Masters of Science in Biodiversity Conservation

2014 Course Information Pack

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www.rupp.edu.kh/master/biodiversity/
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1. Introduction

Cambodia is rich in biodiversity but detailed knowledge of this biodiversity is lacking. In addition to forming an important part of the Indo-Burma Hotspot, containing four Global Ecoregions and 40 Important Bird Areas, Cambodia possesses many of the best remaining forests and wetlands in mainland Southeast Asia, with countless endemic and globally threatened species. While knowledge of Cambodian biodiversity remains limited, recent years have seen an astonishing rise in the number of species documented (Daltry, 2008; 2011). However much of this research has been led by foreign biologists, due to the chronic shortage of Cambodian scientists. As a result, Cambodia’s ability to manage its natural heritage is severely hampered both by a lack of skilled people and biological information.

As Cambodia moves towards greater prosperity a clearer understanding of how to wisely manage and use its natural heritage in needed. Natural resources are the mainstay of the Cambodian economy. More than 80% of Cambodians depend directly on natural resources for subsistence and income, and all utilize wild resources such as fish and timber. With pressures on biodiversity and the environment dramatically increasing, there is a risk of losing much of this natural wealth forever; to the detriment of present and future generations. As a result, the lack of national capacity and reliable biodiversity data has been highlighted in all recent priority-setting exercises, including the National Biodiversity Strategy and Action Plan (2002).

The Masters of Science (M.Sc.) in Biodiversity Conservation was established in 2005 to address the need for qualified conservationists to guide Cambodia towards sustainable development, address existing knowledge gaps, and uphold the nation’s commitments to conserving its biodiversity. The M.Sc. is designed to equip students with the knowledge, skills and experience required for successful careers in the rapidly-growing sustainable development and conservation sectors in Cambodia and SE-Asia. The M.Sc. provides:

- A grounding in contemporary ecological and conservation management theory, and knowledge of project management and strategic planning;
- Real life experience in designing and undertaking field research, data analysis and interpretation, reporting and presentation; and
- Outstanding opportunities to conduct research and conservation projects with government agencies, non-government organisations (NGOs) and overseas institutions.

The M.Sc. is jointly delivered by Fauna & Flora International and the Royal University of Phnom Penh, with assistance from a diverse range of local and international academics and professionals. The knowledge and skills provided are relevant to the work of government environmental and development departments, consultancy firms, NGOs, international agencies, and donors. On graduation, the majority of students very quickly find employment within the environment sector or experience promotion and greater recognition in their existing jobs. An increasing number of graduates each year are also taking advantage of the M.Sc. programmes extensive international links to continue their careers overseas.

References:
2. Student Testimonials

Heng Chinda, 2nd Student Cohort (class of 2007-2008)

“Studying this M.Sc. gave me great exposure and experience in biodiversity conservation issues and really helped my career. The programme introduced me to a variety of practical conservation tools and strategies that can be applied to real effect and since I graduated, my employers now include me in all the projects our organization does in this area.” [Chinda currently works with the Learning Institute in Phnom Penh as a university liaison manager]

Long Kheng, 3rd Student Cohort (class of 2008-2009)

“The M.Sc. helped me to become much more effective and satisfied in my work. I am responsible for managing biodiversity inside a protected area, and the skills I learnt allowed me to develop research and monitoring initiatives for biodiversity, to improve our relationships and coordination with local communities and authorities, and to better communicate our work through presentations and reports.” [Kheng presently works with the Ministry of Environment as Director of the Prek Toal Core Area in the Tonle Sap Biosphere Reserve]

Phen Sarith, 4th Student Cohort (class of 2009-2010)

“The M.Sc. in Biodiversity Conservation was my first introduction to scientific research and changed my opportunities in life by developing my knowledge, improving my skills as a biology teacher and helping me to apply for positions in conservation research. In future, I want to work to create more young conservationists and scientists to promote conservation in Cambodia.” [Alongside his research interests, Sarith currently works as a biology teacher in Koh Kong]

