



ECE535 Satellite Communications Topics

Course Syllabus

● Course Descriptions

“Satellite Communication Systems provide vital and economical fixed and mobile communication services over large coverage areas. In this course, you learn the fundamentals and the techniques for the design and analysis of satellite communication systems.”

● Program Information

Online Master’s Program in Computer Engineering – Internet of Things

<http://unmonline.unm.edu/programs/masters/internet-of-things.html>

Department of Electrical and Computer Engineering, School of Engineering

<http://www.ece.unm.edu/>

Contact information: email ecegradapp@unm.edu; phone 505.277.2436

● Course Instructor

Dr. Tarief Elshafiey, telshafiey@unm.edu

● Course Information

- **Course Objectives:** upon completion of this course, students will be able to:
- C1. Explain and examine fundamental concepts of frequency allocations, Kepler’s laws, satellite different orbits with emphasize on geostationary orbit.
- C2. Evaluate and criticize different types of losses in satellite communications and how it affects the carrier-to-noise ratio for the uplink, downlink, the combined link and received power at the earth stations.
- C3. Analyze different satellite access performance metrics and characteristics with and apply it to some satellite network applications.

Course Objectives and Module Objectives are very important for you to know. Each module will have specific learning objectives listed on the Module Overview Page, which are designed to help you meet the Course Objectives. The activities in that module, discussions, assignments, assessments and project are developed so that you can demonstrate that you have met these objectives.

- **Prerequisites and Co-requisites:** ECE341 (Introduction to Communication Systems) or equivalent.
- **Textbook:** “Satellite Communications” Dennis Roddy-McGraw-Hill, 4th edition, ISBN 0-07-146298-8

● Course Assignments and Exams

- The course assignments should be conducted individually by default. Some assignments will require a group work (two or more people).
- Assignments are enumerated, such as A3.2 to be the second assignment in module 03. Assignments can be type of quiz, homework, and others. Quiz problems are randomly generated from the problem pool. Homework problems will come with problem description sheet but be answered online too. Late quizzes can be accepted within 3 calendar days but with 30% PENALTY. Other assignments cannot be late since solutions will be posted or peer assessment will start.
- Your end of course assignment (in Module 08) will be a related project. To utilize what you've learned, we will have you select a topic related to the course materials and to build a project. The project may be a software, hardware or a published Journal paper. You will be required to submit a project report and presentation in front of all your colleagues. More details will be provided in the course.
- **Exams** will cover material presented in class and assignments. There are two exams, tentatively scheduled on Week 3 and Week 6. Proctorio, virtual proctoring, will apply to both exams. You are required to practice Proctorio in module 01.

● Grading

Weeks	Grading Items	Percentage	Notes
Module 1	Assignments	3%	
Modules 2-6	Assignments	26%	Around 5% for each module
	Exam I	10%	
Modules 7-11	Assignments	26%	Around 5% for each module
	Exam II	10%	
Module 12	Project Presentation	25%	
Total		100%	

Final letter grade --- Below is a *general guideline* for assignment of final letter grades based on the percentage of points received, and in accordance with the weighting of different course components described above.

A	A-	B+	B	B-	C+	C	Fail
≥ 93%	≥ 88%	≥ 83%	≥ 75%	≥ 68%	≥ 63%	≥ 58%	< 58%

● Communication Channels

- **Course-wide in general:** the course home page will display course modules chronologically, the latest modules on the top. The important course events will be sent via Announcement, which may send a copy to your UNM email if checked). Discussion board is the place to ask/answer questions, post works, talk to your peers, leave comments, and so on, under different forums and thread.

- **Individual communications:** you can email to telshafiey@unm.edu, having your subject line starting with “ECE535” (otherwise, the processing can be significantly delayed). If particularly needed, an A/V session can be requested and arranged via email.
- **7-days rule:** your submitted work (assignments, quizzes, exams, etc.) will be graded within 7 days. You can check your individual scores at “My Grade”. If you have any concerns about your grade, you need to request a review via email within 7 days since the grade is made available to you.
- **Instructor response time:** we routinely check the course for postings and/or emails, Monday – Friday (9:00am-5:00pm) and try to watch for emergencies on the weekend. We will try our best to response to your questions within 48 hours.

