New Course

Proposal Reference Number : 9156
PRN Alias : 14-15#379
Version No : 5
Submitted By : Ms Chantal Grignon
Edited By : Ms Chantal Grignon

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	New Data
Program Affected?	Y
Program Change Form Submitted?	Y
Subject/Course/Term	PHAR 505 • one term
Credit Weight or CEU's	3 credits
Course Activities	Schedule Type: A - Lecture; Hours per week: 3 Total Hours per Week : 3 Total Number of Weeks : 13
Course Title	Official Course Title : Structural Pharmacology Course Title in Calendar : Structural Pharmacology
Rationale	The aim of this course is to familiarize students with structure-based drug design methods that are widely-used in the pharmaceutical industry and academia. The course will be coordinated and mainly taught by Drs Jean-François Trempe and Bastien Castagner, two new recruits in the Department with expertise in chemistry & structural biology. It will fill an important knowledge gap in the training of Pharmacology students; the course content integrates seamlessly with other courses offered at the U3 level, such as PHAR 504 and PHAR 508.
Responsible Instructor	Dr. Jean-François Trempe and Dr. Bastien Castagner
Course Description	The course will cover approaches widely used in the pharmaceuticals industry, such as drug target selection, structure determination and medicinal chemistry. The basics of structural biology will be taught in a very visual and interactive manner, with an emphasis on drug:target interactions and chemical principles relevant to drug design. By the end of the

	course, the students will become familiar with the structure-based drug discovery process and principles of molecular pharmacology.
Teaching Dept.	0253 : Pharmacology and Therapeutics
Administering Faculty/Unit	SC : Faculty of Science
Prerequisites	PHAR 301, BIOC 311 or with permission of instructor. Web Registration Blocked? : N
Corequisites	
Restrictions	Not available to students who are/have taken PHAR 503.
Supplementary Calendar Info	
Additional Course Charges	
Campus	Downtown
Projected Enrollment	60
Requires Resources Not Currently Available	N
Explanation for Required Resources	
Required Text/Resources Sent To Library?	
Library Consulted About Availability of Resources?	
Consultation Reports Attached?	Y • PHAR 505 Consultation Form Biochemistry.pdf View • PHAR 505 Consultation Form Chemistry v2 Nov 21.pdf View
Effective Term of Implementation	201509
File Attachments	• Structural Pharmacology Syllabus PHAR 505_v3 nov 18.pdf View
To be completed by the Faculty	
For Continuing Studies Use	

Approvals Summary

Show all comments

Version	Departmental	Departmental	Departmental	Other	Curric/Academic	Faculty	SCTP	Version Status

SYLLABUS
PHAR 505: Structural pharmacology

Course Coordinator:
Jean-François Trempe jeanfrancois.trempe@mcgill.ca
Tel: 398-6833; Rm 1313a (McIntyre Building)

Co-coordinator:
Bastien Castagner bastien.castagner@mcgill.ca
Tel: 398-2181; Rm 805 (McIntyre Building)

Course Lecturers: Jean-François Trempe, Bastien Castagner, TBA

Teaching Assistants: TBA

Overview of the course:

The course will cover approaches widely used in the pharmaceuticals industry, such as drug target selection, structure determination and medicinal chemistry. The basics of structural biology will be taught in a very visual and interactive manner, with an emphasis on drug:target interactions and chemical principles relevant to drug design. By the end of the course, the students will become familiar with the structure-based drug discovery process and principles of molecular pharmacology. The course will be divided into three sections

- The course's first section introduces the principles of structural biology, including the basics of protein and nucleic acid structures, physical principles behind drug-target interactions and medicinal chemistry, with examples from the industry including structure-based selection of targets and structure-assisted drug development. The student's progression will be assessed with a take-home assignment.

- In the second section, the focus will be on the methods of structural biology and organic chemistry, with an emphasis on their applications in pharmacology. This includes experimental and *in silico* methods for structure determination and their applications. The students will be evaluated with an in-class examination

- In the final section, the student will prepare an oral presentation and a written mini-review based on research articles on the topic of structure-based drug design.

Method of evaluation:

1) Take-home assignment (20%)
2) In-class examination (40%)
3) Oral presentation (20%)
4) Written report (20%)

1) Take-home assignment (20%):

The students will complete a take-home assignment distributed on week 5, due on week 6. It will consist of problem-solving and short answers on the principles of structure-based drug design.

2) In-class examination (40%):

Questions will be in multiple-choice as well as short answer formats. Short answers should be concise, clear and demonstrate critical thinking. The exam will take place in week 10 and the material covered will span week 1 to week 9.

3) Oral presentation (20%):

Each student will prepare a 5 min oral presentation on a research article. The article should be on the subject of structural pharmacology and should be approved by a coordinator by the end of week 10. The students will be evaluated on the clarity of the presentation (10%) and a good understanding of the topic (10%).

