

Course title	<b>Integrated Navigation</b>
Credits	2
Course description	This course introduces the inertial navigation system (INS) and multi-sensor integrated navigation techniques; the mathematical principle; and the design and implementation of integrated navigation algorithm using GNSS/INS as example. Students will grasp the basic algorithm and system designs of integrated navigation.
Course objectives	Upon successful completion of the course students should be able to <ul style="list-style-type: none"> <li>• Understand the principle of inertial navigation</li> <li>• Understand the principle of GNSS/INS integrated navigation</li> <li>• Understand the underlying mathematical principles of integrated navigation</li> <li>• Use typical GNSS/INS data processing software.</li> </ul>
Course outline	The course contents includes the following: <ol style="list-style-type: none"> <li>1. Principle and algorithm of inertial navigation <ol style="list-style-type: none"> <li>a) Introduction of inertial navigation and inertial sensors (6 hours)</li> <li>b) Inertial navigation algorithm (INS mechanization) (6 hours)</li> <li>c) Error model of INS (3 hours)</li> </ol> </li> <li>2. Principle and algorithm of GNSS/INS integrated navigation <ol style="list-style-type: none"> <li>a) Kalman filter algorithm (6 hours)</li> <li>b) Design of integrated navigation algorithm (6 hours)</li> <li>c) Experiment of integrated navigation (3 hours)</li> </ol> </li> <li>3. Course project seminar (6 hours)</li> </ol>
Course methods	The course contents are taught through lectures, practical examples, and course project. Students will be required to work out assignments. Students will have the opportunity to discuss and work in teams to do course project.
Course assessment	The course grade depends on students' performance in class activities, assignments, homework, and final course project.
Reading	Handout and copies of PowerPoint slides
Prerequisites	To be admitted to this course the students must have successfully completed the following courses: <ul style="list-style-type: none"> <li>• ...</li> <li>• ...</li> </ul>
Lecturer	Xiaoji Niu