Course Changes

Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

• Submit original form and attachments •

Form Instructions

1. Course request type: ☐ Undergraduate ☑ Graduate ☐ First Professional *(DDS, MD, JD, PharmD, DVM)*
2. Request submitted by *(Department or Program Name)*: Select or Type Department/Program Name
3. Course prefix, number and complete title of course: BIOL 611 MOLEC BIOL DIFF & DEV

Attach a brief supporting statement for changes made to items 4a thru 4d, and 6 below.

4. Change requested
   a. Prerequisite(s): From: _____ To: _____
   b. Withdrawal (reason): _____
   c. Cross-list with: _____

Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.
   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. **Attach a course syllabus.**
5. Is this an existing core curriculum course? ☐ Yes ☐ No
6. If grade type is changing for existing course, indicate the new grade type: ☑ Grade ☐ S/U ☐ P/F (CLMD)
7. If this course will be stacked, please indicate the course number of the stacked course: _____
8. ☑ I verify that I have reviewed the FAQ for *Export Control Basics for Distance Education* (http://vpr.tamu.edu/resources/export-controls/export-controls-basics-for-distance-education).
9. Complete current course title and current catalog course description:
   BIOL 611 - MOLECULAR BIOLOGY OF DIFFERENTIATION AND DEVELOPMENT. Major paradigms of eukaryotic gene regulation in terms of the role of gene expression during ontogeny and the effect of dysfunction in these processes on the neoplastic state.
10. Complete proposed course title and proposed catalog course description (not to exceed 50 words):
    BIOL 611 - DEVELOPMENTAL GENETICS
11. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
BIOL	611	MOLEC BIOL DIFF & DEV

Lect.	Lab	Other	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
3.00	0.00		3.00	2604040002	440	003632	5

b. Change to:

Prefix	Course #	Title (excluding punctuation)
BIOL	611	DEVELOPMENTAL GENETICS

Lect.	Lab	Other	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
3.00	0.00		3.00	2604040002	440	15 - 16	003632	5

Approval recommended by:

Department Head or Program Chair *(Type Name & Sign)* Date
Wayne K Versaw 8-18-14

Department Head or Program Chair *(Type Name & Sign)* Date
(if cross-listed course)

Chair, College Review Committee Date
8-22-14

Dean of College Date
8/23/14

Chair, GC or UCC Date
9-22-14

Submitted to Coordinating Board by:

Associate Director, Curricular Services Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 07/14

Biology 611: Molecular Biology of Differentiation and Development

Bruce Riley (845-6494, briley@mail.bio.tamu.edu)
Jim Erickson (862-2204, jerickson@mail.bio.tamu.edu)

Tuesday and Thursday 9:30-11:00, room 117 Heldenfels.

Aug. 27
Overview of course objectives.
Introduction to historical perspectives and basic concepts.

Aug. 29
Intro to vertebrates
Nodal signaling and organizer activity in zebrafish.

Chen, Y. and Schier, A. F. (2001). The zebrafish Nodal signal Squint functions as a morphogen. *Nature* **411**, 607-610.

Sep. 3
Wnt8 and coordination of AP and DV axes in zebrafish.

Lekven, A. C., Thorpe, C. J., Waxman, J. S. and Moon, R. T. (2001). Zebrafish wnt8 encodes two Wnt8 proteins on a bicistronic transcript and is required for mesoderm and neurectoderm patterning. *Developmental Cell* **1**, 103-114.

Sep. 5
Epithelial-Mesenchymal Transition (EMT) in development & cancer.

Acloque, H., Oscar H. Ocana, O.H., Matheu, A., Rizzoti, K., Wise, C., Lovell-Badge, R. and Nieto1, M.A. (2011). Reciprocal repression between Sox3 and Snail transcription factors defines embryonic territories at gastrulation. *Developmental Cell* **21**, 546-558.

Sep. 10
Fgf, Bmp and DV patterning in zebrafish.

Kwon, H. J., Bhat, N., Sweet, E. M., Cornell, R. A. and Riley, B. B. (2010). Identification of early requirements for preplacodal ectoderm and sensory organ development. *PLOS Genetics* **6 (9)**, e1001133.

Sep. 12
Delta-Notch signaling, neurogenesis, and regulation by ubiquitin ligase.

Itoh, M., Kim, C.-H., Palardy, G., Oda, T., Jiang, Y.-J., Maust, D., Yeo, S.-Y., Lorick, K., Wright, G. J., Ariza-McNaughton, L., Weissman, A. M., Lewis, J. and Chitnis, A. (2003). Mind bomb is a ubiquitin ligase that is essential for efficient activation of Notch signaling by Delta. *Developmental Cell* **4**, 67-82.

Sep. 17
Somitogenesis and molecular clocks.

Hirata, H., Bessho, Y., Kokubu, H., Masamizu, Y., Yamada, S., Lewis, J. and Kageyama, R. (2004). Instability of Hes7 protein is crucial for the somite segmentation clock. *Nature Genetics* **36**, 750-754.