Sor Ratha, 5th Student Cohort (class of 2010-2011)

“Studying the M.Sc. in Biodiversity Conservation really helped improve my career and has made me very happy as my appreciation of the beauty of nature has grown with my understanding. The program provided me with very fundamental knowledge, especially in formulating research questions, critical thinking and scientific reasoning through which all researchers develop their abilities.” [After working at the Centre for Biodiversity Conservation Ratha is now undertaking a PhD at the Université de Toulouse in freshwater ecology]

Chhay Sokmanine, 6th Student Cohort (class of 2011-2012)

“Before I began the M.Sc. in Biodiversity Conservation, I had no idea what conservation was and what scientists do. Studying the M.Sc. has helped my career in many ways by improving my technical knowledge and practical skills. It also helped me to really understand key conservation issues in Cambodia and overseas and the kinds of efforts needed to resolve these.” [Sokmanine won international support for her pioneering thesis on best practices for income generation through free-range farming of bat guano and successfully graduated in 2014]

Thi Sothearen, 7th Student Cohort (class of 2012-2013)

“The M.Sc. program really teaches students to appreciate and understand nature and how important it is for the lives of people and animals. Studying it has changed my life in some ways by developing my conscience about society's negative effects and now that I understand the purpose and benefits of conservation and research much better, I can learn many new things by reading scientific papers and talking with our foreign lecturers.” [Sothearen will graduate in 2015. Her research thesis focused on the potential for agroforestry to improve community livelihoods and rehabilitate degraded forests. She currently works as research officer at the Centre for Biodiversity Conservation]
3. **M.Sc. Curriculum**

The M.Sc. curriculum is a two-year part-time programme which consists of three stages. Students are evaluated at the end of each stage, and only those with adequate grades may proceed to following stages.

3.1 **Bridging Course**

The first stage of the curriculum consists of an eight-week bridging course from October to December 2014, which entails three hours of lessons a day for three days each week. Entrance to the M.Sc. programme depends on the applicant passing exams at the end of the bridging course. The bridging course includes four subjects: 1) Biostatistics; 2) General Biology; 3) Ecology and Evolution; and, 4) English for Academic Purposes. The bridging course does not contribute any credits towards the final M.Sc. degree.

3.2 **M.Sc. Year one**

The second stage of the curriculum consists of two semesters of classes worth 42 credits (February-June and September-January each year). Classes are normally held in the afternoons, though several courses include short field trips. Each semester includes a fortnightly guest lecture series provided by visiting academics and conservation professionals working in Cambodia and overseas. After the first year, and if adequate grades have been achieved, students progress to the third stage (or second year) of the Masters curriculum. Students who fail to achieve adequate marks in first year courses can return to repeat failed courses, but cannot graduate from the Masters programme until satisfactory grades have been achieved.

3.3 **M.Sc. Year two**

The second year of the M.Sc. curriculum consists of a dissertation, which requires students to produce an original research thesis worth 12 credits. (Each student develops a thesis proposal during the second semester of the first year). For their theses, students are encouraged to address subjects relevant to contemporary conservation issues in Cambodia and students often undertake their projects in collaboration with national or international organisations, many of whom offer employment after they graduate. Subjects covered during the first and second years of the M.Sc. curriculum are shown below and detailed descriptions for each subject are given in section 9.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Semester 1 (22 credits)</th>
<th>Semester 2 (20 credits)</th>
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<tbody>
<tr>
<td></td>
<td>• Ecological Field Techniques (3)</td>
<td>• Global Climate Change (3)</td>
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<td></td>
<td>• Research Analysis: A Process of Inquiry (4)</td>
<td>• Species Conservation (6)</td>
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<td></td>
<td>• Scientific Writing and Data Presentation (2)</td>
<td>• Behavioural Ecology: An Evolutionary Approach (5)</td>
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<td></td>
<td>• Research Methods and Applied Statistics (4)</td>
<td>• Geographic Information Systems (2)</td>
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<td></td>
<td>• Integrated Natural Resource Management (5)</td>
<td>• Protected Areas Management (2)</td>
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<td></td>
<td>• Environmental Impact Assessment (2)</td>
<td>• Project Cycle Management (2)</td>
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<td>• Environmental Law (2)</td>
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<table>
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<tr>
<th>Year 2</th>
<th>Research Thesis (12 credits)</th>
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Please note that scheduling of subjects can change due to lecturer availability. All coursework must be completed in the first year of the M.Sc. programme.
4. Eligibility and Admission Requirements

