

**Far Western University  
Mahendranagar, Kanchanpur**



**Subject Combination of B. Sc. Program**

**2074**

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**Mahendranagar, Kanchanpur**  
**Subject Combination of B. Sc. Program**

**Description:**

There will be two disciplines, namely physical and biological group in the four year B.Sc. (Semester) system program of Bachelor degree in Science and Technology. Far-Western University offer subjects like Physics, Mathematics, Chemistry and Environmental Science in Physical group while subjects such as Chemistry, Zoology, Environmental Science and Microbiology are offered in biological group. The total credit hour for B.Sc. will be of 136 for both groups. Course structure for Physical and biological group is given below:

**A. (Physical Group)**

Physical group consist of the following Subjects:

1. *Physics*
2. *Mathematics*
3. *Chemistry*
4. *Environmental Science*

In this group, there may be two subject combination scheme:

S.N.	Subject Combination Scheme	Nature of courses	Total credit Hours
1.	<b>Physics, Chemistry Mathematics (PCM)</b>	<i>Theory +Practical</i>	<i>136</i>
2.	<b>Environmental Science + (PMC, any two)</b>	<i>Theory +Practical</i>	<i>136</i>

**Students interested to select Environmental Science group with physical science combination will have to choose second (S.no.2) combination scheme from above table.**

*In Table, course structure for physical group (including both above mentioned combination scheme) for eight semesters is given below.*

Year	Description	Credit Hour	Total ICH
<b>FIRST SEMESTER</b> (Three – major)	<b>Core Course: Any three Subject from Physical group</b> PHY 111: Physics I ( PHY TH 111, PHY PR 111; <b>Mechanics</b> )	3+1	<b>18</b>
	CHM 111 : Chemistry I ( CHM TH 111, CHM PR 111; <b>Basic Chemistry I</b> )	3+1	
	ENV 111: Environmental Science I ( ENV TH 111, ENV PR 111; <b>Fundamentals Environmental Science</b> )	3+1	
	MTH 111: Mathematics I (Calculus)	3	
	<b>Additional Courses: Compulsory</b> ENG 111 : English I ( <b>English Grammar and Composition</b> )	3	
	COM 111 : Computer I ( <b>Information Technology Fundamentals</b> )	3+1	
<b>SECOND SEMESTER</b>	<b>Core Course: Any three Subject from Physical group</b> PHY 121: Physics II ( PHY TH 121, PHY PR 121; <b>Thermodynamics</b> )	3+1	

<b>(Three – major)</b>	CHM 121 : Chemistry II ( <b>CHM TH 121, CHM PR 121; Basic Chemistry II</b> )	3+1	<b>18</b>
	ENV 121: Environmental Science II( <b>EVN TH 121, EVN PR 121; Environmental Aspects of Meteorology and Hydrology</b> ) MTH 121: Mathematics II ( <b>Calculus of Several Variables</b> )	3 +1 3	
	<b>Additional Courses: Compulsory</b> ENG 121 : English II ( <b>English for Communication</b> ) COM 121 : Computer-II ( <b>Computer Programming</b> )	3 3+1	
<b>Total Credits</b>			<b>36</b>