Pourquie, O. (2003). The segmentation clock: converting embryonic time into spatial pattern. *Science* **301**, 328-330.

Sep. 19
HOX/HOM genes and AP patterning.

Young, T., Rowland, J. E., van de Waters, C., Blalecka, M., Novoa, A., Carapuco, M., van Nes, J., de Graaff, W., Duluc, I., Freund, J.-N., Beck, F. Mallo, M. and Deschamps, J. (2009). *Cdx* and *Hox* genes differentially regulate posterior axial growth in mammalian embryos. *Developmental Cell* **17**, 616-526.

Sep. 24
Hedgehog signaling and axon guidance.

Charron, F., Stein, E., Jeong, J., McMahon, A. P. and Tessier-Levigne, M. (2003). The morphogen Sonic Hedgehog is an axonal chemoattractant that collaborates with Netrin-1 in midline axon guidance. *Cell* **113**, 1-23.

Sep. 26
Intro to *Drosophila*
Drosophila axis determination (AP axis): Transcriptional control of development.

Nusslein-Volhard, C. and Wieschaus, E. (1980). Mutations affecting segment number and polarity in Drosophila. *Nature* **287**, 795-801.

Clyde, D. E., Corado, M. S. G., Wu, X., Pare, A, Papasenko, D. and Small, S. (2003). A self-organizing system of repressor gradients establishes segmental complexity in Drosophila. *Nature* **426**, 849-853.

Oct. 1
Drosophila axis determination (DV axis): Transcriptional control of development.

Ip, Y.T, Park, R.E., Kosman, D. Yazdanbakhsh and Levine, M. (1992). *Dorsal-twist* interactions establish snail expression in the presumptive mesoderm of the *Drosophila* embryo. *Genes Dev.* **6**, 1518-1530.

Hong, J.-W., Hendrix, D.A. Papatsenko D., and Levine M.S. (2008). How the Dorsal gradient works: Insights from postgenome technologies. *Proc Natl Acad Sci USA* **105**, 20072-20076.

Oct. 3
Drosophila axis determination (DV axis): Maternal specification of embryonic polarity .

Nilson, L.A. and Shüpbach, T. (1998). Localized Requirements for windbeutel and pipe Reveal a Dorsoventral Prepattern with the Follicular Epithelium of the Drosophila Ovary. *Cell* **93**, 253-262.

Oct. 8
Translational control of fly development.

Dahanukar, A., Walker, J. A. and Wharton, R. P. (1999). Smaug, a novel RNA-binding protein that operates a translational switch in *Drosophila*. *Molecular Cell* **4**, 209-218.

Kimble, J. (1994). An ancient molecular mechanism for establishing embryonic polarity? *Science* **266**, 577-578.

Oct. 10
Dissection of the EGFR pathway in Drosophila eye development.

Kumar, J.P., Tio, M., Hsiung, F., Akopyan, S., Gabay, L., Seger, R., Shilo, Ben and Moses, K. (1998). Dissecting the roles of the Drosophila EGF receptor in eye development and MAP kinase activation. *Development* **125**, 3875-3885.

Oct. 15
Branching morphogenesis and tracheal development in Drosophila.

Sato, M. and Kornberg, T. B. (2002). FGF is an essential mitogen and chemoattractant for the air sacs of the Drosophila tracheal system. *Developmental Cell* **3**, 195-207.

Oct. 17
Sex Determination.

Erickson J.W., and J.J. Quintero. (2007). Indirect effects of ploidy suggest X chromosome dose, not the X:A ratio, signals sex in *Drosophila*. *PLoS Biol.* **Dec 5(12)**, e332.

Oct. 22
MIDTERM EXAM.

Oct. 24
Introduction to C. elegans
Axis determination.

Good, K., Ciosk, R., Nance, J., Neves, A., Hill, R. J. and Priess, J. R. (2004). The T-box transcription factors TBX-37 and TBX-38 link GLP-1 Notch signaling to mesoderm induction in C. elegans embryos. *Development* **131**, 1967-1978.

Oct. 29
Convergence of multiple signals in C. elegans vulval induction.

Yoo, A. S., Bais, C. and Greenwald, I. (2004). Crosstalk between the EGFR and LIN-12/Notch pathways in C. elegans vulval development. *Science* **303**, 663-666.

Oct. 31
Programmed cell death and the CED pathway in C. elegans.

Joshi, P. and Eisenmann, D. M. (2004). The Caenorhabditis elegans pvl-5 gene protects hypodermal cells from ced-3-dependent, ced4-independent cell death. *Genetics* **167**, 673-685.

Nov. 5
Developmental timing: Heterochrony and regulation by micro-RNA.

Lin, S.-Y., Johnson, S. M., Abrahom, M., Vella, M. C., Pasquinelli, A., Gamberi, C., Gottlieb, E. and Slack, F. J. (2003). The C. elegans hunchback homolog, hbl-1, controls temporal patterning and is a probable microRNA target. *Developmental Cell* **4**, 639-650.

