In *Principles of Cell Biology*, we will explore the structure, function, and evolution of living cells, including prokaryotes (archae and eubacteria) and eukaryotes.

**Instructor:**
Professor Darryl L Kropf  
203G S. Biology  
801-581-5432  
kropf@bioscience.utah.edu  
Office hour; W 3-4 PM

**Lectures are held TU/TH from 12:25 PM-01:45 PM in ASB 220.**
Note that lectures are 80 min periods. This is a 3 credit-hour class and according to University of Utah Policies and Procedures, Chapter VII section 2, you should expect to spend a total of approximately nine hours per week on this course, including attendance at lectures, discussion and tutorial sections, assigned reading, and problem sets. *I strongly suggest that you do not take this course at the same time you are taking other difficult science courses.*

**Text:** Alberts *et al.*, *Essential Cell Biology* THIRD EDITION (Garland Publishing). The text is available at the University bookstore. Students will be responsible for all material covered in the reading assigned from the text. The textbook is also available as an ebook, which is cheaper than the hardcover. For information on the ebook go to the [www.garlandscience.com](http://www.garlandscience.com) website.

Copies of the textbook and additional materials are on reserve in Marriott library. In addition, the Khan Academy website ([http://www.khanacademy.org/](http://www.khanacademy.org/)) has chalk-talk lectures on many cell biology topics that you may find useful.

**Canvas:** Lectures, study questions, exam dates, previous exams and other pertinent material are on the Canvas website. Lectures will be posted at least one day in advance. Old exams provide good examples of the sorts of questions that will appear on exams. Answers to study and old exam questions will be covered in discussion sections, but will not be posted.

**Study questions:** Study questions are included in the page margins and at the end of each chapter of ECB3. Students are encouraged to work these problems, consulting the answers at the end of the book.

To further focus your studying, the instructor and TAs have written supplementary study questions for each week. These are on Canvas. Answers to these questions will be covered in discussion sections.

**Discussion sections:** There will be at least one discussion section per day. Generally, discussion sections are designed to clarify lecture topics and to go over study questions and old exam questions.

**Tutoring sessions:** There will also be at least one tutoring session each day. Tutoring sessions are designed to provide help with specific questions and problems in a one-on-one format.

**Study Skills Section:** Abishek Chari will present two study skills sections each week to help students learn to study and integrate material effectively.
Teaching assistants: teaching assistants will conduct all discussion and tutoring sections:

<table>
<thead>
<tr>
<th>T.As:</th>
<th>e-mail:</th>
<th>Office hours:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna (Annie) Adams</td>
<td><a href="mailto:u0677156@utah.edu">u0677156@utah.edu</a></td>
<td>By appointment</td>
</tr>
<tr>
<td>Simon Currie</td>
<td><a href="mailto:simon.currie@hci.utah.edu">simon.currie@hci.utah.edu</a></td>
<td>By appointment</td>
</tr>
<tr>
<td>Brayden Forbes</td>
<td><a href="mailto:brayden.forbes@utah.edu">brayden.forbes@utah.edu</a></td>
<td>By appointment</td>
</tr>
<tr>
<td>Amanda Khoury</td>
<td><a href="mailto:chickita3@gmail.com">chickita3@gmail.com</a></td>
<td>By appointment</td>
</tr>
<tr>
<td>Natalie Meadows</td>
<td><a href="mailto:natalie.meadows@hsc.utah.edu">natalie.meadows@hsc.utah.edu</a></td>
<td>By appointment</td>
</tr>
<tr>
<td>Raquel Tingey</td>
<td><a href="mailto:raqueltingey@yahoo.com">raqueltingey@yahoo.com</a></td>
<td>By appointment</td>
</tr>
<tr>
<td>Kortnie Walker</td>
<td><a href="mailto:kortnie.walker@utah.edu">kortnie.walker@utah.edu</a></td>
<td>By appointment</td>
</tr>
</tbody>
</table>

Discussion section times and locations: These T.A.-led discussion sections are optional, and you may attend any or all of them. They will focus on clarifying lecture topics and answering study questions and old exam questions.

<table>
<thead>
<tr>
<th>Mondays</th>
<th>Location</th>
<th>TA initials</th>
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</thead>
<tbody>
<tr>
<td>8:30-9:30</td>
<td>ST208</td>
<td>KW</td>
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<table>
<thead>
<tr>
<th>Tuesdays</th>
<th>Location</th>
<th>TA initials</th>
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</thead>
<tbody>
<tr>
<td>11:00-12:00</td>
<td>LCB 222</td>
<td>NM</td>
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<thead>
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<tbody>
<tr>
<td>9:40-10:30</td>
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<td>AA</td>
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<tr>
<td>2:00-3:00</td>
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</thead>
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<tr>
<td>11:00-12:00</td>
<td>LCB 222</td>
<td>AK</td>
</tr>
<tr>
<td>2:00-3:00</td>
<td>JFB 102</td>
<td>RT</td>
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<th>Location</th>
<th>TA initials</th>
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<tbody>
<tr>
<td>10:30-11:30</td>
<td>AEB 310</td>
<td>BF</td>
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Tutoring session times: These T.A.-led tutoring sessions are optional. They will provide help with specific questions and problems in a one-on-one format.