<b>THIRD SEMESTER</b> <b>(Three – major)</b>	<b>Core Course: Any Four Subject from Physical group</b> PHY 231: Physics III( <b>PHY TH 231, PHY PR 231; Waves &amp; Optics</b> )	3+1	<b>17</b>
	MTH 231: Mathematics III( <b>Real Analysis I</b> ) MTH 232: Mathematics IV ( <b>Ordinary and Linear Algebra</b> ) CHM 231: Chemistry III ( <b>CHM TH 231, CHM PR 231; Basic Chemistry III</b> )	3 3 3+1	
	ENV 231: Environmental Science III ( <b>ENV TH 231, ENV PR 231; Environmental Earth Science and Applications</b> )	3+ 1	
	<b>Additional Courses:</b> STT 231: Statistics ( <b>Statistics and Probability</b> )	3	
<b>FOURTH SEMESTER</b> <b>(Three – major)</b>	<b>Core Course: Any Four Subject from Physical group</b> PHY 241: Physics IV( <b>PHY TH 241, PHY PR 241; Electronics</b> )	3+1	<b>17</b>
	MTH 241: Mathematics V( <b>Real Analysis II</b> ) MTH 242: Mathematics VI( <b>Modern Algebra</b> ) CHM 241 : Chemistry IV ( <b>CHM TH 241, CHM PR 241; Basic Chemistry IV</b> )	3 3 3+1	
	ENV 241: Environmental Science IV( <b>Environmental Pollution and Control Technologies</b> )	3+1	
	<b>Additional Courses: Compulsory</b> BCM 241 : Bio-Chemistry	3	
<b>FIFTH SEMESTER</b> <b>(Three – major)</b>	<b>Core Course: Any Four Subject from Physical group</b> PHY 351: Physics V ( <b>PHY TH 351, PHY PR 351; Electricity &amp; magnetism</b> )	3+1	<b>17</b>
	MTH 351: Mathematics VII ( <b>Geometry</b> ) MTH 352: Mathematics VIII( <b>Vector Analysis</b> ) CHM 351 : Chemistry V( <b>CHM TH 351, CHM PR 351; Basic Chemistry V</b> )	3 3 3+1	
	ENV 351: Environmental Science V ( <b>ENV TH 351, ENV PR 351; Urban Environment</b> )	3+1	
	<b>Additional Courses: Compulsory</b> ESS351 : Earth and Space Science	3	
<b>Total Credits</b>			<b>51</b>

<b>SIXTH SEMESTER (Two – major)</b>	<b>Core Course: Four Subjects (two from each discipline )</b> PHY 361: Physics VI( <b>PHY TH 361, PHY PR 361; Atomic, Nuclear &amp; Particle Physics</b> ) PHY 362 : Physics VII ( <b>Relativity</b> ) CHM 361 :Chemistry VI ( <b>CHM TH 361, CHM PR 361</b> ) CHM 362 :Chemistry VII ENV 361: Environmental Science VI( <b>ENV TH 361, ENV PR 361;Environmental Engineering</b> ) ENV 362 : Environmental Science VII( <b>Energy and Environment</b> ) MTH 361: Mathematics IX ( <b>Differential Equations</b> ) MTH 362 : Mathematics X ( <b>Mechanics</b> )	3+1 3 3 + 1 3 3+1 3 4 3	<b>17</b>
	<b>Additional Courses: Compulsory</b> RSM 361 : Research Methodology I	3	
	<b>Core Course: Any two Subjects from one discipline.</b> PHY 471 : Physics VIII ( <b>Math Physics</b> )	4	
<b>SEVENTH SEMESTER (One - major)</b>	PHY 472 : Physics IX ( <b>Classical Physics</b> ) PHY 473 : Physics X ( <b>Physics LAB</b> ) MTH 471: Mathematics X ( <b>Mathematical Analysis I</b> ) MTH 472 : Mathematics XI ( <b>Advance Algebra I Course not available</b> ) MTH 473 : Mathematics XII ( <b>Advance Calculus</b> )	4 2 4 3 3	<b>15</b>
	CHM 471 : Chemistry VIII CHM 472 : Chemistry IX CHM473 : Chemistry X(Chemistry LAB) ENV 471 : Environmental Science VIII( <b>Remote Sensing and Geographic Information System</b> ) ENV 472 : Environmental Science IX( <b>Environmental Modeling</b> ) ENV 473 A: Environmental Science ( <b>Field work based Case Studies</b> ) ENV 473 B: Environmental Science ( <b>Internship</b> )	4 4 2 4 4 1 1	
	<b>Applied Science Courses: Leading to core subject any one from subject pool</b> PHY 474 : Physics XI ( <b>Astronomy</b> ) PHY 475 : Physics XI ( <b>Material Science</b> ) PHY 476 : Physics XI ( <b>Biophysics</b> ) CHM 474 : Chemistry XI ( <b>Applied Chemistry</b> ) CHM 475 : Chemistry XI ( <b>Analytical Chemistry</b> ) CHM 476 : Chemistry XI ( <b>Natural Product Chemistry</b> ) ENV 474 : Environment Science XI ( <b>Biodiversity Conservation and Management</b> ) ENV 475 : Environment Science XI ( <b>Freshwater Environment</b> ) ENV 476 : Environment Science XI ( <b>Climate Change</b> ) MTH 474 : Mathematics XII ( <b>Applied Mathematics</b> ) MTH 475 : Mathematics XII ( <b>Course not available</b> ) MTH 476 : Mathematics XII ( <b>Course not available</b> )	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
	<b>Additional course : Compulsory Courses: Theory and Presentation</b>	3	

