charts on life cycle of *Obelia*, polymorphism, sponge spicules
- Clay models of canal system in sponges
- Visit to adopted village and conducting awareness campaign on diseases, to people as part of Social Responsibility.
- Construction of a vermicompost in each college, manufacture of manure by students and donating to local farmers
- Chart on pearl forming layers using clay or Thermocol
- Visit to a pearl culture rearing industry/institute
- Preparation of charts depicting the feeding mechanism, 3 coeloms, tornaria larva etc., of *Balanoglossus*

REFERENCE BOOKS

1. **L.H. Hyman** '*The Invertebrates' Vol I, II and V.* – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S**. Verma '*Invertebrate Zoology'* S. Chand and Company.
4. **R.D. Barnes** '*Invertebrate Zoology'* by: W.B. Saunders CO., 1986.
5. **Barrington. E.J.W**., '*Invertebrate structure and Function'* by ELBS.
6. **P.S. Dhami and J.K. Dhami.** Invertebrate Zoology. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell**'*A text book of Zoology'* by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).** *Invertebrate Zoology*, V Edition"

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc

ZOOLOGY PRACTICAL SYLLABUS

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES

Periods: 24 **Max. Marks: 50**

Learning Outcomes:

1. To understand the importance of preservation of museum specimens
2. To identify animals based on special identifying characters
3. To understand different organ systems through demo or virtual dissections
4. To maintain a neat, labeled record of identified museum specimens

Syllabus :

1. **Study of museum slides / specimens / models (Classification of animals up to orders)**

Protozoa: Amoeba, *Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoebahistolytica, Plasmodium vivax*

Porifera: *Sycon, Spongilla, Euspongia, Sycon*- T.S & L.S, Spicules, Gemmule

Coelenterata: *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*v.

Platyhelminthes: *Planaria, Fasciola hepatica, Fasciola*larval forms – Miracidium, Redia, Cercaria, *Echinococcusgranulosus, Taeniasolium, Schistosomahaematobium*vii.

Nemathelminthes: *Ascaris(Male & Female), Drancunculus, Ancylostoma, Wuchereria*

Annelida: *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva

Arthropoda: Cancer, Palaemon**,** Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male &female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly. xiii.

Mollusca: *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva

Echinodermata: *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva

Hemichordata: *Balanoglossus,* Tornaria larva

2. **Dissections:**

1. Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst
2. Insect Mouth Parts
3. Laboratory Record work shall be submitted at the time of practical examination
4. An **"Animal album**" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose
5. Computer - aided techniques should be adopted or show virtual dissections

RFERENCE MANUALS:

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl
4. Ruppert and Barnes (2006) Invertebrate Zoology,8th Edition, Holt Saunders International Edition

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc. ZOOLOGY THEORY

INTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES

Zoology Theory- Internal	**Total Marks: 40**	
1. Project	:	10 marks
2. Assignments (2)	:	5x2=10 marks
3. Internals (2) Average	:	10 marks
4. Seminar	:	5 marks
5. Viva voce	:	5 marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc. ZOOLOGY THEORY

EXTERNAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES

Time: 3 Hours **Total Marks: 60**

Zoology Theory- External

Section –A

I. Short Answer questions 1 to 10 (Any 5 from given 10) 5x4=20

Section –B

II. Essay Questions 11 to 15 (With internal choice) 5x8=40

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY

PRACTICAL MARKS ALLOTMENT

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES

Zoology Practical's - External

Time: 3 hrs. **Total Marks: 25**

1. Major dissection demonstration only	:	8 marks
(Identification-2M; Diagram-3M; Labelling-3M)		
2. Mounting (2)/Minor dissection (1)	:	4 marks (2+2)
3.Identification (2)	:	5 marks (2x2 1/2)
4. Record	:	5 marks
5. Viva voce	:	3 marks

Zoology Practical's - Internal **Total Marks: 25**

1.Assessment including viva voce	:	6 marks
2.Record	:	6 marks
3. Field note book	:	5 marks
4. Project	:	8 marks

Question Paper Blue Print

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Sc (B.Z.C) ZOOLOGY THEORY

SEMESTER-I

PAPER – I

ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS

	Section A **Short Questions**			**Section B** **Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**
UNIT -I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Short Questions : 5 x 4 = 20

Questions numbers 1 to 10, Out of 10 Questions 5 has to be answered.

Section-B: Essay Questions : 5 x 8 = 40

Questions numbers 11 to 15, Internal Choice (either / or) and 5 Questions has to be answered.

Total : 60 Marks

Model Question Paper

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Sc (B.Z.C) ZOOLOGY (w.e.f -2017-18)
SEMESTER-I
PAPER – I
ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES

Time: 3Hrs **Max Marks: 60**

SECTION-A

I. Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x4=20**

1. Nutrition in Protozoa
2. Locomotion in Protozoa
3. General characters of porifera
4. Fringing Reef
5. General characters of Nematihelminthes.
6. Class Trematoda
7. Importance of vermicompost
8. Vision in Arthropoda
9. Sense organs in mollusca .
10. Structure of Balanoglossus

SECTION-B

II. Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x8=40**

11. (a) Write an essay on general characters of protozoa and its classification .
(OR)
(b). Describe types of reproduction in protozoa.

12. (a) Explain the Canal system in Sponges.
(OR)
(b).Write an essay on Polymorphism in coelenterate.

13. (a) write an essay on Parasitic adaptations in Helminthes
(OR)
(b) Describe the general characters and classification up to classes level of Platyhelminthes.

14. (a) Write an essay on Vermiculture
(OR)
(b). Explain Respiration in Arthopoda.

15. (a) Explain the process of Pearl formation in Pelycepoda
(OR)
(b) Describe the larval forms in Echinodermata.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc.

ZOOLOGY SYLLABUS

(w.e.f. 2020-21)

SEMESTER-II

PAPER – II

ANIMAL DIVERSITY – BIOLOGY OF CHORDATES

HOURS :60 **Max. Marks:100**

Course Outcomes:

By the completion of the course the graduate should able to -

CO1: Describe general taxonomic rules on animal classification of chordates

CO2: Classify Protochordata to Mammalia with taxonomic keys

CO3: Understand Mammals with specific structural adaptaions

CO4: Understand the significance of dentition and evolutionary significance

CO5: Understand the origin and evolutionary relationship of different phyla from Prochordata to mammalia.