Nov. 7
Aging and longevity.

Murphy, C. T., McCarroall, S. A., Cornelia, I. B., Fraser, A., Kamath, R. S., Ahringer, J., Li, H. and Kenyon, C. (2003). Genes that act downstream of DAF-16 to influence the lifespan of Caenorhabditis elegans. *Nature* **29**, 1-8.

Nov. 12
Introduction to Arabidopsis
Auxin signaling & symmetry-breaking.

Friml, J., Vieten, A., Sauer, M., Weijers, D., Schwarz, H., Hamann, T., Offringa, R. and Jürgens. G. (2003). Efflux-dependent auxin gradients establish the apical-basal axis of Arabidopsis. *Nature* **426**, 147-153.

Nov. 14
Cell signaling and meristem maintenance.

Lenhard, M. and Laux, T. (2003). Stem cell homeostasis in the *Arabidopsis* shoot meristem is regulated by intercellular movement of CLAVATA3 and its sequestration by CLAVATA1. *Development* **130**, 3163-3173.

Nov. 19
Intro to Evo-Devo
Descent with modification.

Abzhaonov, A., Protas, M., Grant, B. R., Grant P. R. and Tabin, C. J. (2004). Bmp4 and morphological variation of beaks in Darwin's finches. *Science* **305**, 1462-1465.

Nov. 21
The concept of developmental modules.

Michael D. Shapiro, M.D., Marks, M.E., Schluter, D. and Kingsley, D.M. (2004) Genetic and developmental basis of evolutionary pelvic reduction in threespine sticklebacks *Nature* **428**, 717-723.

Nov. 26
Developmental constraints and phenotypic variation.

Rutherford, S. L. and Lindquist, S. (1998). Hsp90 as a capacitor for morphological evolution. *Nature* **396**, 336-342.

Syllabus part 2

Course Objectives:
1. Learn general principles and specific mechanisms of development.
2. Become familiar with the advantages and limitations of commonly studied genetic model organisms.
3. Gain experience in critical reading and interpretation of primary research articles.

Course Format for class meetings:
We will be discussing literature papers in the order listed on the syllabus. Papers are available online through the electronic journals page of the Medical Sciences Library (only through an on-campus computer or through dial-up modem/connection through the University). http://library.tamu.edu/ or http://msl.tamu.edu/MSL/InfoRsrc/ejournal2.html. The instructors will assume that you have read the paper PRIOR to arriving at the meeting and are ready to discuss the following issues:

- What was the previous information that led to the question being asked in the paper?
- What is the hypothesis being tested?
- How does the hypothesis relate to or extend what we have discussed earlier or what you may know from other classes?
- What is the design and method of the experiments?
- What were the assays used to examine developmental events?
- How did their results address or relate to their hypothesis?
- Did they prove their point to your satisfaction? If not, what would you have liked to see them do?

Grading: Your grade will be based on four criteria, all weighted equally. The four criteria are as follows:

1) Attendance and participation during class discussions. Asking questions, raising points, answering questions posed by the instructors or classmates and volunteering information are some ways in which you can participate. Of course full participation also requires thorough reading of all assigned papers.

2) Homework assignments. For the first half of the semester, each paper will be accompanied by a set of homework problems designed to make you think about the paper on a deeper level. Homework is DUE at the beginning of the class session in which the paper will be discussed. NO late homework assignments will be accepted.
Notes on plagiarism: When answering homework problems, you may draw from information gleaned from books, articles, etc., but do not simply transcribe (copy word-for-word) any material written by others. You must state all concepts in your own words. If you are describing a complex concept or a model obtained from another author (as opposed to a general principle), use appropriate citation practices. Plagiarism is a very serious offense that has become increasingly common in recent years. Any student caught plagiarizing will receive zero credit for that homework assignment. If there is a

second offense, the student will be summarily dismissed from the course (with an automatic F) and may face expulsion from the university.

3) You will be responsible for presentation of papers for two class periods during the semester. This means providing background, understanding the experimental approaches and interpretations, critiquing experimental design or the authors' conclusions, and being able to lead the group discussion. The background given in the paper will NOT generally be sufficient for your presentation. You should attempt to give a more in-depth introduction to the paper. You are encouraged to discuss your assigned paper with one of the instructors prior to your class presentation. Students are strongly advised to prepare well in advance to allow sufficient time to confer with the instructor and make necessary adjustments to your presentation. We suggest starting at least a week ahead of time if you have not done this type of presentation before.

4) A written midterm exam will be conducted halfway through the semester. The exam will test your understanding and recall of core concepts and developmental mechanisms covered during the first half of the semester. These concepts and mechanisms will also provide a foundation for class discussions in the second half of the semester.

Links that might be helpful:

http://flybase.bio.indiana.edu/

http://www.wormbase.org/

http://www.informatics.jax.org/

http://zfin.org

http://biocourse.bio.tamu.edu/faculty/pepper/awg/

(The last url has various links to sites related to Arabidopsis).