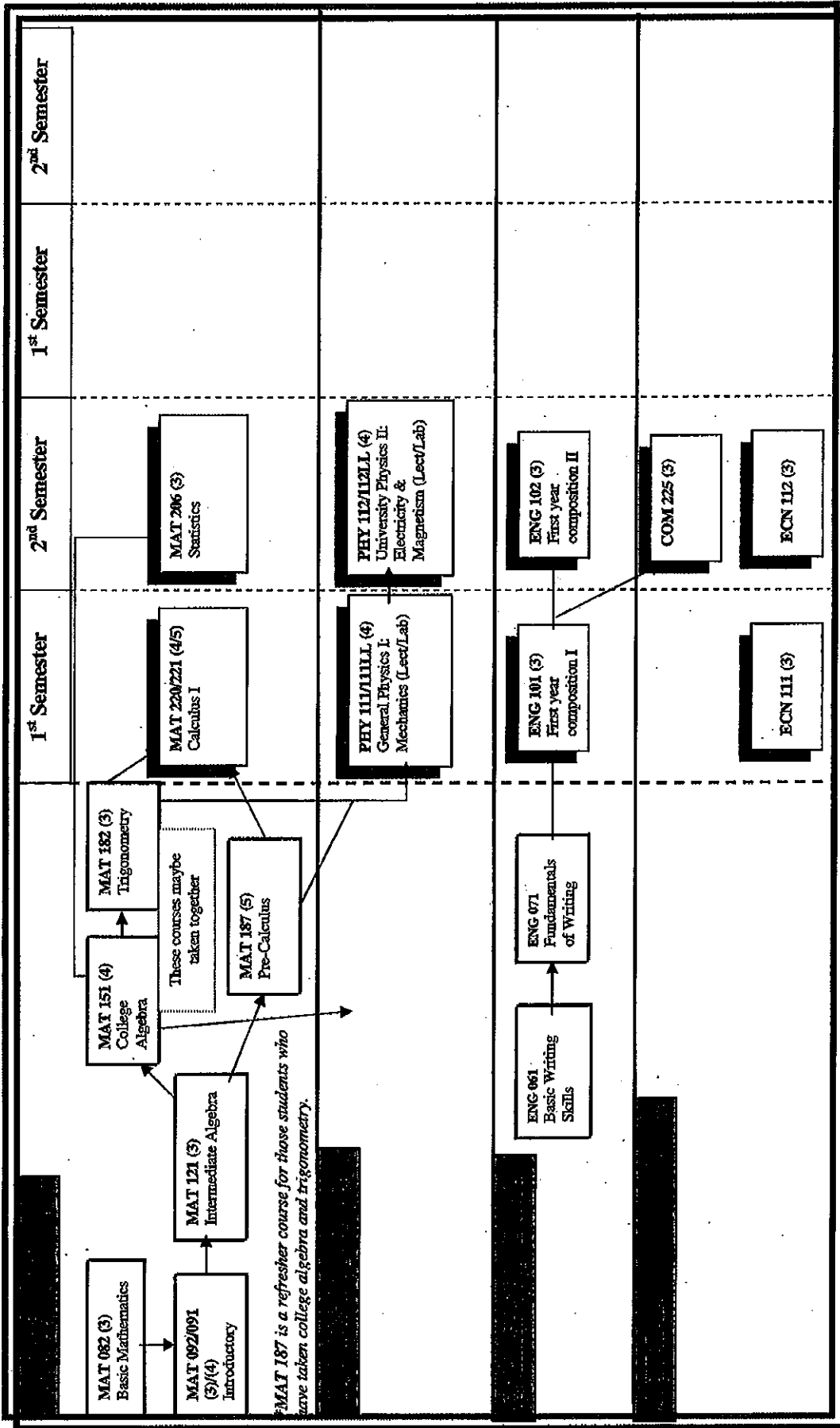


# ENGINEERING ASSESSMENTS AND COURSE SEQUENCE CONSTRUCTION ENGINEERING

## Prerequisite Courses

## Required Courses





# CHANDLER-GILBERT COMMUNITY COLLEGE

<b>Construction Engineering Recommended Study Plan</b>			
<b>Year 1</b>		<b>Year 2</b>	
<b>First Semester</b>	<b>Second Semester</b>	<b>Third Semester</b>	<b>Fourth Semester</b>
<b>ECN 111 (3)</b>	<b>ECN 112 (3)</b>		
<b>MAT 220 (4)</b> Calc 1 <u>Mat 187 or MAT182</u> <b>MAT 265 (3)</b>	<b>MAT 206 (3)</b> Statistics <u>MAT 151</u>		
<b>ENG 101 (3)</b> First Year Composition 1 <b>ENG 101 (3)</b>	<b>ENG102 (3)</b> First Year Composition 2 <b>ENG102 (3)</b>		
<b>PHY 111/LL (4)</b> General Physics: Mechanics	<b>PHY112/LL (4)</b> General Physics: Electricity & Magnetism		
<b>HU/SB (3)</b>	<b>COM 225 (3)</b> <u>ENG101</u>		
<b>17</b>	<b>16</b>		
<b>Underlined = Pre-req</b>			
<p>According to ASU Construction Engineering advisement sheet:            Humanities &amp; Social Sciences (HU/SB) (15 hrs minimum) (Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)</p>			

**Chandler Gilbert Community College**

**ENGINEERING PROGRAM**  
**DIVISION OF SCIENCE**

Bassam Matar  
**480-732-7139**  
B.Matar@cgcmail.maricopa.edu

**Arizona State University**

Location: ECG 251  
 Phone: (480)965-0595





## Undecided Engineering Recommended Study Plan

Year 1		Year 2	
