

ENVIRONMENTAL SCIENCE

BSc (Honours) in Environmental Studies: Science Emphasis

Upon completing the requirements a successful student will be able to:

- I. Depth and Breadth of Knowledge
 - A. Articulate an understanding of environmental studies set in a knowledge of Western culture
 - B. Articulate how the subject material in environmental studies has been shaped by historical forces, philosophical ideas and systems, and by religious commitments and worldviews that have shaped Western culture
 - C. Express familiarity with a long tradition of Christian inquiry into the nature of human life with special attention to writers in the Reformed tradition from the sixteenth century to the present
 - D. Explain chemical (very basic), biological, and geographical concepts that are critical to understanding environmental issues, as well as relationships within and between biotic and abiotic components of creation
 - E. Describe, with a focus on principles from scientific disciplines, impacts of human activities on creation, specifically the impacts of increasing human population, the use and abuse of both renewable and non-renewable resources, damage caused by pollution and disturbance, and the endangerment extinction of species, and propose creative solutions to these problems
 - F. Measure environmental parameters (e.g. soil or water quality), and the impacts of human activities on creation using appropriate biological, chemical, and/or statistical procedures
 - G. Investigate topics in environmental studies in greater detail than what is presented in class
 - H. Demonstrate an ability to critically evaluate environmental issues, recognize the pros and cons of different possible solutions, and choose a good course of action
 - I. Explain chemical concepts that are critical to understanding environmental issues
 - J. Demonstrate a deeper ability to independently read, interpret, and critically evaluate and explain information pertaining to environmental issues
 - K. Demonstrate a broader and deeper knowledge of chemical, biological, and geographical concepts that are critical to understanding environmental issues, as well as relationships within and between biotic and abiotic components of creation
 - L. Demonstrate a broader and deeper knowledge of impacts of human activities on creation, specifically the impacts of increasing human population, the use and abuse of both renewable and non-renewable resources, damage caused by pollution and disturbance, and the endangerment extinction of species, and propose creative solutions to these problems
 - M. Demonstrate knowledge of the impacts of toxic substances on the environment and on human health
 - N. Demonstrate a deep knowledge of one of the following knowledge at least two of the following areas of environmental studies: toxicology, restoration ecology, conservation biology, environmental health, or alpine ecology
- II. Knowledge of Methodologies
 - A. Begin to discern what are the philosophical and worldview assumptions imbedded in the paradigms and conceptual frameworks commonly relied on in environmental studies, and in science in general
 - B. Begin to judge what are the valid insights in such paradigms and concepts and evaluate how they can be used with integrity within a Christian frame of reference

- C. Read, interpret, and critically evaluate and explain information pertaining to environmental issues
 - D. Demonstrate a deeper knowledge of techniques required to gather, record, analyze, interpret, and communicate data gathered in a laboratory and/or field setting
- III. Application of Knowledge
- A. Apply their understanding of biology, chemistry, and environmental studies to:
 - B. determine which information and/or data need to be gathered
 - C. interpret and draw conclusions from information and/or data
 - D. explain environmental issues
 - E. Analyze diverse sources of information to evaluate different approaches to propose solutions to existing and emerging environmental problems that compromise sustainability
 - F. Find, read, and understand literature pertaining to environmental issues and use this information to more fully understand, explain, and propose solutions to environmental issues
- IV. Communication Skills
- A. Explain, orally and in writing, complex environmental issues, their societal relevance, and possible solutions to a range of audiences
 - B. Present scientific results both orally and in writing
- V. Awareness of Limits of Knowledge
- A. Recognize the limits of scientific knowledge in a fallen world, and that science is one of many ways of knowing and investigating the world
 - B. Recognize that environmental issues are very complex, and that proposed solutions have are rooted in many disciplines
 - C. Recognize that there are pressures on our environment for which we have incomplete knowledge but which still must be dealt with in the absence of complete information
- VI. Maturity and Professional Capacity
- A. Articulate that poverty, hunger, social justice, political instability, and environmental degradation are complex and deeply-interconnected issues
 - B. Articulate their career goals and, as appropriate, identify and pursue appropriate programs of further study
 - C. Collaborate effectively with others, with integrity, courtesy, and professionalism, applying knowledge and skills learned to serve God and their neighbor by addressing environmental issues as citizens or in their professional calling
 - D. Demonstrate an appreciation for God's good creation, and a desire to seek justice
 - E. Gain workplace experience (in the form of an internship) within the broad field of environmental studies