All tutoring sessions will be held in room 203 R South Biology.

<table>
<thead>
<tr>
<th>Mondays</th>
<th>TA</th>
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<tbody>
<tr>
<td>11:00-12:00</td>
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<table>
<thead>
<tr>
<th>Tuesdays</th>
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<tbody>
<tr>
<td>2:30-3:30</td>
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<table>
<thead>
<tr>
<th>Wednesdays</th>
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<tbody>
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<td>11:45-12:45</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>8:30-9:30</td>
<td>BF</td>
</tr>
<tr>
<td>3:00-4:00</td>
<td>AA</td>
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<table>
<thead>
<tr>
<th>Fridays</th>
<th>TA</th>
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<tbody>
<tr>
<td>11:30-12:30</td>
<td>RT</td>
</tr>
<tr>
<td>3:00-4:00</td>
<td>KW</td>
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</table>
Graduate Instructor: Abishek Chari (abhishek.chari@utah.edu) will lead the study skills sections.

Study skills section times and locations:

<table>
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<tr>
<th>Mondays</th>
<th>3:00-4:00</th>
<th>JTB 130</th>
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<tbody>
<tr>
<td>Fridays</td>
<td>8:30-9:30 AM</td>
<td>AEB 320</td>
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Summary of all help sessions (with TA initials and location):

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tr>
<td>8:30-9:30 Disc</td>
<td>11:00-12:00 Disc</td>
<td>9:40-10:30 Disc</td>
<td>8:30-9:30 Tutoring</td>
<td>8:30-9:30 Study Skill</td>
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<tr>
<td>KW</td>
<td>NM</td>
<td>AA</td>
<td>BF</td>
<td>AC</td>
</tr>
<tr>
<td>ST208</td>
<td>LCB222</td>
<td>AEB306</td>
<td>SB203R</td>
<td>AEB320</td>
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<tr>
<td>11:00-12:00 Tutoring</td>
<td>2:30-3:30 Tutoring</td>
<td>11:45-12:45 Tutoring</td>
<td>11:00-12:00 Disc</td>
<td>10:30-11:30 Disc</td>
</tr>
<tr>
<td>NM</td>
<td>SC</td>
<td>AK</td>
<td>SB203R</td>
<td>BF</td>
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<tr>
<td>SB203R</td>
<td></td>
<td></td>
<td></td>
<td>AEB310</td>
</tr>
<tr>
<td>3:00-4:00 Study Skill</td>
<td>2:00-3:00 Disc</td>
<td>2:00-3:00 Disc</td>
<td>11:30-12:30 Tutoring</td>
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<tr>
<td>AC</td>
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<td>RT</td>
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<tr>
<td>JTB130</td>
<td>AEB340</td>
<td>JFB102</td>
<td>SB203R</td>
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<tr>
<td></td>
<td>3:00 Kropf Office Hr</td>
<td>3:00-4:00 Tutoring</td>
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<td>SB203R</td>
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Exams: There will be four exams, including the final. All exams will be 80 minutes in length and each will be 100 points. Exams (including the final) are comprehensive only in that material presented later in the semester builds on material presented earlier. All exams will be closed book.

The four exam dates are February 7, February 28, April 4 and May 1. If you cannot attend one or more exams you should drop this course and take it at a later time!

Grading policy: The total points possible in the course is 400. Each student’s four exam scores will be summed and grades will be assigned according to a curve. Generally, the top 20% of students receive As, the next 30% receive Bs, the next 30% receive Cs, and the lowest 20% receive Ds and Es.

Rescheduled, make-up, or missed exams: With few exceptions, there will be no make-up exams, and a missed exam will be given a score of 0. Requests to reschedule an exam will only be granted for medical reasons (requiring a written note from a medical doctor), legal reasons (requiring a note from an officer of the law), religious reasons, or official University business (chapter VII section 15 of the University's policies and procedures). Requests to reschedule an exam must be submitted in writing prior to the exam, and must include all necessary supporting documents. Rescheduled exams may be given orally, at instructor’s discretion. Make-up exams must be completed within 2 weeks of the original exam date.

Rescoring Policy: Regrading must be requested within 1 week of the day exams are returned. Requests must be made in writing to Dr. Kropf. Do not change anything on the graded exam. Realize that a significant percent of exams are photocopied prior to return. The entire exam may be regraded and the score may increase or decrease.
**Content accommodations:** The content of this course fulfills legitimate pedagogical goals. We do **NOT** grant content accommodations. Students are responsible for all material presented in the lectures and required reading.

**Drop policy:** The drop policy of this class is consistent with that of the University: the last day to drop classes is *Wednesday, January 16*. Classes dropped before this date will not appear on transcripts. The last day to withdraw from classes is *Friday, March 1*. A “W” will appear on transcripts.

**A.D.A. policy:** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the instructor and to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD) to make arrangements for these accommodations. All written information in this course can be made available in alternative format with prior notification.