First Semester	Second Semester	Third Semester	Fourth Semester
<b>ECE102 AA (2)</b> Engineering Analysis 1	<b>ECE 103 AB (2)</b> Problem Solving & Design	<b>MAT 261 (3)</b> Differential Equation <i>MAT230</i> <b>MAT275 (3)</b>	
ECE102 (2) AND ECE103 (2)= MAE 100 (2)			
<b>MAT 220 (4)</b> Calc 1 <i>Mat 187 or MAT182</i> <b>MAT 265 (3)</b>	<b>MAT 230 (4)</b> Calc 2 <i>MAT 220</i> <b>MAT 266 (3)</b>	<b>MAT 240 (4)</b> Calc 3 <i>MAT 220</i> <b>MAT267 (4)</b>	
<b>ENG 101 (3)</b> First Year Composition 1 <b>ENG 101 (3)</b>	<b>ENG102 (3)</b> First Year Composition 2 <b>ENG102 (3)</b>	<b>CHM 235/LL (4)</b> General Organic Chemistry <b>CHM 335+lab (4)</b>	
<b>CHM 151/LL (4)</b> General Chemistry 1 <i>HS algebra and HS chemistry</i>	<b>CHM 152/LL (4)</b> General Chemistry 2 <i>CHM 151/LL</i>	<b>PHY 131 (4)</b> University Physics 2 <i>PHY 121, MAT 230</i> <b>PHY131 (4)</b>	
<b>CHM151 (4)+CHM152(4) = CHM 114 or CHM 116 (4)</b>			
<b>HU/SB (3)</b>	<b>PHY 121 (4)</b> University Physics 1 <i>MAT 220</i> <b>PHY 121 (4)</b>	<b>HU/SB (3)</b>	
<b>16</b>	<b>17</b>	<b>18</b>	
<p><b><u>Underlined</u> = Pre-req      <i>Italic</i>= ASU Equivalence</b></p> <p>According to ASU Engineering department:            Humanities &amp; Social Sciences (HU/SB) (15 hrs minimum) (Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)</p>			

