

**SCIENCE FACULTY**

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**



**SYLLABUS**

**FOR**

**T. Y. B. Sc.**

**PHYSICS**

**(With effect from June - 2014)**

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**

Class: T. Y. B. Sc.

Subject: Physics

**With effect from June-2014**

The Board of Studies in physics in its meeting held on 4<sup>th</sup> March 2014 has unanimously accepted the revised syllabus prepared by different committees, discussed and finalized in workshop for T. Y. B. Sc. Syllabi revision. The titles of the papers for T. Y. B. Sc. (Physics) are as given below;

Semester	Course Title	Periods	Marks	
			Ext.	Int.
V	PHY-351: Mathematical Physics	60	40	10
	PHY-352: Classical Mechanics	60	40	10
	PHY-353: Atomic and Molecular Physics	60	40	10
	PHY-354 (A): Electronics II OR	60	40	10
	PHY-354 (B): Instrumentation II	60	40	10
	PHY-355: Solid State Physics	60	40	10
	PHY-356 (A): Technical Electronics- I OR	60	40	10
	PHY-356 (B): Refrigeration and air conditioning-I OR	60	40	10
	PHY-356 (C): Vacuum Technology-I OR	60	40	10
	PHY-356 (D): Microprocessor- I OR	60	40	10
	PHY-356 (E): Programming in C++ - I OR	60	40	10
	PHY-356 (F): Solar Energy - I	60	40	10

Semester	Course Title	Periods	Marks	
			Ext.	Int.
VI	PHY-361: Classical Electrodynamics	60	40	10
	PHY-362: Quantum Mechanics	60	40	10
	PHY-363: Nuclear Physics	60	40	10
	PHY-364: Statistical Mechanics and Thermodynamics	60	40	10
	PHY-365: Elements of Material Science	60	40	10
	PHY-366 (A): Technical Electronics- II OR	60	40	10
	PHY-366 (B): Refrigeration and air conditioning-II OR	60	40	10
	PHY-366 (C): Vacuum Technology-II OR	60	40	10
	PHY-366 (D): Microprocessor- II OR	60	40	10
	PHY-366 (E): Programming in C+ + - II OR	60	40	10
	PHY-366 (F): Solar Energy - II	60	40	10
V and VI	PHY-307: Practical Course-I	120	80	20
V and VI	PHY-308: Practical Course-II	120	80	20
V and VI	PHY-309: Project	120	80	20

#### Important Instructions:

- 1) The students offered Electronics Science at F. Y. B. Sc. and/or at S. Y. B. Sc. as one of the subjects will have to offer **PHY354 (B): Instrumentation II** instead of **PHY: 354(A): Electronics II** at T. Y. B. Sc. (Physics).
- 2) The students offered Computer Science at F. Y. B. Sc. and/or at S. Y. B. Sc. as one of the subjects will have to offer other than **PHY 356(E): Programming in C+ + -I** and **PHY 366(E): Programming in C+ + -II** as an optional subject at T. Y. B. Sc. (Physics).
- 3) The industrial/study tour is compulsory for students of T. Y. B. Sc. (Physics). The tour report should be submitted at the time of practical examination.
- 4) The college authorities should provide Computer system with Internet facility, printer and scanner for project work.

## **PHY 309: Project**

### **Note:**

1. Every student individually shall take a project work on Relevant theoretical or experimental topic of Physics, in the beginning of the (T.Y.B. Sc. first Term) fifth semester, in consultation with the guide and the project must be completed in the (T.Y.B. Sc. Second Term) sixth semester.

2. The project proposal must be submitted in the college in the beginning of the (T.Y.B.Sc. first Term) fifth semester, While selecting / submitting project proposal care is to be taken that project will be completed within the available time of two terms i.e. 4 periods per week for (T.Y.B.Sc. first Term) fifth semester, and 4 periods per week for (T.Y.B.Sc. Second Term) sixth semester

The final title of the project work should be submitted at the beginning of the (T.Y.B.Sc. Second Term) sixth semester.

The guides should regularly monitor the progress of the project work.

### **ASSESSMENT OF PROJECT- FIRST TERM :**

Student should submit a Progress Report on the work done by him/her during the First Phase of the project i.e. on the topics :

1. Project Selection
2. Literature Search Strategy
3. Literature Review
4. Project Planning.

The student will have to give a seminar on the above topics.

### **ASSESSMENT OF PROJECT- SECOND TERM :**

Student should submit a Final Project Report on the work done by him/her during the First and Second Phase of the Project i.e. on the topics :

1. Experimental work.
2. Characterize the samples, if any.
3. Discussion of the results.
4. Conclusions.

### Equivalent courses:

Semester	Course Title (Old)	Semester	Course Title (New)
I	PHY-311: Mathematical Physics	V	PHY-351: Mathematical Physics
	PHY-312: Classical Mechanics		PHY-352: Classical Mechanics
	PHY-313: Atomic and Molecular Physics		PHY-353: Atomic and Molecular Physics
	PHY-314 (A): Electronics II		PHY-354 (A): Electronics II
	OR		OR
	PHY-314 (B): Instrumentation II		PHY-354 (B): Instrumentation II
	PHY-315: Solid State Physics		PHY-355: Solid State Physics
	PHY-316 (A): Technical Electronics- I		PHY-356 (A): Technical Electronics- I
	OR		OR
	PHY-316 (B): Refrigeration and air conditioning-I		PHY-356 (B): Refrigeration and air conditioning-I
	OR		OR
	PHY-316 (C): Vacuum Technology-I		PHY-356 (C): Vacuum Technology-I
	OR		OR
II	PHY-321: Classical Electrodynamics	VI	PHY-361: Classical Electrodynamics
	PHY-322: Quantum Mechanics		PHY-362: Quantum Mechanics
	PHY-323: Nuclear Physics		PHY-363: Nuclear Physics
	PHY-324: Statistical Mechanics and Thermodynamics		PHY-364: Statistical Mechanics and Thermodynamics
	PHY-325: Elements of Material Science		PHY-365: Elements of Material Science
	PHY-326 (A): Technical Electronics- II		PHY-366 (A): Technical Electronics- II
	OR		OR
	PHY-326 (B): Refrigeration and air conditioning-II		PHY-366 (B): Refrigeration and air conditioning-II
	OR		OR
	PHY-326 (C): Vacuum Technology-II		PHY-366 (C): Vacuum Technology-II
	OR		OR
	PHY-326 (D): Microprocessor- II		PHY-366 (D): Microprocessor- II
	OR		OR
	PHY-326 (E): Programming in C+ + - II		PHY-366 (E): Programming in C+ + - II
	OR		OR
	PHY-326 (F): Solar Energy - II		PHY-366 (F): Solar Energy - II
I and II	PHY-307: Practical Course-I	V and VI	PHY-307: Practical Course-I
I and II	PHY-308: Practical Course-II	V and VI	PHY-308: Practical Course-II
I and II	PHY-309: Project	V and VI	PHY-309: Project

## **CAREER OPPORTUNITIES FOR B. Sc. PHYSICS STUDENTS**

B. Sc Physics students can find jobs in public as well as private sectors. There are many opportunities available for B. Sc Physics students in technical as well as scientific fields. They can work as Science and Mathematics Teachers, Quality Control Manager, Laboratory assistant, Laboratory Technician, School Science Technician in any government or private organization.

### **Private Sector:**

There are many opportunities available in IT field for B. Sc Physics graduates. Many IT companies such as Infosys, Wipro and TCS are recruiting B. Sc. Physics graduates for software jobs. They can also get jobs in Energy Plants. Another jobs available for these graduates is Technician in Electronic Industry. They can apply for jobs in many companies in automobile industry. Some of those companies are Maruti Udyog, TATA Motors and Tech Mahindra.

### **Government Sector:**

There are vast opportunities available for B. Sc graduates in Government sector. They can apply for jobs in Scientific Research and Development Organizations such as The Defence Research and Development Organisation (DRDO), CSIR, Physical Research Laboratory (PRL) Ahmedabad, Saha Institute of Nuclear Physics Kolkata and Nuclear Science Centre New Delhi. They can also apply for various jobs in popular government organizations such as Bhabha Atomic Research Centre (BARC), Atomic Energy Regulatory Board (AERB), Oil and Natural Gas Corporation (ONGC), Bharat Heavy Electricals Limited (BHEL), National Thermal Power Corporation (NTPC).

They can also apply for the various competitive exams conducted by Union Public Service Commission such as IFS, IPS and IAS. Several other government exams conducted for recruiting B. Sc Physics graduates are Tax Assistant Exam , Statistical Investigator Exam, Combined Graduate Level Exam

Another option available for B. Sc Physics graduate is to apply for jobs in public sector banking. Several banks are conducting exam every year for recruiting graduates to the post of Probationary Officers. They can also find many jobs in Railway sector. They should qualify the exams conducted by Railway Recruitment Board to get a job in Railway sector. These graduates can also apply for Combined Defense Services Exams conducted for recruiting candidates to various posts in Defense Department.

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**



**SYLLABUS**

**FOR**

**M. Sc. PHYSICS**

**(With effect from June, 2014)**

# M. Sc. Physics Programme

## Objectives of the programme

The objectives of this programme are to develop:

1. The students through high quality of education/study which enables them to succeed in career in which an understanding of physics is relevant;
2. The ability to think logically, to analyze problems and phenomena and to devise explanations or solutions;
3. An appreciation of the role of mathematical modeling of physical phenomena to produce predictions which can be tested against experimental observations;
4. An awareness of the importance of accurate experimentation in the understanding of natural phenomena;
5. The practical and technical skills required for physics experimentation;
6. An awareness of the value and the power of computer based techniques for experimentation, analysis and presentation and a familiarity in their exploitation;
7. An ability to communicate the concepts and discoveries of physics both orally and in writing;
8. An ability to organize time and meet deadlines;
9. An additional skills resulting from the experience of more extensive project work;
10. An ability to integrate 'Information Communication Technology' with basic concepts of physics to promote relevant education and training;
11. The qualities of adoptability, innovation and dynamism.