Learning objectives:

1. To understand the animal kingdom .
2. To understand the taxonomic position of Protochordata to Mammalia.
3. To understand the general characteristics of animals belonging to Fishes to Reptilians.
4. To understand the body organization of Chordata.
5. To understand the taxonomic position of Protherian mammals.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc.

SEMESTER-II

PAPER – II: ANIMAL DIVERSITY – BIOLOGY OF CHORDATES

HOURS: 60 **Max. Marks: 100**

Unit - I

1.1 General characters and classification of Chordata upto classes
1.2 Protochordata- Salient features of Cephalochordata , Affinities of Cephalochordata.
1.3 Salient features of Urochordata

Unit - II

2.1 Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine*
2.2 Pisces : General characters of Fishes
2.3 *Scoliodon*: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and functions of the Brain.
2.4 Migration in Fishes
2.5 Types of Scales
2.6 Dipnoi

Unit - III

3.1 General characters of Amphibia
3.2 Classification of Amphibiaup to orders with examples.
3.3 *Ranahexadactyla*: External features, Respiratory system, Structure and function of Heart,
3.4 Reptilia: General characters of Reptilia, Classification of Reptilia upto orders withexamples
3.5 *Calotes*:External features, Structure and function of Heart, structure and function of Brain.
3.6 *Identification of Poisonous snakes*
Identificion of Poisonous snakes and Skull in reptiles

Unit - IV

4.1 Aves General characters of Aves
4.2 *Columba livia*: External features, Respiratory system, structure and function of Brain
4.3 Migration in Birds
4.4 Flight adaptation in birds

Unit - V

5.1 General characters of Mammalia
5.2 Classification of Mammalia upto sub - classes with examples
5.3 Dentition in mammals

Co-curricular activities (suggested)

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Thermocol or Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Thermocol model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology
- Taxidermic preparation of dead birds for Zoology museum
- Map pointing of prototherian and metatherian mammals
- Chart preparation for dentition in mammals

REFERENCE BOOKS

1. J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
2. Arumugam, N. Chordate Zoology, Vol. 2. SarasPlublication. 278 pages. 200 figs.
3. A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker &Haswell, 1961).
4. M. EkambaranathaAyyar, 1973. A manual of zoology. Part II. (S. ViswanathanPvt. Ltd., Madras).
5. P.S. Dhami& J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
6. Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
7. A.K. Sinha, S. Adhikari& B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
8. R.L.Kotpal, 2000. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
9. E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages.
10. G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
11. Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
12. Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc.

ZOOLOGY PRACTICAL SYLLABUS

SEMESTER-II

PAPER – II

ANIMAL DIVERSITY - BIOLOGY OF CHORDATES

Periods: 24 **Max. Marks: 50**

Learning Outcomes:

- To understand the taxidermic and other methods of preservation of chordates
- To identify chordates based on special identifying characters
- To understand internal anatomy of animals through demo or virtual dissections, thus directing the student for "empathy towards the fellow living beings"
- To maintain a neat, labeled record of identified museum specimens

OBSERVATION OF THE FOLLOWING SLIDES / SPOTTERS / MODELS

1. Protochordata :*Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. Cyclostomata :*Petromyzon and Myxine.*
3. Pisces : *Pristis, Torpedo, Hippocoampus ,Exocoetus, Echeneis, Labeo, Catla, Clarius,Channa, Anguilla.*
4. Amphibia :*Ichthyophis, Amblystoma, Axolotl larva, Hyla,*
5. Reptilia: *Draco, Chamaeleon, Uromastix,,Testudo, Trionyx, Russels viper, Naja,* Krait, *Hydrophis, Crocodile.*
6. Aves : *Psittacula, Eudynamis, Bubo, Alcedo.*
7. Mammalia: *Ornithorhynchus,Pteropus,Funambulus.*

Dissections-

1. *Scoliodon*IX and X, Cranial nerves
2. *Scoliodon*Brain
3. Mounting of fish scales

Note:

1. Dissections are to be demonstrated only by the faculty or virtual.
2.Laboratory Record work shall be submitted at the time of practical examination.

REFERENCE BOOKS:

1. S.S.Lal, Practical Zoology – Vertebrata
2. P.S.Verma, A manual of Practical Zoology – Chordata

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc. ZOOLOGY THEORY

INTERNAL MARKS ALLOTMENT

SEMESTER-II
PAPER – II
ANIMAL DIVERSITY – BIOLOGY OF CHORDATES

Zoology Theory- Internal	**Total Marks: 40**	
1. Project	:	10 marks
2. Assignments (2)	:	5x2=10 marks
3. Internals (2) Average	:	10 marks
4. Seminar	:	5 marks
5. Viva voce	:	5 marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc. ZOOLOGY THEORY

EXTERNAL MARKS ALLOTMENT

SEMESTER-II

PAPER – II

ANIMAL DIVERSITY – BIOLOGY OF CHORDATES

Time: 3 Hours **Total Marks: 60**

Zoology Theory- External

Section –A

I. Short Answer questions 1 to 10 (Any 5 from given 10) 5x4=20

Section –B

II. Essay Questions 11 to 15 (With internal choice) 5x8=40

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc. ZOOLOGY

PRACTICAL MARKS ALLOTMENT

SEMESTER-II

PAPER – II

ANIMAL DIVERSITY - BIOLOGY OF CHORDATES

Zoology Practical's - External

Time: 3 hrs. **Total Marks: 25**

1. Major dissection demonstration only	:	8 marks
(Identification-2M; Diagram-3M; Labelling-3M)		
2. Mounting (2)/Minor dissection (1)	:	4 marks (2+2)
3.Identification (2)	:	5 marks (2x2 1/2)
4. Record	:	5 marks
5. Viva voce	:	3 marks

Zoology Practical's - Internal

Total Marks: 25

1.Assessment including viva voce	:	6 marks
2.Record	:	6 marks
3. Field note book	:	5 marks
4. Project	:	8 marks

Question Paper Blue Print

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

I B.Voc. ZOOLOGY THEORY

SEMESTER-II

PAPER – II

ANIMAL DIVERSITY - BIOLOGY OF CHORDATES

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS

	Section A **Short Questions**			**Section B** **Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**
UNIT -I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Short Questions : 5 x 4 = 20

Questions numbers 1 to 10, Out of 10 Questions 5 has to be answered.

