The completed and signed proposal should be submitted by the Dean’s Office to: curriculumplanning@asu.edu. Before academic units can advertise undergraduate concentrations or include them in their offerings as described in the university catalogs, they must be recommended for approval by the Senate Curriculum and Academic Programs Committee and approved by the Executive Vice President and Provost of the University.

**Definition and minimum requirements:**
A concentration is a formalized selection of courses within a major.

- A concentration requires a minimum of 15 semester hours of which at least 9 semester hours must be upper division. Specialized concentrations (e.g., BIS Concentrations) may have additional or different requirements.
- A concentration is offered by a single unit and is intended exclusively for students pursuing a particular major. If a concentration consists of courses from more than one college the approval of each college Dean is required.

**College/School/Institute:** College of Technology and Innovation

**Department/Division/School:** Engineering

**Proposing Faculty Group (if applicable):**

If this is an official joint degree program? No

If “Yes” List all the additional college(s)/school(s)/institute(s) that will be involved in offering the degree program and providing the necessary resources. Note: All units offering this program must have collaborated in the proposal development and completed the appropriate unit and college/school approvals. N/A

**Existing degree type and name of degree program under which this concentration will be established:** BS Engineering

**Proposed Concentration Name:** Electrical Systems

**Requested effective catalog year?** Fall 2013

For deadline dates see: Curriculum Workflow Calendars.

**Delivery method:** On campus / polytechnic campus

Once students elect a campus or On-line option, students will not be able to move back and forth between the on-campus and the ASU Online options. Approval from the Office of the Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.

**Campus/Locations:**
Indicate all locations where this program will be offered.

☐ Downtown Phoenix  ☑ Polytechnic  ☐ Tempe  ☐ West  ☐ Other:

**Proposal Contact**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dr. Ann McKenna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone number:</td>
<td>480-727-5121</td>
</tr>
</tbody>
</table>

| Title: | Chair and Associate Professor |
| Email: | Ann.McKenna@asu.edu |

<table>
<thead>
<tr>
<th>DEAN APPROVAL(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This proposal has been approved by all necessary unit and College/School levels of review. I recommend implementation of the proposed program.</td>
</tr>
</tbody>
</table>

| College/School/Division Dean name: | Please see email approval in support file. |
| Signature | Date: / /20 |

| College/School/Division Dean name: (if more than one college involved): |
| Signature | Date: / /20 |

Note: An electronic signature, an email from the dean or dean’s designee, or a PDF of the signed signature page is acceptable.
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE CONCENTRATION

1. Overview
   A. Description
      Provide a brief description of the new concentration (including the specific focus of the new concentration, relationship to other concentrations in this degree program, etc).

      The engineering department at the Polytechnic campus has a multidisciplinary engineering program with a concentration in Electrical Systems. The multidisciplinary engineering program allows students to learn in a problem-based curriculum with hands-on projects and the development of professional skills integrated into the program. In the junior and senior years, students take electrical engineering courses to complete a concentration in Electrical Systems. The graduate with an electrical systems concentration will be able to provide leadership in engineering settings, which are intrinsically multidisciplinary in nature, using electrical engineering knowledge to design and implement control systems. Students learn theory and application of sensors, actuators, microcontrollers and microprocessors, power sources and board level implementations of such systems.

   B. Demand
      Explain the unit’s need for the new concentration (e.g., market demand, research base, direction of the discipline, and interdisciplinary considerations). How will the new concentration complement the existing degree program?

      Electrical Systems is an existing focus area inside the BS in Engineering, housed in the College of Technology and Innovation’s Department of Engineering. This proposal is to convert the existing focus area to a formal concentration. The recent merger of the Engineering Technology Department into the Engineering Department provided an opportunity to revise the Electrical Systems curriculum to better address the needs of students and industry. The best measure of the number of students that will be enrolled in the Electrical Systems concentration is the sum of the students previously in the electrical systems focus area and the students in the electronics technology degree program. This represents about 150 students. In addition, the Occupational Outlook Handbook anticipates a 6% increase in job demand between 2010 and 2020. Thus we anticipate a moderate growth in this concentration.

