Dear Dr. Archambault:

Attached please find four revised syllabi (MS word files), the current premed chemistry program plan and a proposed program plan (both pdfs). We would like to submit them for the February UGCC meeting. Below are summaries of changes made accordingly to your inputs (copied below).

With respects to items 6b-e:
1) Grading schemes that indicates percentage of overall points with corresponding letter grades were added to all four syllabi.
2) Regarding 6d, in a revised syllabus, 10% of the course grade would go to two quizzes, 60% to two midterms, and 30% to a final exam.
3) Regarding discriminations between graduate and undergraduate levels, students registered for the graduate credits (i.e. 5000 level) in those four courses will have extra questions on the exams. This is clearly and concisely stated in all four syllabi.
4) For all four syllabi, the number of lectures per topic are incorporated.
5) For all four syllabi, a suggested textbook is listed.

Regarding 6f, please note that changes made in a proposed flow chart are in the junior and senior years as stated in the corresponding original CHANGING GRADUATE REQUIREMENTS IN A MAJOR/MINOR form (not attached to this email). I highlighted in yellow courses to be removed in the current flowchart, and highlighted in green courses to be added in a proposed flowchart for clarity.

With above changes, we believe our revised materials would be suitable for resubmission for the February UGCC meeting. Please kindly let us know if you have any questions/concerns. Thank you very much in advance for your consideration.

Best wishes,
Norito Takenaka

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With regards to items 6b, 6c, and 6e, there was a concern that the proposed grading schemes only listed a number of points for particular graded items (e.g. 100 pts for a midterm exam), but did not indicate what percentage of
overall points would constitute what letter grades at the end of the semester. Also related to the grading schemes, for item 6d, the proposed scheme indicated that 30% of the course grade would go towards a midterm, and 70% would go towards the final exam. The syllabus also noted that there would be two quizzes, but these were not incorporated into the overall course grading scheme. The concern was that too much emphasis was being placed on the final exam, considering that this will be an undergraduate course, and that failure of one exam would likely mean failure in the course.

Additional objections were raised related to items 6b-6e. First, while the proposed courses are to be bi-level, meeting with the corresponding (and existing) graduate courses, the graduate syllabi were provided to the UGCC, and Graduate Policy requires there to be a difference between the graduate and undergraduate versions of the same course, to justify why some students will receive graduate credit, and others will not. Second, each of the syllabi only provide a list of topics to be covered. While the list may be detailed, the UGCC requires that associated time per topic also be provided, either as the number of lectures or class hours to be spent on each topic. Third, none of the courses specified a required textbook, indicating only that appropriate references will be given corresponding the courses’ topics. Finally, related to item 6f, it seemed that the current and proposed flowcharts were identical, so it was unclear what changes were actually being proposed.

Norito Takenaka
Associate Professor of Chemistry
Department of Chemistry
Florida Institute of Technology
150 West University Boulevard
Melbourne, Florida 32901-6975
Telephone: (321) 674-7310
DATE: December 6, 2016

TO: UGCC

FROM: Norito Takenaka, Ph.D., Associate Professor, Department of Chemistry

THROUGH: Dr. Michael Freund, Head, Department of Chemistry

THROUGH: Dr. Hamid K. Rassoul, Dean, College of Sciences

SUBJECT: Request to Add New Courses to the Curriculum.

Premedical Chemistry program currently offered in the Department of Chemistry is designed to focus on preparation for the medical school admission. To provide broader education for students, while getting them ready for medical schools, we would like to replace its two restricted electives with Medicinal Chemistry (CHM 5520) and Natural Products (CHM 5507). These courses provide students solid foundation on life sciences at molecular level, as well as introduction to the modern drug discovery and development.

Existing Medicinal Chemistry (CHM 5520) and Natural Products (CHM 5507) are graduate courses. As such, we are requesting UGCC an approval to change them to bi-level courses (CHM 4/5520 and CHM 4/5507) so as to add them to the curriculum as requirements. Once approved, these courses will also be offered as electives to all interested students on campus as these courses are appropriate for students who seek to become dentists, nurses, pharmacists, and veterinarians.
Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

This is a request for reactivation of a course in the system. □ Yes  □ No

New courses are available beginning with the fall term in which they appear in the University Catalog.