4.1 Eligibility

To be eligible for the Masters of Science in Biodiversity Conservation, applicants must be under the age of 45 and fulfil one of the following:

(1) Hold a Bachelor of Science (B.Sc.) in any science field (priority will be given to students with a higher GPA);

or

(2) Hold a bachelor degree in any field and have a minimum of two years relevant work experience in the natural science field (certification of employment required).

4.2 Admission Requirements

To apply for the Masters of Science in Biodiversity Conservation programme, please enclose the following documents and send them to the Centre for Biodiversity Conservation (CBC) – Room 415, Building A, Royal University of Phnom Penh, Faculty of Science, Confederation of Russia Boulevard, Phnom Penh.

- One completed application form
- Three 4x6 cm and two 3x4 cm photographs against a white background
- Your Bachelor degree certificate, certified by the Phnom Penh Municipality
- An indication of your proficiency in spoken and written English (recent qualifications only)
- Certificate of Employment (if required)

4.3 Application Deadline

The deadline for applications for the 2015-2016 academic session is 26th September, 2014. Candidates will be notified about the outcome of their applications by 10th October, 2014.

5. Student Selection, Fees and Scholarships

5.1 Student Selection

Successful applicants will undertake a bridging course for eight (8) weeks from mid October to December, 2014, which will conclude in examinations on each course studied. Candidates performing well in these exams will be notified by early January 2015 and will then be admitted to the first semester of the M.Sc. programme starting in February, 2015.

5.2 Student Fees

On completion of the eight-week bridging course, successful candidates will be required to pay a tuition fee of USD $250 each semester to the Centre for Biodiversity Conservation of the Royal University of Phnom Penh. The M.Sc. programme consists of four semesters and so the total tuition fee for the programme over the course of its two years is USD $1,000.

Payment of tuition fees is due at the beginning of each semester and failure to meet this requirement will result in candidates being deferred or ejected from the programme. Staff from the Royal University of Phnom Penh who meet the admission requirements of the M.Sc. programme
are exempt from this fee.

5.3 Student Scholarships and Other Grants

A range of scholarships are currently available for students entering the first year of the M.Sc. programme in February 2015:

- In partnership with Free the Bears one scholarship worth $4,500 is available to cover the tuition fees, thesis costs and living expenses of a male or female student completing a thesis on the topic “Investigating the feasibility of using remote sensing to estimate bear population size in tropical climates”.
- Courtesy of the Prince Albert II of Monaco Foundation (through Fauna & Flora International), two one-year scholarships worth $1,500 are available to support the thesis costs of a male or female student completing a thesis focussed on marine conservation.
- Courtesy of the Kannitha Fund (administered by Fauna & Flora International), one scholarship covering tuition fees are available exclusively for female students
- Courtesy of the International Crane Foundation, one scholarship worth $1,000 is available for male and female students interested in studying a wetland-related subject for their second year thesis
- Courtesy of the Centre for Biodiversity Conservation, additional scholarships for tuition fees are awarded to the highest scoring students not receiving any other award on the M.Sc. programme in each semester of the first year.

It is anticipated that further scholarships will be announced for students starting the M.Sc. in 2015. Financial support is also available from the Centre for Biodiversity Conservation for all students for their second year thesis research, as is assistance for students wishing to present their work at international conferences and other gatherings.

