



Central International University-CIU

**In Partnership With
Diversity Learning Institute-DLI**

All registered in Germany and the European Union

Master's Degree in Education in Natural Sciences, M.Sc.Ed. (Specialisation: Chemistry, Biology)

A) Course: Education in Natural Sciences (Chemistry, Biology), M.Sc.Ed. CB.

Duration: 3 Semesters (18 months), 6 months per semester.

Credits: 180 Credits.

B) Module Details:

Semester 1 Modules:

1. Module Code: ENSCB101
 - Module Name: Foundations of Chemistry Education
 - Study Hours: 150
 - Credits: 15
2. Module Code: ENSCB102
 - Module Name: Foundations of Biology Education
 - Study Hours: 150
 - Credits: 15
3. Module Code: ENSCB103
 - Module Name: Pedagogical Approaches in Natural Sciences
 - Study Hours: 120
 - Credits: 12

Semester 2 Modules:

4. Module Code: ENSCB201
 - Module Name: Advanced Topics in Chemistry Education
 - Study Hours: 180
 - Credits: 18
5. Module Code: ENSCB202
 - Module Name: Advanced Topics in Biology Education
 - Study Hours: 180
 - Credits: 18
6. Module Code: ENSCB203
 - Module Name: Assessment and Evaluation in Natural Sciences Education
 - Study Hours: 120
 - Credits: 12

Semester 3 Modules (Elective):

7. Module Code: ENSCB301
 - Module Name: Environmental Chemistry
 - Study Hours: 150
 - Credits: 15
8. Module Code: ENSCB302
 - Module Name: Biotechnology in Education
 - Study Hours: 150
 - Credits: 15
9. Module Code: ENSCB303
 - Module Name: Special Topics in Natural Sciences Education
 - Study Hours: 120
 - Credits: 12

D) Outline of Syllabus:

1. *Foundations of Chemistry Education:*
 - Atomic Structure
 - Chemical Bonding
 - Periodic Table and Trends
 - Chemical Kinetics
2. *Foundations of Biology Education:*
 - Cell Biology
 - Genetics
 - Evolution
 - Ecology
3. *Pedagogical Approaches in Natural Sciences:*
 - Teaching Strategies
 - Classroom Management
 - Educational Technology in Science
4. *Advanced Topics in Chemistry Education:*
 - Organic Chemistry
 - Inorganic Chemistry
 - Physical Chemistry
5. *Advanced Topics in Biology Education:*
 - Physiology
 - Microbiology
 - Immunology
6. *Assessment and Evaluation in Natural Sciences Education:*
 - Types of Assessment
 - Evaluation Methods
 - Formative and Summative Assessment
7. *Environmental Chemistry*
 - Environmental Impact of Chemicals
 - Green Chemistry Principles
 - Analytical Techniques in Environmental Chemistry

8. *Biotechnology in Education*

- Applications of Biotechnology in Education
- Genetic Engineering and Ethics
- Biotechnology in Medicine and Agriculture.

9. *Special Topics in Natural Sciences Education (ENSCB303):*

- Emerging Trends in Science Education
- Science Education Policy and Reform
- Cross-disciplinary Approaches in Natural Sciences Education

E) Practicals: Practicals will be incorporated in Modules 1, 2, 4, and 5.

F) Industrial Attachment (Semester 3):

Students will undergo a 3-month industrial attachment where they will engage in hands-on experiences in educational institutions or relevant industries. Duties include lesson observation, curriculum development, and practical implementation.

G) Research Topics (Semester 3): Research topics may include:

- "Impact of Innovative Teaching Methods in Chemistry Education"
- "Biology Curriculum Enhancement for Effective Learning"
- "Assessment Strategies in Natural Sciences Education"

H) Benefits of the Course:

1. In-depth knowledge of natural sciences education.
2. Enhanced pedagogical skills.
3. Increased employability in educational institutions.
4. Contribution to advancements in science education.
5. Opportunities for research and publication.
6. Development of critical thinking and problem-solving skills.
7. Networking with professionals in the field.
8. Exposure to cutting-edge topics in science education.
9. Preparation for leadership roles in education.
10. Contribution to community development through education.

I) Entrepreneurship Benefits:

1. Curriculum development consultancy.
2. Educational content creation.
3. Science education training services.
4. Establishment of science education centers.
5. Educational technology entrepreneurship.

J) Inventions and Discoveries: Learners can contribute to:

1. Innovative science teaching tools.
2. Educational games for biology and chemistry.
3. Sustainable energy solutions.
4. Biotechnological applications in education.
5. Environmental conservation initiatives.

K) Employment Opportunities:

1. High schools, colleges, universities, and other
2. Scientific companies and organisations.
3. African Company: African Academy of Sciences
4. International Organizations.

L) Recommended Books:

- "Science Education for Sustainable Development" by John K. Gilbert
- "Teaching Science Through Inquiry-Based Instruction" by Terry L. Contant
- "Biology Education in the Era of Rapid Technological Progress" by Mary Atwater