Section-B: Essay Questions : 5 x 8 = 40

Questions numbers 11 to 15, Internal Choice (either / or) and 5 Questions has to be answered.

Total : 60 Marks

Model Question Paper

SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Sc (B.Z.C) ZOOLOGY
SEMESTER-II
PAPER – II
ANIMAL DIVERSITY- BIOLOGY OF CHORDATES

Time:3Hrs **Max Marks: 60**

SECTION-A

I. Answer any FIVE of the following
Draw labeled diagrams wherever necessary **5x4=20**

1. Chordata General characters
2. Protochordates
3. Placoid scale
4. Dipnoi
5. Apoda
6. Calotes Brain
7. Quill feather
8. Ratitae
9. Prototheria
10. Types of Dentition.

II. Answer any FIVE of the following: **5x8=40**
Draw labeled diagrams wherever necessary

11. a. Write about General characters of cephalochordate and its affinities

OR

b. Explain silent features of Urochordata

12. a. Compare the characters of *Petromyzon* and *Myxine*

OR

b. Describe the Respiratory system in *Scoliodon*

13. a. Describe the digestive system of *Rana hexadactyla*

OR

b. Describe the identifications of poisonous snakes

14. a. Write an essay on flight adaptations in birds

OR

b. Explain the respiratory system of *Columba livia*

15. a. Write about general characters of Mammals and its classification

OR

b. Write an essay on dentition in mammals

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SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

DEPARMENT OF ZOOLOGY

B.Voc., Course in Aquaculture Technology SYLLABUS (w.e.f -2021-22)

SEMESTER – I

PAPER – I

BIOLOGY OF FIN FISH & SHELL FISH

HOURS: 60 **Max.Marks: 100**

Learning Objectives:

1 To gain knowledge in classification of fish, crustacean and molluscs.
2 To understand the feed and feed management in fish culture.
3 To improve the knowledge to determination of age and growth methods in fish.
4 To understand the reproductive biology of fish, shrimp.
5 To understand the Embryonic and larval development cultivable aquatic fin and shell fish.
6 To understand the hormonal influences in finfish and shell fish.

Learning Outcomes:

1. By the end of the course the student have good knowledge in Taxonomy, Morphology & Physiology of Fin fish & Shell fish.
2. Knowledge on the basic taxonomy tools for the identification of fin &shell fishes will be learnt by the student.

UNIT-I: GENERAL CHARACTERS & CLASSIFICATION OF CULTIVABLE FIN & SHELL FISH

1-1 General Characters and classification of fishes

1-2 General characters and classification of Crustaceans and mollusks up to the level of classes.

1-3 Morphology of a teleost. Variation in the form and structure, skin, colouration, scales,

1-4 Anatomy of a teleost fish. Alimentary canal and associated structures like gills, swim bladder, accessory respiratory organs, heart and circulation of blood.

1-5 Osmatic regulation and ion regulation – mechanism and general account.

UNIT-II: FOOD, FEEDING AND GROWTH

2-1 Natural fish food, feeding habits, feeding intensity, stimuli for feeding, utilization of food, gut content analysis, structural modifications in relation to feeding habits .

2-2 Principles of Age and growth determination; growth regulation, Growth rate measurement – scale method, otolith method, skeletal parts as age indicators

2-3 Genetic, biotic & ecological factors in determining the longevity of fishes, length frequency method, age composition, age-length keys, absolute and specific growth, back calculation of length and growth, annual survival rate, asymptomatic length, fitting of growth curve

2-4 Length-weight relationship, condition factor/Ponderal index, relative condition factor

UNIT-III: REPRODUCTIVE BIOLOGY

3-1 Breeding in fishes, breeding places, breeding habits & places, breeding in natural environment and in artificial ponds, courtship and reproductive cycles

3-2 Induced breeding in fishes

3-4 Breeding in shrimp,

UNIT – IV: DEVELOPMENT

4-1 Parental care in fishes, ovo-viviparity, oviparity, viviparity, nest building and brooding

4-2 Embryonic and larval development of fishes

4-3 Embryonic and larval development of shrimp.

4-4 Environmental factors affecting reproduction and development of cultivable aquatic fin &shell fish

UNIT-V: HORMONES & GROWTH

5-1 Endocrine system in fishes

5-2 Neurosecretary cells, androgenic gland, ovary, Y-organ, chromatophores, pericardial glands and cuticle.

5-3 Molting, molting stages, metamorphosis in crustacean shell fish

PRACTICALS:

1. Study of mouth parts in herbivorous and carnivorous fishes
2. Comparative study of digestive system of herbivorous and carnivorous fishes
3. Length-weight relationship of fishes
4. Gut content analysis in fishes and shrimp
5. Mouth parts and appendages of cultivable prawns, shrimps .
6. Study of eggs of fishes, shrimps, prawns
7. Embryonic and larval development of fish
8. Study of gonadal maturity and fecundity in fishes and shellfish
9. Observation of crustacean larvae
10. Study of nest building and brooding of fishes

PRESCRIBED BOOK(S):

1. Bone Q et al., 1995. Biology of fishes, Blackie academic & professional, LONDON
2. Saxena AB 1996. Life of Crustaceans. Anmol Publications Pvt.Ltd., NewDelhi

REFERENCES:

1. Tandon KK & Johal MS 1996. Age and Growth in Indian Fresh Water Fishes. Narendra Publishing House, New Delhi.
2. Raymond T et al., 1990. Crustacean Sexual Biology, Columbia University Press, NewYork
3. Guiland J.A (ed) 1984. Penaeid shrimps- Their Biology and Management.
4. Barrington FJW 1971. Invertebrates: Structure and Function.ELBS
5. Parker F & Haswell 1992. The text book of Zoology, VolI. Invertebrates (eds. Marshal AJ & Williams). ELBS & Mc Millan & Co.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Voc.Aquaculture Technology
SEMESTER – I
PAPER – I
BIOLOGY OF FIN FISH & SHELL FISH

Theory- Internal	**Total Marks: 40**
1. Project	: 10 marks
2. Assignments (2)	: 5x2=10 marks
3. Internals (2) Best of Two	: 10 marks
4. Seminar	: 5 marks
5. Viva voce	: 5 marks