6. Student Support

A variety of resources and support are available to students studying the Masters of Science in Biodiversity Conservation. These are summarised below.

6.1 Career Development

Through the programme’s extensive links to international scientific and conservation organisations, students have access to a diverse array of specialists and professionals who regularly deliver guest lectures and supervise M.Sc. theses. In addition to introducing students to future employers in Cambodia and overseas, the M.Sc. programme provides career support by arranging student work placements with organizations nationwide and assisting graduates to prepare job, scholarship and grant applications (providing references where needed).

The Centre for Biodiversity Conservation at the Royal University of Phnom Penh also employs outstanding students. Current data on alumni demonstrates that students who have jobs while studying experience promotions and greater recognition within their organizations upon graduation, while those who undertake the M.Sc. immediately after their undergraduate degree typically very quickly gain conservation or education related employment in Cambodia, or continue further post-graduate studies through overseas scholarships.

6.2 Conservation Library
In addition to the Hun Sen Library, students on the M.Sc. programme have full access to a dedicated reference collection containing several hundred recent texts on conservation biology and sustainable development. The conservation library is housed in the zoological museum (below) and students also have access to thousands of electronic titles through databases available to the M.Sc. programme.

6.3 Computing and Other Facilities

Dedicated I.T. facilities including five desktop and two laptop computers are available to students on the M.Sc. programme (all equipped with internet access and latest software packages) and wifi internet access is available to students within the Centre of Biodiversity Conservation. Students also have full access to a wide variety of research equipment, including camping gear, and equipment for sampling water quality and freshwater and terrestrial biota, in addition to a range of laboratory and curatorial activities.

6.4 Zoological and Botanical Museum Collections

Established by the Centre for Biodiversity Conservation in 2007, the reference collections have grown to include thousands of voucher specimens and remain the only natural history museums dedicated to lesser-known and smaller-bodied biota in Cambodia. As a result, they have become an important national asset for documenting Cambodian biodiversity and are regularly used in systematic and conservation-orientated research efforts, M.Sc. teaching and by students undertaking course assignments and second year thesis projects.

6.5 The Cambodian Journal of Natural History

Students on the M.Sc. programme receive a free hardcopy subscription to the *Cambodian Journal of Natural History*, the first peer-reviewed scientific journal in Cambodia. Aimed at helping Cambodian scientists to share their findings and improve their writing skills, the journal addresses the critical need for information on the conservation status and management requirements of Cambodian biodiversity. Back issues of the journal can be freely downloaded from [www.fauna-flora.org/publications/cambodian-journal-of-natural-history/](http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/)

7. Student Assessment and Grading

7.1 Student Assessment

All subjects on the Masters curriculum involve assessments, both as an ongoing process during the course (e.g. through tests, seminars, workshops, fieldwork studies, essays, literature review, internships etc), and at the end of each course or semester by a written and/or oral exam or by submission of an assignment. The syllabus for each course specifies the nature of assessments and their individual contributions to the overall grade for that course.

Course assessments are primarily undertaken by the lecturers of each course, with assistance from Fauna & Flora International and the Royal University of Phnom Penh (RUPP). Students must attend at least 90% of all classes in each subject to be eligible to take an exam. Absence over 10% or incapacity to take exams for valid and approved reasons will however be taken into consideration.

All assessments are designed to facilitate evaluation of the students acquired competencies and capacity for critical thinking rather than mnemonic effort. Grading reflects the actual control by the student of the concepts, techniques and arguments presented during each course. Additional criteria for grading may include:

- Effort applied to improve knowledge of the subject;
• Personal study beyond that required by the course;
• Additional use of recommended materials;
• Personal library work on the course topic; and
• Originality and clarity of arguments presented.