General Major: Humanities Stream

Upon completing the requirements for a BA in Environmental Studies (General Major: Humanities Emphasis), a successful student will be able to:

- I. Depth and Breadth of Knowledge
 - A. Articulate an understanding of environmental studies set in a knowledge of Western culture
 - B. Articulate how the subject material in environmental studies has been shaped by historical forces, philosophical ideas and systems, and of religious commitments and worldviews that have shaped Western culture
 - C. Express familiarity with a long tradition of Christian inquiry into the nature of human life with special attention to writers in the Reformed tradition from the sixteenth century to the present
 - D. Explain (very basic) chemical and biological but especially geographical, economic, literary, political, or social concepts that are critical to understanding environmental issues and their solutions
 - E. Describe, with a focus on principles from disciplines within the humanities, impacts of human activities on creation, specifically the impacts of increasing human population, the use and abuse of both renewable and non-renewable resources, damage caused by pollution and disturbance, and propose creative solutions to these problems
 - F. Investigate topics in environmental studies in greater detail than what is presented in class
 - G. Demonstrate an ability to critically evaluate environmental issues, recognize the pros and cons of different possible solutions, and choose a good course of action

- II. Knowledge of Methodologies
 - A. Begin to discern what are the philosophical and worldview assumptions imbedded in the paradigms and conceptual frameworks commonly relied on in environmental studies
 - B. Begin to judge what are the valid insights in such paradigms and concepts and evaluate how they can be used with integrity within a Christian frame of reference
 - C. Gather, record, analyze, interpret, and communicate data gathered in a laboratory and/or field setting
 - D. Read, interpret, and critically evaluate and explain information pertaining to environmental issues

- III. Application of Knowledge
 - A. Apply their understanding of geography, economics, environmental literature, political science, and environmental studies to:
 - determine which information needs to be gathered
 - interpret and draw conclusions from information
 - explain environmental issues
 - B. Analyze diverse sources of information to evaluate different approaches to propose solutions to existing and emerging environmental problems that compromise sustainability
 - C. Find, read, and understand literature pertaining to environmental issues and use this information to more fully understand, explain, and propose solutions to environmental issues

- IV. Communication Skills
 - A. Explain, orally and in writing, complex environmental issues, their societal relevance, and possible solutions to a range of audiences

- V. Awareness of Limits of Knowledge
 - A. Recognize that environmental issues are very complex, and that proposed solutions have are rooted in many disciplines
 - B. Recognize that there are pressures on our environment for which we have incomplete knowledge but which still must be dealt with in the absence of complete information

- VI. Maturity and Professional Capacity
 - A. Articulate that poverty, hunger, social justice, political instability, and environmental degradation are complex and deeply-interconnected issues.
 - B. Articulate their career goals and, as appropriate, identify and pursue appropriate programs of further

- study
- C. Collaborate effectively with others, with integrity, courtesy, and professionalism, applying knowledge and skills learned to serve God and their neighbor by addressing environmental issues as citizens or in their professional calling
 - D. Demonstrate an appreciation for God's good creation, and a desire to seek justice.

Minor: Humanities Stream

Upon completing the requirements for a Minor: Humanities Emphasis (6 courses), a successful student will be able to:

- I. Depth and Breadth of Knowledge
 - A. Articulate how the subject material in environmental studies has been shaped by historical forces, philosophical ideas and systems, and of religious commitments and worldviews that have shaped Western culture
 - B. Explain (very basic) chemical and biological but especially geographical, economic, literary, political, or social concepts that are critical to understanding environmental issues
 - C. Describe, with a focus on principles from disciplines within the humanities, impacts of human activities on creation, specifically the impacts of increasing human population, the use and abuse of both renewable and non-renewable resources, damage caused by pollution and disturbance, and propose creative solutions to these problems
 - D. Investigate topics in environmental studies in greater detail than what is presented in class
 - E. Demonstrate an ability to critically evaluate environmental issues, recognize the pros and cons of different possible solutions, and choose a good course of action
- II. Knowledge of Methodologies
 - A. Begin to discern what are the philosophical and worldview assumptions imbedded in the paradigms and conceptual frameworks commonly relied on in environmental studies
 - B. Begin to judge what are the valid insights in such paradigms and concepts and evaluate how they can be used with integrity within a Christian frame of reference
 - C. Read, interpret, and critically evaluate and explain information pertaining to environmental issues
- III. Application of Knowledge
 - A. Apply their understanding of geography, the humanities, and environmental studies to:
 - B. determine which information needs to be gathered
 - C. interpret and draw conclusions from information
 - D. explain environmental issues
 - E. Analyze diverse sources of information to evaluate different approaches to propose solutions to existing and emerging environmental problems that compromise sustainability
 - F. Find, read, and understand literature pertaining to environmental issues and use this information to more fully understand, explain, and propose solutions to environmental issues
- IV. Communication Skills
 - A. Explain, orally and in writing, complex environmental issues, their societal relevance, and possible solutions to a range of audiences
- V. Awareness of Limits of Knowledge