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Voc Aquaculture Technology
SEMESTER – I
PAPER – I
BIOLOGY OF FIN FISH & SHELL FISH

Aquaculture :Theory- External Total Marks: 60

Section –A

III. Short Answer questions 1 to 10 (Any 5 from given 10)
5x4=20

Section –B

IV. Essay Questions 11 to 15 (With internal choice)
5x8=40

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Voc. Aquaculture Technology
SEMESTER – I
PAPER – I
BIOLOGY OF FIN FISH & SHELL FISH

Practical's - External

Time: 3 hrs. **Total**

Marks: 25

1. Identification of given sample : 6 marks
2. Identification of given sample : 6 marks
3.Identification (2) : 5 marks (2x2 1/2)
4.Record : 5 marks
5.Viva voce : 3 marks

Practical's – Internal **Total**

Marks: 25

1.Assessment including viva voce : 6 marks
2.Record : 6 marks
3.Field note book : 5 marks
4.Project : 8 marks

Question Paper Blue Print
SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.VOC. AQUACULTURE TECHNOLOGY)
AQUACULTURE TECHNOLOGY THEORY (w.e.f -2019-20)
SEMESTER-I
PAPER – I

BIOLOGY OF FIN FISH & SHELL FISH

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS 60 Marks

	Section A Short Questions			**Section B Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**
UNIT –I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Questions numbers 1 to 10,

Out of 10 Questions 5 has to be answered.

Section-B: Questions numbers 11 to 15,

Internal Choice (either / or) and 5 Questions has to be answered.

1. Short Questions : 5 x 4 = 20
2. Essay Questions : 5 x 8 = 40

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER – I

PAPER – I

BIOLOGY OF FIN FISH & SHELL FISH

Time: 3 hrs **Max. Marks:60**

Answer any FIVE of the following

Draw labeled diagrams wherever necessary **5x4=20**

1. Electric organs.
2. Swim bladder in fishes
3. Natural fish food
4. Length-weight relationship
5. Breeding places
6. Induced breeding
7. Nest building
8. Ovo-viviparity
9. Osmotic regulation
10. Pericardial glands

II. Answer any FIVE of the following: **5x10=50**

Draw labeled diagrams wherever necessary

11. a. Describe general characters of fishes and classify up to class level.

(or)

b. Explain fin fish and shell fish commercial importance.

12.a. Explain different methods to estimate fish age and growth

(or)

b. Explain different factors in fish longevity

13.a. Write an essay on different breeding habitats.

(**or)**

b. Explain Breeding in shrimp

14.a. Describe embryonic and larval development in fishes.

(or)

b. Explain environmental factors effecting on fin fish in reproduction and development.

15.a. Role of Endocrine hormones in fishes.

(or)

b. Describe metamorphosis in crustaceans.

SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology
SEMESTER – I
PAPER – I
BIOLOGY OF FIN FISH & SHELL FISH

Time: 2 hrs **Max. Marks:25**

PRACTICAL MODEL PAPER

I. Enumerate Length Weight relationship of the given fishes.
Write procedure and Draw Graphs as required. **10 marks**

II. `Identify the following spotters **4x5=20 marks**

A. Mouth Parts
B. Type of Eggs
C. Larval Forms
D. Larval Forms

III. Record **05 marks**

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SRR & CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.

DEPARMENT OF ZOOLOGY

B.Voc Aquaculture Technology SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology.

SEMESTER – I

PAPER – II

BASIC PRINCIPLES OF AQUACULTURE

HOURS : 60 **Max.Marks: 100**

Learning Objectives**:**

1. To know the present status of aquaculture and their role in world economy and food production.
2. To understand the pond ecosystems and natural food production.
3. To improve the technical knowledge to preparation of fish pond and management of fish ponds.
4. To gain knowledge to estimation of different parameters in cultural ponds to better aquaculture practices.
5. To gain knowledge harmful algal blooms and their control.
6. To improve the technical skills in soil analysis for better aquaculture practice.

Learning Outcomes:

1. To study this course the student will be equipped with the aquatic ecosystem
2. Knowledge on the pond ecosystem will be learnt by the student.
3. Knowledge on the cultivable fishes learnt by the student.

UNIT-I: INTRODUCTION

1.1Concept of Blue Revolution - History and definition of Aquaculture

1-1 Scope of Aquaculture at global Level, India and Andhra Pradesh

1-2 Fresh water aquaculture, brackish water aquaculture and mariculture

1-3 Aquaculture versus Agriculture; Present day needs with special reference to Andhra Pradesh

UNIT-II: POND ECOSYSTEM

2-1 General Concepts of Ecology, Carrying Capacity and Food Chains

2-2 Lotic and lentic systems, streams and springs

2-3 Nutrient Cycles in Culture Ponds – Phosphorus, Carbon and Nitrogen

2-4 Importance of Plankton and Benthos in culture ponds and algal blooms

2-5 Concepts of Productivity, estimation and improvement of productivity

UNIT-III: TYPES OF FISH PONDS

3-1 Classification of ponds based on water resources – spring, rain water, flood water, well water and water course ponds

3-2 Functional classification of ponds – head pond, hatchery, nursery, rearing, production, stocking and quarantine ponds

3-3 Hatchery design

UNIT- IV: POND PREPARATION

4-1 Important factors in the construction of an ideal fish pond – site selection, topography,

4-2 nature of the soil, water resources

4-3 Lay out and arrangements of ponds in a fish farm

4-4 Construction of an ideal fish pond – space allocation, structure and components of barrage pond.