### Important Instructions:

1. B. Sc. (Physics) students are eligible to offer this program.
2. Two written tests, one oral test and one seminar (per semester) should be conducted for each course in addition to regular teaching schedule.
3. Faculty members are advised to use 'compact disks' and computers as teaching aids so as to ingrain the basic ideas of Physics.
4. Students are advised to borrow scientific information (published worldwide) from scientific websites on Internet.
5. A well-equipped computer laboratory with at least 5 computers and 5 Microprocessor kits is necessary to conduct related experiments.
6. Student should start the Project work soon after the commencement of third semester. Literature survey, Definition of the problem, Pre-oral before finalization of the topic, Preliminary experimental work, Oral to assign the internal marks etc should be covered in the third semester.
7. Student should carry out the experimental work, keep record of the observations and results and should draw the conclusions of the project. Systematic project report should be prepared. Teacher should arrange oral examination to assign internal marks

M. Sc. Physics Programme Details		
	1 <sup>st</sup> Year	2 <sup>nd</sup> Year
No. of teaching days (weeks)/year	180(30)	180(30)
No. of teaching days (weeks)/semester	90(15)	90(15)
No. of contact hours/theory Course/week	4	4
No. of contact hours /week/practical course	6	6+6* *Project
No. of teaching hours theory course/semester	48	48
No. of contact hours/semester for tests, seminars, tutorials	12	12
No. of contact hours/theory course/semester	60	60



## M. Sc. (Physics) Structure

Semester	Course Number	Title of the Course
<b>I</b>	PHY 101	Mathematical Methods for Physics
	PHY 102	Classical Mechanics
	PHY 103	Quantum Mechanics
	PHY 104	Solid State Physics
	PHY 105	Basic Physics Laboratory I
<b>II</b>	PHY 201	Statistical Mechanics
	PHY 202	Classical Electrodynamics
	PHY 203	Material Science
	PHY 204	Any <b>ONE</b> of the following
	PHY 204 (A)	Physics of Semiconductor devices
	PHY 204 (B)	Electronics Instrumentation
	PHY 204 (C)	Biophysics
	PHY 205	Basic Physics Laboratory II
<b>III</b>	PHY 301	Atomic and Molecular Physics
	PHY 302	Any <b>ONE</b> of the following
	PHY 302 (A)	Materials Synthesis Methods
	PHY 302 (B)	Microprocessor and its Applications
	PHY 302 (C)	Communication Electronics
	PHY 303	Any <b>ONE</b> of the following
	PHY 303 (A)	Systematic Materials Analysis
	PHY 303 (B)	Computational Methods and Programming Using 'C' Language
	PHY 303 (C)	Acoustics and Entertainment Physics
	PHY 304	Special Laboratory I
	PHY 305	Project Work- I (Literature Survey, Definition of Problem, Experimental work, Oral etc.)
<b>IV</b>	PHY 401	Nuclear Physics
	PHY 402	Any <b>ONE</b> of the following
	PHY 402 (A)	Nanomaterials: Synthesis, Properties and Applications
	PHY 402 (B)	LASER and it's Applications
	PHY 402 (C)	Astrophysics
	PHY 403	Any <b>ONE</b> of the following
	PHY 403 (A)	Renewable Energy Sources
	PHY 403 (B)	Microwave: Theory and Applications
	PHY 403 (C)	Environmental Physics
	PHY 404	Special Laboratory II
	<b>PHY 405</b>	<b>Project Work- II (Characterization, Analysis of Result, Conclusions, Project Report, Oral etc.)</b>

## **PHY-405: M. Sc. Project - II**

### **Activities:**

1. To complete the experimental work.
2. To carry out the measurements.
3. To characterize the samples.
4. To obtain the results.
5. To draw the conclusions.
6. To write the project report.
7. To appear for Internal examination
8. To appear for External examination

### **Project Report:**

1. Students have to write a 'project report'.
2. A report should be a concise account of project work containing full descriptions of the aims, method and outcomes.
3. Length of report should not normally exceed 40 pages.

### **Assessment Criteria of the project:**

The following criteria are to be used in assessing the project work:

#### **(i) The conduct of project work:**

The following questions are considered in assessing how well students have carried out the project work.

1. How difficult was the project?
2. How well did the student understand the scientific principles behind the project?
3. How well did the student plan the project work?
4. How much effort was put into the project?
5. Was an interim report presented on time?
6. Was the student's project logbooks adequate?
7. How much initiative and/or originality did the student contribute to the project.
8. How well did the student cope with problems that arose during the course of project?
9. Did a project reach a stage of completion where meaningful results were obtained and definite conclusions could be drawn?

#### **(ii) The Project Report:**

1. How well did the report set out the background?
2. How well did the report describe the underlying them?
3. Was the report a reasonable length?
4. How well was the report structured?
5. How understandable was the written content?
6. How well did the report describe the execution of the project?
7. Did the report have an adequate summary or conclusions?

#### **(iii) Oral Examination:**

1. Did the student adequately describe what he/she had done in their project?
2. Did the student have a clear interpretation of his/her results?
3. What was the clarity and overall standard of the presentation?
4. How well was the talk/presentation structured?
5. Did the student cover all the relevant material in a reasonable time?

## Equivalent courses

Old Course		New Course	
Course Number	Title of the Course	Course Number	Title of the Course
PHY 101	Mathematical Methods for Physics	PHY 101	Mathematical Methods for Physics
PHY 102	Classical Mechanics	PHY 102	Classical Mechanics
PHY 103	Quantum Mechanics	PHY 103	Quantum Mechanics
PHY 104	Solid State Physics	PHY 104	Solid State Physics
PHY 105	Basic Physics Laboratory I	PHY 105	Basic Physics Laboratory I
PHY 201	Statistical Mechanics	PHY 201	Statistical Mechanics
PHY 202	Classical Electrodynamics	PHY 202	Classical Electrodynamics
PHY 203	Material Science	PHY 203	Material Science
PHY 204	Any <b>ONE</b> of the following	PHY 204	Any <b>ONE</b> of the following
PHY 204 (A)	Physics of Semiconductor devices	PHY 204 (A)	Physics of Semiconductor devices
PHY 204 (B)	Electronics Instrumentation	PHY 204 (B)	Electronics Instrumentation
PHY 204 (C)	Biophysics	PHY 204 (C)	Biophysics
PHY 205	Basic Physics Laboratory II	PHY 205	Basic Physics Laboratory II
PHY 301	Atomic and Molecular Physics	PHY 301	Atomic and Molecular Physics
PHY 302	Any <b>ONE</b> of the following	PHY 302	Any <b>ONE</b> of the following
PHY 302 (A)	Materials Synthesis Methods	PHY 302 (A)	Materials Synthesis Methods
PHY 302 (B)	Microprocessor and its Applications	PHY 302 (B)	Microprocessor and its Applications
PHY 302 (C)	Communication Electronics	PHY 302 (C)	Communication Electronics
PHY 303	Any <b>ONE</b> of the following	PHY 303	Any <b>ONE</b> of the following
PHY 303 (A)	Systematic Materials Analysis	PHY 303 (A)	Systematic Materials Analysis
PHY 303 (B)	Computational Methods and Programming Using 'C' Language	PHY 303 (B)	Computational Methods and Programming Using 'C' Language
PHY 303 (C)	Acoustics and Entertainment Electronics	PHY 303 (C)	Acoustics and Entertainment Physics
PHY 303 (D)	Biomedical Instrumentation	PHY 204 (C)	Biophysics
PHY 304	Special Laboratory I	PHY 304	Special Laboratory I
PHY 305	Project Work- I (Literature Survey, Definition of Problem, Experimental work, Oral etc.)	PHY 305	Project Work- I (Literature Survey, Definition of Problem, Experimental work, Oral etc.)
PHY 401	Renewable Energy Sources	PHY 403 (A)	Renewable Energy Sources
PHY 402	Any <b>ONE</b> of the following	PHY 402	Any <b>ONE</b> of the following
PHY 402 (A)	Nanomaterials: Synthesis, Properties and Applications	PHY 402 (A)	Nanomaterials: Synthesis, Properties and Applications
PHY 402 (B)	LASER and it's Applications	PHY 402 (B)	LASER and it's Applications
PHY 403	Any <b>ONE</b> of the following	PHY 403	Any <b>ONE</b> of the following
PHY 403 (A)	Nuclear Physics	PHY 401	Nuclear Physics
PHY 403 (B)	Microwave: Theory and Applications	PHY 403 (B)	Microwave: Theory and Applications
PHY 403 (C)	Environmental Physics	PHY 403 (C)	Environmental Physics
PHY 403 (D)	Astrophysics and Astronomy	PHY 402 (C)	Astrophysics
PHY 404	Special Laboratory II	PHY 404	Special Laboratory II
PHY 405	Project Work- II (Characterization, Analysis of Result, Conclusions, Project Report, Oral etc.)	PHY 405	Project Work- II (Characterization, Analysis of Result, Conclusions, Project Report, Oral etc.)