Second year M.Sc. theses are independently assessed and graded by a minimum of three examiners, including at least one external to the University. The M.Sc. programme coordinators are responsible for collating average grades from these, formulating written statements on each thesis (using reports provided by each examiner) and submitting these for ratification and transmission to the Ministry of Education, Youth and Sport.

7.2 Grading System

The programme grading system is based on a point scale of a maximum 100 marks, 50 being the minimum passing mark. This is translated into a "grade letter", a "grade point", and a "value" as described below:

<table>
<thead>
<tr>
<th>Marks</th>
<th>Grade</th>
<th>Grade Point</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-100 %</td>
<td>A</td>
<td>4.0</td>
<td>Excellent</td>
</tr>
<tr>
<td>80-84 %</td>
<td>B+</td>
<td>3.5</td>
<td>Very Good</td>
</tr>
<tr>
<td>70-79 %</td>
<td>B</td>
<td>3.0</td>
<td>Good</td>
</tr>
<tr>
<td>65-69 %</td>
<td>C+</td>
<td>2.5</td>
<td>Fair</td>
</tr>
<tr>
<td>50-64 %</td>
<td>C</td>
<td>2.0</td>
<td>Pass</td>
</tr>
<tr>
<td>&lt;50 %</td>
<td>F</td>
<td>1.0</td>
<td>Fail</td>
</tr>
<tr>
<td>n/a</td>
<td>-</td>
<td>-</td>
<td>Incapacity to take the exam</td>
</tr>
</tbody>
</table>

Students should note that plagiarism (direct copying from other students and information sources and/or use of other material without appropriate acknowledgement) will make it impossible to receive any grade other than "fail". Heavy or repeated offences will result in dismissal from the programme.

8. Programme Partners

The Masters of Science in Biodiversity Conservation programme was originally launched in 2005 with the support of the Darwin Initiative (UK) and the US Fish and Wildlife Service. It has also received valuable support from the Margaret A Cargill Foundation (USA), John D. and Catherine T. MacArthur Foundation (USA), the Zoological Parks and Gardens Board of Victoria (Australia), United States Agency for International Development, Australian Centre for International Agricultural Research, and the International Crane Foundation (USA). A wide variety of national and international organisations are involved in course delivery and student support:-

• Angkor Centre for Conservation of Biodiversity, Cambodia
• Bat Conservation International, USA
• Charles Sturt University, Australia
• Conservation International, Cambodia
• Conservation Leadership Programme, UK
• Murdoch University, Australia
• Museum National d'Histoire Naturelle, France
• National University of Singapore, Singapore
• North Carolina Museum of Natural Sciences, USA
9. M.Sc. Course Descriptions

9.1 Year one, first semester (February-June 2015)

MBC511: Research Analysis: A Process of Inquiry (Credits: 4)

Lecturer: To be determined

The formation of an idea, a question or an opinion is based on previously acquired information and knowledge that, in turn, is collected either ad hoc, at random or in a systematic manner. Collection and analysis of data through direct studies in nature or through experimental setups in a laboratory are fundamental to all kinds of scientific research. The way in which questions are asked, however, also affects the way a study is set up to answer the respective question, and therefore a systematic and replicable process of inquiry is fundamental to any kind of modern science. In addition, collection and analysis of data also supports decision-makers to prepare informed decisions about the management of wildlife and natural resources. Modern scientific research is based on principles that evolved 2,500 years ago in Greece and this course examines the history of critical thinking and discusses the difference between Tenacity, Intuition, Authority, Rationalism, Empiricism and Science. It touches on the topics of data, analysis and interpretation, deduction vs. induction, data quality and types, processing survey data, and interpreting graphs and other illustrations. This course teaches the students the difference between scientific research and general information gathering, and aims to enable students to formulate specific research questions and to design appropriate methodologies that can provide answers to these questions, with the ultimate goal of understanding of nature better. Course assessment is based on a written assignment (50%), a written exam (40%) and class participation (10%).