	RSM 471: Research Methodology II SEM 471: Seminar/Term Paper (leading to core course)	1	
<b>EIGHTH SEMESTER (One – major)</b>	<b>Core Course: Any two Subjects from one discipline.</b>		<b>15</b>
	PHY 481: Physics XI( <b>Quantum Mechanics</b> )	4	
	PHY 482 : Physics XII( <b>Solid State Physics</b> )	4	
	PHY 483 : Physics XIII (Physics LAB)	2	
	MTH 481: Mathematics XIII( <b>Mathematical Analysis II</b> )	4	
	MTH 482 : Mathematics XIII ( <b>Advance Algebra II</b> )	3	
	MTH 483: Mathematics XIV( <b>Discrete Mathematics</b> )	3	
	CHM 481 : Chemistry XII	4	
	CHM 482 : Chemistry XIII	4	
	CHM483 Chemistry XIV(LAB)	2	
ENV 481 : Environmental Science XI( <b>Environmental Assessment and Management System</b> )	4		
ENV 482 : Environmental Science XII( <b>Environmental</b>	4		
	<b>Economics</b> )		
	ENV 483 : Environmental Science XIII( <b>Environmental Assessment and Management System (Practical)</b> )	2	
	<b>Interdisciplinary Courses: Leading to core subject, anyone from subject pool</b>		
	PHY 484 : Physics XIII ( <b>Econophysics</b> )	2	
	PHY 485: Physics XIII ( <b>Entrepreneurship</b> )	2	
	PHY 486: Physics XIII ( <b>Applied Physics</b> )	2	
	CHM 484: Chemistry XIII( <b>Nanoscience</b> )	2	
	CHM 485 : Chemistry XIII( <b>Polymer Science</b> )	2	
	CHM 486 : Chemistry XIII( <b>Instrumental Method of Analysis</b> )	2	
	ENV 484: Environmental Science XIII( <b>Ecosystem Services Management</b> )	2	
	ENV 485: Environmental Science XIII( <b>Integrated Water Resource Management</b> )	2	
	ENV 486: Environmental Science XIII( <b>Disaster Risk Management</b> )	2	
	MTH 484: Mathematics XIV ( <b>Linear Programming</b> )	2	
	MTH 485 : Mathematics XIV ( <b>Numerical Analysis</b> )	2	
	MTH 486: Mathematics XIV( <b>Teaching Methods</b> )	2	
	PRW481: Project Work : <b>Research / Presentation</b>	3	
<b>Total Credit Hours</b>			<b>136</b>

*Note: Subject pool in Interdisciplinary Science course can be increased and decreased as per subject.*

### **1. Description for First Five semester for Physical group (Three major)**

The first five semester of Physical group mainly focus on the general theoretical courses as well as general experimental courses. In these semester student will have three major subjects with various subject combination. The subject combination scheme is mentioned in first table as given above. Student will have to take some additional courses, which are compulsory. From third Semester students of Physical Group will have an additional course for Mathematics with Total credits of 3.

### **2. Description for Sixth semester for Physical group (Two major)**

The sixth semester will be of two major subjects with total credits of **17 CH**. In this semester student will mainly focus on advanced, applied and research oriented courses leading to two major system. In this semester students will have various combination from which, students have to choose any one combination. Combinations which are offered in Far-western University in Physical

group of B.Sc. sixth semester are as follows:

(Choose any one combination from the following six)

1. **Physics and Chemistry**
2. **Physics and Mathematics**
3. **Chemistry and Mathematics**
4. **Physics and Environment Science**
5. **Mathematics and Environment Science**

### 3. **Chemistry and Environment Science**

Description for Seventh and Eighth semester for Physical group (One major)

From Seventh semester student will choose any one subject (either Physics or Mathematics or Chemistry or Environmental Science) as a major subject from their combination of sixth semester. In eighth semester, there will be four subjects (2 core+ 1 applied +1 compulsory) in Physical group with compulsory subject of Research Methodology. In seventh semester student will have to develop a research based paper (Term Paper) which will carry out 1 credit. While in Eighth semester student will have to carry out project work of 3 credits. Interdisciplinary course will be offered in final semester.