UNIT-V: POND MANAGEMENT FACTORS

5-1 Need of fertilizer and manure application in culture ponds; Role of nutrients; NPK contents of different fertilizers and manures used in aquaculture; and precautions in their application

5-2 Physico-chemical conditions of soil and water optimum for culture – temperature, depth, turbidity, light, water and shore currents, PH, DOD, CO2 and nutrients; measures to increase oxygen and reduce ammonia & hydrogen sulphide in culture ponds; correction of PH

5-3 Eradication of predators and weed control – advantages and disadvantages of weed, weed plants in culture ponds, aquatic weeds, weed fish, toxins used for weed control and control of predators

Reference Books :

1. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi
2. Pillay TVR, 1996. Aquaculture Principles and Practices, Fishing News Books Ltd., London
3. Pillay TVR & M.A.Dill, 1979. Advances in Aquaculture. Fishing News Books Ltd., London
4. Stickney RR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc. 1981
5. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsivier Scientific Publishing

Bose AN et.al., 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing

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DEPARMENT OF ZOOLOGY

B.Voc., COURSE IN AQUACULTURE TECHNOLOGY (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER –I

PAPER - II

BASIC PRINCIPLES OF AQUACULTURE

Periods: 24 **Max. Marks: 50**

PRACTICALS: (Any 8 as per the local Industry needs and Requirement)

1. Estimation of Carbonates, Bicarbonates in water samples
2. Estimation of Chlorides in water samples
3. Estimation of dissolved oxygen

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DEPARMENT OF ZOOLOGY

B.Voc., COURSE IN AQUACULTURE TECHNOLOGY (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER –I

PAPER - II

BASIC PRINCIPLES OF AQUACULTURE

Periods: 24 **Max. Marks: 50**

PRACTICALS: (Any 8 as per the local Industry needs and Requirement)

1. Estimation of Carbonates, Bicarbonates in water samples
2. Estimation of Chlorides in water samples
3. Estimation of dissolved oxygen
4. Estimation of ammonia in water
5. Field visit to nursery, rearing and stocking ponds of aqua farms
6. Field visit to hatchery
7. Study of algal blooms and their control
8. Collection & identification of zooplankton and phytoplankton
9. Study of aeration devices
10. Determination of soil nitrogen and phosphorus
11. Collection and study of aquatic weeds
12. Filed survey of nearby habitat for dietary dependency on and requirement of aqua products

Question Paper Blue Print
SRR&CVR GOVT. DEGREE COLLEGE (A), VIJAYAWADA.
I B.Voc. Aquacultue Technology
AQUACULTURE TECHNOLOGY THEORY (w.e.f -2019-20)
SEMESTER-I
PAPER – II
BASIC PRINCIPLES OF AQUACULTURE

BLUE PRINT MODEL FOR EXTERNAL EXAMINATIONS

	Section A Short Questions			**Section B Essay Questions**		
	NO OF QUESTIONS	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**	**NO OF QUESTIONS**	**MARKS ALLOTED FOR EACH QUESTION**	**TOTAL MARKS**
UNIT -I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT- III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT- V	02	4	8	02	8	16

Section-A: Questions numbers 1 to 10,

Out of 10 Questions 5 has to be answered.

Section-B: Questions numbers 11 to 15,

Internal Choice (either / or) and 5 Questions has to be answered.

1. Short Questions : 5 x 4 = 20
2. Essay Questions : 5 x 8 = 40

Total : 60 Marks

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B.Voc., COURSE IN AQUACULTURE TECHNOLGY SYLLABUS

(w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER –I

PAPER - II

BASIC PRINCIPLES OF AQUACULTURE

Time : 3 hrs **Max. Marks:60**

THEORY MODEL PAPER

Answer any FIVE of the following

Draw labeled diagram wherever necessary **5x4=20**

1. Blue revolution.
2. Monoculture
3. Food chains
4. Brackish water culture
5. Lotic system
6. Phosphorus cycle
7. Nursery pond
8. Flood water
9. Barrage pond
10. Topography

I. Answer any FIVE of the following

Draw labeled diagram wherever necessary **5x10=50**

11 .a. Explain Fresh water aquaculture

(or)

b. Explain Intensive and Semi-Intensive aquaculture.

12a. Explain Carbon cycle

(or)

b. Describe the importance of plankton and Benthos in culture ponds .

13. a. Explain different types of ponds in aquaculture.

(or)

b. Describe how to design Hatchery .

14. a. Which important factors are involved to construct an ideal fish pond.

(or)

b. Explain the components of barrage pond.

15. a. Explain chemical factors effect in aquaculture.

(or)

b. write about weed control in aquaculture.

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DEPARMENT OF ZOOLOGY

B.Voc., Course in Aquaculture Technology Syllabus (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER –I

PAPER - II

BASIC PRINCIPLES OF AQUACULTURE

Time : 2 hrs **Max. Marks:50**

PRACTICAL MODEL PAPER

I. Estimate carbonates/Bicarbonates/chlorides/DO/Ammonia in a given sample and write procedure and principle **10 marks**

II. Identify the following spotters **20 marks**

a. Phytoplankton
b. Phytoplankton
c. Zooplankton
d. Aquatic Weed

III. Record **05 marks**

IV. Internal assessment **15 marks**

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DEPARMENT OF ZOOLOGY

B.Voc., COURSE IN AQUACULTURE TECHNOLOGY SYLLABUS

(w.e.f -2021-22)

SEMESTER – I

PAPER – III

FRESH WATER & BRACKISHWATER AQUACULTURE

HOURS:60(5X12) **Max.Marks: 100**

Learning Objectives:

1 To know the present status of freshwater aquaculture and their role in world economy and food production.
2 To gain knowledge in carp and prawn culture and composite fish culture systems.
3 To improve the technical knowledge prawn hatchery technology and culture practices.
4 To gain knowledge mixed culture of fish and prawns.
5 To improve the knowledge and technical skills to identification of cultivable fin fish and shell fish.

Learning Outcomes:

1 At the end of the course the student can able to gain the knowledge on the fresh water practices
2 Student learn Culture systems
3 Student learn Brackish water culture practice.

UNIT-1: INTRODUCTION TO FRESHWATER AQUACULTURE

1-1 Status, scope and prospects of fresh water aquaculture in the world, India and AP

1.2. Special systems of Aquaculture- brief study of culture in running water, re-circulatory systems, cages and pens, sewage-fed fish culture .

1.3Different Aquaculture systems – Pond, Cage, Pen, Running water, Extensive, Intensive & Semi-Intensive Systems and their significance. Monoculture, Polyculture and Monosex culture systems

UNIT-II: CARP CULTURE

2-1 Major cultivable Indian carps – Labeo, Catla and Cirrhinus & Minor carps

2-2 Exotic fish species introduced to India – Tilapia, Pangassius and Clarius sp.