MBC512: Research Methods and Applied Statistics (Credits: 4)

Lecturers: Mr Meak Kamerane and Dr Neil M. Furey

Wise natural resource management depends on the collection and analysis of reliable data upon which biologists and managers can base decisions and recommendations. The objective of this course is to develop the student’s ability to formulate hypotheses and research projects testing these that make appropriate use of sampling theory, data collection techniques and statistical tools. The course emphasizes the practical application of different sampling designs and statistical tools. Students learn how to develop and apply appropriate sampling designs and statistical tests to determine the degree of support for specific hypotheses, and the importance of eliminating confounding variables and bias. At the end of the course each student will have a clear understanding of the scientific research method and how it can be applied to their own research. This specifically strengthens each student’s ability to critically develop his or her own second year thesis project. Course assessment is based on a written assignment (60%), an exam (15%) and class participation (25%).
MBC513: Integrated Natural Resource Management (Credits: 5)
Lecturers: Dr Mak Sithiri and Dr Nicholas J. Souter

Cambodia has an abundance of natural resources such as, water, forests, fisheries, minerals and wildlife, but also has a high human population growth rate of 1.7 percent annually. People have relied heavily on natural resources for their livelihoods. This course defines what sustainable use is and aims to familiarise students with practical techniques and concepts for determining the sustainability of agriculture, forestry, hunting and other practices. Topics include: assessing natural resources and their economic value, measuring yield and carrying capacity, resolving conflicts, and the precautionary principle. The course especially focuses on contemporary challenges facing rural communities in developing countries, and the importance of natural resources for their food security and poverty alleviation. The roles of traditional management systems, land use planning, community forestry and fisheries, community-based wildlife conservation and ecotourism are discussed. The course includes case studies that illustrate successful and unsuccessful approaches, and their economic, environmental and social impact. Course assessment is based on a written assignment (50%), a written exam (40%) and class participation (10%).

MBC514: Global Climate Change (Credits: 3)
Lecturers: Mr Se Bunleng and Dr Nicholas J. Souter

Global environmental change, particularly global warming and climate change, as a result of human activities is now accepted as reality. While uncertainties remain as to the exact timing and regional character of many of the climate change impacts resulting from the 'enhanced greenhouse effect', change is now unavoidable. There is therefore a need to manage and adapt to these changing conditions and their biological, social, economic and political consequences. This course begins with the fundamentals of climate change science, focusing on the processes that drive climatic variability and change, and the roles of the terrestrial biosphere and the oceans in the global carbon cycle. The likely impacts of climate change on ecosystems and human activities are then considered, including biodiversity, system buffering and resilience, and geographical inequality and vulnerability. From here, a range of possible response strategies are investigated, with reference to international environmental treaties and emphasis on mitigation efforts, particularly emerging approaches in SE-Asia such as ‘payments for ecosystem services’ (PES) and ‘reducing emissions from deforestation and forest degradation’ (REDD & REDD+) schemes. Finally, existing strategies and efforts to improve adaptation to climate change consequences are considered in a Cambodian context. Course assessment is based on a written assignment (80%) and class participation (20%).

MBC515: Environmental Impact Assessment (Credits: 2)
Lecturers: Dr Chhun Sophal and Mr Danh Serey

Environmental Impact Assessment (EIA) is an important procedure for ensuring that the effects of new development on the environment are understood and taken into account before the development is allowed to go ahead. EIA is an important tool to assist decision-making which helps ensure that development projects are designed in a sustainable way prior to their approval. In this context, EIA helps to determine if a development proposal is acceptable from environmental and social viewpoints, how given issues must be addressed to ensure that it is, and to establish terms and conditions for undertaking a project. Due to limitations in the EIA process and lack of understanding about its application however, EIA often fails to achieve the purpose for which it is intended. The purpose of this course is therefore to provide students - as future practitioners or stakeholders in EIA processes – with a working knowledge of EIA concepts and techniques and how these can be applied in Cambodia. Course assessment is based on student presentations
and contributions to group discussions during the course (100%).