      The BSE Engineering program is designed so that students combine a primary concentration with a secondary focus. The proposed Electrical Systems concentration will serve as one of the BSE program’s primary concentrations and will allow students to design their programmatic experience in many positive ways. For instance, when the Electrical Systems concentration is combined with a secondary focus area in either mechanical or robotics, the student achieves a unique multidisciplinary background that provides a solid foundation in systems analysis and design. Another choice when a student takes the Electrical Systems concentration could be a secondary focus in computing studies, which creates a highly marketable hardware/software combination. Such combinations are difficult to achieve within the confines of a traditional disciplinary-specific engineering degree. The graduate with an electrical systems concentration and the multidisciplinary background achieved from additional study areas will be able to provide leadership in engineering settings which are intrinsically multi-disciplinary in nature, using electrical engineering knowledge to observe and control other systems, perhaps of a mechanical, thermal or chemical nature.

2. Support and Impact
   A. Faculty governance
      Provide a supporting letter from the chair of the academic unit verifying that the proposed concentration has received faculty approval through appropriate governance procedures in the unit and that the unit has the resources to support the concentration as presented in the proposal, without impacting core course resources.

   B. Other related programs
      Identify other related ASU programs and outline how the new concentration will complement these existing ASU programs. (If applicable, statements of support from potentially-affected academic unit administrators need to be included with this proposal submission.)

      The Ira A Fulton School of Engineering was consulted for comment and has no objection to the proposed concentration (email attached).

   C. Letter(s) of support
      Provide a supporting letter from each college/school dean from which individual courses, or the entire concentration, are taken.
3. Academic Curriculum and Requirements

A. Knowledge, competencies, and skills

List the knowledge, competencies, and skills (learning outcomes) students should have when they complete this proposed concentration. Examples of program learning outcomes can be found at [http://www.asu.edu/oue/assessment.html](http://www.asu.edu/oue/assessment.html).

In addition to the learning outcomes shared by all concentrations in the BSE Engineering program, the following learning outcomes have been specifically identified for the proposed concentration:

1. The student will explain and demonstrate how electrical technology, markets, and tools drive design and apply this knowledge to the design of electrical systems and subsystems.
2. The student will develop user requirements and decompose problems into systems of systems.
3. The student will use their knowledge of components and architectures to design electrical and electromechanical modules and integrate them into systems.
4. The student will apply the processes necessary to fabricate electrical systems: prototype, simulate/model, validate and troubleshoot.
5. The student will use modern components and techniques to manage electrical energy.

B. Admissions criteria

List the admissions criteria for the proposed concentration. If they are identical to the admission criteria for the existing major and degree program under which this concentration will be established, please note that here.

Admission criteria mirrors that of the existing major and degree.
### C. Curricular structure

Provide the curricular structure for this concentration. Be specific in listing required courses and specify the total minimum number of hours required for the concentration.

#### Required Core Courses for the Degree/Major

**Engineering Core** *(note: Additional supporting courses required within general studies are noted on major map)*

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Number</th>
<th>Title</th>
<th>Is this a new Course?</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR</td>
<td>101</td>
<td>Introduction to Engineering Design I</td>
<td>N</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>102</td>
<td>Introduction to Engineering Design II</td>
<td>N</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>104</td>
<td>Critical Inquiry in Engineering</td>
<td>N</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>201/202</td>
<td>Fall/Spring Multidisciplinary Project</td>
<td>N</td>
<td>3/3</td>
</tr>
<tr>
<td>EGR</td>
<td>218</td>
<td>Materials and Manufacturing Processes</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>219</td>
<td>Computational Modeling of Engineering Systems</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>280</td>
<td>Engineering Statistics</td>
<td>N</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>301/302</td>
<td>Fall/Spring Concentration Project</td>
<td>N</td>
<td>3/3</td>
</tr>
</tbody>
</table>