● Course Timing

- All modules, except for Module 1, will open on Wednesdays and be available throughout the week ending on the following Tuesday.
- The course due dates will usually fall on Fridays and Wednesdays or be specified in each Module. Check the course schedule for a full list of due dates.
- Module 1 will be open on Monday as we ask you to complete some orientation activities during the first two days of the course.
- We expect that this course will take approximately 12-15 hours of time per week.

● Specific Course Requirements and Technical Requirements

About Computer and Operating Systems

- A high-speed Internet connection is highly recommended.
- Supported browsers include: Chrome, Firefox, Edge & IE, and Safari. Detailed Supported Browsers: <http://online.unm.edu/help/learn/students/>
- Any computer capable of running a recently updated web browser should be sufficient to access your online course. However, bear in mind that processor speed, amount of RAM and Internet connection speed can greatly affect performance.
- You are required to learn and manipulate the LEARN platform, to construct WIKI pages (at LEARN), to produce screenshots and post them.

About Web Conferencing

- Web conferencing may be used in this course. More details will be provided in the course. You will need a USB headset (or built-ins) with microphone. A high-speed internet connection is highly recommended for these sessions. A wireless Internet connection may be used if successfully tested for audio quality prior to web conferencing.
- Web Conferencing and Media Support
+1 505-277-0857 (M-F 8am-5pm); +1 877-688-8817, learn@unm.edu

About Requirements for hardware necessary to use Proctorio:

- Portable web camera OR built-in laptop camera
- Microphone headset OR built-in computer/laptop microphone
- Minimum Internet connection speed of .092 Mbps (.663 Mbps is optimal)
- Minimum recommended RAM of 4GB
- Download of Chrome Browser (free and open)

● **Procedures for Completing Coursework**

- All written work needs to be submitted online. If you have a difficulty using a tool to complete work, for the purposes of this course, please contact UNM Learn Student Technical Support.
- UNM Learn automatically records all students' activities including: your first and last access to the course, the pages you have accessed, the number of discussion messages you have read and sent, web conferencing, discussion text, and posted discussion topics. This data can be accessed by the instructor to evaluate class participation and to identify students having difficulty.

● **Netiquette**

- In following with the UNM Student Handbook, all students will show respect to their fellow students and instructor when interacting in this course. Netiquette refers to a set of guidelines in online communication that help to ensure positive interactions. For more details, refer to <http://online.unm.edu/help/learn/students/pdf/discussion-netiquette.pdf>.
- In this case specifically, these guidelines seek to keep this online class a positive learning environment for everyone. Take Netiquette suggestions seriously. Flaming is considered a serious violation and will be dealt with promptly. Postings that do not reflect respect will be taken down immediately.

● **UNM Policies**

- *Copyright Issues* - All materials in this course fall under copyright laws and should not be downloaded, distributed, or used for any purpose outside this course.
- *Accessibility* - The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodations of their disabilities. If you have a disability requiring accommodation, please contact Accessibility Services Office in 2021 Mesa Vista Hall at 277-3506 or <http://as2.unm.edu/index.html>. Information about your disability is confidential.
- *Academic Misconduct* - You should be familiar with UNM's Policy on Academic Dishonesty and the Student Code of Conduct (<https://pathfinder.unm.edu/campus-policies/academic-dishonesty.html>) which outline academic misconduct defined as plagiarism, cheating, fabrication, or facilitating any such act.
- *Graduate Student Resources* - <https://grad.unm.edu/resources/>



ECE535 Satellite Communications

Course Schedule | 8-week Session

Module 01: Introduction (0.5 week)