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**Biol 2020**

**LECTURE SCHEDULE**

**Spring 2013**

The following schedule of lectures and reading may change during the course of the semester. Exam dates are fixed.

**Lecture topic and assigned reading:**

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Section 1: Molecules to Energy</th>
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<table>
<thead>
<tr>
<th>Week 2</th>
<th>Lecture 3: Molecules: Polysaccharides</th>
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<tbody>
<tr>
<td>Jan 15</td>
<td>Chemical composition of cells bonds, elements, water. Basic groups of macromolecules; polysaccharides <em>ECB 2</em>: 39 - 63; panels 2-1 to 2-3 (pp 64-69).</td>
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<table>
<thead>
<tr>
<th>Week 3</th>
<th>Lecture 5: Molecules: proteins</th>
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<tbody>
<tr>
<td>Jan 22</td>
<td>Protein structure and function: catalysis and thermodynamics</td>
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<td></td>
<td>Membrane proteins. <em>ECB 4</em>: 119-153; <em>3</em>: 88-100; and <em>11</em>: 372-384,</td>
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</table>
R 6: Membrane Transport and Cellular Energy:

b

**Week 4**

Jan 29

Lecture 7: Cellular Energy:

Jan 31

Lecture 8: Cellular Energy:
Glycolysis, Citric Acid Cycle, Global warming *ECB* 13: 425-51.

**Week 5**

**Section 2: Nucleic Acids to Biotechnology**


Feb 7

**First midterm exam on February 7**

**Week 6**

Feb 12

Lecture 10: DNA Replication and Prokaryotic Transcription

Feb 14

Lecture 11: Eukaryotic Transcription
Eukaryotic Transcription; Gene Organization, RNA Processing; 7: 238-246; *ECB* 8: 278-293

**Week 7**

Feb 19

Lecture 12:

Feb 21

Lecture 13:
Molecular Techniques *ECB* 10: 327-353

**Week 8**

Feb 26

Lecture 14:
Genetic Engineering *ECB* 10: 354-358

Feb 28

**Second midterm exam on Feb 28**

**Week 9**

Mar 5

Lecture 15
Gene and genome evolution *ECB* 9: 297-323

Mar 7

**Section 3: Protein and membrane trafficking**

Lecture 16:
Import into nucleus, mitochondria and chloroplasts
*ECB* 15: 495-505
<table>
<thead>
<tr>
<th>Week 10</th>
<th>Spring Break!</th>
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<tbody>
<tr>
<td>March 10-17</td>
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<table>
<thead>
<tr>
<th>Week 11</th>
<th>Lecture 17: Protein import into the ER. Begin vesicle transport</th>
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<tbody>
<tr>
<td>Mar 19</td>
<td>ECB 15: 505-509, 514-522</td>
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<tr>
<td>Mar 21</td>
<td>Lecture 18</td>
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<tr>
<td></td>
<td>Vesicle and protein targeting: ER to Golgi to plasma membrane/lysosome</td>
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<td>ECB 15: 510-522</td>
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<tr>
<th>Week 12</th>
<th>Lecture 19 Endocytosis ECB 15:523-528</th>
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<tbody>
<tr>
<td>Mar 26</td>
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<table>
<thead>
<tr>
<th>week 13</th>
<th>Section 4: Cytoskeleton to Cell Division</th>
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<tbody>
<tr>
<td>Mar 28</td>
<td>Lecture 20 Cytoskeleton; Intermediate filaments; Microfilaments and muscle</td>
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<td>ECB 17: 572-577, 599-605</td>
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<tr>
<th>Week 14</th>
<th>Lecture 21 Non-muscle actin</th>
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<tr>
<td>Apr 2</td>
<td>ECB 17: 592-600</td>
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| Apr 4 | Third midterm exam on April 4 |

<table>
<thead>
<tr>
<th>Week 15</th>
<th>Lecture 22 Microtubules and flagella</th>
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<tbody>
<tr>
<td>Apr 9</td>
<td>ECB 17: 577-590</td>
</tr>
<tr>
<td>Apr 11</td>
<td>Lecture 23 Cell cycle and apoptosis</td>
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<td>ECB 18: 609-624, 638-646</td>
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<table>
<thead>
<tr>
<th>Week 16</th>
<th>Lecture 24 Cell Division</th>
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<td>Apr 16</td>
<td>ECB 18: 622-638</td>
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<tr>
<th>Apr 18</th>
<th>Section 5: Special Topics</th>
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<tr>
<td></td>
<td>Lecture 25 Cell communication</td>
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<td>ECB 16: 531-567; ECB 20: 700-707</td>
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<tr>
<th>Week 16</th>
<th>Lecture 26 Stem cells</th>
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<tbody>
<tr>
<td>Apr 23</td>
<td>ECB 20: 711-717; ECB 10:354-359</td>
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<table>
<thead>
<tr>
<th>Wed May 1</th>
<th>Final Exam at 10:30 to 12:30 on Wednesday May 1</th>
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