**Section sub-total:** 36

#### Required Concentration Courses

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Number</th>
<th>Title</th>
<th>Is this a new Course?</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR</td>
<td>330</td>
<td>Design of Electrical Systems</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>334</td>
<td>Analog-Digital Interface</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>338</td>
<td>Microcontrollers in Smart Systems</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>430</td>
<td>Design, Fabrication, and Architecture of Electronic Devices</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>EGR</td>
<td>431</td>
<td>Power Management</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>PHY</td>
<td>331</td>
<td>Principles of Modern Electromagnetism</td>
<td>N</td>
<td>3</td>
</tr>
</tbody>
</table>

**Section sub-total:** 18

#### Elective Concentration Courses

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Number</th>
<th>Title</th>
<th>Is this a new Course?</th>
<th>Credit Hours</th>
</tr>
</thead>
</table>

**Section sub-total:** 0

#### Other Concentration Requirements

E.g. – Capstone experience, internship, clinical requirements, field studies, foreign language skills as applicable

**Credit Hours**
Academic Curriculum and Requirements (Continued)

D. Minimum residency requirement

How many hours of the concentration must be ASU credit? 6 credits

E. Provide a brief course description for each new course.

Degree Core:

EGR 216: Fundamentals of Engineering Systems I (3)
An introduction to modeling of engineering systems using mathematical and scientific principles. Modeling techniques include network models for electrical, fluid and heat systems; application of basic thermodynamic considerations to understand limitations in energy conversion; and application of basic mechanics of particles to model simple mechanical systems. In addition, the course will introduce the basic structure a modern electronic measurement system and relate this structure to measurement accuracy, precision and resolution.
Enrollment requirements: Prerequisite: CHM 113 or CHM 114, MAT 265

EGR 217: Fundamentals of Engineering Systems II (3)
Modeling of engineering systems at an intermediate level using mathematical and scientific principles. Modeling techniques include basic static and dynamic analysis of rigid bodies; electrical circuit analysis; simple frequency domain models of linear systems; and applications of feedback in linear system models.
Enrollment requirements: Prerequisites: PHY 121, EGR 216

EGR 218 Materials and Manufacturing Processes (3)
Course description: Application of material properties and manufacturing processes to the design and fabrication of engineered artifacts.
Enrollment requirements: Prerequisites: CHM 113 or CHM 114

EGR 219 Computational Modeling of Engineering Systems (3)
Course description: An introduction to computing that develops software to find solutions to engineering problems. Students will write and document code to solve problems in data acquisition, modeling of physical systems, and optimization.

Concentration:

EGR 330: Design of Electrical Systems (3) (will also be required for the Robotics concentration)
Overview of electrical system architectures and components used in design of smart electrical and electromechanical systems. Prerequisites EGR 217 and EGR 219

EGR 334: Analog-Digital Interface (3) (will also be required for the Robotics concentration)
Overview of electrical system architectures and components used in design of smart electrical and electromechanical systems. Prerequisites: EGR 217 and EGR 219; Corequisite EGR 301

EGR 338: Microcontrollers in Smart Systems (3)
Microcontroller implementation of smart systems. Microcontrollers are applied to control dynamic systems; this includes the interface with sensors and actuators as well as developing simple open- and closed-loop control laws. Prerequisites: EGR 330, EGR 334
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE CONCENTRATION

EGR 430: Design, Fabrication, and Architecture of Electronic Devices (3)
Comprehensive introduction to the design, operation, production and application of the most common semiconductor devices and categories of integrated circuit. The close interaction between materials, semiconductor physics and circuit performance is demonstrated, especially in terms of the applications and economics of digital systems. Prerequisite: EGR 330

EGR 431: Power Management (3)
Devices and techniques to supply and manage power in electrical systems. Prerequisite: EGR 330

Note: All new required courses should be submitted in Curriculum Changemaker and ready for Provost’s Office approval before this concentration is put on Curriculum and Academic Programs Committee (CAPC) agenda.

