

**COURSE SCHEDULE**  
**KINE 4230: Neuronal development for activity and health.**

**COURSE DIRECTOR**      **Dr. Dorota Anna Crawford**  
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**COURSE TA**                      **Christine Wong**  
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**GRADING**                      Midterm exam                      40%  
Final Exam                      60%

**TEXTBOOK**                      Sanes, Reh and Harris: “Development of the Nervous System”  
3<sup>rd</sup> Edition.

Exam relevant material will consist of (i) all the material covered in the lectures and power point slides and (ii) the content of the corresponding chapters from the textbook. Exams will consist of multiple choice and essay-type questions. It is strongly advised that you attend classes.

If you miss a midterm or final exam for a documented medical or other reason you will be required to write a make-up exam. Proper documentation must be delivered to the course director **NO LATER THAN 1 WEEK FOLLOWING THE EXAM**.

**Do not approach the course director to have your grade increased. THE ANSWER IS NO!! Any grade adjustments will be applied to EVERYONE, no special circumstances will be granted. No “extra assignments” will be available for anyone to write.**

**COURSE DESCRIPTION**

This course is intended to discuss the molecular mechanism involved in neuronal and neuromuscular development with an emphasis on physical activity, health and disease. It will focus on molecular and environmental cues that signal and promote differentiation, outgrowth and target-finding, and refinement of synaptic or neuromuscular connections and the acquisition of regional and cellular identity. Specific topics include the basics of cell signaling, neural induction, patterning, mechanisms of axon guidance, cell migration, proliferation and death, target recognition and synapse formation and elimination. Information drawn from these basic developmental mechanisms will be used to discuss the recent advances in our understanding of the pathogenesis of neurological disorders that affect health and physical activity.

**COURSE SCHEDULE:**

<b>Lecture 1</b>	<b>Course overview</b>
<b>Lecture 2</b>	<b>Brain Development</b>
<b>Lecture 3</b>	<b>Early development of the Embryo</b>
<b>Lecture 4</b>	<b>Induction of the neural plate</b>
<b>Lecture 5</b>	<b>Neural Induction Cont'd</b>
<b>Lecture 6</b>	<b>Neuronal Migration</b>
<b>Lecture 7</b>	<b>Developmental Genes (Hox genes) and Retinoic acid</b>
<b>Lecture 8</b>	<b>Neural Tube Defects; Smith-Lemli-Opitz Syndrome</b>
<b>Lecture 9</b>	<b>Neural Tube Defects Cont'd</b>

**MIDTERM EXAM**

<b>Lecture 10</b>	<b>Sonic hedgehog in development</b>
<b>Lecture 11</b>	<b>Neural crest cell migration</b>
<b>Lecture 12</b>	<b>Axonal pathfinding 1 - Neuronal polarity, axonal and dendritic growth</b>
<b>Lecture 13</b>	<b>Axonal pathfinding 2 - Axonal outgrowth</b>
<b>Lecture 14</b>	<b>Synaptogenesis - Synapse rearrangement and Synaptic plasticity</b>
<b>Lecture 15</b>	<b>Synapses and Myelination</b>
<b>Lecture 16</b>	<b>Synaptogenesis</b>
<b>Lecture 17</b>	<b>Critical Period - Experience dependent synaptic plasticity</b>
<b>Lecture 18</b>	<b>Nature vs. nurture</b>
<b>Lecture 19</b>	<b>Environmental causes of Neuronal Defect</b>
<b>Lecture 20</b>	<b>Disorders of Early Neuronal Development - Autism</b>
<b>Lecture 21</b>	<b>Research Methods for Studying Brain Development</b>
<b>Lecture 22</b>	<b>Review</b>

**MIDTERM EXAM (Lectures 2-9)**

**FINAL EXAM (Lectures 10-21)**

<b>Feb. 13-19</b>	Reading Days
<b>April 4</b>	Classes end
<b>April 6-20</b>	Examination Period
<b>Jan. 17</b>	Last date to add a course <b>without permission</b> of instructor
<b>Jan. 29</b>	Last date to add a course <b>with permission</b> of instructor
<b>March 4</b>	Last date to drop course without receiving a grade

## IMPORTANT GENERAL COURSE INFORMATION FOR STUDENTS

### Academic Honesty and Integrity

York students are required to maintain high standards of academic integrity and are subject to the Senate Policy on Academic Honesty. There is also an academic integrity website with complete information about academic honesty. Students are expected to review the materials on the Academic Integrity website (<http://www.yorku.ca/academicintegrity>).

### Access/Disability

York provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. It is the student's responsibility to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Failure to make these arrangements may jeopardize your opportunity to receive academic accommodations. Additional information is available at [www.yorku.ca/disabilityservices](http://www.yorku.ca/disabilityservices) or from disability service providers:

- *Office for Persons with Disabilities: N108 Ross, 416-736-5140, <http://calendars.registrar.yorku.ca/2008-2009/services/opd.htm>*
- *Learning and Psychiatric Disabilities Programs - Counselling & Development Centre: 130 BSB, 416-736-5297, [www.yorku.ca/cdc](http://www.yorku.ca/cdc)*

### Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director *within the first three weeks of class*. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately.

Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at [http://www.registrar.yorku.ca/pdf/exam\\_accommodation.pdf](http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf)

### Student Conduct

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect and to refrain from actions disruptive to such a relationship. Moreover, it is the responsibility of the instructor to maintain an appropriate atmosphere in the classroom, and the responsibility of the student to cooperate in that endeavor. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. A statement of the policy and procedures involving disruptive and/or harassing behaviour by students in academic situations is available on the York website

<http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>