SUBJECT  C H M  COURSE NO.*  4 5 0 7  CREDIT HOURS  3  ACADEMIC YEAR TO BE ADDED TO THE FILE  Fall 2017
(e.g. CSE)    (e.g., 1301)  (e.g, Fall 2010)

*Justify level if 1000-level+ and no co- or prerequisites

CLASS HOURS  45/semester  LECTURE HOURS  45/semester  LAB HOURS  0/semester  CONTACT HOURS (CEU ONLY)  N/A

DEPARTMENT  Chemistry
(e.g., Biological Sciences)

SCHEDULE TYPE  Lecture (A)
(e.g., Lecture, Lab or Special Topics/Project)

☐ COLLEGE OF AERONAUTICS – 23
☐ NATHAN M. BISK COLLEGE OF BUSINESS – 24
☐ COLLEGE OF ENGINEERING – 1
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS – 25

□ COLLEGE OF SCIENCE – 26
☐ EXTENDED STUDIES/NMB COLLEGE OF BUSINESS – 90
☐ SCHOOL OF COMPUTING – 29
☐ SCHOOL OF HUMAN-CENTERED DESIGN, INNOVATION & ART – 28

COMPUTER TITLE  Natural Products
Restricted to 25 characters, including spaces

This course will be entered into the system as: Bi-Level  □ Cross-Listed  □ Dual-Numbered  □ Full-Load  □ None of these/Standard Listing □

CATALOG TITLE  Natural Products

CATALOG DESCRIPTION OF COURSE  Restricted to 350 characters, including spaces

Surveys organic natural products, emphasizing marine organisms. Outlines major structural families and their sources. Includes the role of natural products in the environment, approaches to their analysis and structure elucidation, and biosynthesis of major classes of secondary metabolites. Meets with CHM 5507.

This description has been approved by the catalog office

Catalog & Curriculum Manager  11/30/2016

In addition, please attach a course syllabus and/or more detailed description.

GRADES TO BE ISSUED  □ A, B, C, D, F  □ A, B, C, D, F, CEU/Audit  □ CEU
□ S, U  □ P, F  □ Other

RESTRICTIONS  □ Prerequisite  CHM 2002  □ Corequisite  Course Number
Course Number
□ Prerequisite  CHM 3001  □ Corequisite  Course Number
Course Number
□ Prerequisite  Course Number
□ Corequisite  Course Number

□ and □ or
□ and □ or
□ and □ or
□ and □ or
□ and □ or

ADDITIONAL RESTRICTION  □ and □ or

(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

Subject Alpha Prefix (e.g., CSE)  COURSE NO. (e.g., 1301)  TERM TO INACTIVATE

□ Yes  □ No  Will this course be used to measure program-level student learning outcomes? If yes, review and signature required.**
□ Yes  □ No  Will this course be used to satisfy the scholarly inquiry requirement? If yes, attach "Q" materials for review.
□ Yes  □ No  Will this course impact any existing programs? If yes, attach "Changing Graduation Requirements" form for each program impacted.

APPROVALS: On completion of description and course number verification, affix appropriate signatures as indicated, and submit to the Office of Graduate Programs, or Undergraduate Curriculum Committee Chair for placement on agenda.

Originator

Date  12/03/2016

Department Head/Program Chair

Date  12/06/2016

Dean or Associate Dean

Date  11/24/17

Chair, Graduate Council

Date

OR

Chair, Undergraduate Curriculum Committee

Date

**Chief Academic Officer

Date

FLORIDA INSTITUTE OF TECHNOLOGY • OFFICE OF THE REGISTRAR

150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827

RGR-297-816
Recommended Textbook:
Appropriate references will also be given in due course according to relevant topics.

Prerequisites:
General Chemistry, Organic Chemistry and relevant labs

Homework:
Occasional homework assignments will be given out for practice. They will be collected, corrected, but not graded.

Exams:
There will be 5 quizzes, a midterm, a final, an abstract and a presentation of that abstract. Students registered for CHM5507 (i.e. graduate credits) will have extra questions on the mid-term and final exams.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (5 x 20)</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm</td>
<td>25%</td>
</tr>
<tr>
<td>Presentations</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grading: 100 – 85% (A), 84 – 75% (B), 74 – 65% (C), 64 – 55% (D), 54 – 0% (F),

Course Outline: (hours/lecture)
- Introduction (2)
- History of Natural Products (2)
- Carbohydrates (4)
- Nucleic Acids (2)
- Amino Acids (4)
- Fatty Acids (3)
- Terpenes (3)
- Vitamins and Cofactors (3)
- Alkaloids (3)
- Steroids (3)
- Pheromones (2)
- Toxins (2)
- Phenolics (2)
- Ginkgolides (1)
- Color Chemistry (1)

Highlights of Individual Natural Products:
Outline of lectures on the left:
- Background and History
- Significance and mode of action
- Isolation
- Structure elucidation
- Synthesis
- Biosynthesis
ADDING A NEW COURSE TO THE CURRICULUM

New courses are available beginning with the fall term in which they appear in the University Catalog.

