

Astronomy 3303A – Galaxies – Fall 2020

Calendar description:

Introduction to galaxies, including the Milky Way. Galaxy components and their variation with location, shape, and age; the distribution of galaxies in space and time; interpretation of observational data to derive physical properties of galaxies.

List of Prerequisites:

Physics 2101A/B, 2102A/B

Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Instructor:

Professor Els Peeters
epeeters@uwo.ca

Office hours:

Online (Zoom), by appointment

Teaching assistant:

Hadi Papei: hpapei@uwo.ca

Format:

Online course

- The University timetable specifies a time for lectures: Thursday 9:30-11:30 AM (Eastern time). Please keep this time free in your schedule: we will connect via Zoom during this time. The content of these sessions will vary and may include short lectures though most of the hours available will be used to break up into small groups in zoom 'breakout rooms' to work on either projects (assignments) within your groups or problems together in real-time. Attendance to this synchronous class time is highly recommended.
- Students must use their Western (@uwo.ca) email addresses when contacting their instructors.
- You can contact the instructor or TA by email or during the synchronous class time (for example by 'private' chat in zoom). We will try to respond to your email inquiry within two working days of reception.
- Students should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

- All course material will be posted to OWL: <http://owl.uwo.ca>.
- If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Professionalism and netiquette:

It is expected that students will display the same standard of behaviour in all online interactions as they would in the regular classroom. Video interactions will be done in respectful language, in a quiet environment, in appropriate clothing, etc. Failure to abide with these requirements may result in the barring of the student from such interactions and the loss of any associated marks. For a refresher on netiquette see

<https://www.rasmussen.edu/student-experience/college-life/netiquette-guidelines-every-online-student-needs-to-know/>

The integrity of the course and the privacy of its participants is expected to be preserved. It is illegal to distribute, share in any public domain, or sell any course materials without prior written consent of the instructor.

Technical Requirements:

Participation in some activities requires a webcam/microphone and/or a stable internet connection. If you anticipate any problems along these lines please contact your professor. You are expected to attend Thursday synchronous class time, but if internet or other issues prevent you from logging in at the designated time, you can access the recordings of the general portion of the session (work done in break-out rooms will not be recorded).

Course Goals:

By the end of this course, students should have a basic understanding of the theory and observations that underpin current research in galaxies and galaxy evolution. More specifically, students should be able to:

- Explain quantitatively how the three-dimensional structure of the Milky Way, the Local Group, and the large-scale distribution of galaxies is measured, and the results of those measurements.
- Quantitatively describe the components that make up galaxies, explain how these components are studied and their relation to galaxy morphological type.
- Compute properties of galaxies by combining observational data with physical laws.
- Describe the statistical distributions of integrated galaxy properties in the universe and explain how these properties have changed over cosmic time.

Outline of topics to be covered:

1. Galaxies in the Local Universe
 - The Milky Way and its satellites
 - The Hubble Diagram
2. Galaxy Structure
 - morphology: (thin and thick) disk, bulge, halo
 - globular cluster systems
 - interstellar medium and star formation
 - light distribution

- dynamics of stars, gas, dark matter (rotation and random motions)
 - nuclei
 - stellar populations
 - scaling relations (Tully-Fisher, fundamental plane)
 - distance scale
3. Galaxy Populations
 - dwarf ellipticals, dwarf spheroidals, dwarf irregulars
 - properties and environmental dependencies
 4. Galaxy Environments
 - field
 - groups
 - clusters
 - large scale structure
 5. Galaxy Evolution
 - changes with cosmic time
 - the active galactic nuclei phase
 - mergers

Course content may vary.

Required textbook:

Sparke & Gallagher, Galaxies in the Universe, An Introduction, 2nd Edition, Cambridge University Press. We will use this text for reading assignments in Perusall and thus you must have access to this textbook via Perusall. You will be prompted to purchase the book through Perusall when you first access the book in the platform. You must access the course's Perusall site via the OWL course site.

Calculator:

A basic scientific calculator (e.g. the Sharp EL-510RB calculator used for first year physics courses) is allowed during the midterm and the final exam.

Perusall:

A portion of the class marks will be assigned for performing the readings, for posing and answering questions, engaging with other students and making well-thought out comments on the Perusall website on a weekly basis. This is done via the Perusal tool which will be accessible from the course OWL site. Students do not have to create a separate Perusall account.