**Chandler Gilbert Community College**

**ENGINEERING PROGRAM  
DIVISION OF SCIENCE**

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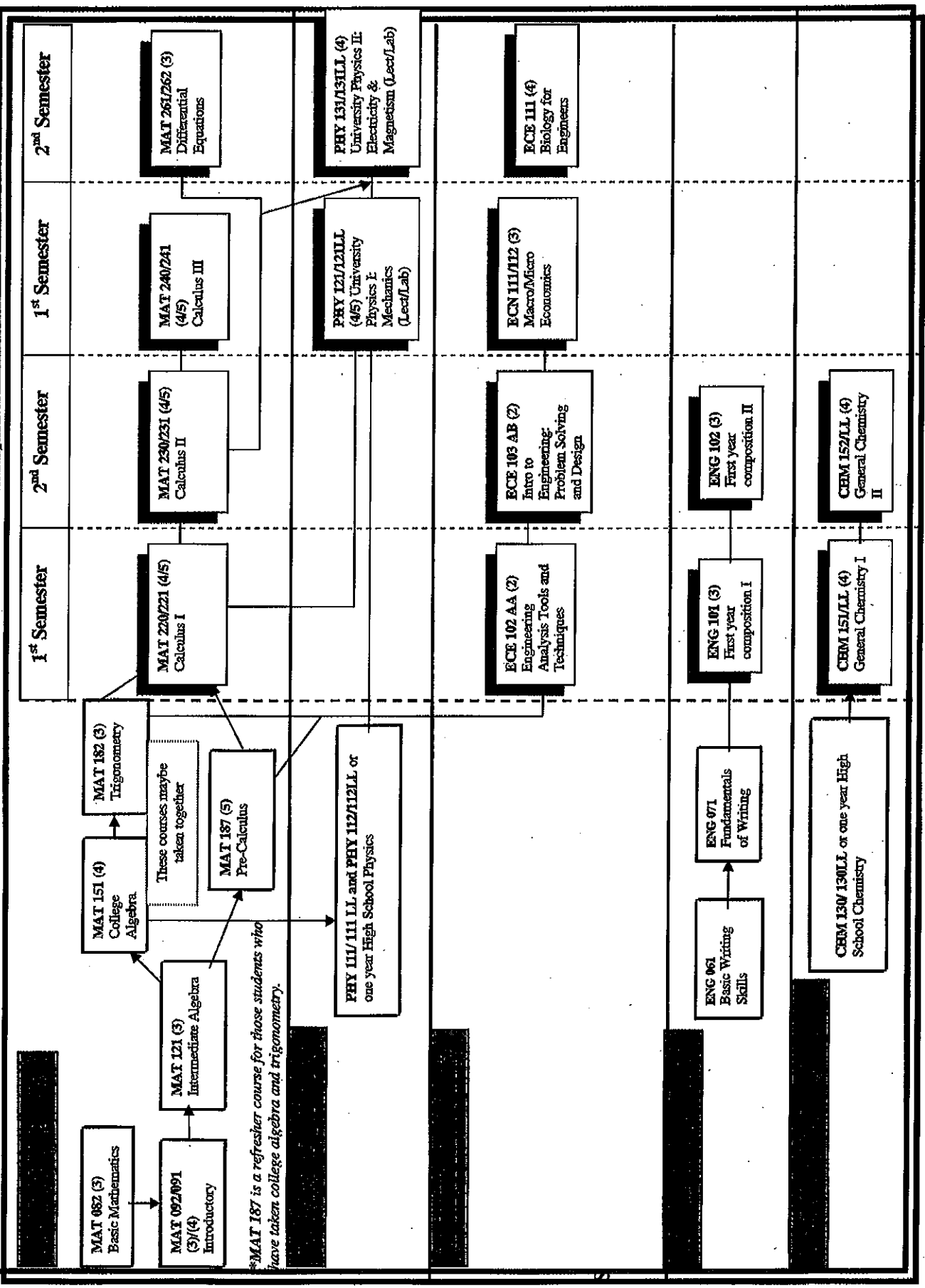
**Arizona State University**

ECG 202  
 Phone: (480) 965-3313

# MATERIALS SCIENCE ENGINEERING

## Prerequisite Courses

## Required Courses



1<sup>st</sup> Semester      2<sup>nd</sup> Semester      1<sup>st</sup> Semester      2<sup>nd</sup> Semester