4) Written report (20%):

Each student will prepare a written review (2 manuscript pages, single-spaced) on a research topic related to structural pharmacology. The review topic should focus on a single research article, placed within the context of previous literature. The style should be similar to a "News & Views" *Nature* article with a maximum of 10 references. The choice of the topics should be approved by the end of week 10. The review will be graded according to a good understanding of the topic (10%).

The criteria that will be used to evaluate the written reports are:

1. Quality of the presentation (clarity, well-structured paragraphs, use of images or tables)
2. Good understanding of the topic (context of the study, critical thinking, completeness of review)

TIMETABLE FOR PHAR 505 COURSE FALL 2015

Lectures will be held on Tuesday and Thursday, 1.5 h each.

SECTION 1 –PRINCIPLES OF STRUCTURE-BASED DRUG DESIGN

Week 1	1.5h	Presentation of PHAR 505, evaluation, course format – J.-F.T. & B.C.
	1.5h	Introduction to structural pharmacology – J.-F.T.
Week 2	1.5h	Principles of biomolecular structures – J.-F.T.
	1.5h	Interactive session with molecular graphics I – J.-F.T.
Week 3	1.5h	Drug discovery: structure-based target selection – TBA
	1.5h	Target-based drug discovery using chemical screening – TBA
Week 4	1.5h	Quantification of drug:target interactions – J.-F.T.
	1.5h	Drug development – finding the target of an active compound - TBA
Week 5	1.5h	Medicinal chemistry: what makes a good drug – B. C.
	1.5h	Medicinal chemistry II – B.C.

SECTION 2 – METHODS OF STRUCTURAL PHARMACOLOGY

Week 6	1.5h	Principles of X-ray crystallography – J.-F.T.
	1.5h	Drug optimization using crystallography – TBA
Week 7	1.5h	Principles of nuclear magnetic resonance – J.-F.T.
	1.5h	Fragment-based drug design – TBA
Week 8	1.5h	In silico docking of drug:target complexes - TBA
	1.5h	Interactive session with molecular graphics II – J.-F.T.
Week 9	1.5h	Molecular mimicry – B. C.
	1.5h	Enzyme inhibitor design – B. C.
Week 10	1.5h	Selection of topics for presentations and report – J.-F.T. & B.C.
	1.5h	*In-class examination*

SECTION 3 – EXAMINATION & STUDENT PRESENTATIONS

Week 11	2x1.5h	Student oral presentations – J.-F.T. & B.C.
Week 12	2x1.5h	Student oral presentations – J.-F.T. & B.C.
Week 13	2x1.5h	Student oral presentations – J.-F.T. & B.C.
Week 14		Submission of written report

CONSULTATION REPORT FORM
RE COURSE PROPOSALS

DATE: October 10th 2014

TO: Masad Damha
Professor and Chair, Department of Chemistry

FROM: Jean-François Trempe,
Assistant Professor in the Department of Pharmacology & Therapeutics

The attached proposal has been submitted to the Curriculum/Academic Committee, and it has been decided that your department should be consulted.

Course : PHAR 505 - Structural Pharmacology

Would you be good enough to review this proposal and let me know as soon as possible, on this form, whether or not your department has any objections to, or comments regarding, the proposal.

X **NO OBJECTIONS** _____ **SOME OBJECTIONS**

COMMENTS:

N/A

Signature: _____

Date: Nov 20, 2014

CONSULTATION REPORT FORM
RE COURSE PROPOSALS

DATE: October 10th 2014

TO: Albert Berghuis
Professor and Chair, Department of Biochemistry

FROM: Jean-François Trempe,
Assistant Professor in the Department of Pharmacology & Therapeutics

The attached proposal has been submitted to the Curriculum/Academic Committee, and it has been decided that your department should be consulted.

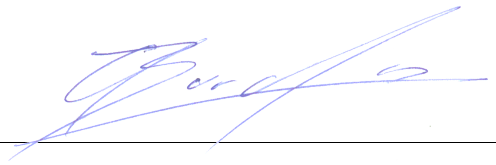
Course : PHAR 505 - Structural Pharmacology

Would you be good enough to review this proposal and let me know as soon as possible, on this form, whether or not your department has any objections to, or comments regarding, the proposal.

✓ **NO OBJECTIONS** _____ **SOME OBJECTIONS**

COMMENTS:

There could be some perceived overlap between this course and BIOC 404 or BIOC 604. However, after examination, the proposed number of lectures on biophysical techniques, e.g. NMR and X-ray crystallography, are too few to be considered a conflict with BIOC 404, let alone BIOC 604. Therefore, the Department of Biochemistry does not have any objections.

Signature: 

Date: October 15, 2014