**MBC516: Environmental Law (Credits: 2)**
*Lecturer: Mr Soth Sang-Bonn*

Legislation and law enforcement are among the most important ways of ensuring that natural resources are conserved or used sustainably. This course examines and appraises general principles of environmental law, as developed in international and national legislation of jurisdictions around the world and in Cambodia. The course discusses Cambodia’s responsibility in relation to regional, and international trade agreements (e.g., WTO) and international conventions (e.g., United Nations Framework Convention on Climate Change, Convention on Biological Diversity, and CITES). The aim is to ensure that students are familiar with the basic concepts of law as far as they are relevant for environmental policies, as well as with relevant international agreements and Cambodian national legislation and their implementation. Course assessment is based on a written assignment (40%), a written exam (40%) and presentation (20%).

**MBC517: Scientific Writing and Data Presentation (Credits: 2)**
*Lecturer: To be determined*

Clear writing and presentation skills are vital for effective communication in science. Focussing on the main presentation forms (oral, visual and written), the aim of this course is to strengthen students’ abilities to collate, interpret and communicate scientific information. The course begins with an overview of Basic English grammar and writing techniques. Students then learn how to research topics and obtain information from written sources, with an emphasis on utilising and transforming information into knowledge. The final part of the course focuses on presentation methods, where students develop their data interpretation and presentation skills through a variety of graphs and charts, and learn to choose the most appropriate presentation forms to suit different circumstances. Course assessment is based on attendance (20%), oral assignment (40%) and poster (40%).

**9.2 Year one, second semester (September 2015 - January 2016)**

**MBC521: Species Conservation (Credits: 6)**
*Lecturers: Dr Neil M. Furey*

Preventing the extinction of endangered wild animals and plants is a growing challenge for both developed and developing nations. This course introduces students to the wide range of problems that arise when conserving endangered species, and the variety of possible tools and solutions. Focusing at the population level, students learn about the social and genetic dynamics of wild populations and the factors that make some populations more prone to extinction than others. The course then describes the application of conservation status criteria, as well as introducing the students to important recovery solutions such as captive breeding and propagation, ranching, head-starting, reintroduction, translocation, disease control and invasive species control. Case studies are used to illustrate and discuss current problems facing wildlife managers in SE Asia and Cambodia. Course assessment is based on a written assignment (50%), written exam (40%) and class participation (10%).

**MBC522: Behavioural Ecology: An Evolutionary Approach (Credits: 5)**
*Lecturers: Mr Ith Saveng and Mr Chhin Sophea*

This course begins with an introduction to evolution, the theoretical cornerstone for almost all contemporary species and habitat conservation issues. Through this, students become familiar with evolutionary history and important events in the history of life, including human evolution and
the origin of life. Effective wildlife management depends on a good understanding of the target species’ behaviour; for example, its food and foraging strategies, its reproductive biology, and its interactions with other species. The second part of the course considers the survival value of behaviour and how hypotheses may be formulated and experimentally tested. Subjects include: how individual animals make “economic” decisions, predator-prey relationships, resource competition, sexual conflict and selection, parental care and mating systems, and the roles of altruism and selfishness. To illustrate these, the course takes a comparative approach in discussing human beings in behavioural ecological contexts in relation to current resource use and social and cultural structures. Students learn why differences in behaviour between individuals or species can affect management decisions, and how to design and implement behavioural studies. Laboratory experiments are included to familiarize students with the basics of setting up “test-models”, small experiments, data recording and analysis. Course assessment is based on a written assignment (40%), written exam (30%), oral exam (20%) and class participation (10%).