**MAT 082 (3)**  
Basic Mathematics

**MAT 092/091 (3)/(4)**  
Introductory

**MAT 121 (3)**  
Intermediate Algebra

**MAT 151 (4)**  
College Algebra

**MAT 182 (3)**  
Trigonometry

These courses may be taken together

**MAT 187 (5)**  
Pre-Calculus

**PHY 111/111 LL and PHY 112/112 LL or**  
one year High School Physics

**MAT 220/221 (4/5)**  
Calculus I

**MAT 230/231 (4/5)**  
Calculus II

**MAT 240/241 (4/5)**  
Calculus III

**MAT 261/262 (3)**  
Differential Equations

**PHY 121/121 LL (4/5)**  
University Physics I  
Mechanics (Lect/Lab)

**PHY 131/131 LL (4)**  
University Physics II  
Electricity & Magnetism (Lect/Lab)

**ECE 102 AA (2)**  
Engineering Analysis Tools and Techniques

**ECE 105 AB (2)**  
Intro to Engineering: Problem Solving and Design

**ECN 111/112 (3)**  
Macro/Micro Economics

**ECE 111 (4)**  
Biology for Engineers

**ENG 061**  
Basic Writing Skills

**ENG 071**  
Fundamentals of Writing

**ENG 101 (3)**  
First year composition I

**ENG 102 (3)**  
First year composition II

**CHEM 130/130 LL or one year High School Chemistry**

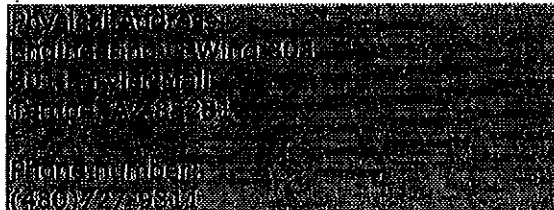
**CHEM 151/LL (4)**  
General Chemistry I