**NORTH MAHARASHTRA UNIVERSITY, JALGAON**

**SYLLABUS FOR**  
**MASTER OF SCIENCE**  
**In**  
**ORGANIC CHEMISTRY**  
**PART- II**  
**(Semester III and IV)**

**w. e. f. June 2015**

# **NORTH MAHARASHTRA UNIVERSITY, JALGAON**

## **Syllabus for M.Sc. Part-II Organic Chemistry**

(Semester - III & IV)

(With Effect from June 2015)

### **Course Structure for Second Year**

The following will be the structure for revised syllabus from June 2015 for semester III and semester IV

#### **SEMESTER - III**

Sub. Code: Title

CH-350: Organic Reaction Mechanism

CH-351: Spectroscopic Methods in Structure Determination

CH-352: Organic Stereochemistry

CH-353: Free radical, photochemistry, pericyclic reaction and their applications

#### **SEMESTER - IV**

Sub. Code: Title

CH-450: Chemistry of Natural Products

CH-451: Synthetic Methods in Organic Chemistry

CH-452: Heterocyclic chemistry, chiron approach, chiral drugs and medicinal chemistry

### **Practical courses:**

Sub. Code: Title

CH -O-2: Ternary mixture separation (Annual)

CH -O-3: Three stage preparations (Annual)

CH -O-4: Short Research Project (Annual)

### **Course Code: CH-O-3**

#### **Three stage preparations (Starting with 5g or less.) Monitored by TLC**

1. Preparation of Benzanilide by Beckmann rearrangement.
2. Preparation of Anthranilic acid.
3. Preparation of Phthalimide.
4. Preparation of p-aminobenzoic acid.
5. Preparation of N-Bromosuccinamide.
6. Preparation of p-chloronitrobenzene by Sandmeyer reaction.
7. Preparation of p-iodonitrobenzene by Sandmeyer reaction.
8. Pinacol-pinacolone rearrangement.
9. Preparation of Acetophenone by Fries rearrangement.
10. Preparation of aromatic aldehydes by Vilsmeier-Hack reaction or Reimer-Tiemann.
11. Wittig reaction.

### **CH -O-4: Short Research Project**

Literature survey, studies of reactions, synthesis, mechanism, isolation of natural products, standardization of reaction conditions, new methods etc.

**NORTH MAHARASHTRA UNIVERSITY,  
JALGAON**



(NAAC Re-Accredited)

“A” Grade

**FACULTY OF SCIENCE THEORY &  
PRACTICAL COURSES  
FOR  
M.Sc. (Botany) Part-II**

**To Be Implemented From  
Academic Year 2015-16**

# **NORTH MAHARASHTRA UNIVERSITY, JALGAON**

## **Syllabus for Theory and Practical Courses for M.Sc. In Botany**

### **M.Sc. Part-II**

**(w.e.f. Academic Year 2015-2016)**

#### **SEMESTER-III**

- BOT.3.1 Gymnosperms and Paleobotany
- BOT.3.2 Plant Biotechnology And Bioinformatics
- BOT.3.31 Algae Special Paper-I
- BOT.3.32 Mycology and Plant Pathology Special Paper-I
- BOT.3.33 Genetics and Plant Breeding Special Paper-I
- BOT.3.34 Angiosperm Taxonomy Special Paper-I
- BOT.3.4 Practical-I (Based on BOT.3.1 & 3.2)
- BOT.3.5 Practical-II (Based on BOT.3.31 or 3.32 or 3.33 or 3.34)

#### **SEMESTER-IV**

- BOT.4.1 Developmental Botany
- BOT.4.21 Algae Special Paper-II
- BOT.4.22 Mycology and Plant Pathology Special Paper-II
- BOT.4.23 Genetics and Plant Breeding Special Paper-II
- BOT.4.24 Angiosperm Taxonomy Special Paper-II
- BOT.4.31 Algae Special Paper-III
- BOT.4.32 Mycology and Plant Pathology Special Paper-III
- BOT.4.33 Genetics and Plant Breeding Special Paper-III
- BOT.4.34 Angiosperm Taxonomy Special Paper-III
- BOT.4.4 Practical-I (Based on BOT 4.1)
- BOT.4.5 Practical-II (Based on BOT 4.21 and 4.31 or 4.22 and 4.32 or 4.23 and 4.33 or 4.24 & 4.34)
- BOT.4.6 Project Work**



### Equivalent Theory & Practical Courses Of M.Sc. Botany (Part II) (Sem. III & IV)

New Courses (To be implemented from June 2015)	Old Course
BOT 3.1 Gymnosperms and Paleobotany	BOT 3.1 Genetics and Plant Breeding
BOT 3.2 Plant Biotechnology and Bioinformatics	BOT 3.2 Environmental Botany and Biostatistics
BOT 3.31 Algae Special Paper – I	BOT 3.31 Algae Special Paper – II
BOT 3.32 Mycology and Plant Pathology Paper – I	BOT 3.32 Mycology and Plant Pathology Paper – I
BOT 3.33 Genetics and Plant Breeding Paper – I	BOT 3.34 Genetics and Plant Breeding Paper – I
BOT 3.34 Angiosperm Taxonomy Special Paper – I	BOT 3.33 Angiosperm Taxonomy Special Paper - I
BOT 3.4 Practical - I (Based on BOT 3.1 & 3.2)	BOT 3.4 Practical - I (Based on BOT 3.1 & 3.2)
BOT 3.5 Practical - II (Based on BOT 3.31 or 3.32 or 3.33 or 3.34)	BOT 3.5 Practical - II (Based on BOT 3.31 or 3.32 or 3.33 or 3.34)
BOT 4.1 Developmental Botany	BOT 4.1 Developmental Botany
BOT 4.21 Algae Special Paper – II	BOT 4.21 Algae Special Paper – II
BOT 4.22 Mycology and Plant Pathology Paper – II	BOT 4.22 Mycology and Plant Pathology Paper – II
BOT 4.23 Genetics and Plant Breeding Paper – II	BOT 4.24 Genetics and Plant Breeding Paper – II
BOT 4.24 Angiosperm Taxonomy Special Paper – II	BOT 4.23 Angiosperm Taxonomy Special Paper – II
BOT 4.31 Algae Special Paper – III	BOT 4.31 Algae Special Paper – III
BOT 4.32 Mycology and Plant Pathology Paper –III	BOT 4.32 Mycology and Plant Pathology Paper – III
BOT 4.33 Genetics and Plant Breeding Paper – III	BOT 4.34 Genetics and Plant Breeding Paper – III
BOT 4.34 Angiosperm Taxonomy Special Paper III	BOT 4.33 Angiosperm Taxonomy Special Paper – III
BOT 4.4 Practical - I (Based on BOT 4.1)	BOT 4.4 Practical - I (Based on BOT 4.1)
BOT 4.5 Practical - II (Based on BOT 4.21 & 4.31 or 4.22 & 4.32 or 4.23 & 4.33 or 4.24 & 4.34.	BOT 4.5 Practical - II (Based on BOT 4.21 & 4.31 or 4.22 & 4.32 or 4.23 & 4.33 or 4.24 & 4.34.
<b>BOT 4.6 Project Work</b>	<b>BOT 4.6 Project Work</b>

**NORTH MAHARASHTRA UNIVERSITY,  
JALGAON**



'A' Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)

**SYLLABUS**

**Master of Science  
in  
Microbiology**

**Part-II  
(Semester – III and IV)**

**w. e. f. June 2016 -2017**

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**

**Syllabus for M.Sc. (Part- II) Microbiology**

Effective from June 2016 -2017

<b>Subject code</b>	<b>Title of the paper</b>	<b>Duration (Hrs./Wk)</b>	<b>Max. Marks</b>	<b>Exam. Time (Hrs.)</b>
<b>SEMESTER – III</b>				
<b>Theory courses</b>				
MB-301	Applied and Environmental Microbiology	<b>04</b>	<b>100</b>	<b>03</b>
MB-302	Molecular Biology and Bioinformatics	<b>04</b>	<b>100</b>	<b>03</b>
MB-303	Pharmaceutical Microbiology	<b>04</b>	<b>100</b>	<b>03</b>
<b>Laboratory courses</b>				
MB-304	Methods in Biostatistics and Bioinformatics	<b>04+04</b>	<b>100</b>	<b>06</b>
MB-305	Methods in Applied Microbiology	<b>04+04</b>	<b>100</b>	<b>06</b>
<b>SEMESTER – IV</b>				
<b>Theory courses</b>				
MB-401	Fermentation Technology	<b>04</b>	<b>100</b>	<b>03</b>
MB-402	Applied Molecular Biology	<b>04</b>	<b>100</b>	<b>03</b>
MB-403	Agricultural Microbiology	<b>04</b>	<b>100</b>	<b>03</b>
<b>Laboratory courses</b>				
MB-404	Methods in Biotechnology	<b>04+04</b>	<b>100</b>	<b>06</b>
<b>MB-405</b>	<b>Laboratory course (Project Dissertation)</b>	<b>04+04</b>	<b>100</b>	<b>06</b>

**Instructions:**

1. Each theory course has to be completed in 50 lectures of 60 min duration each in one semester.
2. Semester III and IV will have THREE theory courses and TWO Practical courses.
3. Practical examination of each laboratory course shall be conducted at the end of each respective semester.
4. Each course will be of 100 marks (40 marks internal and 60 marks-external examinations).
5. Seminar activity in each semester should be conducted and made compulsory to each student.
6. The student will have to carry out the research based project work in lieu of practical in the fourth semester in the department.

### MB-405 : Laboratory course (Project Dissertation)

The project allotted during the Forth semester and it is expected that the students will design experiments and collect experimental data to deduce conclusions. At the end, they will submit a detailed thesis for evaluation. The students should be introduced to research methodology in the beginning through few lectures.

The approach towards the execution of project should be as follows:

1. Selection of topic relevant to priority areas of biotechnology.
2. Collection of literature from libraries, internet, on-line journals, etc.
3. Planning of research experiments
4. Performing the experiments with scientific and statistical acceptability.
5. Presentation of observations and results.
6. Interpretation of results and drawing important conclusions.
7. Discussion of obtained results with respect to literature reports.
8. Preparation of report (thesis) containing introduction, materials and methods, results and discussion, conclusions, bibliography.
9. Presentation of research data in a bound form.