## B. **(Biological Science Group)**

Far western University offers following subjects for Biological group.

1. **Chemistry**
2. **Zoology**
3. **Environmental Science**
4. **Microbiology**

In this group, there may be two (subject) combination scheme:

S.N.	Subject Combination Scheme	Nature of courses	Total credit Hours
1.	<b><i>Environmental Science, Chemistry, Zoology (ECZ)</i></b>	<i>Theory +Practical</i>	136
2.	<b><i>Microbiology, Chemistry, Zoology (MCZ)</i></b>	<i>Theory +Practical</i>	136

**Students interested to select Environmental Science group will have to choose first (1) combination scheme from above table, AND, Students interested to select Microbiology group will have to choose second (2) combination scheme from above table**

*In the table below, course structure for biological Science (Environmental Science or Microbiology) group is given.*

Year	Description	Credit Hour	Total CH
<b>FIRST SEMESTER (Three –major)</b>	<b>Core Course: Any three Subject from Biological group</b>		<b>19</b>
	CHM 111 : Chemistry I	3+1	
	ZOO 111: Zoology I	3+1	
	ENV 111: Environmental Science I	3+1	
	MIB 111: Microbiology I	3+1	
	<b>Additional Courses: Compulsory</b>		
	ENG 111 : English I	3	
	COM 111 : Computer I	3+1	

<b>SECOND SEMESTER</b> <b>(Three – major)</b>	<b>Core Course: Any three Subject from Biological group</b> CHM 121 : Chemistry II ZOO 121: Zoology II ENV 121: Environmental Science II MIB 121 : Microbiology II	3+1 3+1 3+1 3+1	<b>19</b>
	<b>Additional Courses: Compulsory</b>		
	ENG 121 : English II COM 121 : Computer II	3 3+1	
<b>THIRD SEMESTER</b> <b>(Three – major)</b>	<b>Core Course: Any Four Subject from Biological group</b> CHM 231 : Chemistry III ZOO 231: Zoology III ENV 231: Environmental Science III MIB 231: Microbiology III	3+1 3+1 3+1 3+ 1	<b>18</b>
	<b>Additional Courses:</b> NRM 231: Natural Resource Management STT 231 : Statistics	3 3	
<b>FOURTH SEMESTER</b> <b>(Three – major)</b>	<b>Core Course: Any three Subject from Biological group</b> CHM 241 : Chemistry IV ZOO241: Zoology IV ENV 241: Environmental Science IV MIB 241: Microbiology IV	3+1 3+1 3+1 3+1	<b>15</b>
	<b>Additional Courses: Compulsory</b> WMN 241 : Waste Management	3	
<b>FIFTH SEMESTER</b> <b>(Three – major)</b>	<b>Core Course: Any three Subject from Biological group</b> CHM 351: Chemistry V ZOO 351: Zoology V ENV 351: Environmental Science V MIB 351: Microbiology V	3+1 3+1 3+1 3+1	<b>15</b>
	<b>Additional Courses: Compulsory</b> SSD351 : Sustainable Development	3	
<b>SIXTH SEMESTER</b> <b>(Two – major)</b>	<b>Core Course: Four Subjects (two from each discipline )</b> CHM 361: Chemistry VI CHM 362 : Chemistry VII ZOO 361 : Zoology VI ZOO362 : Zoology VII ENV 361: Environmental Science IX ENV 362 : Environmental Science X MIB 361: Microbiology VI MIB 362 : Microbiology VII	3+1 3 3 + 1 3 3 3+1 3 3+1	<b>17</b>
	<b>Additional Courses: Compulsory</b> RSM 361 : Research Methodology I	3	
<b>SEVENTH SEMESTER</b> <b>(One - major)</b>	<b>Core Course: Any two Subjects from one discipline.</b> CHM 471: Chemistry VIII CHM 472 : Chemistry IX CHM 473 : Chemistry LAB ZOO 471: Zoology X ZOO 472 : Zoology XI ZOO 473 : Zoology LAB ENV 471 : Environmental Science VIII ENV 472 : Environmental Science IX	4 4 2 4 4 2 4 4	<b>17</b>