MBC523: Geographic Information Systems (Credits: 2)
Lecturer: Mr Sovann Chansopheaktra

This course teaches basic concepts and provides students with practical experience in using Geographical Information Systems (GIS) and remote sensing as a tool for natural resource management. ArcGIS Desktop is employed to familiarise students with standard tools for viewing, managing, and processing GIS and remote sensing data. ArcGIS Desktop is a collection of software products used to create, import, edit, query, map, analyze, and publish geographic information. These tools can be applied in different fields of study, including the research thesis on the second year of the Masters programme. Course assessment is based on an assignment (100%) where each student develops thematic maps relating to natural resources in Cambodia.

MBC524: Ecological Field Techniques (Credits: 3)
Lecturer: Mr Chhin Sophea, Mr Neang Thy, Dr Nicholas Souter and Mr Chheang Sarak

Conservation biologists and natural resource managers cannot fully understand the complexities of the species populations or areas they manage without making visits to the field and identifying target species, populations or groups of species. This course teaches students the basics of good field craft, including map reading, compass use, GPS use, radio-use, field safety and first aid, emergency measures, reading tracks and other field signs, rapid habitat assessment, observation techniques and the art of camping. Students learn methods for describing and collecting specimens in the field, specimen preparation and storage, the use of identification keys, examining specific traits and the basics of animal and plant morphology. Much of this course takes place in the field and laboratory, focusing on animals and plants in their natural habitats. Course assessment is based on a written exam (60%), field trip participation (30%) and class participation (10%).

MBC 525: Project Cycle Management (Credits: 2)
Lecturer: Dr Seak Sophat, Mr Spoan Vin

The ability to design, manage and evaluate an effective project is an essential skill for professionals working in the environmental or development sector. This course aims to familiarise students with the concepts and tools used in international project management with particular focus on the logical framework approach. Subjects include: the project cycle and its main phases, stakeholder analysis, problem analysis, objectives analysis, project strategy selection and devising a logical framework, defining roles and responsibilities, resource inputs, implementation, monitoring and evaluation, and reporting. The course is highly practical, with exercises and analysis of real conservation and sustainable use projects. Course assessment is based on a written assignment (80%) and class participation (20%).

MBC526: Protected Area Management (Credits: 2)
Lecturer: Dr Loeung Kesaro

Protected areas (PAs) are the dominant global strategy for conserving biodiversity. This course aims to introduce students to the role and benefits of protected areas, and the main principles and challenges in managing them effectively, both nationally and worldwide. Topics include: how priority areas for conservation are identified, the different types and classifications of protected areas, the ways in which area, size, shape and connectivity influence PA design, and the principal tools currently used to manage protected areas and to evaluate management effectiveness. The course concludes with a review of some of the more controversial aspects of protected areas and the potential benefits and costs they impose on stakeholders. With roughly 25% of Cambodia under protection, this course is of particular value for those interested in working in the natural resource management or development sectors. Course assessment is based on a written exam (60%), class presentation (20%) and class participation (20%).

8.3  Year two, first and second semesters (February – December 2016)

Research Thesis (Credit value: 12)

Coordinators: Dr Nicholas J Souter and Ms Pheng Sokline

The research thesis is primarily a learning experience: learning the skills of research and exploring a topic in depth. Though it must involve research into an aspect of a discipline which the student has studied, this is broadly interpreted: it may involve research within or outside Cambodia and it may draw heavily on the students’ specialist background or work experience. For their theses, students are encouraged to address subjects relevant to conservation and natural resource management issues in Cambodia. To this end, students frequently undertake their projects in collaboration with local or international organisations. A good M.Sc. thesis is one in which the student clearly states the objective of the research; is well conceived and designed; uses appropriate research methods, is able to evaluate the results of the research in a broader context, and is well presented. A good thesis also shows evidence of wide reading; the ability to integrate information obtained from various sources into a unified whole, and the ability to write in accordance with accepted standards of scholarship, style and presentation. It is these general qualities and the ability to apply research skills that are critical, rather than the content of the research undertaken. The written thesis accounts for 80% of the total grade for the thesis, while an oral defence accounts for the remaining 20%.