## Epilogue

**Skills imparted:** The curriculum is designed to instill basic and applied knowledge of the subject to the students. One of the major objectives considered during designing is to make technically educated human resource. Basic microbiology, molecular biology, microbial physiology may help to find out unseen facts in various environmental, agriculture, food and pharmaceutical sectors. The subjects like genetic engineering, applied microbiology, microbial biochemistry, pharmaceutical microbiology, fermentation technology and biochemical techniques are designed to impart theoretical and practical knowledge of modern scientific advances in the field. Further to enhance skillful human resource with precision, the course like biostatistics and bioinformatics are included. The subject like Microbial biotechnology would give not only the practical knowledge of industry and industrial processes but also make aware the students with the global environmental problems like pollutions, contamination and bioremediation. Practical courses are based on theory courses and are designed to improve research oriented skills of students.

**Job opportunity:** The designed curriculum offers job opportunities in various sectors like,

- Pharmaceutical industry : Clinical, medicine, vaccine, QC division
- Biotech industry: Recombinant product, QC, QA
- Agrochemical and pesticide industry
- Chemical industry: synthesis, testing
- Environmental protection industry and Agencies
- Research leading to Ph. D. degree
- Self entrepreneurship
- Marketing of biological and pharmaceutical products

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**

**M. Sc. (Part-II) ZOOLOGY**

**New Syllabus 2015-2016**

**Pattern 80-20**

**Semester I**

	UA + CA	Hours
<b>ZOO 301: Special Paper Entomology – I</b>		
(A) Insect Taxonomy and Morphology - I	40 marks + 10	30
(B) Insect Taxonomy and Morphology - II	40 marks + 10	30
<b>ZOO 301: Special Paper Animal Physiology – I</b>		
(A) Animal Physiology section – I	40 marks + 10	30
(B) Animal Physiology section – II	40 marks + 10	30
<b>ZOO 301: Special Paper Reproductive Physiology – I</b>		
(A) Reproductive Physiology – I	40 marks + 10	30
(B) Reproductive Physiology – II	40 marks + 10	30
ZOO 302: (A) Freshwater Zoology	40 marks + 10	30
(B) Skills in scientific communication and writing research report	40 marks + 10	30
ZOO 303: (A) Medical physiology / Insect Anatomy	40 marks + 10	30
(B) Animal Biotechnology	40 marks + 10	30
<b>ZOO 304: Practical 301 (A) + 301(B) +302(A)</b>	<b>80 marks + 20</b>	<b>60</b>
Six practicals corresponding to 301 (A) (30 marks)		
Six practicals corresponding to 301 (B) (20 marks)		
Four practicals corresponding to 302 (A) (30 marks)		
<b>ZOO 305: Practical 302(B) + 303(A) + 303(B)</b>	<b>80 marks + 20</b>	<b>60</b>
Four practicals corresponding to 302 (B) (20 marks)		
Six practicals corresponding to 303 (A) (30 marks)		
Six practicals corresponding to 303 (B) (30 marks)		

**Semester II**

	UA + CA	Hours
<b>ZOO 401: Special Paper Entomology – II</b>		
(A) Insect Taxonomy and Morphology - I	40 marks + 10	30
(B) Insect Taxonomy and Morphology - II	40 marks + 10	30
<b>ZOO 401: Special Paper Animal Physiology – II</b>		
(A) Animal Physiology section – I	40 marks + 10	30
(B) Animal Physiology section – II	40 marks + 10	30
<b>ZOO 401: Special Paper Reproductive Physiology – II</b>		
(A) Reproductive Physiology – I	40 marks + 10	30
(B) Reproductive Physiology – II	40 marks + 10	30
ZOO 402: (A) Systematic and evolutionary biology	40 marks + 10	30
(B) Advanced methods in biology	40 marks + 10	30
ZOO 403: (A) Fundamental processes and advanced tool in biology	40 marks + 10	30
(B) Forensic Zoology	40 marks + 10	30
<b>ZOO 404: Practical 401 (A) + 401 (B) + 402(A)</b>	<b>80 marks + 20</b>	<b>60</b>
Six practicals corresponding to 401 (A) (30 marks)		
Six practicals corresponding to 401 (B) (30 marks)		
Four practicals corresponding to 402 (A) (20 marks)		
<b>ZOO 405: Practical 402(B) + 403(A) + 403(B)</b>	<b>80 marks + 20</b>	<b>60</b>
Four practicals corresponding to 402 (B) (20 marks)		
Six practicals corresponding to 403 (A) (30 marks)		
Six practicals corresponding to 403 (B) (30 marks)		

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**

**M. Sc (Part –II) ZOOLOGY**

**Equivalence for old Syllabus 2010**

**Semester – III**

Old Course 2010		New Course 2014	
Paper code	Title of paper	Paper code	Title of paper
ZOO 301	Special paper Entomology-I Animal physiology-I Reproductive physiology-I	ZOO 301	Special Paper Entomology – I (A) Insect Taxonomy and Morphology - I (B) Insect Taxonomy and Morphology – II Special Paper Animal Physiology – I (A) Animal Physiology section – I (B) Animal Physiology section – II Special Paper Reproductive Physiology – I (A) Reproductive Physiology – I (B) Reproductive Physiology – II
ZOO 302	a) Enzymology b) System physiology – Animal	ZOO 302	(A) Freshwater Zoology (B) Skills in scientific communication and writing research report
ZOO 303	a) Applied Biology b) Skill in scientific communication and writing a research report	ZOO 303	(A) Medical physiology / Insect Anatomy (B) Animal Biotechnology
ZOO 304	Practical 301+ 302(a)	ZOO 304	Practical 301 (A) + 301(B) +302(A)
ZOO 305	Practical 302(b) + 303(a) + 303(b)	ZOO 305	Practical 302(B) + 303(A) + 303(B)

**Semester – IV**

Old Course 2010		New Course 2014	
Paper code	Title of paper	Paper code	Title of paper
ZOO 401	Special paper Entomology-II Animal physiology-II Reproductive physiology-II	ZOO 401	Special Paper Entomology – II (A) Insect Taxonomy and Morphology - I (B) Insect Taxonomy and Morphology – II Special Paper Animal Physiology – II (A) Animal Physiology section – I (B) Animal Physiology section – II Special Paper Reproductive Physiology – II (A) Reproductive Physiology – I (B) Reproductive Physiology – II
ZOO 402	a) Systematic and Evolutionary biology b) Animal biotechnology	ZOO 402	(A) Systematic and evolutionary biology (B) Advanced methods in biology
ZOO 403	a) Methods in biology b) Fundamental processes and tools	ZOO 403	(A) Fundamental processes and advanced tool in biology
ZOO 404	Practical 401+ 402(a) + 402(b)	ZOO 404	Practical 401 (A) + 401 (B) + 402(A)
ZOO 405	402(b) + 403(a) + 403(b) + Project	ZOO 405	Practical 402(B) + 403(A) + 403(B)

**SCIENCE FACULTY**

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**



**SYLLABUS**

**FOR**

**T. Y. B. Sc.**

**PHYSICS**

**(With effect from June - 2017)**



# **NORTH MAHARASHTRA UNIVERSITY, JALGAON**

**Class: T. Y. B. Sc.**

**Subject: Physics**

The revised syllabus for T. Y. B. Sc. Physics prepared by different committees was discussed and finalized in the workshop for T. Y. B. Sc. Syllabi revision on 25<sup>th</sup> February 2017. The titles of the papers for T. Y. B. Sc. (Physics) are as given below;

<b>Semester</b>	<b>Title of Course</b>	<b>Periods</b>	<b>Marks</b>	
			<b>Ext.</b>	<b>Int.</b>
<b>V</b>	PHY 351: Mathematical Physics	60	60	40
	PHY-352: Classical Mechanics	60	60	40
	PHY- 353: Atomic and Molecular Physics	60	60	40
	PHY: 354(A): Electronics II or PHY-354(B): Instrumentation II	60	60	40
	PHY 355: Solid State Physics	60	60	40
	PHY 356(A): Technical Electronics- I or PHY 356 (B): Refrigeration and Air conditioning- I or PHY 356(C): Vacuum Technology-I or PHY: 356(D): Microprocessor-I or PHY 356(E): Programming in C+ + - I or PHY 356 (F): Solar Energy-I	60	60	40
	PHY 357: Practical Course-I	60	60	40
	PHY 358: Practical Course-II	60	60	40
	PHY 359: Project work-I	60	60	40

Semester	Title of Course	Periods	Marks	
			Ext.	Int.
VI	PHY 361: Classical Electrodynamics	60	60	40
	PHY 362: Quantum Mechanics	60	60	40
	PHY 363: Nuclear Physics	60	60	40
	PHY: 364: Statistical Mechanics and Thermodynamics	60	60	40
	PHY 365: Elements of Material Science	60	60	40
	PHY 366(A): Technical Electronics- II or PHY 366(B): Refrigeration and Air conditioning- II or PHY 366(C): Vacuum Technology-II or PHY: 366(D): Microprocessor-II or PHY 366(E): Programming in C+ + - II or PHY 366 (F): Solar Energy- II	60	60	40
	PHY 367: Practical Course – III	60	60	40
	PHY 368: Practical Course – IV	60	60	40
	PHY 369: Project work- II	60	60	40

Number of teaching days /year	180
Number of teaching days /term	90
Number of periods for theory course or practical course/ week	04

Number of teaching periods /term	52
Number of periods /term for test, seminars and tutorials	08
Total number of periods / term for course	<b>52 + 08 = 60</b>

## **PHY- 359: Project – I**

### **ASSESSMENT OF PROJECT- FIRST TERM:**

Student should submit a Progress Report on the work done by him/her during the First Phase of the project i.e. on the topics :

1. Project Selection
2. Literature Search Strategy
3. Literature Review
4. Project Planning.

The student will have to give a seminar on the above topics.

The student must perform his project presentation by PPT on LCD projector.

## **PHY- 369: Project work – II**

### **ASSESSMENT OF PROJECT- SECOND TERM:**

Student should submit a Final Project Report on the work done by him/her during the First and Second Phase of the Project i.e. on the topics :

1. Experimental work.
2. Characterize the samples, if any.
3. Discussion of the results.
4. Conclusions.

The student must perform his project presentation by PPT on LCD projector.