**CHEM 152/LL (4)**  
General Chemistry II



# CHANDLER-GILBERT COMMUNITY COLLEGE

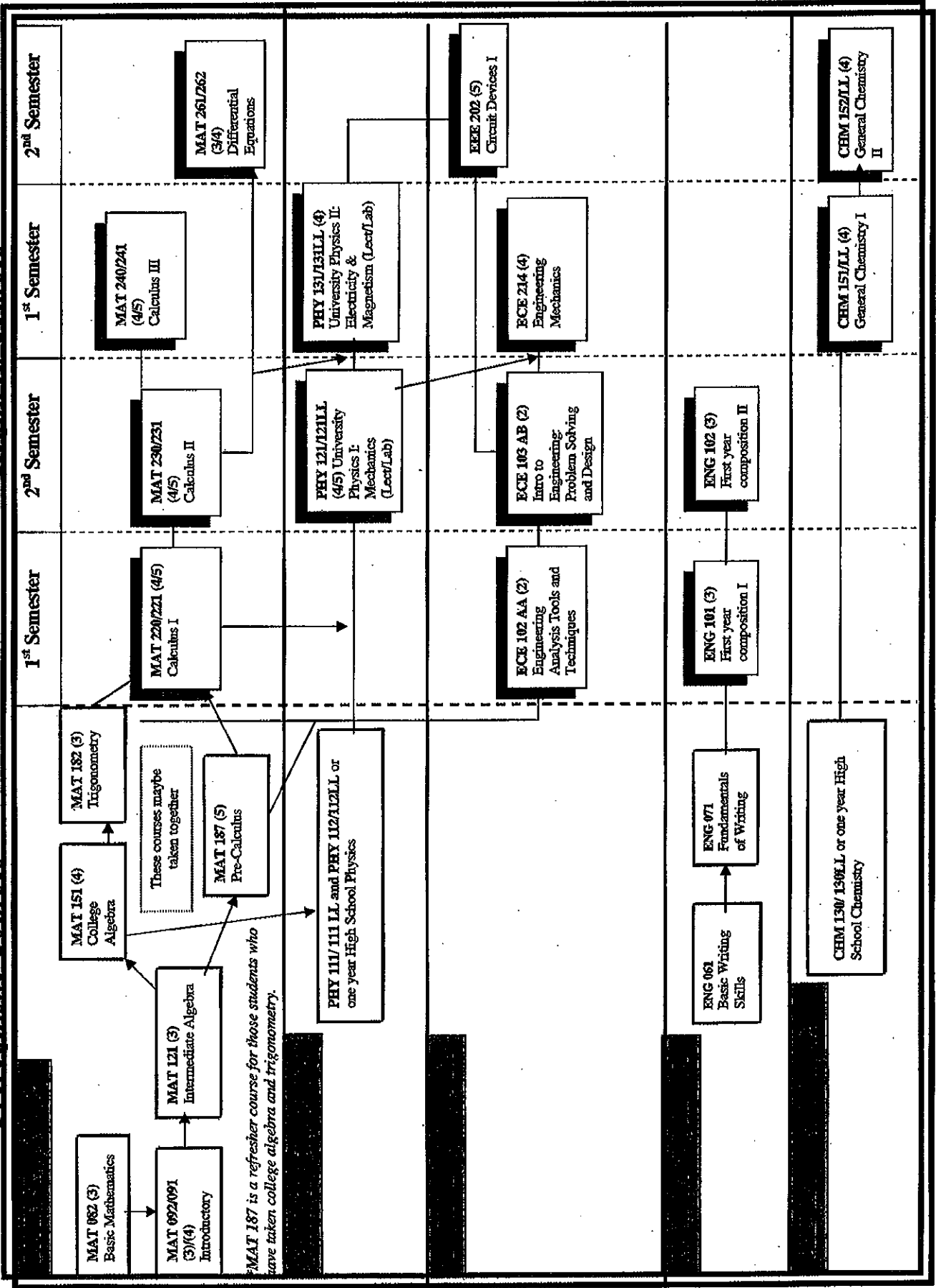
Material Science Engineering Recommended Study Plan			
Year 1		Year 2	
First Semester	Second Semester	Third Semester	Fourth Semester
<b>ECE102 AA (2)</b> Engineering Analysis 1	<b>ECE 103 AB (2)</b> Problem Solving & Design		<b>ECE111 (3)</b> Biology Requirement <b>BME 111 (3)</b>
ECE102 (2) AND ECE103 (2)= MAE 100 (2)			
<b>MAT 220 (4)</b> Calc 1 <u>Mat 187 or MAT182</u> <b>MAT 265 (3)</b>	<b>MAT 230 (4)</b> Calc 2 <u>MAT 220</u> <b>MAT 266 (3)</b>	<b>MAT 240 (4)</b> Calc 3 <u>MAT 230</u> <b>MAT267 (4)</b>	
<b>ENG 101 (3)</b> First Year Composition 1 <b>ENG 101 (3)</b>	<b>ENG102 (3)</b> First Year Composition 2 <b>ENG102 (3)</b>	<b>ECN 111/112 (3)</b> Macro/Micro Economics	<b>PHY 131 (4)</b> University Physics 2 <u>PHY 121, MAT 230</u> <b>PHY131 (4)</b>
<b>CHM 151/LL (4)</b> General Chemistry 1 <u>HS algebra and HS chemistry</u>	<b>CHM 152/LL (4)</b> General Chemistry 2 <u>CHM 151/LL</u>		
CHM151 (4)+CHM152(4)=CHM 114 or CHM 116 (4)		<b>PHY 121 (4)</b> University Physics 2 <u>PHY 111, MAT 220</u> <b>PHY121 (4)</b>	<b>HU/SB (3)</b>
<b>HU/SB (3)</b>	<b>HU/SB (3)</b>	<b>HU/SB (3)</b>	
<b>16</b>	<b>16</b>	<b>14</b>	<b>13</b>
<b>Underlined = Pre-req      <i>Italic</i>= ASU Equivalence</b>			
<p>According to ASU Material Science Engineering advisement sheet:            Humanities &amp; Social Sciences (HU/SB) (15 hrs minimum)            (Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)</p>			

<p><b>Chandler Gilbert Community College</b></p> <p style="text-align: center;"><b>ENGINEERING PROGRAM DIVISION OF SCIENCE</b></p> <p>Bassam Matar 480-732-7139 <a href="mailto:B.Matar@cgcmail.maricopa.edu">B.Matar@cgcmail.maricopa.edu</a></p>	<p><b>Arizona State University</b></p> 
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# ENGINEERING ASSESSMENTS AND COURSE SEQUENCE CIVIL ENGINEERING

