WINONA STATE UNIVERSITY
PROPOSAL FOR NEW COURSES

Department _______ Biology _______ Date _______ 9/7/2012 _______

Refer to Reg 3-4, Policy for Changing the Curriculum, for complete information

<table>
<thead>
<tr>
<th>BIOL 402</th>
<th>Endocrinology</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course No.</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
</tbody>
</table>

This proposal is for a(n) X Undergraduate Course _____ Graduate Course

Applies to: X Major _____ Minor _____ Required _____ Required _______ General Education Program

_____ Required _____ Elective (for BIOL) _____ University Studies Program

(1) Elective (for BIAH, BICM, BIEC)

Prerequisites: BIOL 308, 311, 322, CHEM 350 or 340. BIOL 323 and CHEM 400 suggested

Grading method X Grade only ______ P/NC only ______ Grade and P/NC Option

Frequency of offering Once per year

Provide the following information:

A. Course Description

1. Catalog description.
   402 – Endocrinology (3 SH).
   Students will gain an understanding of the structure, function, and cellular/molecular biology of the endocrine system with an emphasis on mammalian/human endocrinology and relevant disease states. It will also have an emphasis on identifying, reading, and discussing primary literature. This course is primarily intended for students who are preparing for further studies in medicine, veterinary medicine, allied health fields, or graduate work in related disciplines. Prerequisites: BIOL 308, BIOL 311, BIOL 322, either CHEM 350 or CHEM 340. BIOL 323 and CHEM 400 recommended. Offered yearly.

2. Course outline of the major topics and subtopics (minimum of two-level outline).
   I. Introduction to Endocrinology
      a. Basic gross anatomy, hormone classes and chemistry, secretion and transport mechanisms, receptor classes
   II. Hypothalamus and Pituitary
      a. Discussion of classes and actions of hypothalamic and pituitary hormones
      b. Influence of hypothalamic and pituitary hormones on other endocrine glands and organ systems
      c. Coordination and communication between hypothalamus and pituitary
   III. Thyroid
      a. Synthesis, secretion, and actions of thyroid hormones
      b. Regulation of thyroid function, thyroid disorders
IV. Adrenal cortex
   a. Adrenal cortex histology
   b. Adrenal cortical hormones and their function
   c. Regulation and secretion of cortical hormones
   d. Transport and peripheral metabolism of cortical hormones
   e. Role of adrenal cortical hormones in development
   f. Role of adrenal cortical hormones in regulation of electrolyte and fluid homeostasis
   g. Disorders of the adrenal cortex

V. Adrenal medulla
   a. Medullary hormones
   b. Regulation and secretion of medullary hormones
   c. Function of adrenal hormones and disorders of secretion
   d. Discussion of classes and functions of adrenergic receptors

VI. Endocrine Pancreas
   a. Histology of Islets of Langerhans
   b. Pancreatic hormones and their function
   c. Regulation of pancreatic hormone secretion
   d. Diabetes and metabolic disorders

VII. Hormonal control of calcium homeostasis
   a. Parathyroid gland hormones
   b. Regulation of parathyroid function
   c. Role of thyroid hormones in calcium homeostasis
   d. Coordination of endocrine, skeletal, digestive, urinary systems in calcium homeostasis

VIII. Androgens
   a. Regulation of gonadal and adrenal cortical secretion of androgens
   b. Androgen hormones and their actions
   c. Role of androgens in male reproduction

IX. Estrogens and progesterone
   a. Regulation of gonadal and adrenal cortical secretion of female sex steroids
   b. Female sex steroids and their actions
   c. Endocrine control of female reproductive cycle

X. Hormones of pregnancy/development
   a. Sources of endocrine hormones during pregnancy and partuition
   b. Endocrine placenta structure and function
   c. Role of thyroid hormones, adrenal cortical hormones, growth hormones, and sex steroids in organ system development
   d. Partuition and neonatal development

XI. Endocrine disrupting chemicals (EDCs)
   a. Environmental and Xenoestrogens
   b. Other classes of EDCs
   c. Impact on EDCs on reproduction, development, endocrine function

XII. Hormones and cancer
   a. Role of growth hormones and sex steroids in the development and pathogenesis of various cancers
3a. Instructional delivery methods utilized: (Please check all that apply).