### Equivalent courses:

Semester	Course Title (Old)	Semester	Course Title (New)
V	PHY-351: Mathematical Physics	V	PHY-351: Mathematical Physics
	PHY-352: Classical Mechanics		PHY-352: Classical Mechanics
	PHY-353: Atomic and Molecular Physics		PHY-353: Atomic and Molecular Physics
	PHY-354 (A): Electronics II		PHY-354 (A): Electronics II
	OR		OR
	PHY-354 (B): Instrumentation II		PHY-354 (B): Instrumentation II
	PHY-355: Solid State Physics		PHY-355: Solid State Physics
	PHY-356 (A): Technical Electronics- I		PHY-356 (A): Technical Electronics- I
	OR		OR
	PHY-356 (B): Refrigeration and air conditioning-I		PHY-356 (B): Refrigeration and air conditioning-I
	OR		OR
	PHY-356 (C): Vacuum Technology-I		PHY-356 (C): Vacuum Technology-I
VI	PHY-361: Classical Electrodynamics	VI	PHY-361: Classical Electrodynamics
	PHY-362: Quantum Mechanics		PHY-362: Quantum Mechanics
	PHY-363: Nuclear Physics		PHY-363: Nuclear Physics
	PHY-364: Statistical Mechanics and Thermodynamics		PHY-364: Statistical Mechanics and Thermodynamics
	PHY-365: Elements of Material Science		PHY-365: Elements of Material Science
	PHY-366 (A): Technical Electronics- II		PHY-366 (A): Technical Electronics- II
	OR		OR
	PHY-366 (B): Refrigeration and air conditioning-II		PHY-366 (B): Refrigeration and air conditioning-II
	OR		OR
	PHY-366 (C): Vacuum Technology-II		PHY-366 (C): Vacuum Technology-II
	OR		OR
	PHY-366 (D): Microprocessor- II		PHY-366 (D): Microprocessor- II
V and VI	PHY-307: Practical Course-I	V	PHY- 357: Practical Course-I
		VI	PHY- 367: Practical Course-III
V and VI	PHY-308: Practical Course-II	V	PHY- 358: Practical Course-II
		VI	PHY- 368: Practical Course-IV
V and VI	PHY-309: Project	V	PHY-359: Project work-I
		VI	PHY-369: Project work-II

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**



'A' Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)

## **SYLLABUS**

**FOR**

**M.Sc. Part II**

**PHYSICS**

**(With effect from July - 2018)**

## M.Sc.II.(Physics)Structure

The revised syllabus for M. Sc. (II) Physics prepared by different committees was discussed and finalized in the workshop for M. Sc. (II) Syllabi revision on 16<sup>th</sup> July 2018. The titles of the papers for M. Sc. (II) Physics are as given below:

<b>SEM III</b>	PHY 301	Atomic and Molecular Physics
	PHY 302	Any ONE of the following
	PHY 302 (A)	Materials Synthesis Methods
	PHY 302 (B)	Microprocessor and its Applications
	PHY 302 (C)	Communication Electronics
	PHY 303	Any ONE of the following
	PHY 303 (A)	Systematic Materials Analysis
	PHY 303 (B)	Computational Methods and Programming Using 'C' Language
	PHY 303 (C)	Acoustics and Entertainment Physics
	PHY 304	Special Laboratory I
	PHY 305	Project Work-I (Literature Survey, Definition of Problem, Experimental work, Oral etc.)
<b>SEM IV</b>	PHY 401	Nuclear Physics
	PHY 402	Any ONE of the following
	PHY 402 (A)	Nanomaterials: Synthesis, Properties and Applications
	PHY 402 (B)	LASER and its Applications
	PHY 402 (C)	Astrophysics
	PHY 403	Any ONE of the following
	PHY 403 (A)	Renewable Energy Sources
	PHY 403 (B)	Microwave: Theory and Applications
	PHY 403 (C)	Environmental Physics
	PHY 404	Special Laboratory II
	PHY 405	Project Work-II (Characterization, Analysis of Result, Conclusions, Project Report, Oral etc.)

### M.Sc. Physics Programme:

Number of teaching days /year	180
Number of teaching days /term	90
Number of contact hours for theory course or practical course/ week	04
Number of teaching hours for theory course /term	52
Number of contact hours /term for test, seminars and tutorials	08
Total number of contact hours / term for course	<b>52+08 = 60</b>

## **PHY-405: M. Sc. Project - II**

### **Activities:**

1. To complete the experimental work.
2. To carry out the measurements.
3. To characterize the samples.
4. To obtain the results.
5. To draw the conclusions.
6. To write the project report.
7. To appear for Internal examination
8. To appear for External examination

### **Project Report:**

1. Students have to write a 'project report'.
2. A report should be a concise account of project work containing full descriptions of the aims, method and outcomes.
3. Length of report should not normally exceed 40 pages.

### **Assessment Criteria of the project:**

The following criteria are to be used in assessing the project work:

#### **(i) The conduct of project work:**

The following questions are considered in assessing how well students have carried out the project work.

1. How difficult was the project?
2. How well did the student understand the scientific principles behind the project?
3. How well did the student plan the project work?
4. How much effort was put into the project?
5. Was an interim report presented on time?
6. Was the student's project logbooks adequate?
7. How much initiative and/or originality did the student contribute to the project.
8. How well did the student cope with problems that arose during the course of project?
9. Did a project reach a stage of completion where meaningful results were obtained and definite conclusions could be drawn?

#### **(ii) The Project Report:**

1. How well did the report set out the background?
2. How well did the report describe the underlying theme?
3. Was the report a reasonable length?
4. How well was the report structured?
5. How understandable was the written content?
6. How well did the report describe the execution of the project?
7. Did the report have an adequate summary or conclusions?

#### **(iii) Oral Examination:**

1. Did the student adequately describe what he/she had done in their project?
2. Did the student have a clear interpretation of his/her results?
3. What was the clarity and overall standard of the presentation?
4. How well was the talk/presentation structured?
5. Did the student cover all the relevant material in a reasonable time?





॥ अंतरी पेटवू ज्ञानज्योत ॥

कवयित्री बहिणाबाई चौधरी उत्तर महाराष्ट्र विद्यापीठ, जळगाव

Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon

अभ्यास मंडळ विभाग

जा.क्र. : उमवि/२१/Environmental Studies/५२७/२०१८

दिनांक:- २२/११/२०१८

प्रति,

क.ब.चौ.उमविशी संलग्न सर्व महाविद्यालयांचे मा.प्राचार्य  
व मान्यता प्राप्त परिसंस्थांचे मा. संचालक आणि  
मा.विभाग प्रमुख विद्यापीठ शैक्षणिक प्रशाळा / विभाग यांना...

**विषय :-** Environmental Studies या विषयाचे अभ्यासक्रमा संदर्भात.

महोदय / महोदया,

उपरोक्त विषयांस अनुसरून आपणांस कळविण्यात येते की, मा.सर्वोच्च न्यायालयाचे निर्णयानुसार पर्यावरण संतुलन राखण्यासाठी प्रथम वर्षास प्रवेशित विद्यार्थ्यांसाठी सहा महिन्यांचा पर्यावरणशास्त्र विषयाचा अभ्यासक्रम जून, २००४ पासून सर्व विद्याशाखांमध्ये समाविष्ट करण्यात आलेला आहे.

शैक्षणिक वर्ष २०१८-१९ पासून प्रथम वर्ष कला विज्ञान व वाणिज्य वर्गांना Choice Based Credit System लागू करण्यात आलेली असल्याने Environmental Studies या विषयाचा अभ्यासक्रम Ability Enhancement Course अंतर्गत Choice Based Credit System प्रमाणे तयार करणेसाठी नियुक्त समितीच्या सभेत Environmental Studies विषयाच्या गुणांची विभागणी (Marks Pattern) देखील ६०:४० प्रमाणे करण्यात यावी, व गुणांकन (Marks Pattern) पुढील प्रमाणे करण्यात यावे, असे ठरले आहे.

लेखी परीक्षा (Theory)	६० गुण
अंतर्गत (Internal) परीक्षा फिल्ड वर्क / व्हायवा	४० गुण
एकूण	१०० गुण

अंतर्गत ४० गुणांची विभागणी पुढील प्रमाणे करण्यात यावी.

उपस्थिती (Attendance)	०५ गुण
वर्तणूक (Behaviour)	०५ गुण
व्हायवा (Viva-voce)	१० गुण
फिल्ड वर्क (Report of field Work)	२० गुण
	४० गुण

त्याअनुषंगाने Environmental Studies या विषयाचा अभ्यासक्रम विद्यापीठ अनुदान आयोगाने दिलेला असून तो जसाचे तसा लागू करण्यात आलेला असल्याने अभ्यासक्रमात बदल न करता अभ्यासक्रम तोच ठेवण्यात आला आहे. सदरचा अभ्यासक्रम उमविच्या संकेत स्थळावर अपलोड करण्यात आला आहे. तरी वरील आशय सर्व संबंधित प्राध्यापक व विद्यार्थी यांचे निदर्शनास आणून देवून पुढील योग्य ती कार्यवाही करून विद्यापीठास सहकार्य करावे, ही विनंती.