4. Administration and Resources

A. How will the proposed concentration be administered (including admissions, student advisement, retention, etc.)?

The concentration will be administered through the current structure and process for in place for the existing major and degree.

B. What are enrollment projections for the next three years?

<table>
<thead>
<tr>
<th></th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Yr. 1 continuing + new entering)</td>
<td>(Yr. 1 continuing + new entering)</td>
<td></td>
</tr>
<tr>
<td>Number of Students (Headcount)</td>
<td>150*</td>
<td>159</td>
<td>169</td>
</tr>
</tbody>
</table>

*Projections based on enrollment in existing focus areas and expected growth as explained in demand statement.

C. Resources

What are the resource implications for the proposed concentration, including any projected budget needs? Will new books, library holdings, equipment, laboratory space and/or personnel be required now or in the future? If multiple units/programs will collaborate in offering this concentration please discuss the resource contribution of each participating program. Letters of support must be included from all academic units that will commit resources to this concentration.

No additional resources are required.
D. Primary Faculty

List the primary faculty participants regarding this proposed concentration. For interdisciplinary concentrations, please include the relevant names of faculty members from across the University.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Area(s) of Specialization as they relate to proposed concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odesma Dairymple</td>
<td>Assistant Professor</td>
<td>Engineering Education</td>
</tr>
<tr>
<td>Robert Grondin</td>
<td>Associate Professor</td>
<td>Solid State Electronics</td>
</tr>
<tr>
<td>Shawn Jordan</td>
<td>Assistant Professor</td>
<td>Engineering Education</td>
</tr>
<tr>
<td>Narciso Macia</td>
<td>Associate Professor</td>
<td>Control Systems</td>
</tr>
<tr>
<td>Arunachalanadar Madakannan</td>
<td>Associate Professor</td>
<td>Energy Sources</td>
</tr>
<tr>
<td>Arunachalanadar Madakannan</td>
<td>Associate Professor</td>
<td>Energy Sources</td>
</tr>
<tr>
<td>Darryl Morrell</td>
<td>Associate Professor</td>
<td>Signal Processing</td>
</tr>
<tr>
<td>Lakshmi Munukulta</td>
<td>Professor</td>
<td>Materials and Energy Sources</td>
</tr>
<tr>
<td>Scott Pollat</td>
<td>Senior Lecturer</td>
<td>Power Systems</td>
</tr>
<tr>
<td>John Robertson</td>
<td>Professor</td>
<td>Integrated Systems</td>
</tr>
<tr>
<td>Govindasamy Tamizhmani</td>
<td>Clinical Professor (50%)</td>
<td>Energy Sources</td>
</tr>
</tbody>
</table>

5. Additional Materials

A. Major Map

Attach a copy of the “proposed” major map for this degree program and each concentration(s) to be offered. Instructions on how to create a “proposed major map” in BAMM can be found in the Build a Major Map Training Guide.

B. Appendix

Complete and attach the Appendix document.

C. Attach other information that will be useful to the review committees and the Office of the Provost.
1. Proposed Concentration Name: Engineering (Electrical Systems), BSE

2. Program Description (150 words maximum)

The Department of Engineering in the College of Technology & Innovation has a multidisciplinary engineering program with a concentration in electrical systems. The multidisciplinary engineering program allows students to learn in a problem-based curriculum with hands-on projects and the development of professional skills integrated into the program. In the junior and senior years, students take electrical engineering courses to complete a concentration in electrical systems. The graduate with an electrical systems concentration will be able to provide leadership in engineering settings, which are intrinsically multi-disciplinary in nature, using electrical engineering knowledge to design and implement control systems. Students learn theory and application of sensors, actuators, microcontrollers and microprocessors, power sources and board level implementations of such systems.