2-3 Composite fish culture system of Indian and exotic carps

2-4 Impact of exotic fish, Compatibility of Indian and exotic carps and competition among them

UNIT-III: CULTURE OF AIR-BREATHING AND COLD WATER FISH

3-1 Recent developments in the culture of clarius, anabas, murrels,

3-2 Advantages and constraints in the culture of air-breathing and cold water fishes-

3-3 seed resources, feeding, management and production of air-breathing and cold water fishes-

UNIT-IV: CULTURE OF PRAWN

4-1 Fresh water prawns of India - commercial value

4-2 *Macrobrachium rosenbergii* and *M. Malcomsonii* – biology, seed production, pond preparation, stocking, management of nursery and grow-out ponds, feeding, morphotypes and harvesting

UNIT-V: CULTURE OF BRACKISHWATER SPECIES

5-1 Culture of P.mondon – Hatchery technology and Culture practices including feed and disease management

5-2 Culture of L. vannamei – hatchery technology and culture practices including feed and disease management.

5-3 Mixed culture of fish and prawns

Reference Books:

1. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi
2. Sena de silva, trevor a anderson 1995. Fish nutrition in aquaculture**.** Chapmann & Hall,
3. Guiland J.A (ed) 1984. Penaeid shrimps- Their Biology and Management.
4. Barrington FJW 1971. Invertebrates: Structure and Function.ELBS
5. Parker F & Haswell 1992. The text book of Zoology, VolI. Invertebrate

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DEPARMENT OF ZOOLOGY

B.Voc., COURSE IN AQUACULTURETECHNOLOGY SYLLABUS

(w.e.f -2021-22)

SEMESTER – I

PAPER – III

FRESH WATER & BRACKISHWATER AQUACULTURE

Periods:24 **Max. Marks: 50**

PRACTICALS: (Any 8 as per the local Industry needs and Requirement)

1. Identification of important cultivable carps
2. Identification of important cultivable air-breathing fishes
3. Identification of important cultivable fresh water prawns
4. Identification of different life history stages of fish
5. Identification of different life history stages of fresh water prawn
6. Collection and study of weed fish
7. Identification of commercially viable crabs – Scylla cerrata, Portunus pelagicus, P.sanguinolentus,
8. Neptunus pelagicus, N. Sanguinolentus
9. Identification of lobsters – Panulirus polyphagus, P.ornatus, P.homarus, P.sewelli, *P.penicillatus*
10. Identification of oysters of nutritional significance – Crossostrea madrasensis, C.gryphoides, C. cucullata, C.rivularis , Picnodanta
11. Identification of mussels and clams
12. Identification of developmental stages of oysters
13. Field visit to aqua farm and study of different components like dykes etc.

Question Paper Blue Print

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DEPARMENT OF ZOOLOGY

B.Voc., COURSE IN AQUACULTURETECHNOLOGY SYLLABUS

(w.e.f -2021-22)

SEMESTER – I

PAPER – III

FRESH WATER & BRACKISHWATER AQUACULTURE

	Section A Short Questions			Section B Essay Questions		
	NO OF QUESTIONS	MARKS ALLOTED FOR EACH QUESTION	TOTAL MARKS	NO OF QUESTIONS	MARKS ALLOTED FOR EACH QUESTION	TOTAL MARKS
UNIT -I	02	4	8	02	8	16
UNIT-II	02	4	8	02	8	16
UNIT-III	02	4	8	02	8	16
UNIT-IV	02	4	8	02	8	16
UNIT-V	02	4	8	02	8	16

Section-A: Questions numbers 1 to 10,

Out of 10 Questions 5 has to be answered.

Section-B: Questions numbers 11 to 15,

Internal Choice (either / or) and 5 Questions has to be answered.

1. Short Questions : 5 x 4 = 20
2. Essay Questions : 5 x 8 = 40

Total : 60

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DEPARMENT OF ZOOLOGY

B.Voc., COURSE IN AQUACULTURE TECHNOLOGY SYLLABUS

(w.e.f -2021-22)

SEMESTER – I

PAPER – III

FRESH WATER & BRACKISHWATER AQUACULTURE

Time : 3 hrs **Max.Marks:60**

THEORY MODEL PAPER

I. Answer any FIVE of the following

Draw labeled diagrams wherever necessary **5x4=20**

1. .Fresh water aquaculture system
2. Aquaculture status in India
3. Exotic fishes
4. Minor carps
5. re-circulatory system
6. Sewage-fed fish culture
7. Seed production
8. grow-out ponds
9. Pond preparation
10. Mixed culture of fish and prawn

II. Answer any FIVE of the following: **5x10=50**

Draw labeled diagrams wherever necessary

11. a. Describe status and prospects of fresh water aquaculture in A.P.

(or)

b. Explain fresh water aquaculture system.

12. a. Write an essay on major cultivable Indian carps

(or)

b. Describe composite fish culture system of Indian and exotic carps.

13. a. Explain recent culture trends in murrels

(**or)**

b. Explain advantages in the culture of air-breathing and cold water fishes

.

14. a. Write an essay commercial value of Indian fresh water prawn.

(or)

b. Explain Macrobrachium rosenbergii culture .

15 a. Explain feed and disease management in P.monodon culture.

(or)

b. Describe hatchery technology and culture practice in L. vannamei.

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B.Voc., COURSE IN AQUACULTURE TECHNOLOGY SYLLABUS

(w.e.f -2021-22)

SEMESTER – I

PAPER – III

FRESH WATER & BRACKISHWATER AQUACULTURE

Time : 2 hrs **Max. Marks:50**

PRACTICAL MODEL PAPER

I. Identify the following specimens and write a short notes on their commercial importance **6x5=30M**

a. Carp
b. Freshwater prawn
c. Stages of prawn
d. Crab
e. Oyesters
f. Mussel/clam

II. Record **05 marks**

III. Internal assessment **15 marks**

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ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER –II

PAPER – IV

FISH NUTRITION & FEED TECHNOLOGY

HOURS : 60 **Max.Marks: 100**

Learning Objectives:

1 To understand the different type feeds and feeding methods in fin and shell fish.
2 To improve the knowledge in feed preparation and feed storage.
3 To gain knowledge feed manufacture and storage.
4 To understand the feed additives & non-nutrient ingredients in aquaculture.
5 To know the different nutritional deficiency in cultivable fish and their prevention methods.
6 To improve the technical knowledge feed quality and nutritional value analysis.