Monday, Mar. 18 – Tuesday, Mar 19

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
1.1	Assignment/Quiz A1.1 (Syllabus quiz)	Tuesday 11:59pm	1%
1.2	Assignment A1.2 (Class Roster)	Tuesday 11:59pm	1%
1.3	Assignment A1.3 (Discussion board)	Tuesday 11:59pm	1%
	Module 01 Total		3%

Module 02: Overview of Satellite Systems (0.5 week)

Wednesday, Mar. 20 – Friday, Mar. 22

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
2.1	Assignment/HW	Friday 11:59pm	3%
	Module 02 Total		3%

Module 3: Orbits and Launching Methods (1.5 week)

Monday, Mar. 25 – Tuesday, Apr. 02

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
3.1	Assignment/HW	Friday 11:59pm	3%
3.2	Assignment/HW	Sunday 11:59pm	3%
3.3	Assignment/HW	Tuesday 11:59pm	3%
	Module 03 Total		9%

Module 4: The Geostationary Orbit (0.5 week)

Wednesday, Apr. 03 – Friday, Apr. 05

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
4.1	Assignment/ Case Study	Friday 11:59pm	2.5%
4.2	Assignment/HW	Sunday 11:59pm	2.5%
	Module 04 Total		5%

Module 5: Radio Wave Propagation (0.5 week)

Monday, Apr. 08 – Tuesday, Apr. 09

	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
5.1	Assignment/ Case Study	Tuesday 11:59pm	2.5%
5.2	Assignment/HW	Friday 11:59pm	2.5%
	Module 05 Total		5%

Module 6: Polarization (0.5 week)

Wednesday, Apr. 10 – Friday, Apr. 12

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
6.1	Assignment/ Case Study	Friday 11:59pm	2%
6.2	Assignment/HW	Sunday 11:59pm	2%
	Module 06 Total		4%

Exam I: M2 - M6

Friday, Apr. 19

	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
	Complete Exam I for M2 – M6	Friday 8:00am	10%

Module 7: The Space Segment (0.5 week)

Monday, Apr. 15 – Tuesday, Apr. 16

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
7.1	Assignment/ Case Study	Tuesday 11:59pm	2%
7.2	Assignment/HW	Friday 11:59pm	2%
	Module 07 Total		4%

Module 8: The Earth Segment (0.5 week)

Wednesday, Apr. 17 – Friday, Apr. 19

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
7.1	Assignment/ Case Study	Friday 11:59pm	2%
7.3	Assignment/HW	Sunday 11:59pm	2%
	Module 07 Total		4%

Module 9: The Space Link (1.5 week)

Monday, Apr. 22 – Tuesday, Apr. 30

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
7.1	Assignment/ Case Study	Tuesday 11:59pm	3%
7.2	Assignment/HW	Friday 11:59pm	3%
7.3	Assignment/HW	Friday 11:59pm	3%
	Module 07 Total		9%

Module 10: Satellite Access (0.5 week)

Wednesday, May 01 – Friday, May 03

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
7.1	Assignment/ Case Study	Friday 11:59pm	2.25%
7.2	Assignment/HW	Tuesday 11:59pm	2.25%
	Module 07 Total		4.5%

Module 11: Satellites in Networks (0.5 week)

Monday, May 06 – Tuesday, May 07

#	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
7.1	Assignment/ Case Study	Tuesday 11:59pm	2.25%
7.2	Assignment/HW	Friday 11:59pm	2.25%
	Module 07 Total		4.5%

Exam II: M7 – M11

Thursday, May 09

	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
	Complete Exam II for M7 – M11	Friday 8:00am	10%

Module 12: Project Presentation (0.5 week)

Wednesday, May 08 – Friday, May 11

	LEARNING ACTIVITY	DUE DATE	GRADING WEIGHT
8.1	Joining the group, present the project report	Wednesday 11:59pm	10%
	Complete and Post Project Presentation	Thursday 11:59pm	10%
	Peer-to-Peer Review	Friday 11:59pm	5%