	ENV473 A: Environmental Science (research based field)	1	
	ENV473 B: Environmental Science (Internship)	1	
	MIB 471 : Microbiology VIII	4	
	MIB 472 : Microbiology IX	4	
	MIB473 : Microbiology LAB	2	
	<b>Applied Science Courses: Leading to core subject any one from subject pool</b>		
	ZOO 474 : Zoology X	3	
	ZOO 475: Zoology X	3	
	ZOO 476: Zoology X	3	
	CHM 474: Chemistry X	3	
	CHM 474 Chemistry X	3	
	CHM 474 Chemistry X	3	
	ENV 474: Environment Science X	3	
	ENV 475: Environment Science X	3	
	ENV 476: Environment Science X	3	
	MIB 474: Microbiology XII	3	
	MIB 475 : Microbiology XII	3	
	MIB 476: Microbiology XII	3	
	<b>Additional course : Compulsory Courses: Theory and Presentation</b>	3	
	RSM 471: Research Methodology II	1	
	SEM471:Seminar/Term Paper (leading to core course)		
<b>EIGHTH SEMESTER (One – major)</b>	<b>Core Course: Any two Subjects from one discipline.</b>		<b>16</b>
	CHM 481: Chemistry XI	4	
	CHM 482 : Chemistry XII	4	
	CHM 482 : Chemistry LAB	2	
	ZOO 481: Zoology XIII	4	
	ZOO482 : Zoology XIII	4	
	ZOO483: Zoology LAB	2	
	ENV 481 : Environmental Science XI	4	
	ENV 482 : Environmental Science XII	4	
	ENV483 : Environmental Science	2	
	MIB 481 : Microbiology XI	4	
	MIB 482 : Microbiology XII	4	
	MIB 483 : Microbiology LAB	2	
	<b>Interdisciplinary Courses: Leading to core subject, anyone from subject pool</b>		
	ZOO 484 : Zoology XIII	3	
	ZOO 485: Zoology XIII	3	
ZOO 486: Zoology XIII	3		
CHM 484: Chemistry XIII	3		
CHM 485 : Chemistry XIII	3		



CHM 486 : Chemistry XIII	3	
ENV 484: Environmental Science XIII	3	
ENV 485: Environmental Science XIII	3	
ENV 486: Environmental Science XIII	3	
MIB 484: Microbiology XIV	3	
MIB 485 : Microbiology XIV	3	
MIB 486: Microbiology XIV	3	
PRW481: Project Work : Research / Presentation	3	
<b>Total Credit Hours</b>		<b>136</b>

*Note: Subject pool in Interdisciplinary Science course can be increased and decreased as per subject.*

### **1. Description for First Five semester for Biological group**

The first five semester of biological group mainly focus on the general theoretical courses as well as general experimental courses. In these semester student will have three major subjects with various combination. In this group, student will take subject combination of **Zoology, Environmental Science and Chemistry** or **Zoology, Microbiology and Chemistry**. Student will have to take some additional courses, which are compulsory in these semesters.

### **2. Description for Sixth semester for Biological group**

The sixth semester will be of two major subjects with total credits of **17 CH**. In this semester student will mainly focus on advanced, applied and research oriented courses leading to two major system. In this semester students will have various combination from which, students have to choose any one combination. The sixth semester offers following combination for Biological group of B.Sc. as follows : (Choose any one combination from the following five)

- 1. Zoology and Chemistry**
- 2. Zoology and Microbiology**
- 3. Chemistry and Microbiology**
- 4. Zoology and Environment**
- 5. Chemistry and Environment**

### **3. Description for Seventh and Eighth semester for Biological group**

The final two semesters (Seventh and eighth) will be one major. The Seventh and Eighth semester will be Research oriented, with advanced course. In seventh semester student will choose one major subject (**either, Environmental Science or Microbiology or Chemistry or Zoology**) from subject pool. They have to choose one major from their sixth semester combination. Interdisciplinary course will be offered in final semester.

Seventh semester will be semester of research theory and basics while eighth will be semester where student will get knowledge about interdisciplinary subject related to their discipline. In eighth semester student will conducted their research project work.