This is a request for reactivation of a course in the system. Yes ☐ No ☐

SUBJECT C H M COURSE NO.* 4 5 2 0 CREDIT HOURS 3 ACADEMIC YEAR TO BE ADDED TO THE FILE Fall 2017

*Justify level if 1000-level+ and no co- or prerequisites

CLASS HOURS: 45/semester LECTURE HOURS: 45/semester LAB HOURS: 0/semester CONTACT HOURS (CEU ONLY): N/A

DEPARTMENT: Chemistry

SCHEDULE TYPE: Lecture (A)

COLLEGE OF AERONAUTICS – 23
☑ COLLEGE OF SCIENCE – 26
☐ NATHAN M. BISK COLLEGE OF BUSINESS – 24
☐ EXTENDED STUDIES/NMB COLLEGE OF BUSINESS – 90
☐ COLLEGE OF ENGINEERING – 1
☐ SCHOOL OF COMPUTING – 29
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS – 25
☐ SCHOOL OF HUMAN-CENTERED DESIGN, INNOVATION & ART – 28

COMPUTER TITLE: Medicinal Chemistry

Restricted to 25 characters, including spaces

This course will be entered into the system as: BI-Level ☐ Cross-Listed ☐ Dual-Numbered ☐ Full-Load ☐ None of these/Standard Listing ☐

CATALOG TITLE: Medicinal Chemistry

CATALOG DESCRIPTION OF COURSE: Restricted to 350 characters, including spaces

Studies the chemical nature of physiological mediators, the hormones that mediate life processes. Includes isolation, structure determination and synthesis of the mediators. Preparation of inhibitors or activators of enzymes that work on those mediators or agonists or antagonists to the mediators to correct imbalances that cause disease.

This description has been approved by the catalog office

Catalog & Curriculum Manager

11/30/2016

In addition, please attach a course syllabus and/or more detailed description.

RESTRICIONS: ☐ Prerequisite CHM 2002 ☐ Corequisite Course Number ☐ and/or or
☐ Prerequisite CHM 3001 ☐ Corequisite Course Number ☐ and/or or
☐ Prerequisite Course Number ☐ Corequisite Course Number ☐ and/or or

ADDITIONAL RESTRICTION: ☐ and ☐ or Meets with CHM 5590

☑ Major, Class Level, Department Head Approval

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

SUBJECT Alpha Prefix (e.g., CSE) COURSE NO. (e.g., 1301) TERM TO INACTIVATE

☑ Yes ☐ No Will this course be used to measure program-level student learning outcomes? If yes, review and signature required.**

☑ Yes ☐ No Will this course be used to satisfy the scholarly inquiry requirement? If yes, attach “Q” materials for review.

☑ Yes ☐ No Will this course impact any existing programs? If yes, attach “Changing Graduation Requirements” form for each program impacted.

APPROVALS: On completion of description and course number verification, affix appropriate signatures as indicated, and submit to the Office of Graduate Programs, or Undergraduate Curriculum Committee Chair for placement on agenda.

Chair, Graduate Council Date

1/13/2017

Dean or Associate Dean Date

1/12/2017

Chair, Undergraduate Curriculum Committee Date

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150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827

REGISTRAR’S USE ONLY

SCACRSE SCADTL SCAPREQ SCABASE ACATALOG

SCARRES CIP Code Operator Init. Date
Syllabus
CHM 4520/5520 Medicinal Chemistry

Joshua Rokach, Ph.D.
674-8578
jrokach@fit.edu
Office Hours: TBA

Recommended Textbook:

Exams:
There will be two quizzes, two mid-term exams and the final exam. Students registered for CHM5520 (i.e. graduate credits) will have extra questions on the mid-term and final exams.

Grading:
- Two quizzes 10%
- Two mid-terms: 60%
- Final: 30%
Total 100%

Grading Scheme: 100 – 90% (A), 89 – 80% (B), 79 – 70% (C), 69 – 60% (D), 59 – 0% (F),

Drug Development (10 lectures)

- A few facts about large and small pharmaceutical companies
- Evaluation and selection of a program and drug targets—What are we going to work on; what drug for what disease? (e.g. HMG CoA reductase)
- New lead discovery: 1) rational design, computer and molecular modeling, crystal x-rays, etc.; 2) screening process, microbial incubation, natural product groups, sample collections.
- Bio-testing, in vitro, in vivo
- Selection for development: general meeting, patent issues, publication philosophy, etc.
- Process research, large-scale synthesis
- Metabolism and bioavailability
- Preliminary safety assessment: 2 species, 3 doses, 3 months
- Gene Tox.
- Teratogenicity (rabbit) introduced after the Thalidomide disaster (immuno regulator)
- 5 Phases of clinical trials in humans—Phase 1 tolerance test: small study ~12 normal people measuring safety parameters, e.g. liver transaminase and alkaline phosphatase enzymes, bioavailability, metabolism, etc. Phases II and III: show efficacy; Phases IV and V: large scale