<table>
<thead>
<tr>
<th>Lecture: Auditorium</th>
<th>ITV</th>
<th>Online</th>
<th>Web Enhanced</th>
<th>Web Supplemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture: Classroom X</td>
<td>Service Learning</td>
<td>Travel Study</td>
<td>Laboratory</td>
<td>Internship/Practicum</td>
</tr>
</tbody>
</table>

Other: (Please indicate)

3b. MnSCU Course media codes: (Please check all that apply).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2. CD Rom</td>
<td>5. Broadcast TV</td>
<td>8. ITV Receiving</td>
<td></td>
</tr>
</tbody>
</table>

4. Course requirements (papers, lab work, projects, etc.) and means of evaluation.

Grades are assigned based on performance on 4 in-class exams (2/3 of final grade) and performance in discussion sessions of primary literature (1/3 of final grade).

Exams: Written exams take place during regularly scheduled class periods and consist of 25-30 multiple choice, true/false, and matching questions (approximately 50% of exam). The remainder of the exams will consist of 4-5 essay type questions.

Literature discussions: Throughout the course of the semester each student will select one journal article for reading and lead a discussion of that article. The discussion will focus on the following topics: hypothesis, experimental design, experimental methodology/techniques, results, and contribution of the study to the field of endocrinology. Each student is required to maintain a three-ring binder with copies of all of the primary literature articles that are discussed throughout the semester. In addition, students are required to complete a preliminary worksheet for each article discussed prior to the beginning of the discussion. Binders will be collected and reviewed by the instructor at the mid-point of the semester and again at the completion of the semester. The instructor will keep a log of student participation and effectiveness of the discussion leader.

5. Course materials (textbook(s), articles, etc.).

For the 2012-2013 academic year the text used will be:


ISBN 978-0123739759

6. Assessment of Outcomes

Students will:

Understand the gross and microscopic anatomy of endocrine glands and tissues – Lecture exams
Understand mechanisms of hormone secretion, transport, metabolism & secretion – Lecture exams
Understand endocrine control of homeostasis and coordination of organ system function – Lecture exams

Be able to critically analyze experimental design and experimental results – Literature discussions
Demonstrate knowledge of methodologies employed in endocrine research – Literature discussions
7. List of references.


B. Rationale

1. Statement of the major focus and objectives of the course.
Through lectures, readings, and literature discussions the students will gain and advanced understanding of the structure and function of the endocrine system in mammalian systems in health and disease states. The students will gain an understanding of the classes of endocrine hormones, including the regulation of their synthesis, transport, metabolism and mode of action at the molecular level. Additionally, students will gain a greater appreciation for the role of the endocrine system in coordinating the actions of other organ systems and the role this plays in maintenance of homeostasis.

2. Specify how this new course contributes to the departmental curriculum.
Endocrinology is a basic science course which contributes to student understanding of mammalian anatomy and physiology and also serves as a preparatory course for students interested in further study in medicine, veterinary medicine, allied health fields, and graduate work in cellular/molecular biology, developmental biology, animal behavior, among others. This course will reinforce and expand the students understanding of anatomy, physiology, cellular and molecular biology, biochemistry and genetics beyond the department’s current course offerings. This course will further expand the upper level elective courses available for students in all curricular tracks within the biology department.

3. Indicate any course(s) which may be dropped if this course is approved. None

C. Impact of this Course on other Departments, Programs, Majors, or Minors

1. Does this course increase or decrease the total credits required by a major or minor of any other department: No
2. Attach letter(s) of understanding from impacted department(s). N/A

Financial and Staffing Data Sheet attached.
Approval Form with appropriate signatures attached.

Department Contact Person for this Proposal:

Dr. Mark Garbrecht  457-2261  mgarbrecht@winona.edu
Name (please print)  Phone  e-mail address
Include a Financial and Staffing Data Sheet with any proposal for a new course, new program, or revised program.

Please answer the following questions completely. Provide supporting data.

1. **Would this course or program be taught with existing staff or with new or additional staff? If this course would be taught by adjunct faculty, include a rationale.**

   Faculty existing in the department would teach this course (Mark Garbrecht, primary). The department currently also has other faculty members with endocrinology expertise who could teach this course if they desire or on an as-needed basis.

2. **What impact would approval of this course/program have on current course offerings? Please discuss number of sections of current offerings, dropping of courses, etc.**

   This course will be an additional elective for Biology majors, so its impact will be to reduce the need for additional sections of other elective courses to meet student demand. None of those other elective offerings with strong enrollments will be dropped. Initially, one section of this course (approximately 24 students) will be offered per academic year, although high student demand in future years could result in additional sections.

3. **What effect would approval of this course/program have on the department supplies? Include data to support expenditures for staffing, equipment, supplies, instructional resources, etc.**

   Approval of this lecture-only course will have minimal demand for departmental supplies and resources beyond three credits of teaching load for the instructor.