- A. Recognize that environmental issues are very complex, and that proposed solutions are rooted in many disciplines
 - B. Recognize that there are pressures on our environment for which we have incomplete knowledge but which still must be dealt with in the absence of complete information
- VI. Maturity and Professional Capacity
- A. Articulate that poverty, hunger, social justice, political instability, and environmental degradation are complex and deeply-interconnected issues
 - B. Collaborate effectively with others, with integrity, courtesy, and professionalism, applying knowledge and skills learned to serve God and their neighbor by addressing environmental issues as citizens or in their professional calling
 - C. Demonstrate an appreciation for God's good creation, and a desire to seek justice

General Major: Science Stream

Upon completing the requirements for a BSc in Environmental Studies (General Major: Science Emphasis), a successful student will be able to:

- I. Depth and Breadth of Knowledge
 - A. Articulate an understanding of environmental studies set in a knowledge of Western culture
 - B. Articulate how the subject material in environmental studies has been shaped by historical forces, philosophical ideas and systems, and by religious commitments and worldviews that have shaped Western culture
 - C. Express familiarity with a long tradition of Christian inquiry into the nature of human life with special attention to writers in the Reformed tradition from the sixteenth century to the present
 - D. Explain chemical (very basic), biological, and geographical concepts that are critical to understanding environmental issues, as well as relationships within and between biotic and abiotic components of creation
 - E. Describe, with a focus on principles from scientific disciplines, impacts of human activities on creation, specifically the impacts of increasing human population, the use and abuse of both renewable and non-renewable resources, damage caused by pollution and disturbance, and the endangerment extinction of species, and propose creative solutions to these problems
 - F. Measure environmental parameters (e.g. soil or water quality), and the impacts of human activities on creation using appropriate biological, chemical, and/or statistical procedures
 - G. Investigate topics in environmental studies in greater detail than what is presented in class
 - H. Demonstrate an ability to critically evaluate environmental issues, recognize the pros and cons of different possible solutions, and choose a good course of action
- II. Knowledge of Methodologies
 - A. Begin to discern what are the philosophical and worldview assumptions imbedded in the paradigms and conceptual frameworks commonly relied on in environmental studies, and in science in general
 - B. Begin to judge what are the valid insights in such paradigms and concepts and evaluate how they can be used with integrity within a Christian frame of reference
 - C. Gather, record, analyze, interpret, and communicate data gathered in a laboratory and/or field setting
 - D. Read, interpret, and critically evaluate and explain information pertaining to environmental issues
- III. Application of Knowledge
 - A. Apply their understanding of biology, chemistry, and environmental studies to:

- determine which information and/or data need to be gathered
 - interpret and draw conclusions from information and/or data
 - explain environmental issues
- B. Analyze diverse sources of information to evaluate different approaches to propose solutions to existing and emerging environmental problems that compromise sustainability
- C. Find, read, and understand literature pertaining to environmental issues and use this information to more fully understand, explain, and propose solutions to environmental issues
- IV. Communication Skills
- A. Explain, orally and in writing, complex environmental issues, their societal relevance, and possible solutions to a range of audiences
- B. Present scientific results both orally and in writing
- V. Awareness of Limits of Knowledge
- A. Recognize the limits of scientific knowledge in a fallen world, and that science is one of many ways of knowing and investigating the world
- B. Recognize that environmental issues are very complex, and that proposed solutions have are rooted in many disciplines
- C. Recognize that there are pressures on our environment for which we have incomplete knowledge but which still must be dealt with in the absence of complete information
- VI. Maturity and Professional Capacity
- A. Articulate that poverty, hunger, social justice, political instability, and environmental degradation are complex and deeply-interconnected issues
- B. Articulate their career goals and, as appropriate, identify and pursue appropriate programs of further study
- C. Collaborate effectively with others, with integrity, courtesy, and professionalism, applying knowledge and skills learned to serve God and their neighbor by addressing environmental issues as citizens or in their professional calling
- D. Demonstrate an appreciation for God's good creation, and a desire to seek justice

