The Minor in Applied Physics & Electrical Engineering

Units required: 19

The minor in applied physics & electrical engineering provides students with course work that will enhance their background, knowledge and skills in the topical area of applied physics and electrical engineering. This program covers classes in several fields of science and engineering, encompassing electronics, solid-state devices, applied electromagnetics, radiofrequency and microwave technology, fiber-optic communication, applied optics, nanophotonics, sensors, and medical and biological imaging technology.

This program consists of six courses total: one required course, two core courses and three electives. At least three of these six courses must be ESE courses taught by the ESE department and not taught by other departments by means of cross-listing. Students who complete the requirements in Applied Physics & Electrical Engineering subjects at Washington University as specified below may be awarded a minor in applied physics & engineering.

Target students: Students who are interested in applied physics and electrical engineering applications.

Prerequisite: ESE 318 Engineering Mathematics A or its equivalent is recommended.

Course Requirements

Required course:
- ESE 230 Introduction to Electrical and Electronic Circuits

One core lab course from the following list:
- ESE 331 Electronics Laboratory or Physics 321 Electronics Laboratory
- ESE 435 Electrical Energy Laboratory

One core course from the following list:
- ESE 232 Introduction to Electronic Circuits
- ESE 330 Engineering Electromagnetics Principles or Physics 421 Electricity and Magnetism
- ESE 337 Electronic Devices and Circuits
- ESE 444 Sensors and Actuators
- Physics 471 Quantum Mechanics

Three electives from the following list. These three courses (i) must exclude the course selected in requirement (3) above and (ii) must include at least one physics course:

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<th>Code</th>
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<tbody>
<tr>
<td>ESE 232</td>
<td>Introduction to Electronic Circuits</td>
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<tr>
<td>ESE 330</td>
<td>Engineering Electromagnetics Principles</td>
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<td>ESE 332</td>
<td>Power, Energy and Polyphase Circuits</td>
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<tr>
<td>ESE 337</td>
<td>Electronic Devices and Circuits</td>
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<td>ESE 433</td>
<td>Radio Frequency and Microwave Technology for Wireless Systems</td>
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<td>ESE 434</td>
<td>Solid-State Power Circuits and Applications</td>
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<tr>
<td>ESE 438</td>
<td>Applied Optics</td>
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<tr>
<td>ESE 444</td>
<td>Sensors and Actuators</td>
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<tr>
<td>ESE 531</td>
<td>Nano and Micro Photonics</td>
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<tr>
<td>ESE 532</td>
<td>Introduction to Nano-Photonic Devices</td>
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<td>ESE 534</td>
<td>Special Topics in Advanced Electrodynamics</td>
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<tr>
<td>ESE 575</td>
<td>Fiber-Optic Communications</td>
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<td>Physics 463</td>
<td>Statistical Mechanics and Thermodynamics</td>
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<tr>
<td>Physics 471</td>
<td>Quantum Mechanics</td>
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<td>Physics 472</td>
<td>Solid State Physics</td>
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<td>L31 Physics 537</td>
<td>Kinetics of Materials</td>
<td>3</td>
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</table>

For more information, please contact the program director, Jung-Tsung Shen (https://ese.wustl.edu/faculty/Pages/faculty.aspx?bio=79).