**Leukotrienes, Lipoxins and HETEs** (8 lectures)

**Introduction: SRS-A – LTC₄, D₄, E₄**

1) Biochemical formation

2) Synthesis

3) Biological activity of leukotrienes

4) Design of LTD₄ antagonists
   a) Drugs available for asthma, phosphodiesterase inhibitors, β-agonists
   b) Bio assays: Binding studies, cell and broken cell assays, GP ileum, GP lung, asthmatic rat, squirrel monkey
   c) Early leads
   d) Story of metabolism of LTC₄ and LTD₄: Unusual reason to study metabolism and β-oxidation. Mechanism of β-oxidation

5) Development of Singulair, an LTD₄ antagonist for asthma, allergic rhinitis
   a) New lead discovery
   b) Assays
   c) SAR

6) Discovery of Flap (5-LO activating protein)
a) MK886 (Flap antagonist)

b) Design of photoaffinity and radiolabelled probe

c) Design of affinity chromatography reagents (Affi-Gel)

7) Design of 5-LO enzyme inhibitor L-651,392 and mechanism of action

**5-Oxo-ETE and Asthma** (8 lectures)

1) Role of 5-oxo-ETE in asthma

2) Biochemical formation of 5-oxo-ETE

3) In vitro assays for 5-oxo-ETE: chemotaxis and Ca assays

4) Design of photoaffinity and affinity chromatography ligands for the isolation of 5-HEDH – early and late designs

5) The rational design of 5-oxo-ETE receptor antagonists – early lead 5,12 DiHETE

6) Pharmacokinetics (PK) and metabolism of 5-oxo-ETE receptor antagonists

7) In vivo models – GP, rat, primate

8) Enzyme inhibitor

**Prostaglandins and N-SAID** (8 lectures)

1) Biochemical formation of prostaglandins from AA and other lipids

2) Involvement of PGF$_{2\alpha}$ in the eye

3) PGE$_{2}$ and the H$^+$ pump in the stomach

4) Thromboxane A$_2$ and platelets and the cardiovascular system

5) The role of ω-3 fatty acid

**IsoProstanes and Neuroprostanes** (8 lectures)

1) Formation and identification of iP’s in biological fluids

2) Quantitation of isoprostanes by LC/MS/MS

3) iP’s in diseases and oxidant stress, study in ApoE deficient mice
4) Correlation of iP’s to severity of inflammatory diseases, e.g. Alzheimer, atherosclerosis
DATE: January 17, 2017

TO: UGCC

FROM: Norito Takenaka, Ph.D., Associate Professor, Department of Chemistry

THROUGH: Dr. Michael Freund, Head, Department of Chemistry

THROUGH: Dr. Hamid K. Rassoul, Dean, College of Sciences

SUBJECT: Request to Add New Courses to the Curriculum.

To provide broader education for premedical students, the Chemistry Department has agreed to revise the existing Premedical Chemistry program. As a first step toward this goal, we would like to replace its current restricted elective courses with Biochemistry 2 (BIO 4110), Organic Synthesis (CHM 5503), Natural Products (CHM 5507), Bioorganic Chemistry (CHM 5508) and Medicinal Chemistry (CHM 5520). These courses provide students a solid foundation on life sciences at the molecular level, as well as an introduction to the modern drug discovery and development.

Existing Organic Synthesis (CHM 5503), Natural Products (CHM 5507), Bioorganic Chemistry (CHM 5508) and Medicinal Chemistry (CHM 5520) are graduate courses. As such, we need to change these courses to bi-level courses to include in the curriculum as restricted electives. A request for Natural Products and Medicinal Chemistry was already submitted for consideration to UGCC. We are herewith requesting UGCC an approval to change Organic Synthesis and Bioorganic Chemistry to bi-level courses (i.e. CHM 4/5503 and CHM 4/5508). Once approved, these courses will also be offered as electives to all interested students on campus as these courses are appropriate for students who seek to become dentists, nurses, pharmacists, and veterinarians.
**Florida Institute of Technology**

**ADDING A NEW COURSE TO THE CURRICULUM**

This is a request for reactivation of a course in the system. □ Yes □ No

**New courses are available beginning with the fall term in which they appear in the University Catalog.**

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>COURSE NO.*</th>
<th>CREDIT HOURS</th>
<th>ACADEMIC YEAR TO BE ADDED TO THE FILE</th>
</tr>
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<tbody>
<tr>
<td>(e.g., CSE)</td>
<td>4503</td>
<td>3</td>
<td>Fall 2017</td>
</tr>
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</table>

*Justify level if 1000-level+ and no co- or prerequisites

<table>
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<tr>
<th>CLASS HOURS</th>
<th>LECTURE HOURS</th>
<th>LAB HOURS</th>
<th>CONTACT HOURS (CEU ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45/semester</td>
<td>45/semester</td>
<td>0/semester</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>SCHEDULE TYPE</th>
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</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>Lecture (A)</td>
</tr>
</tbody>
</table>

| Restricted to 25 characters, including spaces |

☐ COLLEGE OF AERONAUTICS – 23
☐ NATHAN M. BISK COLLEGE OF BUSINESS – 24
☐ COLLEGE OF ENGINEERING – 1
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS – 25

<table>
<thead>
<tr>
<th>COMPUTER TITLE</th>
<th>CATALOG TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Synthesis</td>
<td></td>
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</tbody>
</table>

This course will be entered into the system as: Bi-Level ☐ Cross-Listed ☐ Dual-Numbered ☐ Full-Load ☐ None of these/Standard Listing ☐

**CATALOG DESCRIPTION OF COURSE** Restricted to 350 characters, including spaces

Studies reagents, their capabilities and limitations, and the use of reagents in the design of an organic synthesis. Meets with CHM 5503.