म.कळावे,

आपला विश्वासू,

  
(ए.सी.ममोर)

उपकुलसचिव

अभ्यास मंडळ विभाग

**Six Months Module Syllabus  
for  
Environmental Studies  
for  
Under Graduate Courses**



**UNIVERSITY GRANTS COMMISSION**

**BAHADURSHAH ZAFAR MARG**

**NEW DELHI- 110 002**

**2003**

- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

(6 lectures)

#### **Unit 8 : Field work**

- Visit to a local area to document environmental assets-  
river/forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5  
lecture hours)



# **North Maharashtra University, Jalgaon**

## **Syllabus for M.Sc. (Computer Science) [Affiliated Colleges]**

### **Faculty of Science and Technology**

**With Effect from Academic Year 2017-18**

**Degree Name: Master in Science (Computer Science)**  
**[M. Sc. (Computer Science)]**

**Duration: 02 years' Full Time course (Semester Pattern, 04 semesters)**

**Examination Pattern:**

**60% (External Assessment) +40% (Internal Assessment) with separate head of passing for each assessment**

**Evaluation Mode: CGPA**

**Lecture: Clock hour (60 minutes)**

**North Maharashtra University, Jalgaon**  
**Syllabus for M.Sc. (Computer Science)– 2017**

**SEM – I**

CS-101	Advanced C++ Programming
CS-102	Automata Theory and Computability
CS-103	Advanced Operating System
CS-104	Digital Image Processing
CS-105- LAB - I	Lab on Advanced OS and Digital Image Processing
CS -106-LAB - II	Lab on Advanced C++ Programming

**SEM – II**

CS-201	Advanced DBMS
CS-202	Machine Intelligence
CS-203	Compiler Construction
CS-204	Design and Analysis of Algorithms
CS-205- LAB - III	Lab on DAA and MI
CS -206-LAB - IV	Lab on Advanced DBMS

**SEM –III**

CS-301	Software Engineering
CS-302	Optimization of Algorithm
CS-303	Advanced Java Programming
CS-304	Windows, WCF and WPF Programming
CS-305-LAB – V	Lab on Windows, WCF and WPF Programming
CS -306-LAB – VI	Lab on Advanced Java Programming

**SEM – IV**

CS-401	Natural Language Processing
CS-402	Advanced Network Programming
CS-403	Data Warehousing and Data Mining
CS-404- LAB – VII	Lab on Network programming and Data Mining
CS -405	Mini Project (200 marks)

### **CS-405-Mini Project**

#### **Mini project Guidelines**

1. Project will be of 200 marks.
2. One project per student
3. Project title must be unique.
4. Duration of project completion will be full semester.
5. Project should be completed under the guidance of allocated guide by HOD.
6. All project work should be completed in the college laboratory under the supervision of guide.
7. For project report the specifications are – Font size 12, Name – Times New Roman, Spacing 1.5 with header and footer.
8. Project report should be with spiral binding having maximum 90-100 pages only.
9. Project report should be submitted with two hard copies.
10. Evaluation of project will be done as per university rules.



**NORTH MAHARASHTRA UNIVERSITY, JALGAON M. Sc. (Part-II) ZOOLOGY**  
**New Syllabus with effect from 2018-2019**  
**Pattern 60-40**

**Semester III**

<b>Paper Code</b>	<b>Paper</b>	<b>UA + CA</b>	<b>Hours</b>
ZOO 301	(A) Entomology – I	60 marks + 40	60
	<b>OR</b>		
	(B) Animal Physiology – I	60 marks + 40	60
	<b>OR</b>		
	(C) Reproductive Physiology – I	60 marks + 40	60
	<b>OR</b>		
	(D) Helminthology – I	60 marks + 40	60
ZOO 302	Immunology and Molecular Biology	60 marks + 40	60
ZOO 303	Genetics	60 marks + 40	60
ZOO 304	ZOO 304: Practical 301 + 302	60 marks + 40	60
ZOO 305	ZOO 305: Practical 302 + 303	60 marks + 40	60

**Semester IV**

<b>Paper Code</b>	<b>Paper</b>	<b>UA + CA</b>	<b>Hours</b>
ZOO 401	(A) Entomology – II	60 marks + 40	60
	<b>OR</b>		
	(B) Animal Physiology – II	60 marks + 40	60
	<b>OR</b>		
	(C) Reproductive Physiology – II	60 marks + 40	60
	<b>OR</b>		
	(D) Helminthology – II	60 marks + 40	60
ZOO 402	Systematic and evolutionary biology	60 marks + 40	60
ZOO 403	Skill in Communication and Writing research Paper	60 marks + 40	60
ZOO 404	ZOO 304: Practical 401 + 402	60 marks + 40	60
ZOO 405	ZOO 305: Practical 402 + 403	60 marks + 40	60
<b>ZOO 406</b>	<b>Project Work</b>	60 marks + 40	60



**NORTH MAHARASHTRA UNIVERSITY,**

**‘A’ GRADE NAAC RE – ACCREDITED ( 3<sup>rd</sup> CYCLE )**

**JALGAON – 425001, MAHARASHTRA (INDIA)**



**SYLLABUS OF M. Sc. BOTANY**

**THEORY AND PRACTICAL COURSES**

**M. Sc. – II**

**(w. e. f. Academic Year 2018 - 19)**

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**  
**PROPOSED THEORY AND PRACTICAL COURSE FOR**  
**M.SC. BOTANY SCHEME & COURSES**

**M.SC. PART - II**

(w. e. f. Academic. Year 2018 - 19)

**SEMESTER - III**

- BOT. - 301 : Gymnosperm and Palaeobotany**  
**BOT. - 302 : Plant Biotechnology and Bioinformatics**  
**BOT. - 331 : Algae special paper - I**  
**BOT. - 332 : Mycology and Plant Pathology Special paper - I**  
**BOT. - 333 : Genetics and Plant breeding Special paper - I**  
**BOT. - 334 : Angiosperm Taxonomy Special paper - I**  
**BOT. - 304 : Practical - I ( Based on Bot. - 301 & 302 )**  
**BOT. - 305 : Practical - II ( Based on Bot. - 331 / 332 / 333/ 334 )**

**SEMESTER - IV**

- BOT. - 401 : Developmental Botany**  
**BOT. - 421 : Algae special paper - II**  
**BOT. - 422 : Mycology and Plant Pathology Special paper - II**  
**BOT. - 423 : Genetics and Plant breeding Special paper - II**  
**BOT. - 424 : Angiosperm Taxonomy Special paper - II**  
**BOT. - 431 : Algae special paper - III**  
**BOT. - 432 : Mycology and Plant Pathology Special paper - III**  
**BOT. - 433 : Genetics and Plant breeding Special paper - III**  
**BOT. - 434 : Angiosperm Taxonomy Special paper - III**  
**BOT. - 404 : Practical – I ( Based on Bot. – 401 )**  
**BOT. - 405 : Practical – II ( Based on Bot. – 421 & 431 /Bot. – 422 & 432 / Bot. 423 &433/ Bot. – 424 &434 )**

**BOT. - 406 : Project work.**

**Note:**

1. Botanical excursions are compulsory for practical courses of each semester.
2. Each theory course consists of total 60 lectures of 60 min. each.
3. Each theory course requires 5 lectures and 1 tutorial per week.
4. Each practical course requires 02 practical per week & each practical requires 4 hours duration. (24 Practical).
5. Practical Bot- 304, Bot- 305, Bot – 404, Bot – 405. Total practical 24 = practical to be taken 20 + 4 practical converted in to project work
6. Duly certified practical journals and tour reports are necessary for appearing all practical examinations.

**Kavayitri Bahinabai Chaudhari  
North Maharashtra University, Jalgaon**

**Syllabus**

**M. Sc. II (Semester III and IV)**

**Microbiology**

**(Affiliated Colleges)**

**June 2019 -2020**

**Instructions:**

- Each theory and practical course has to complete in 50 lectures, respectively of 60 min duration,
- Each theory and practical course will be of 100 marks comprising of 40 marks internal (20 marks of 2 internal examinations) and 60 marks external examination.
- Theory examination (60 marks) will be of three hours duration for each theory course. There shall be 5 questions each carrying equal marks (12 marks each). The pattern of question papers shall be:
  - Question 1 (12 marks): 6 sub-questions, each of 3 marks; answerable in brief and based on entire syllabus, attempt any 4 out of 6 questions.
  - Question 2, 3 and 4 (12 marks each): based from Unit I & II, III & IV, V & any Unit I to IV, respectively, each question has 3 sub-questions of 6 marks each and answer only 2 sub-questions from each Q2, Q3, and Q4.
  - Question 5 (12 marks): answer only 3 out of 5 in brief, based from all 5 units, Each 4 marks.
- **Internal examination** (40 marks each semester): Internal assessment of the student by respective teacher will be comprehensive and continuous, based on written test. The written test shall comprise of both objective and subjective type questions.
- **Practical Examination:** Practical examination shall be conducted by the respective college at the end of the semester. Practical examination will be of minimum 5 – 6 hours duration and shall be conducted as per schedule (10 am to 5 pm on schedule date or can be scheduled 10 am -1pm/ 2 – 5 pm for 2 consecutive days) in case of microbiology practicals where incubation condition, allied aspect are essential. There shall be 5 marks for laboratory log book and well written journal, 10 marks for viva voce and minimum three experiments (major and minor). Certified journal is compulsory to appear for practical examination. There shall be one expert and two examiners (external and internal) per batch for the practical examination
- Equivalence for M.Sc. (Microbiology) is given below:

<b>Old Syllabus (w. e f. AY 2016-2017)</b> Semester III (Pattern 60:40)	<b>New Syllabus (w. e. f. AY 2019 -20)</b> Semester III (Pattern 60:40)
MB-301 Applied and Environmental Microbiology	MB-301 Applied and Environmental Microbiology
MB-302 Molecular Biology and Bioinformatics	MB-302 Molecular Biology and Bioinformatics
MB-303 Pharmaceutical Microbiology	MB-303 Pharmaceutical Microbiology
MB-304 Methods in Biostatistics and Bioinformatics	MB-304 Methods in Biostatistics and Bioinformatics
MB-305 Methods in Applied Microbiology	MB-305 Methods in Applied Microbiology
<b>Semester IV (Pattern 60:40)</b>	<b>Semester IV (Pattern 60:40)</b>
MB-401 Fermentation Technology	MB-401 Fermentation Technology
MB-402 Applied Molecular Biology	MB-402 Applied Molecular Biology
MB-403 Agricultural Microbiology	MB-403 Agricultural Microbiology
MB-404 Methods in Biotechnology	MB-404 Methods in Biotechnology
MB-405 Laboratory course (Project Dissertation)	MB-405 Laboratory course (Project Dissertation)