Four-Year Major: Science Stream

Upon completing the requirements for a BSc in Environmental Studies (Four-Year Major: Science Emphasis), a successful student will be able to:

- Achieve all of the learning outcomes of the BSc in Environmental Studies (General Major: Science Emphasis)
- I. Depth and Breadth of Knowledge
- A. Explain chemical concepts that are critical to understanding environmental issues
- B. Demonstrate a deeper ability to independently read, interpret, and critically evaluate and explain information pertaining to environmental issues
- C. Demonstrate a broader and deeper knowledge of chemical, biological, and geographical concepts that are critical to understanding environmental issues, as well as relationships within and between biotic and abiotic components of creation
- D. Demonstrate a broader and deeper knowledge of impacts of human activities on creation, specifically the impacts of increasing human population, the use and abuse of both renewable and non-renewable

resources, damage caused by pollution and disturbance, and the endangerment extinction of species, and propose creative solutions to these problems

II. Knowledge of Methodologies

- A. Demonstrate a deeper knowledge of techniques required to gather, record, analyze, interpret, and communicate data gathered in a laboratory and/or field setting

Minor: Science Stream

Upon completing the requirements for a Minor: Science Emphasis, a successful student will be able to:

I. Depth and Breadth of Knowledge

- A. Articulate how the subject material in environmental studies has been shaped by historical forces, philosophical ideas and systems, and of religious commitments and worldviews that have shaped Western culture
- B. Explain basic chemical and biological concepts that are critical to understanding environmental issues, as well as relationships within and between biotic and abiotic components of creation
- C. Describe, with a focus on principles from scientific disciplines, impacts of human activities on creation, specifically the impacts of increasing human population, the use and abuse of both renewable and non-renewable resources, damage caused by pollution and disturbance, and propose creative solutions to these problems
- D. Measure environmental parameters (e.g. soil or water quality), and the impacts of human activities on creation using appropriate biological, and/or chemical procedures
- E. Investigate topics in environmental studies in greater detail than what is presented in class
- F. Demonstrate an ability to critically evaluate environmental issues, recognize the pros and cons of different possible solutions, and choose a good course of action

II. Knowledge of Methodologies

- A. Begin to discern what are the philosophical and worldview assumptions imbedded in the paradigms and conceptual frameworks commonly relied on in environmental studies, and in science in general
- B. Begin to judge what are the valid insights in such paradigms and concepts and evaluate how they can be used with integrity within a Christian frame of reference
- C. Gather, record, analyze, interpret, and communicate data gathered in a laboratory and/or field setting
- D. Read, interpret, and critically evaluate and explain information pertaining to environmental issues

III. Application of Knowledge

- A. Apply their understanding of biology and environmental studies to:
- determine which information and/or data need to be gathered
 - interpret and draw conclusions from information and/or data
 - explain environmental issues
- B. Analyze diverse sources of information to evaluate different approaches to propose solutions to existing and emerging environmental problems that compromise sustainability
- C. Find, read, and understand literature pertaining to environmental issues and use this information to more fully understand, explain, and propose solutions to environmental issues

IV. Communication Skills

- A. Explain, orally and in writing, complex environmental issues, their societal relevance, and possible solutions to a range of audiences
 - B. Present scientific results both orally and in writing
- V. Awareness of Limits of Knowledge
- A. Recognize that environmental issues are very complex, and that proposed solutions have are rooted in many disciplines
 - B. Recognize that there are pressures on our environment for which we have incomplete knowledge but which still must be dealt with in the absence of complete information
- VI. Maturity and Professional Capacity
- A. Collaborate effectively with others, with integrity, courtesy, and professionalism, applying knowledge and skills learned to serve God and their neighbor by addressing environmental issues as citizens or in their professional calling
 - B. Articulate that poverty, hunger, social justice, political instability, and environmental degradation are complex and deeply-interconnected issues
 - C. Demonstrate an appreciation for God's good creation, and a desire to seek justice