

ACADEMIC INFORMATION

OENG 530 - Fundamentals of Remote Sensing Phenomenology

Credits: 3 (quarter credit hours)

Prerequisites: None

This course lays the groundwork for solving MASINT remote sensing problems, with emphasis on IR technology. Both the signature and metric aspects of MASINT will be considered. Topics include source characterization, radiometry, propagation and attenuation, collection optics, detectors and elementary data stream processing. Students should have a strong background in basic physics and mathematics and/or significant practical experience in MASINT or GEOINT.

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OENG 531 - Overhead OPIR Collection Systems

Credits: 3

Prerequisites: OENG 530

The principles developed in the first course will be applied to explore available technology for collecting, processing and exploiting OPIR data for Missile Warning, Missile Defense, Support for Military Operations, Battlespace Characterization and Technical Intelligence using National Technical Sensors.

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OENG 533 - Multispectral/Hyperspectral Exploitation

Credits: 3

Prerequisites: OENG 530

Examines the information that can be extracted from multispectral and hyperspectral data sets collected by GEOINT sensors. Introduces the basic sensor/platform concepts and performance metrics for collecting spectral data. Surveys existing spectral sensor and/or platform combinations for various applications and the corresponding algorithms for data exploitation.

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OENG 532 - Introduction to Radar and Synthetic Aperture Systems

Credits: 3

Prerequisites: OENG 530

Provides the basis for understanding radar systems, including range-azimuth, Doppler, synthetic aperture, phased array, bistatic, and over-the-horizon radars. Emphasizes the application of GEOINT phenomenology with signature exploitation of radar cross-sections and wideband signal interpretation. Examples may be drawn from the National Technical Sensors.

OENG 536, OENG 537, OENG 539, EENG 538 - IR/SAR Data Processing

Labs

Credits: 1 credit each

Corequisites: OENG 530, OENG 531, OENG 533, EENG 532 (respectively)

Problem solving and hands-on practical sessions are used to investigate GEOINT data phenomenology and processing algorithms. Exercises will complement the academic courses with demonstrations and applications of software to process non-imaging focal plane array, multi/hyperspectral image cube and synthetic aperture radar data. Problems may include use of Excel®, MODTRAN or PLEXUS, NOAS, Matlab®, Satellite Tool Kit (STK®), OSMEC, ENVI®, Case Executive®, and other specific application IR, MSI/HSI and SAR workbench tools.

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OENG 535 - HYW b]WJ' b]hY`]] YbW for the Warfighter Seminar

Credits: 1

Prerequisites: none

Weekly sessions present technical intelligence topics of interest to the military and intelligence communities, and take advantage of the knowledge and experience of seasoned users and practitioners of infrared, SAR and spectral data products. Credit given upon completion of all weekly seminars.

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Mathematics and Physics Review

Credits: 0

Prerequisites: none

In the first week, before the academic courses get underway, some skills in basic mathematics that support GEOINT problem solving will be reviewed. Some fundamental issues in physics, chemistry, engineering and technology will also be introduced.