**Suggested readings:**

- Aneja KR (2007). Experiments in microbiology, plant pathology and biotechnology. New Age International, New Delhi
- Benson HJ (2002). Microbiological applications; a laboratory manual in general microbiology, 8th Edition, McGraw Hill, New York
- Cappuccino J and Sherman NC (1992) Microbiology-A Laboratory Manual, The Benjamin- Cummings Publ. Co., Inc., New York.
- Davis LG, Dibner MD and Battey JF (1986) Basic Methods in Molecular Biology, Appleton and Lange, Norwalk (ISBN: 0-8385-0582-1).
- Hewitt W (1977) Microbiological Assay, Academic Press, New York.
- Janarthanan S and Vincent S (2007) Practical Biotechnology, Universities Press (India) Pvt. Ltd., Hyderabad (ISBN: 13-978-81-7371-582-2).
- Kalaichelvan PT (2006) Microbiology and Biotechnology: A Laboratory Manual, MJP Publ., Chennai (ISBN: 81-8094-008-X).
- Mudili J (2007) Introductory Practical Microbiology, Narosa Publ. House Pvt. Ltd., New Delhi (ISBN: 978-81-7319-744-4).
- Primrose SB and Wardlaw, AC (1982) Source Book for Experiments for the Teaching of Microbiology, Academic Press, London (ISBN: 0-12-565680-7).
- Sambrook and Russell Molecular Cloning Vol I, II and III, CSHL Press, USA.
- Sawhney SK and Singh R (2001) Introductory Practical Biochemistry, Narosa Publ. House, Chennai.
- Schmauder HP Schweizer M and Schewizer LM (2003) Methods in Biotechnology, Taylor and Francis Ltd., London (ISBN: 0-7484-0430-9).
- Tablot N (2005) Molecular and Cellular Biology of Filamentous Fungi, Practical Approach, Indian Edn., Oxford University Press, New Delhi (ISBN: 0-19-567943-1).
- White D (2000) The Physiology and Biochemistry of Prokaryotes, Oxford University Press, Oxford.

**MB-405: Laboratory course (Project Dissertation)**

The project is allotted during the Forth semester. The students will get an opportunity to become a part of ongoing research activities in the respective College. The student will explore and gain experience in different sectors of biotechnology viz agriculture, food, medicine and pharmaceutical. The students will acquire skill to write, compile and analyze data, and present the detailed technical/scientific report. At the end of successful project semester training, potentially the students become employable in the industries/organizations.

It is expected that the students will design experiments and collect experimental data to deduce conclusions. At the end, they will submit a detailed thesis for evaluation. The students should be introduced to research methodology in the beginning through few lectures.

The approach towards the execution of project should be as follows:

1. Selection of topic relevant to priority areas of biotechnology.
2. Collection of literature on the topic of research from libraries, internet, on-line journals, Planning of research experiments
3. Performing the experiments with scientific and statistical acceptability.
4. Presentation of observations and results.
5. Interpretation of results and drawing important conclusions.
6. Discussion of obtained results with respect to literature reports.
7. Writing monthly progress report

<p>8. Preparation of report (Dissertation) containing introduction, materials and methods, results and discussion, conclusions, bibliography and submission of at least 3 copies (1 copy retained in the department and after examination submitted to Library, 1 copy submitted to the guide and 1 copy kept with the candidate).</p> <p>9. Presentation of research data during university examination and submission of project dissertation in a bound form.</p>
<p>1. <b>Internal examination</b> (40 marks): Components of continuous internal assessment Submission of monthly progress report and signed by supervisor (at least 4 reports) (2 marks per report = 8 marks), Literature collected, experiment planning and design (10 marks), Experiments conducted (10 marks), outcome of the experiments and viva (8 marks) and regular attendance (4 marks) recorded: Research Supervisor</p> <p>2. <b>External examination</b> (60 marks) and Components of external assessment: Subject matter (5 marks), Review of literature (10 marks), Writing of dissertation submitted in bound form at the time of examination (Title page, Certificate, Plagiarism report, Main content: Abstract, Introduction, Literature, Materials and methods, results and discussion and conclusion with relevant references) (15 marks), Presentation structure (PPT format) (8 marks), Overall presentation reflecting contribution of work (4 marks), Response to questions (15 marks).</p>
<p><b>Suggested readings: Refer to the journals, reference books, abstracts etc. related to topic</b></p>

## Epilogue

### Skills imparted:

The curriculum is designed to instill basic and applied knowledge of the subject to the students. One of the major objectives considered during designing is to make technically educated human resource. Basic microbiology, molecular biology, microbial physiology may help to find out unseen facts in various environmental, agriculture, food and pharmaceutical sectors. The subjects like genetic engineering, applied microbiology, microbial biochemistry, pharmaceutical microbiology, fermentation technology and biochemical techniques are designed to impart theoretical and practical knowledge of modern scientific advances in the field. Further to enhance skillful human resource with precision, the course like biostatistics and bioinformatics are included. The subject like Microbial biotechnology would give not only the practical knowledge of industry and industrial processes but also make aware the students with the global environmental problems like pollutions, contamination and bioremediation. Practical courses are based on theory courses and are designed to improve research oriented skills of students.

### Job opportunity:

The designed curriculum offers job opportunities in various sectors like,

- Pharmaceutical industry : Clinical, medicine, vaccine, QC division
- Biotech industry: Recombinant product, QC, QA
- Agrochemical and pesticide industry
- Chemical industry: synthesis, testing
- Environmental protection industry and Agencies
- Research leading to Ph. D. degree
- Self entrepreneurship

**FACULTY OF SCIENCE & TECHNOLOGY**  
**KAVAYITRI BAHINABAI CHAUDHARI NORTH**  
**MAHARASHTRA UNIVERSITY, JALGAON**



**‘A’ Grade**  
**NAAC Re-Accredited**  
**(3rd Cycle)**

**SYLLABUS**  
**FOR**  
**T. Y. B. Sc. (PHYSICS)**

**(AS PER CHOICE BASED CREDIT SYSTEM PATTERN OF UGC)**

**(With effect from June - 2020)**

**BOS (PHYSICS)-Faculty of Science & Technology**  
**Kavayitri Bahinabai Chaudhari**  
**North Maharashtra University, Jalgaon**

Class: T. Y. B. Sc. Subject: Physics  
Choice Base Credit System (With effect from June 2020)

The Board of Studies in Physics has unanimously accepted the revised syllabus (as per CBCS pattern) prepared by different committees, discussed and finalized in the **Online Workshop on Curriculum Development in Physics at T.Y.B.Sc.** held on 15<sup>th</sup> and 16<sup>th</sup> May 2020.

The titles of the papers for T.Y.B.Sc. (Physics) are as given below:

Sem	Course type	Course code	Course title	Credits	Total hrs /week	Total teaching periods	Total marks	
							CA	UA
V	Discipline specific Course (DSC)	PHY 501	Mathematical Physics	3	3	45	40	60
		PHY502	Solid State Physics	3	3	45	40	60
		PHY 503	Atomic and molecular physics	3	3	45	30	60
		PHY 504(A) Or PHY 504(B)	Electronics-II Or Instrumentation -II	3	3	45	40	60
	Skill Enhancement course (SEC)	PHY 505	Solar Energy and applications	3	3	45	40	60
	DSE Elective course (Any one)	PHY 506(A) PHY 506(B)  PHY 506(C) PHY 506(D) PHY 506 (E)	Technical Electronics- I or Refrigeration and Air conditioning- I or Vacuum Technology-I or Microprocessor-I or Programming in C++ I	3	3	45	40	60
	DSC CORE Practicals	PHY 507	Physics Practical I	4	4 (per batch)	60	40	60
		PHY 508	Physics Practical II	4	4 (per batch)	60	40	60
		PHY 509	Physics Practical III or Project	4	4 (per batch)	60	40	60
	Non credit audit course (Any one)	AC 501(A)	NCC	No credit	2	30	100	
		AC 501(B)	NSS					
		AC 501 (C)	Sports					
			<b>Total credit</b>	<b>30</b>				



Sem	Course type	Course code	Course title	Credits	Total hrs /week	Total teaching periods	Total marks	
							CA	UA
VI	Discipline specific Course (DSC)	PHY 601	Quantum mechanics	3	3	45	40	60
		PHY602	Material Science	3	3	45	40	60
		PHY 603	Nuclear Physics	3	3	45	30	60
		PHY 604	Modern Physics	3	3	45	40	60
	Skill Enhancement course (SEC)	PHY 605	Basic Instrumentation Skills	3	3	45	40	60
	DSE Elective course (Any one)	PHY 606 (A) PHY 606 (B) PHY 606 (C) PHY 606 (D) PHY 606 (E)	Technical Electronics- I or Refrigeration and Air conditioning- II or Vacuum Technology-II or Microprocessor-I or Programming in C++ II	3	3	45	40	60
		PHY 607	Physics Practical I	4	4 (per batch)	60	40	60
		PHY 608	Physics Practical II	4	4 (per batch)	60	40	60
		PHY 609	Physics Practical III or Project	4	4 (per batch)	60	40	60
	DSC CORE Practicals							
	Non credit audit course (Any one)	AC 601(A)	Soft skill	No credit	2	30	10	0
		AC 601(B)	Yoga					
		AC 601(C)	Practicing Cleanliness					
			Total credit	30				

**Note: The industrial/study tour is compulsory for students of T. Y. B. Sc. (Physics).**

**Semester V: (LAB): Physics paper VII**  
**PHY 509: Project -I**  
**(Credits: 04) :( 60 Marks)**

**ASSESSMENT OF PROJECT- FIRST TERM:**

Student should submit a Progress Report on the work done by him/her during the First Phase of the project i.e. on the topics :

1. Project Selection
2. Literature Search Strategy
3. Literature Review
4. Project Planning.
5. Experimental work (30 to 40 %)

**Instructions:**

1. The topic of project of the first term must be continued in the second term.
2. The project report of first term should be maintained and should be produced to examiner of second term.
3. The student will have to give a seminar on the project topic in the practical exam.
4. The student must perform his project presentation by PPT on LCD projector.