3. Contact and Support Information

Building Name, code and room number: (Search ASU map) TECH 101
Program office telephone number: (i.e. 480/965-2100) 480/727-1874
Program Email Address: egr@asu.edu
Program Website Address: https://technology.asu.edu/egr

4. Delivery/Campus Information Delivery: On campus, Polytechnic campus

Note: Once students elect a campus or On-line option, students will not be able to move back and forth between the on-campus and the ASU Online options. Approval from the Office of the Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.

5. Campus/Locations: indicate all locations where this program will be offered.

- Downtown Phoenix  ☑ Polytechnic  ☐ Tempe  ☐ West  ☐ Other:

6. Additional Program Description Information

A. Additional program fee required for this program? YES (the BSE in Engineering has a program fee)
B. Does this program have a second language requirement? No

7. Career Opportunities & Concentrations

Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration. (150 words maximum)

Electrical engineers are in high demand for many industry sectors, especially manufacturing, utilities, communications and defense systems. However, electronic systems also pervade the service sectors such as health care, finance, education and entertainment. Graduates from this program have the broad base of technical and operational skills that make them well suited for employment across the whole spectrum of applications.

8. Additional Admission Requirements

If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.)

None
9. Keywords
List all keywords used to search for this program. Keywords should be specific to the proposed program.
Engineering, electrical engineering, electronics, electronic systems, integrated systems, manufacturing, control, semiconductors, power systems

10. Advising Committee Code
List the existing advising committee code to be associated with this degree. UGTIEN
Note: If a new advising committee needs to be created, please complete the following form:
Proposal to create an undergraduate advising committee

11. First Required Math Course
List the first math course required in the major map. MAT 265 is the first required MA course. The program also requires: MAT 266, MAT 267, MAT 275, MAT 343 for a total of 15 mathematics credits

12. Western Undergraduate Exchange (WUE) Eligible:
Has a request been submitted to the Provost by the Dean to consider this degree program as eligible for WUE? Note: No action will be taken during the implementation process with regards to WUE until approval is received from the Provost.
The concentration is eligible for WUE.

13. Area(s) of Interest
A. Select one (1) primary Area of Interest from the list below that applies to this program.

- Architecture, Construction & Design
- Artistic Expression & Performance
- Biological Sciences, Health & Wellness
- Business, Management & Economics
- Communication & Media
- Computing & Mathematics
- Education & Teaching
- Engineering & Technology
- Environmental Issues & Physical Science
- Interdisciplinary Studies
- Languages & Cultures
- Law & Justice
- Social Science, Policies & Issues

B. Select any additional Areas of Interest that apply to this program from the list below.

- Architecture, Construction & Design
- Artistic Expression & Performance
- Biological Sciences, Health & Wellness
- Business, Management & Economics
- Communication & Media
- Computing & Mathematics
- Education & Teaching
- Engineering & Technology
- Environmental Issues & Physical Science
- Interdisciplinary Studies
- Languages & Cultures
- Law & Justice
- Social Science, Policies & Issues

The following fields are to be completed by the Office of the Executive Vice President and Provost of the University.
CIP Code: ____________________________
Plan Code: ____________________________
## 2013 - 2014 Major Map
### Engineering-Electrical Systems, BSE (Proposed)

<table>
<thead>
<tr>
<th>Term</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term 1</strong></td>
<td>0 - 14 Credit Hours Critical course signified by <strong>E</strong></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EGR 101: Introduction to Engineering Design</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR ENG 101 or ENG 102: Second-Year Composition</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 107 or ENG 108: English for Foreign Students</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 265: Calculus for Engineers I (PA)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Term hours subtotal:</strong></td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Term 2 | 15 - 29 Credit Hours Critical course signified by **E** | 3 |  
| EGR 102: Introduction to Engineering Design II | 3 |  
| ENG 104: Critical Inquiry in Engineering (IL) | 3 |  
| ENG 101 or ENG 102: First-Year Composition OR ENG 101 or ENG 102: Second-Year Composition | 3 |  
| ENG 107 or ENG 108: English for Foreign Students | 3 |  
| PHY 121: University Physics I: Mechanics (S) | 3 |  
| **Term hours subtotal:** | 15 |  