This description has been approved by the catalog office.  

**In addition, please attach a course syllabus and/or more detailed description.**

<table>
<thead>
<tr>
<th>RESTRICTIONS</th>
<th>GRADES TO BE ISSUED</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Prerequisite CHM 2002</td>
<td>☐ A, B, C, D, F</td>
</tr>
<tr>
<td>☐ Prerequisite CHM 3001</td>
<td>☐ A, B, C, D, F, CEU/Audit</td>
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</table>

<table>
<thead>
<tr>
<th>ADDITIONAL RESTRICTION</th>
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<tbody>
<tr>
<td>☐ and ☐ or</td>
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</tbody>
</table>

(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

**APPROVALS:** On completion of description and course number verification, affix appropriate signatures as indicated, and submit to the Office of Graduate Programs, or Undergraduate Curriculum Committee Chair for placement on agenda.

**CROSS-CARRIED COURSES:**

□ Yes □ No Will this course be used to measure program-level student learning outcomes? If yes, review and signature required.**

□ Yes □ No Will this course be used to satisfy the scholarly inquiry requirement? If yes, attach "Q" materials for review.

□ Yes □ No Will this course impact any existing programs? If yes, attach "Changing Graduation Requirements" form for each program impacted.

**CATALOG & CURRICULUM MANAGER**

These changes/additions have been made for the University Catalog and entered into the BANNER term named above.

**REGISTRAR'S USE ONLY**

SCACRSE SCADETL SCAPREQ SCABASE ACATALOG SCARRIES CIP Code Operator Init. Date

Florida Institute of Technology • Office of the Registrar

150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827

RGR-297-816
CHM 4503/5503 Syllabus
Organic Synthesis
Joshua Rokach
jrokach@fit.edu
Office Hours: TBA

1. Interaction of Electrophiles and Nucleophiles (2 lectures)

2. Reactions and their mechanisms:-(8 lectures)
   5.1. Double bond formation: a) Wittig rxn b) Grubbs rxn c) Julia olefination
   5.2. Oxidation: a) PCC b) Des-Martin c) Swern oxd® d) Periodic acid
   5.3. Reduction: a) LiAlH₄ b) Borane c) Catecholborane
   5.4.Miscellaneous: a) Ester Hydrolysis b) Bromination, Iodination, Thiocarbonate/I₂
       c) Aromatic Electrophilic and Nucleophilic substitution

3. Protecting groups:-(8 lectures)
   t-Boc, Fmoc, silyl (TMS, TES, TBDMS, TIPS, TBDPS), benzyl, acetonide, THP,
   acetal, and ketal

4. Introduction to Eicosanoids:-(8 lectures)
   3.1. Leukotrienes & HETE:
       a) Racemic synthesis of LTA₄ and assignment of C₈ double bond
       b) Stereospecific synthesis of LTA₄, LTC₄, LTD₄ & LTE₄ from
       2-deoxy-D-Ribose & D-Arabinose
       c) LTB₄ stereospecific synthesis. Enzymatic and chemical hydrolysis of LTA₄
   3.2. Prostaglandins, Prostacyclins : Synthesis of 15-R- methyl PGD₂
   3.3. Thromboxanes: Mechanism of formation of TXA₂ and TXB₂

5. Isoprostanes:-(8 lectures)
   4.1. Classification and Biological Importance
   4.2. Formation of Isoprostanes:-
       Endoperoxide mechanism & Dioxetane mechanism
   4.3. Synthesis of Isoprostanes:-
       a) From D- & L-Glucose
       b) Diels-Alder approach
       c) Cyclopentadiene Route
   4.4. Isoprostane Analysis

6. Radical Reactions:-(8 lectures)
   6.1. Addition of radical to olefin
   6.2. Electron and γ-ray induced formation of radical
   6.3. Thioxanthate in the generation of a free radical
Recommended Textbook:

Exams:
There will be two quizzes, two mid-term exams and the final exam. Students registered for CHM5503 (i.e. graduate credits) will have extra questions on the mid-term and final exams.

