Course Goal: To understand the concept, theory and design of the antennas and arrays used in the modern wireless communication systems.

Prerequisite: EE 540: Microwave Devices and Systems or equivalent

Lecture Hours and Location: T TH 5.30PM-6.45PM, E-427

Course Synopsis: The course covers fundamental topics of the theory and design of the antennas used in the wireless communication systems. The course starts with the introduction of antennas, and the description of the antenna fundamental parameters. Both wire and aperture antennas will be addressed. After students are familiar with the single antenna radiating element, importance of arraying in linear and planar fashion will be discussed. Finally, reflector antennas, antenna measurement techniques and radio wave propagation will be covered. Emphasis will be on the concept, theory, understanding and design of the antennas. As needed and time permitting, different types of antennas and antenna measurement technique demonstrations will be shown in the class.

Course Contents:

1. Antenna radiation mechanism, and antenna types
2. Fundamental antenna parameters
3. Wire Antennas: Theory of wire antennas, Monopoles, Dipoles, Loops, Yagi-Uda, Log-Periodic, and Helical antennas
4. Array Antennas: Theory of linear (Uniform Distribution) and planar (Uniform Distribution) array configurations including beam steering antennas and feed networks
5. Theory of Aperture Antennas
6. Microstrip Patch Antennas
7. Antenna Measurement Techniques: Near-field, and far-field radiation pattern measurements
8. Radio wave propagation

Text Book:


Reference Books:

**Evaluation:** Final course grade (A, A−, B+, B, B−, C+, C, C−, Ds, and F) will be determined based on the student’s performance in the assignments, mid-term tests, project report/presentation, and a final examination. The weighting of the components are given below:

<table>
<thead>
<tr>
<th>Components</th>
<th>Value</th>
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<tbody>
<tr>
<td>1) Assignments (5)</td>
<td>20%</td>
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<tr>
<td>2) Mid-term Test (<strong>Around 75 min, Oct end</strong>)</td>
<td>25%</td>
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<tr>
<td>3) Review Project Report/Class Presentation</td>
<td>10% (7.5% Report + 2.5% Presentation)</td>
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<tr>
<td>4) Design Project Report/Interview</td>
<td>15% (12.5% Report + 2.5% Presentation)</td>
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<td>5) Final Examination (.................................)</td>
<td>30%</td>
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**Project Reports:** Additional information will be supplied during the class by Sept 15 for Review Project Report and Oct 15 for Design Project Report.

**Last Day of the Class:** .................

**Policies:**

1. Attendance is essential for successful completion of this course. Maximum 3 absentees are tolerated but with prior permission.
2. Late assignments and reports are NOT accepted. Assignments should be clearly written or typed. Assignments will be graded and returned.
3. Solution for only selected assignment problems will be given either in class or will be posted. I also solve/discuss representative problems in class.
4. Make-up schedules for the mid-term test and final examination is NOT allowed.
5. Both mid-term and final examinations are OPEN book format. The course book and any other permitted materials are ONLY allowed. The assignments or notes are NOT permitted.
6. **Course for Mid-term Test:** All the course contents covered in the class before this test
7. **Course for Final Exam:** All the course contents covered in the class since the Mid-Term Exam
8. Plagiarism and any form of cheating in the assignments, mid-term tests, project report, and final examination will NOT be tolerated. If anybody caught cheating, a Grade, F will be automatically assigned.

**Instructor:**

- Prof. Satish K. Sharma, Ph. D.
- Office: E202D
- Telephone: (619)-594-0241
- Email: ssharma@mail.sdsu.edu

**Office Hours:** Tuesday (T) and Thursday (TH) 3.30PM to 4.30PM or by appointment.