Zoom:

Virtual class time will be held synchronously, that is, students and instructor will all log in at the same time, via zoom. You can access Zoom from the course OWL site.

Gradescope:

Some assignments will be submitted to gradescope, accessible from the course OWL site. Gradescope accepts pdfs, scans or photos of handwritten assignment pages. These will be accessed by the TAs to grade, and marks and feedback will be returned to the student via Gradescope.

Remote Proctoring Software:

Tests and examinations in this course will be conducted using the remote proctoring service, such as Proctortrack. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. More information about this remote proctoring service is available in the Online Proctoring Guidelines at the following link: <https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>

Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. Information about the technical requirements are available at the following link: <https://www.proctortrack.com/tech-requirements/>

Grading:

The overall course grade will be calculated as listed below:

Quiz 1 (by Sep 14, 5pm)	1%
Quiz 2 (by Oct 15, 5pm)	2%
Reading Assignments (13; due by Sundays 11:59pm)	33%
Assignment 1 (multiple due dates, see OWL)	10%
Assignment 2 (by Oct 18, 11:59pm)	5%
Assignment 3 (by Nov 22, 11:59pm)	5%
Assignment 4 (by Dec 6, 11:59pm)	10%
Midterm Exam (date TBD, Registrar's Office)	15%
Final Exam (date TBD, Registrar's Office)	20%

In order to pass this course, you must obtain (1) a grade of at least 50% over *all* course components AND (2) a grade of at least 50% on the weighted average of the midterm and the final exam. If you fail to obtain a grade of 50% on either one, this failing grade will be adopted as your final course grade.

Please note: The Department of Physics and Astronomy may, in exceptional cases, adjust the final course marks in order to conform to Departmental policy.

Accommodated Evaluations

Quizzes: Quizzes are accessible for multiple days. If you are unable to submit by their deadline for valid reasons (see Academic Consideration for Student Absence), a late submission deadline can be arranged in consultation with the instructor.

Reading Assignments: Thirteen reading assignments are scheduled weekly. Assignments will be posted on OWL/Perusall on Mondays at 1 am and must be completed (on Perusall) by the following Sunday at 11:59pm. Late submissions are not accepted. Each reading assignment is worth 3% of your final grade; therefore, you can miss two weekly reading assignments without penalty. If you complete all thirteen reading assignments, your lowest two grades will be dropped. Missed reading assignments cannot be made up at a later date for any reason. Marking will be done based on software available in Perusall (see OWL site, week 1 for details).

Assignments: All assignments will have one or more submission deadlines as well as late submission deadlines. You are allowed to submit one of (sub)assignment by its late submission deadline without requiring a penalty. A penalty of 50% (of the maximum score) will be applied to the second (sub)assignment submitted by the late submission deadline. A penalty of 75% (of the maximum score) will be applied to the third (sub)assignment submitted by the late submission deadline. Further late submissions will receive a grade of zero. Assignments submitted after their late submission deadline will not be accepted. Note assignment 1 has two deadlines without a late submission option (September 12 and 16).

Make-up Midterm and final exam: See Academic Consideration for Student Absence to receive permission to write a make-up. Note that if you fail to write a scheduled Special Examination, permission to write another Special Examination will be granted only with the permission of the Dean in exceptional circumstances and with appropriate supporting documents. In such a case, the date of this Special Examination of a final exam normally will be the scheduled date for the final exam the next time the course is offered.

If you received permission for absence to the midterm, the missed midterm must be made up at a later date and cannot be handled through re-weighting other course components.

Final exam: The final exam will not cover material covered by the midterm and quiz 2.

Accommodation Policies:

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf

Academic Consideration for Student Absence:

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. *Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence*, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs, see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf

and for the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Religious Accommodation:

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar:

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

Academic Policies:

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html>, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Recording:

Some of the synchronous learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Scholastic offences:

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing (such as footnotes or citations). Plagiarism is a major academic offence.

Note that working on problems in a group and discussing solution approaches is not a form of plagiarism. However, each student must submit solutions in his or her own words. Identical assignments will be treated as a case of plagiarism.

Support services:

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.