Grading:

a. Two quizzes  10%

b. Two mid-terms:  60%

c. Final:*  30%

Total  100%

Grading Scheme: 100 – 90% (A), 89 – 80% (B), 79 – 70% (C), 69 – 60% (D),
59 – 0% (F),

*The final exam will have about 25% of the syllabus from the mid-term. The mid-term syllabus for the final exam will be discussed in class.
Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

New courses are available beginning with the fall term in which they appear in the University Catalog.

SUBJECT  C  H  M
(e.g., CSE)  (e.g., 1301)

COURSE NO.*  4  5  0  8
(e.g., Fall 2010)

CREDIT HOURS  3

ACADEMIC YEAR TO BE ADDED TO THE FILE  Fall 2017

*Justify level if 1000-level* and no co- or prerequisites

CLASS HOURS  45/semester
LECTURE HOURS  45/semester
LAB HOURS  0/semester
CONTACT HOURS (CEU ONLY)  N/A

DEPARTMENT  Chemistry
(e.g., Biological Sciences)

SCHEDULE TYPE  Lecture (A)
(e.g., Lecture, Lab or Special Topics/Project)

☐ COLLEGE OF AERONAUTICS – 23
☐ NATHAN M. BISK COLLEGE OF BUSINESS – 24
☐ COLLEGE OF ENGINEERING – 1
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS – 25
☐ COLLEGE OF SCIENCE – 26
☐ EXTENDED STUDIES/NMB COLLEGE OF BUSINESS – 90
☐ SCHOOL OF COMPUTING – 29
☐ SCHOOL OF HUMAN-CENTERED DESIGN, INNOVATION & ART – 28

COMPUTER TITLE  Bioorganic Chemistry

 Restricted to 25 characters, including spaces

This course will be entered into the system as:  Bi-Level ☐  Cross-Listed ☐  Dual-Numbered ☐  Full-Load ☐  None of these/Standard Listing ☐

CATALOG TITLE  Bioorganic Chemistry

CATALOG DESCRIPTION OF COURSE
Restricted to 350 characters, including spaces

Includes structure-function interrelationships, the role of cofactors, origins of efficiency and selectivity, recognition phenomena and artificial enzymes. Meets with CHM 5508.

[Signature]
Catalog & Curriculum Manager

This description has been approved by the catalog office

In addition, please attach a course syllabus and/or more detailed description.

RESTRICTIONS ☐ Prerequisite CHM 2002
☐ Corequisite Course Number

☐ Prerequisite CHM 3001
☐ Corequisite Course Number

GRADING TO BE ISSUED
☐ A, B, C, D, F
☐ A, B, C, D, F, CEU/Audit
☐ CEU
☐ S, U
☐ P, F
☐ Other

☐ and ☐ or

ADDITIONAL RESTRICTION ☐ and ☐ or

(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information and the date/term the course may be removed from the system.

SUBJECT  Alpha Prefix (e.g., CSE)  COURSE NO. (e.g., 1301)

TERM TO INACTIVATE

☐ Yes  ☐ No  Will this course be used to measure program-level student learning outcomes? If yes, review and signature required.**

☐ Yes  ☐ No  Will this course be used to satisfy the scholarly inquiry requirement? If yes, attach "Q" materials for review.

☐ Yes  ☐ No  Will this course impact any existing programs? If yes, attach "Changing Graduation Requirements" form for each program impacted.

APPROVALS: On completion of description and course number verification, affix appropriate signatures as indicated, and submit to the Office of Graduate Programs, or Undergraduate Curriculum Committee Chair for placement on agenda.

[Signature]
Chair, Graduate Council
[Date]

[Signature]
Chair, Undergraduate Curriculum Committee
[Date]

**Chief Academic Officer

[Signature]
Catalog & Curriculum Manager

Florida Institute of Technology • Office of the Registrar
130 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7927

RGR-297-818
CHM 4508/5508 Bioorganic Chemistry

Instructor: Professor Nasri Nesnas, PhD
Office: 323PS
Phone: 674-8902
E-mail: nesnas@fit.edu
Office Hours: By appointment
ATTENDANCE: REQUIRED and by 7:55 am.

Recommended Textbook:
Appropriate references will also be given in due course according to relevant topics. The chemical literature is to be relied on for recent and up-to-date references.

Prerequisites:
General Chemistry, Organic Chemistry and relevant labs

Homework:
Occasional homework assignments will be given out for practice. They will be collected, corrected, but not graded.