| Term 3 | 30 - 44 Credit Hours Critical course signified by **E** | 3 |  
| EGR 201: Fall Multidisciplinary Project | 3 |  
| EGR 216: Fundamentals of Engineering Systems I | 3 |  
| EGR 218: Materials and Manufacturing Processes | 3 |  
| EGR 280: Engineering Statistics (CS) | 3 |  
| MAT 267: Calculus for Engineers III (PA) | 3 |  
| **Term hours subtotal:** | 15 |  

| Term 4 | 45 - 59 Credit Hours Critical course signified by **E** | 3 |  
| EGR 202: Spring Multidisciplinary Project | 3 |  
| EGR 217: Fundamentals of Engineering Systems II | 3 |  
| EGR 219: Computational Modeling of Engineering Systems | 3 |  
| Humanities, Fine Arts and Design (HU) AND Historical Awareness (HE) | 3 |  
| MAT 279: Modern Differential Equations (PA) OR PHY 279: Modern Differential Equations (PA) | 3 |  
| **Term hours subtotal:** | 15 |  

| Term 5 | 60 - 75 Credit Hours | 4 |  
| BIO 181: General Biology I (S) OR BIO 182: General Biology II (S) | 3 |  
| BIO 183: General Chemistry I (S) OR CHEM 191: General Chemistry I (S) | 3 |  
| CHEM 192: General Chemistry II (S) OR CHEM 192: General Chemistry II (S) | 3 |  
| GEG 101: Introduction to Geology or Laboratory (S) OR PHY 122: University Physics Laboratory I (S) OR PHY 123: University Physics Laboratory II (S) OR PHY 124: University Physics Laboratory III (S) OR PHY 125: University Physics Laboratory IV (S) OR PHY 126: University Physics Laboratory V (S) | 3 |  
| EGR 301: Fall Concentration Project | 3 |  
| EGR 330: Design of Electrical Systems | 3 |  
| EGR 334: Analog-Digital Interface | 3 |  
| **Secondary Focus Area:** | 16 |  

| Term 6 | 76 - 90 Credit Hours | 3 |  
| **Secondary Focus Area:** |  

---

https://webapp4.asu.edu/programs/t5/roadmaps/ASU00/QCHMNGK/null/ALL/2013 10/15/2012
### Term 7 - 91 - 105 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 401: Engineering Capstone Project I (L)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EGR 430: Design, Fabrication, and Architecture of Electronic Devices</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHY 331: Principles of Modern Electromagnetism</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Secondary Focus Area</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social and Behavioral Sciences (SB)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Secondary Focus Area**

- A secondary focus area is a group of courses comprising of 12 or more credit hours (minimum 6 hours upper division at the 300 or 400 level) which form a coherent theme. For example, all courses may share a common subject prefix. Students work with an academic success specialist to identify their secondary focus area.

**Term hours subtotal:** 15

### Term 8 - 106 - 120 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR 402: Engineering Capstone Project II</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EGR 431: Power Management</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities, Fine Arts and Design (HU)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Secondary Focus Area</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Humanities, Fine Arts and Design (HU) OR</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Social and Behavioral Sciences (SB) AND</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Cultural Diversity in the U.S. (C)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Secondary Focus Area**

- A secondary focus area is a group of courses comprising of 12 or more credit hours (minimum 6 hours upper division at the 300 or 400 level) which form a coherent theme. For example, all courses may share a common subject prefix. Students work with an academic success specialist to identify their secondary focus area.