## Prerequisite Courses

## Required Courses





# CHANDLER GILBERT COMMUNITY COLLEGE

## Civil Engineering Recommended Study Plan

Year 1		Year 2	
First Semester	Second Semester	Thrd Semester	Fourth Semester
<b>ECE102 AA (2)</b> Engineering Analysis 1	<b>ECE 103 AB (2)</b> Problem Solving & Design	<b>CHM 151/LL (4)</b> General Chemistry 1 <i>HS algebra and HS chemistry</i>	<b>HU/SB (3)</b>
<b>ECE102 (2) AND ECE103 (2)= MAE 100 (2)</b>			
<b>MAT 220 (4)</b> Calc 1 <u>Mat 187 or MAT182</u> <b>MAT 265 (3)</b>	<b>MAT 230 (4)</b> Calc 2 <u>MAT 220</u> <b>MAT 266 (3)</b>	<b>MAT 240 (4)</b> Calc 3 MAT 220 <b>MAT267 (4)</b>	<b>EEE 202 (5)</b> Circuits 1 <u>pre-co: PHY131, MAT261</u> <b>EEE 202 (4)</b>
<b>ENG 101 (3)</b> First Year Composition 1 <b>ENG 101 (3)</b>	<b>ENG102 (3)</b> First Year Composition 2 <b>ENG102 (3)</b>	<b>ECE 214 (4)</b> Mechanics <u>PHY121, pre-co MAT240</u> <b>ECE214 (4)</b>	<b>MAT 261 (3)</b> Differential Equation <u>MAT230</u> <b>MAT275 (3)</b>
	<b>HU/SB (3)</b>		
		<b>PHY 131 (4)</b> University Physics 2 <u>PHY 121, MAT 230</u> <b>PHY131 (4)</b>	<b>CHM 152/LL (4)</b> General Chemistry 2 <u>CHM 151/LL</u>
<b>HU/SB (3)</b>	<b>PHY 121 (4)</b> University Physics 1 <u>MAT 220</u> <b>PHY 121 (4)</b>		
<b>12</b>	<b>16</b>	<b>16</b>	<b>15</b>

Underlined = Pre-req      *Italic* = ASU Equivalence

According to ASU Civil Engineering advisement sheet:

Humanities & Social Sciences (HU/SB) (15 hrs minimum) (Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)

**Chandler Gilbert Community College**

**ENGINEERING PROGRAM  
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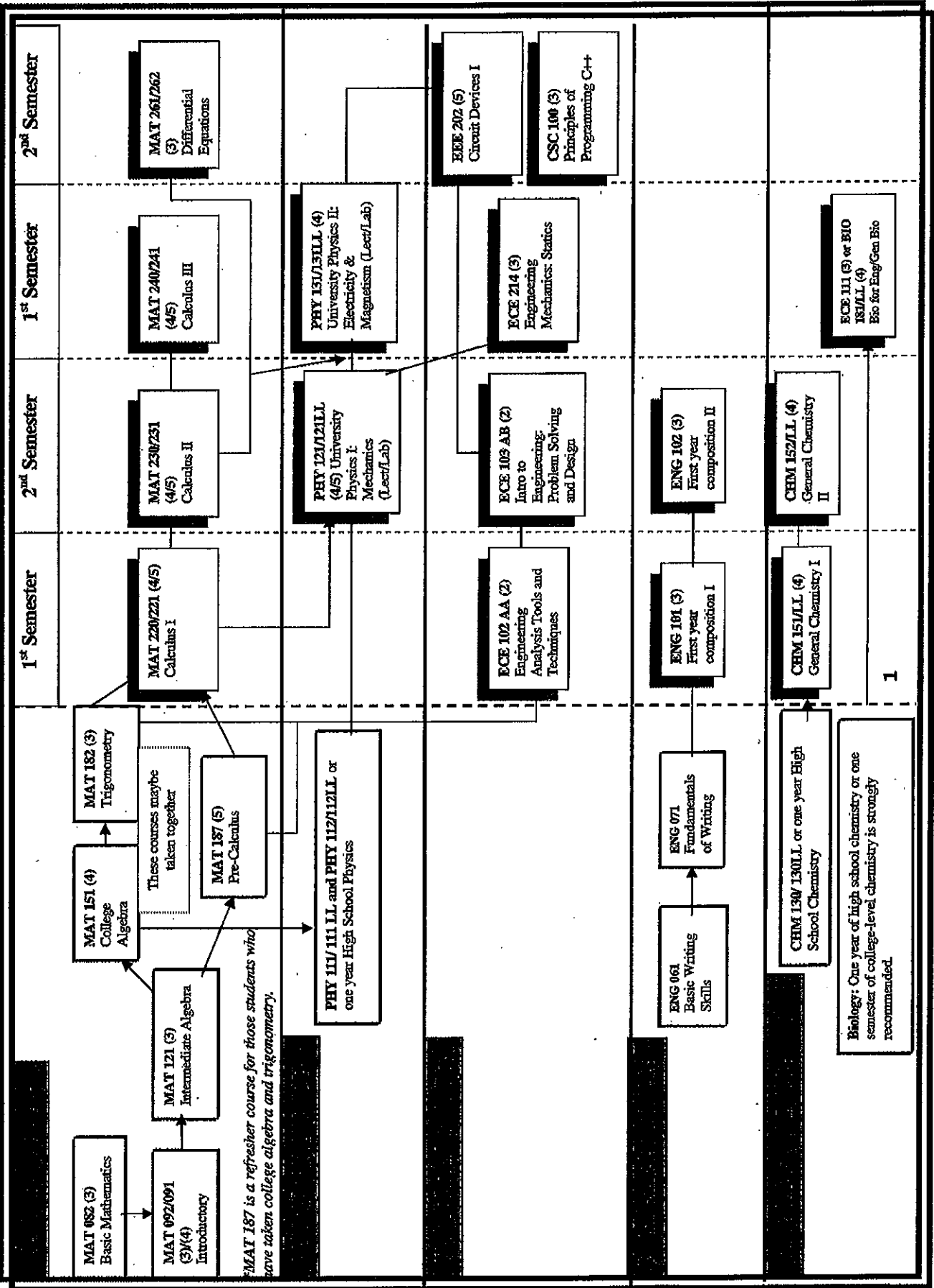
**Arizona State University**