Exams:
There will be 5 quizzes, a midterm, a final, a paper and a presentation of that paper. Students registered for CHM5508 (i.e. graduate credits) will have extra questions on the mid-term and final exams.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (5 x 20)</td>
<td>25%</td>
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<tr>
<td>Midterm</td>
<td>25%</td>
</tr>
<tr>
<td>Paper (3 pages)</td>
<td>12.5%</td>
</tr>
<tr>
<td>Presentations</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Total</td>
<td>100%</td>
</tr>
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</table>

Grading: 100 – 85% (A), 84 – 75% (B), 74 – 65% (C), 64 – 55% (D), 54 – 0% (F),

Course Highlights (lectures or hours):

- Introduction (3)  
- Amino acid / proteins (3)  
- Binding constants (1)  
- Enzymes / Catalysis (2)  
- Bioorganic mechanisms and catalysis (3)  
- Enzyme mediated organic reactions (3)  
- Nucleotides (3)  
- Biomimetic Chemistry (3)  
- Molecular Recognition (3)  
- Molecular Modeling (2)  
- Importance of Metal ions (3)  
- Biotin (2)  
- Applications in vision research (3)  
- Drug design (intro)  
- CHEMICAL LITERATURE (intro)
• Applications of bioorganic chemistry in Nanotechnology (3)
The addition or removal of any graduation requirement in a major or minor requires that this form, accompanied by supporting documentation, be completed and approved as indicated below. Incomplete or incorrect forms will not be processed.

COLLEGE: College of Science  
DEPARTMENT: Chemistry

DEGREE LEVEL: Undergraduate  
PROGRAM TITLE: Premedical Chemistry

TO BE INITIATED WITH CATALOG YEAR 20 17/ /20 18  
CHANGE REQUESTED FOR: ☑ major program  ☐ minor program  7036  
Major/Minor Code

Program changes are effective beginning with the fall term in which they appear in the University Catalog.

☐ Yes ☐ No Will this change impact the program's assessment process? If yes, attach a description of how the assessment will be impacted and the new process.

DESCRIPTION OF REQUESTED CHANGES: Attach a more detailed description and any supporting documentation.

We request: 1) to replace Physical Biochemistry (CHM 4700, 1 credit) and Physical Chemistry Laboratory 2 (CHM 3012, 2 credits) with Advanced Organic Chemistry (CHM 4500, 3 credits), and 2) to replace all of its five restricted elective courses with Biochemistry 2 (BIO 4110), Organic Synthesis (CHM 4503), Natural Products (CHM 4507), Bioorganic Chemistry (CHM 4508), and Medicinal Chemistry (CHM 4520).

These changes have been added to the proposed program planing chart that is attached along with the current Premedical Chemistry program planing chart. Please note that a few courses had to be moved around in Junior and Senior years of the proposed chart to add the above mentioned changes.

Approvals: On completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee, for approval below and forward to the Catalog & Curriculum Manager.

Or

Chair, Graduate Council  Date  
Chair, Undergraduate Curriculum Committee  Date

REGISTRAR’S USE ONLY

☐ Yes ☐ No  Academic Year  Update completed  Date  Initials

☐ Yes ☐ No  Academic Year  Update completed  Date  Initials

Florida Institute of Technology • Office of the Registrar

150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827  
RGR-201-315
Chemistry - Premedical Chemistry, B.S.

Major Code: 7036  
Degree Awarded: Bachelor of Science  
Delivery Mode(s): Classroom  
Age Restriction: No  
Admission Status: Undergraduate  
Location(s): Main Campus - Melbourne

The Bachelor of Science in Chemistry - Premedical Chemistry is accredited by the American Chemical Society. The premedical chemistry major prepares the graduate for the many diverse career opportunities available to the chemist in government, private industry and academia.

The premedical chemistry major is designed for the student interested in a solid background in chemistry in preparation for a career in medicine or a related professional field. The curriculum includes all required coursework to make the student competitive for admission to medical, dental or veterinary schools. The advisor to this program provides up-to-date information on admission requirements for most of those schools, as well as admission test information.

Degree Requirements

Candidates for a Bachelor of Science in Chemistry - Premedical Chemistry must complete the minimum course requirements as indicated. Deviation from the recommended program can be made only with the approval of the student’s advisor and the concurrence of the department head.

Because the subject matter in general chemistry forms a critically important foundation for all of the advanced chemistry courses, both CHM 1101 and CHM 1102 must be passed with grades of at least C before taking any other chemistry courses.

Freshman Year

Fall (16 credit hours)

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<th>Course Name</th>
<th>Term Taken</th>
<th>Grade</th>
<th>Gen Ed</th>
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</thead>
<tbody>
<tr>
<td>BIO 1010 Biological Discovery 1</td>
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<tr>
<td>CHM 1101 General Chemistry 1</td>
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<td>COM 1101 Composition and Rhetoric</td>
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<td>FYE 1000 University Experience</td>
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<tr>
<td>MTH 1001 Calculus 1</td>
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Spring (15 credit hours)

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<tbody>
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<td>CHM 1102 General Chemistry 2</td>
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<td>COM 1102 Writing About Literature</td>
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<td>MTH 1002 Calculus 2</td>
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Sophomore Year

Fall (17 credit hours)