**Term hours subtotal:** 15

---

**General University Requirements Legend**

- General Studies Core Requirements:
- Literacy and Critical Inquiry (L)
- Mathematical Studies (M)
- Computer/Statistics/Quantitative Applications (C)
- Humanities, Fine Arts and Design (HU)
- Social and Behavioral Sciences (SB)
- Natural Science - General (NS)
- Natural Science - Quantitative (NQ)
- Cultural Diversity in the U.S. (CD)
- Global Awareness (G)
- Historical Awareness (HA)
- First-Year Composition (FY)

**General Studies Awareness Requirements:**

- Cultural Diversity in the U.S. (CD)
- Global Awareness (G)
- Historical Awareness (HA)

**Total Hours:** 120

**Upper Division Hours:** 45 minimum

**Major GPA:** 2.00 minimum

**Cumulative GPA:** 2.50 minimum

**Total hours at ASU:** 30 minimum

**Resident Credit for Academic Recognition:** 55 minimum

**Total Community College hours:** 64 maximum

**General Studies designations listed on the major map are current for the 2013 - 2014 academic year.**

---

© 2007 Arizona State University

https://webapp4.asu.edu/programs/t5/roadmaps/ASU00/QCHMNGK/null/ALL/2013 10/15/2012
To: Elizabeth D. Phillips  
Executive Vice President and University Provost

From: Mitzi Montoya  
Vice Provost, Dean, and Professor  
College of Technology and Innovation

Date: September 23, 2012

Re: Establishment of Concentration in Electrical Systems within the B.S. in Engineering

Please accept this memo of support for the establishment of the proposed concentration in Electrical Systems within the B.S. in Engineering. The attached proposal has been developed by the faculty of Engineering, has been reviewed and approved through the established process within the college and has full support of the faculty and the College of Technology and Innovation dean's office.

The department of Engineering has sufficient resources to support the new concentration in Electrical Systems without impacting the offering of core courses within the unit.

If you have any questions or concerns, please do not hesitate to contact me.

CC: Scott Danielson, Associate Dean of Academic Programs, College of Technology and Innovation  
Ann McKenna, Chair and Associate Professor, College of Technology and Innovation
Date: September 25, 2012

To: Mitzi Montoya  
   Vice Provost, Dean, and Professor  
   College of Technology and Innovation

From: Ann McKenna  
   Chair and Associate Professor  
   Engineering Department  
   College of Technology and Innovation

Re: Establishment of Concentration in Electrical Systems within the B.S. in Engineering

Please accept this memo of support for the establishment of the proposed concentration in Electrical Systems within the B.S. in Engineering. The attached proposal has been developed by the faculty of Engineering, has been reviewed and approved through the established process within the department and the college and has full support of the faculty of the College of Technology and Innovation.

The department of Engineering has sufficient resources to support the new concentration in Electrical Systems without impacting the offering of core courses within the unit.
From: James Collofello  
Sent: Wednesday, September 26, 2012 9:28 AM  
To: Scott Danielson  
Subject: RE: BSE in Engineering Concentrations Proposal Impact Statements

Scott,

The engineering school does not have any concerns with the new proposed concentrations.

jim

James S. Collofello  
Associate Dean of Academic and Student Affairs  
Professor of Computer Science and Engineering  
School of Computing Informatics and Decision Systems Engineering  
Ira A. Fulton Schools of Engineering  
Arizona State University

From: Scott Danielson  
Sent: Tuesday, September 25, 2012 4:30 PM  
To: James Collofello  
Subject: BSE in Engineering Concentrations Proposal Impact Statements

Jim,

As per our conversations, I am asking for your comment on the attached proposals for three different concentrations to be offered by the BSE in Engineering program in the College of Technology and Innovation at the Polytechnic campus. It is my understanding that our Deans reached agreement on our offering these concentrations in previous conversations.

Thank you.

Scott Danielson, Ph.D., P.E.  
Associate Dean for Academic Programs  
College of Technology and Innovation  
Arizona State University