UNIT-I: NUTRITIONAL REQUIREMENTS OF CULTIVABLE FISH

1-1 Requirements for energy, proteins, carbohydrates, lipids, fiber, micronutrients for different stages of cultivable fish and prawns
1-2 Essential aminoacids and fatty acids, protein to energy ratio, nutrient interactions and protein sparing effect
1-3 Dietary sources of energy, effect of ration on growth, determination of feeding rate, check tray
1-4 Factors affecting energy partitioning and feeding

UNIT-II: FORMS OF FEEDS & FEEDING METHODS

2-1 Fed conversion efficiency, feed conversion ratio and protein efficiency ratio
2-2 Wet feeds, moist feeds, dry feeds, mashes, pelleted feeds, floating and sinking pellets, advantages of pelletization
2-3 Manual feeding, demand feeders, automatic feeders, surface spraying, bag feeding & tray feeding
2-4 Frequency of feeding

UNIT-III: FEED MANUFACTURE & STORAGE

3-1. Feed ingredients and their selection, nutrient composition and nutrient availability of feed ingredients
3-2. Feed formulation – extrusion processing and steam pelleting, grinding, mixing and drying, pelletization, and packing
3-3. Water stability of feeds, farm made aqua feeds, micro-coated feeds, micro-encapsulated feeds and micro-bound diets
3-4. Microbial, insect and rodent damage of feed, chemical spoilage during storage period and proper storage methods

UNIT-IV: FEED ADDITIVES & NON-NUTRIENT INGREDIENTS

4-1. Binders, anti-oxidants, probiotics

4-2. Feed attractants and feed stimulants

4-3. Enzymes, hormones, growth promoters and pigments

4-4. Anti-metabolites, afflatoxins and fiber

UNIT-V: NUTRITIONAL DEFICIENCY IN CULTIVABLE FISH

5-1 Protein deficiency, vitamin and mineral deficiency symptoms

5-2 Nutritional pathology and ant-nutrients

5-3 Importance of natural and supplementary feeds, balanced diet

Reference Books:

1. HALVER JE 1989. Fish nutrition. Academic press, San diego
2. Lovell rt 1998. Nutrition and feeding of fishes, Chapmann & Hall, New York
3. Sena de silva, trevor a anderson 1995. Fish nutrition in aquaculture**.** Chapmann & Hall,
4. Guiland J.A (ed) 1984. Penaeid shrimps- Their Biology and Management.
5. Jhingran VG 1998. Fish and Fisheries of India. Hindusthan Publishing Corporation, New Delhi

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ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER – II

PAPER – IV

FISH NUTRITION & FEED TECHNOLOGY

Time : 3 hrs **Max. Marks:60**

THEORY MODEL PAPER

I. Answer any FIVE of the following

Draw labeled diagram wherever necessary **5x4=20**

1. Lipids
2. Check tray
3. Feed conversion efficiency
4. Bag feeding
5. Extrusion processing
6. Micro-coated feeds
7. Anti-oxidants
8. Afflatoxins

II. Answer any FIVE of the following

Draw labeled diagram wherever necessary **5x5=50**

9. a. Explain essential amino acids required for cultivable fish

(or)

b. Describe various carbohydrates and micronutrients for different stages of cultivable fish

10. a. Explain various feeds

(or)

b. Describe different feeding methods.

11 a. Explain nutrient composition and nutrient availability of feed ingredients..

(or)

b. Describe feed storage methods

12. a. Explain Probiotics role in fishes

(or)

c. Describe Enzymes and growth promoters

13. a. Explain Protein and Vitamin deficiency symptoms.

(or)

b. Describe natural and supplementary feed importance.

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ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER – II

PAPER – IV

FISH NUTRITION & FEED TECHNOLOGY

Periods: 24 **Max. Marks: 50**

PRACTICALS: (Any 8 as per the local Industry needs and Requirement)

1. Estimation of protein content in aquaculture feeds
2. Estimation of carbohydrate content in aquaculture feeds
3. Estimation of lipid content in aquaculture feeds
4. Estimation of ash in aquaculture feed
5. Study of water stability of pellet feeds
6. Feed formulation and preparation in the lab
7. Study of binders used in aquaculture feeds
8. Study of feed packing materials
9. Study of physical and chemical change during storage
10. Study on physical characteristics of floating and sinking feeds
11. Visit to a aqua-feed production unit
12. Visit to a farm for studying feeding practices

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ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc. Aquaculture Technology

SEMESTER – II

PAPER – IV

FISH NUTRITION & FEED TECHNOLOGY

Time : 2 hrs **Max. Marks:50**

PRACTICAL MODEL PAPER

I.	Estimate Protein content in aquaculture feeds. Write procedure	**10 marks**
II.	Estimate the Ash content in aquaculture feed. Write procedure	**10 marks**
III.	Different Feed formulation identification using charts	**05 marks**
IV.	Record	**05 marks**
V.	Field Note book	**05 marks**
VI.	Internal assessment	**15 marks**

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ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER – II

PAPER – V

FISH HEALTH MANGEMENT

HOURS : 60 (5X12) **Max.Marks: 100**

Learning Objectives:

1. To understand the definition of disease and to know the changes that occur at cellular level caused by it.
2. To gain knowledge about the disease causing microbial organism in fin fishes, how to prevent its infection and the treatment to be followed for that disease.
3. To gain knowledge about the disease causing microbial organism in shell fishes, how to prevent its infection and the treatment to be followed for that disease.
4. To understand about the diseases that are caused due to nutritional deficiency
5. To understand about the diagnosis tools that are followed in field of aquaculture and understand the importance of good feed management for health of the organism.

UNIT I: PATHOLOGY AND PARASITOLOGY

1-1 Introduction to fish diseases –Definition and categories of diseases – Disease and environment

1-2 Disturbance in cell structure – changes in cell metabolism, progressive and retrogressive tissue changes, types of degeneration, infiltration, necrosis, cell death and causes

1-3 Atrophy, hypertrophy, neoplasms, inflammation, healing and repair

UNIT II: DISEASES OF FIN FISH

2-1 Fungal diseases (both of shell and finfish) – Saprolegniosis, brachiomycosis, ichthyophorus diseases – Lagenidium diseases – Fusarium disease, prevention and therapy

2-2 Viral diseases – Emerging viral diseases in fish, haemorrhagic scepticemia, spring viremia of carps, infectious hematopoietic necrosis in trout, infectious pancreatic necrosis in salmonids, swim-bladder inflammation in cyprinids, channel cat fish viral disease, prevention and therapy

2-3 Baterial diseases – Emerging bacterial diseases, aermonas, pseudomonas and vibrio infections, columnaris, furunculosis, epizootic ulcerative syndrome, infectious abdominal dropsy, bacterial gill disease, enteric red mouth, bacterial kidney disease.