**Semester VI: (LAB): Physics paper VIII**  
**PHY 609: Project II**  
**(Credits: 04) :( 60 Marks)**

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**ASSESSMENT OF PROJECT- SECOND TERM:**

Student should submit a Final Project Report on the work done by him/her during the First and Second Phase of the Project i.e. on the topics:

1. Experimental work. (remaining further work in continuation with the work in the first term)
2. Characterize the samples, if any.
3. Discussion of the results.
4. Conclusions.

**Instructions:**

1. The topic of project of the first term must be continued in the second term.
2. The project report of first term should be maintained and should be produced to examiner of second term.
3. The student will have to give a seminar on the project topic in the practical exam.
4. The student must perform his project presentation by PPT on LCD projector.



**NORTH MAHARASHTRA UNIVERSITY, JALGAON**

**SYLLABUS FOR  
MASTER OF SCIENCE**

**In  
ORGANIC CHEMISTRY**

**PART- II**

**(Semester III and IV)**

**w. e. f. June 2015**

# **NORTH MAHARASHTRA UNIVERSITY, JALGAON**

## **Syllabus for M.Sc. Part-II Organic Chemistry**

(Semester - III & IV)

(With Effect from June 2015)

### **Course Structure for Second Year**

The following will be the structure for revised syllabus from June 2015 for semester III and semester IV

#### **SEMESTER - III**

Sub. Code: Title

CH-350: Organic Reaction Mechanism

CH-351: Spectroscopic Methods in Structure Determination

CH-352: Organic Stereochemistry

CH-353: Free radical, photochemistry, pericyclic reaction and their applications

#### **SEMESTER - IV**

Sub. Code: Title

CH-450: Chemistry of Natural Products

CH-451: Synthetic Methods in Organic Chemistry

CH-452: Heterocyclic chemistry, chiron approach, chiral drugs and medicinal chemistry

### **Practical courses:**

Sub. Code: Title

CH -O-2: Ternary mixture separation (Annual)

CH -O-3: Three stage preparations (Annual)

CH -O-4: Short Research Project (Annual)

### **Course Code: CH-O-3**

#### **Three stage preparations (Starting with 5g or less.) Monitored by TLC**

1. Preparation of Benzanilide by Beckmann rearrangement.
2. Preparation of Anthranilic acid.
3. Preparation of Phthalimide.
4. Preparation of p-aminobenzoic acid.
5. Preparation of N-Bromosuccinamide.
6. Preparation of p-chloronitrobenzene by Sandmeyer reaction.
7. Preparation of p-iodonitrobenzene by Sandmeyer reaction.
8. Pinacol-pinacolone rearrangement.
9. Preparation of Acetophenone by Fries rearrangement.
10. Preparation of aromatic aldehydes by Vilsmeier-Hack reaction or Reimer-Tiemann.
11. Wittig reaction.

### **CH -O-4: Short Research Project**

Literature survey, studies of reactions, synthesis, mechanism, isolation of natural products, standardization of reaction conditions, new methods etc.

**SCIENCE FACULTY**

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**



**SYLLABUS**

**FOR**

**T. Y. B. Sc.**

**Zoology**

**(With effect from June - 2017)**

**North Maharashtra University, Jalgaon**  
**T.Y.B.Sc. (Zoology) Syllabus structure w.e.f. June 2017**

Semester	Paper	Course code	Course Title	Period	Marks	
					UA	CA
<b>VI</b>	<b>I</b>	Zoo 361	Chordates III	60	60	40
	<b>II</b>	Zoo 362	General Embryology	60	60	40
	<b>III</b>	Zoo 363	Mammalian Histology and Physiology II	60	60	40
	<b>IV</b>	Zoo 364	Research Methodology	60	60	40
	<b>V</b>	Zoo 365	Microtechnique	60	60	40
	<b>VI</b>	Zoo 366	A) Bioinformatics	60	60	40
			B) Sericulture	60	60	40
			C) Applied Zoology III (Vermiculture, Poultry and Fisheries)	60	60	40
	<b>VII Practical I</b>	Zoo 367	Practicals related to Zoo 361 and Zoo 363	60	60	40
	<b>VIII Practical II</b>	Zoo 368	Practicals related to Zoo 362 and Zoo 365	60	60	40
	<b>IX Practical III</b>	Zoo 369	A) Practical related to Zoo 364 , Zoo 366 and Project work	60	15+ 30+ 15= 60	30+ 10 (Project)



**NORTH MAHARASHTRA UNIVERSITY, JALGAON**  
**PROPOSED SYLLABUS STRUCTURE FOR TYBSc ZOOLOGY**  
**Proposed syllabus strstructure for TYBSc Zoology ; Year of 2017-18 ( Semester V and VI)**

Course code	Name of course	Teaching scheme				Theory (Marks)		Practical (Marks)		Total Marks	Credits
		Teaching Hrs/Week	Tut.Hrs/Week	PR Hrs./Week	Total Hrs/Week	CA	UA	CA	UA		
Zoo-351	Non-chordates III	3	1	0	4	40	60	0	0	100	3
Zoo 352	Cell and Molecular biology	3	1	0	4	40	60	0	0	100	3
Zoo 353	Mammalian Histology and Physiology I	3	1	0	4	40	60	0	0	100	3
Zoo 354	Biochemistry	3	1	0	4	40	60	0	0	100	3
Zoo 355	Systematics, Evolution and Palaeontology	3	1	0	4	40	60	0	0	100	3
Zoo 356	A) Biotechnology	3	1	0	4	40	60	0	0	100	3
	B) Pest management	3	1	0	4	40	60	0	0	100	3
	C) Public health and hygiene	3	1	0	4	40	60	0	0	100	3
Zoo 357	Practicals related to Zoo 351 and Zoo 353	0	0	4	4	0	0	40	60	100	3
Zoo 358	Practicals related to Zoo 352 and Zoo 355	0	0	4	4	0	0	40	60	100	3
Zoo 359	Practicals related to Zoo 354 and Zoo 356	0	0	4	4	0	0	40	60	100	3
Zoo 361	Chordates III	3	1	0	4	40	60	0	0	100	3
Zoo 362	General Embryology	3	1	0	4	40	60	0	0	100	3
Zoo 363	Mammalian Histology and Physiology II	3	1	0	4	40	60	0	0	100	3
Zoo 364	Research Methodology	3	1	0	4	40	60	0	0	100	3
Zoo 365	Microtechnique	3	1	0	4	40	60	0	0	100	3
Zoo 366	A) Bioinformatics	3	1	0	4	40	60	0	0	100	3
	B) Sericulture	3	1	0	4	40	60	0	0	100	3
	C) Applied Zoology III (Vermiculture, Poultry and Fisheries)	3	1	0	4	40	60	0	0	100	3
Zoo 367	Practicals related to Zoo 361 and Zoo 363	0	0	4	4	0	0	40	60	100	3
Zoo 368	Practicals related to Zoo 362 and Zoo 365	0	0	4	4	0	0	40	60	100	3
Zoo 369	A) <b>Practicals related to Zoo 364, Zoo 366 and Project work</b>	0	0	4	4	0	0	40	60	100	3

CA: College Assessment, UA: University Assessment

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**  
**Syllabus Distribution : Hours per Semester**  
**Subject : Zoology**

Class	Course Code	Name of Course	Hours per Week	Total Hrs per semester
FYBSc	ZOO 111	Non chordate I	3	45
	ZOO 112	Cell Biology	3	45
	ZOO 113	Practical related to Zoo 111 and Zoo 112	4	45
	ZOO 121	Chordate I	3	45
	ZOO 122	Applied Zoology I (Goatary and Lac Culture)	3	45
	ZOO 103	Practical related to Zoo 121 and Zoo 122	4	45
SYBSc	ZOO 231	Non chordate II	4	60
	ZOO 232	Medical Zoology	4	60
	ZOO 233	Practical related to Zoo 231 and Zoo 232	4	60
	ZOO 241	Chordate II	4	60
	ZOO 242	Applied Zoology II ( Apiculture)	4	60
	ZOO 243	Practical related to Zoo 241 and Zoo 242	4	60
TYBSc	Zoo 351	Non-chordates III	4	60
	Zoo 352	Cell and Molecular biology	4	60
	Zoo 353	Mammalian Histology and Physiology I	4	60
	Zoo 354	Biochemistry	4	60
	Zoo 355	Systematics, Evolution and Palaeontology	4	60
	Zoo 356	A) Biotechnology	4	60
		B) Pest management	4	60
		C) Public health and hygiene	4	60
	Zoo 357	Practicals related to Zoo 351 and Zoo 353	4	60
	Zoo 358	Practicals related to Zoo 352 and Zoo 355	4	60
	Zoo 359	Practicals related to Zoo 354 and Zoo 356	4	60
	Zoo 361	Chordates III	4	60
	Zoo 362	General Embryology	4	60
	Zoo 363	Mammalian Histology and Physiology II	4	60
	Zoo 364	Research Methodology	4	60
	Zoo 365	Microtechnique	4	60
	Zoo 366	A) Bioinformatics	4	60
		B) Sericulture	4	60
		C) Applied Zoology III (Vermiculture, Poultry and Fisheries)	4	60
	Zoo 367	Practicals related to Zoo 361 and Zoo 363	4	60
	Zoo 368	Practicals related to Zoo 362 and Zoo 365	4	60
	Zoo 369	A) Practical related to Zoo 364, Zoo 366 and Project work	4	60