

Course Content

Course Title (English)	Signal Integrity
Course Title (Chinese)	訊號完整度
Credit	3
Instructor	Prof. Ruey-Beei Wu 吳瑞北 教授
Outline	<p>The signal propagating in modern digital systems has reached high data rate of several Gbps or above, spanning frequency range from DC to microwave spectrum. The interconnections in the packaging structures exhibit crucial concerns in the electric performance due to various electromagnetic effects among them. Systematic approaches of modeling, simulation, analysis, and design should be elaborated to improve the signal integrity. Covering electromagnetic theory and practical applications, this course will introduce main themes of basic transmission line analysis, reflection and crosstalk noise, lossy line analysis, I/O modeling, and eye diagram fast analysis. The detailed topics are as follow:</p> <ol style="list-style-type: none">1. Fundamental Issues of Signal Integrity2. Ideal Transmission Line Fundamentals3. Ideal Transmission Line Reflection4. Crosstalk5. Interconnection Modeling6. Nonideal Conductor Modeling7. Electric Properties of Dielectric8. Differential Signaling9. Modeling for Discontinuities

	<p>10. I/O Circuits and Models</p> <p>11. Equalization</p> <p>12. Fast Eye-Diagram Analysis</p>
Goal	<p>When propagating in chips, packages, and boards, the high-speed signal suffers from various signal integrity concerns such as delay, reflection, crosstalk, switching noise, attenuation, and so on, resulting in the deteriorated eye diagram. The students will learn the physical mechanism of the above issues from the electromagnetic theory and then the design concepts to improve the signal quality, thereby forming solid foundation in the research and development of high-speed digital systems.</p>
English Teaching	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Teaching Material	<input checked="" type="checkbox"/> English <input type="checkbox"/> Chinese