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<tbody>
<tr>
<td>CHM 2001 Organic Chemistry 1</td>
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<tr>
<td>CHM 2011 Organic Chemistry Laboratory 1</td>
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<td>CHM 3301 Analytical Chemistry 1</td>
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<td>MTH 2001 Calculus 3</td>
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<tr>
<td>PHY 1001 Physics 1</td>
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<tr>
<td>PHY 2091 Physics Laboratory 1</td>
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Spring (17 credit hours)

<table>
<thead>
<tr>
<th>Course Name</th>
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<th>Gen Ed</th>
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<tbody>
<tr>
<td>BIO 2801 Biometry</td>
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<tr>
<td>CHM 2002 Organic Chemistry 2</td>
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**Chemistry - Premedical Chemistry, B.S. - Florida Tech - Acalog ACMS™**

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<th>Course Name</th>
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<tbody>
<tr>
<td>CHM 2012 Organic Chemistry Laboratory 2</td>
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<td>HUM 2051 Civilization 1: Ancient Through Medieval</td>
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<td>PHY 2002 Physics 2</td>
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<td>PHY 2092 Physics Laboratory 2</td>
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**Junior Year**

**Fall (16 credit hours)**

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<tbody>
<tr>
<td>BIO 2110 General Genetics</td>
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<tr>
<td>BIO 4010 Biochemistry 1</td>
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<tr>
<td>CHM 3001 Physical Chemistry 1</td>
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<tr>
<td>CHM 3311 Analytical Chemistry Laboratory 1</td>
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<tr>
<td>PSY 1411 Introduction to Psychology</td>
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**Spring (15 credit hours)**

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<thead>
<tr>
<th>Course Name</th>
<th>Term Taken</th>
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<th>Gen Ed</th>
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<tbody>
<tr>
<td>CHM 3002 Physical Chemistry 2</td>
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<tr>
<td>CHM 3302 Analytical Chemistry 2: Instrumentation</td>
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<tr>
<td>CHM 3312 Analytical Chemistry 2: Instrumentation Laboratory</td>
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<tr>
<td>COM 2012 Research Sources and Systems</td>
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<tr>
<td>COM 2223 Scientific and Technical Communication</td>
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<tr>
<td>Social Science Elective Credit Hours: 3</td>
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**Senior Year**

**Fall (15 credit hours)**

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<thead>
<tr>
<th>Course Name</th>
<th>Term Taken</th>
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<tbody>
<tr>
<td>CHM 3011 Physical Chemistry Laboratory 1</td>
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<tr>
<td>CHM 4001 Inorganic Chemistry 1</td>
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<td><strong>CHM 4700 Physical Biochemistry</strong></td>
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<td>CHM 4800 Undergraduate Research 1</td>
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<td>CHM 4900 Chemistry Seminar</td>
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<td>Restricted Elective (CHM) Credit Hours: 3</td>
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**Spring (17 credit hours)**

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<tr>
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<td>Free Elective Credit Hours: 3</td>
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<td>Humanities Elective Credit Hours: 3</td>
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**Total Credits Required: 128**

**Restricted Electives:**

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<tbody>
<tr>
<td>CHM 4002 Advanced Inorganic Chemistry</td>
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<td>CHM 4111 Advanced Physical Chemistry</td>
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<td>CHM 4304 Advanced Analytical Chemistry</td>
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<td>CHM 4500 Advanced Organic Chemistry</td>
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<tr>
<td>CHM 4550 Polymer Chemistry</td>
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Degree Requirements
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<th>Freshman Year</th>
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<tr>
<td>BIO 1020 Biological Discovery 2</td>
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### Junior Year

#### Fall (16 credit hours)

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<tr>
<td>COM 2012 Research Sources and Systems</td>
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<tr>
<td>COM 2223 Scientific and Technical Communication</td>
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### Senior Year

#### Fall (15 credit hours)

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<tbody>
<tr>
<td>CHM 3011 Physical Chemistry Laboratory 1</td>
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<td>CHM 4500 Advanced Organic Chemistry</td>
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<td>CHM 4800 Undergraduate Research 1</td>
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<td>CHM 4900 Chemistry Seminar</td>
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<td>Technical Elective Credit Hours: 3</td>
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<td>CHM 4900 Chemistry Seminar</td>
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<tr>
<td>Humanities Core Course Credit Hours: 3</td>
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<td>Total Credits Required: 128</td>
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</tbody>
</table>

**Restricted Electives:**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Term Taken</th>
<th>Grade</th>
<th>Gen Ed</th>
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</thead>
<tbody>
<tr>
<td>BIO 4110 Biochemistry 2, Credit Hours: 4</td>
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<tr>
<td>CHM 4503 Organic Synthesis, Credit Hours: 3</td>
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<td>CHM 4507 Natural Products, Credit Hours: 3</td>
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<td>CHM 4508 Bioorganic Chemistry, Credit Hours: 3</td>
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<td>CHM 4520 Medicinal Chemistry, Credit Hours: 3</td>
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**Notes:**