UNIT III: DISEASES OF SHELL FISH

3-1 Major shrimp viral diseases – Bacculovirus penaeii, Monodon Bacculovirus, Bacculoviral midgut necrosis, Infectious hypodermal and haematopoietic necrosis virus, Hepatopancreatic parvo like virus, Yellow head bacculovirus, white spot bacculovirus.

3-2 Bacterial diseases of shell fish – aeromonas, pseudomonas and vibrio infections, luminous bacterial disease, filamentous bacterial disease. Prevention and therapy

3-3 Protozoan diseases- Ichthyophthiriasis, Costiasis, whirling diseases, trypanosomiasis. Prevention and therapy

UNIT IV: NUTRITIONAL DISEASES

4-1 Nutritional pathology – lipid liver degeneration, Vitamin and mineral deficiency diseases. Aflatoxin and dinoflagellates.

4-2 Antibiotic and chemotherapeutics. Nutritional cataract. Genetically and environmentally induced diseases.

UNIT V: FISH HEALTH MANAGEMENT

5-1 Diagnostic tools – immune detection- DNA/RNA techniques, General preventive methods and prophylaxis. Application and development of vaccines.

5-2 Quarantine – Significance, methods and regulations for transplants.

5-3 Production of disease-free seeds. Evaluation criteria of healthy seeds.

5-4 Good Feed management for healthy organisms, Zero water exchange, Probiotics in health management, Issues of biosecurity.

Reference Books:

1. Shaperclaus W. 1991 Fish Diseases- Vol.I & II. Oxonian Press Pvt.ltd
2. Roberts RJ 1989. Fish pathology. Bailliere Tindall, New York
3. Lydia Brown 1993. Aquaculture for veterinarians- fish husbandray and medicine. Pergamon Press. Oxford
4. Shankar KM & Mohan CV. 2002. Fish and Shellfish Health Management. UNESCO Publ. Sindermann CJ. 1990
5. Walker P & Subasinghe RP. (Eds.). 2005 Principal Diseases of Marine Fish and Shellfish. Vols. I, II. 2nd Ed. Academic Press
6. Wedmeyer G, Meyer FP & Smith L. 1999. DNA Based Molecular Diagnostic Techniques: Research Needs for Standardization and Validation of the Detection of Aquatic Animal Pathogens and Diseases. FAO Publ.
7. Bullock G et.al., 1972 Bacterial diseases of fishes. TFH publications, New Jersey
8. Post G 1987. Text book of Fish Health. TFH publications, New Jersey
9. Johnson SK 1995. Handbook of shrimp diseases. Texas A & M University, Texas

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DEPARTMENT OF ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc Aquaculture Technology

SEMESTER – II

PAPER – V

FISH HEALTH MANAGEMENT

Time : 3 hrs **Max. Marks:60**

THEORY MODEL PAPER

Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x4=20**

1. Necrosis
2. Inflammation
3. Aermonas in Fin fish
4. Fusarium in Fin fish
5. Costiasis in shell fish
6. Yellow head bacculovirus in shell fish
7. Aflatoxin
8. Zero water exchange

Answer any FIVE of the following
Draw labeled diagram wherever necessary **5x8=40**

9. a. Explain progesssive and retrogressive tissue changes in fish.

(or)

b. Describe cell death and causes in fish

10. a. Explain any three fungal diseases in fin fish with preventive and therapeutic measures.

(or)

b. Describe spring viremia of carps and infectious pancreatic necrosis in Salmonids.

11. a. Explain any three viral diseases in shell fish.

(or)

b. Explain preventive and therapaeutic measeures of protozoan diseases in shell fish.

12. a. Describe vitamin deficiency diseases in Fin fish.

(or)

b. Explain genetically induced diseases in Fin fish

13. a. Describe immune detection techniques used in shell fish

(or)

b. Write an account on Probiotics in health management of shell fish.

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I B.Voc AQUACULTURE PRACTICAL SYLLABUS FOR SEMESTER-II

PAPER - V

FISH HEALTH MANGEMENT

Periods: 24 **Max. Marks: 50**

PRACTICALS: (Any 8 as per the local Industry needs and Requirement)

1. Enumeration of Bacteria by TPC Method
2. Enumeration of total Coliforms
3. Observation of gross pathology and external lesions of fish and prawn with reference to the common diseases in aquaculture
4. Examination of pathological changes in gills and gut lumen, lymphoid organ, muscles and nerves of fish
5. Examination of pathological changes in gut lumen, hepatopancreas, lymphoid organ, muscles and nerves of prawn and shrimp
6. Collection, processing and analysis of data for epidemiological investigations of viral diseases
7. Bacterial pathogens – isolation, culture and characterization
8. Identification of parasites in fishes: Protozoan, Helmiths, Crustaceans
9. Antibiograms – preparation and evaluation
10. Molecular and immunological techniques; Biochemical tests; PCR; ELISA; Agglutination test; Challenge tests; Purification of virus for development of vaccines (Demonstration at institutes/labs)
11. Estimation of dose, calculation of concentration, methods of administration of various chemotherapeutics to fish and shell fish
12. Estimation of antibiotics used in aquaculture practices
13. Estimation of probiotics used in aquaculture
14. Field visit to farm for health monitoring and disease diagnosis

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ZOOLOGY SYLLABUS (w.e.f -2021-22)

I B.Voc. Aquaculture Technology
SEMESTER – II
PAPER – V
FISH HEALTH MANAGEMENT

Time : 2 hrs **Max. Marks:50**

PRACTICAL MODEL PAPER

I.	Enumeration of Bacteria by TPC Method , write procedure	**10 marks**
II.	Identification of pathological diseases (5x2)	**10 marks**
III.	Identification of parasites (any 2)	0**5 marks**
IV.	Record	**05 marks**
V.	Field Note book	**05 marks**
VI.	Internal assessment	**15 marks**