Location: ECG 251  
Phone: (480)965-0595

# BIO ENGINEERING

## Prerequisite Courses

## Required Courses





Bio Engineering Recommended Study Plan			
Year 1		Year 2	
First Semester	Second Semester	Third Semester	Fourth Semester
<b>ECE102 AA (2)</b> Engineering Analysis 1	<b>ECE 103 AB (2)</b> Problem Solving & Design	<b>ECE111 (3)</b> Biology Requirement OR BIO 181+Lab (3) <b>BME 111 (3)</b>	<b>HU/SB (3)</b>
<b>ECE102 (2) AND ECE103 (2)= MAE 100 (2)</b>			
<b>MAT 220 (4)</b> Calc 1 <u>Mat 187 or MAT182</u> <b>MAT 265 (3)</b>	<b>MAT 230 (4)</b> Calc 2 <u>MAT 220</u> <b>MAT 266 (3)</b>	<b>MAT 240 (4)</b> Calc 3 <u>MAT 220</u> <b>MAT267 (4)</b>	<b>EEE 202 (4)</b> Circuits 1 <u>pre-co: PHY131, MAT261</u> <b>EEE 202 (4)</b>
<b>ENG 101 (3)</b> First Year Composition 1 <b>ENG 101 (3)</b>	<b>ENG102 (3)</b> First Year Composition 2 <b>ENG102 (3)</b>	<b>ECE 214 (4)</b> Mechanics <u>PHY121, pre-co MAT240</u> <b>ECE214 (4)</b>	<b>MAT 261 (3)</b> Differential Equation <u>MAT230</u> <b>MAT275 (3)</b>
<b>CHM 151/LL (4)</b> General Chemistry 1 <u>HS algebra and HS chemistry</u>	<b>CHM 152/LL (4)</b> General Chemistry 2 <u>CHM 151/LL</u>	<b>PHY 131 (4)</b> University Physics 2 <u>PHY 121, MAT 230</u> <b>PHY131 (4)</b>	<b>CSC 100 (3)</b>
<b>CHM151 (4)+CHM152(4)=CHM 114 or CHM 116 (4)</b>			<b>CSC 100 (3)</b>
<b>HU/SB (3)</b> ECN111/112 recommended	<b>PHY 121 (4)</b> University Physics 1 <u>MAT 220</u> <b>PHY 121 (4)</b>		<b>HU/SB (3)</b>
<b>16</b>	<b>17</b>	<b>15</b>	<b>16</b>
<b>Underlined = Pre-req      <i>Italic</i>= ASU Equivalence</b>			
According to ASU Bio Engineering advisement sheet: Humanities & Social Sciences (HU/SB) (15 hrs minimum) (Required: 1 course upper			

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**ENGINEERING PROGRAM  
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**Arizona State University**

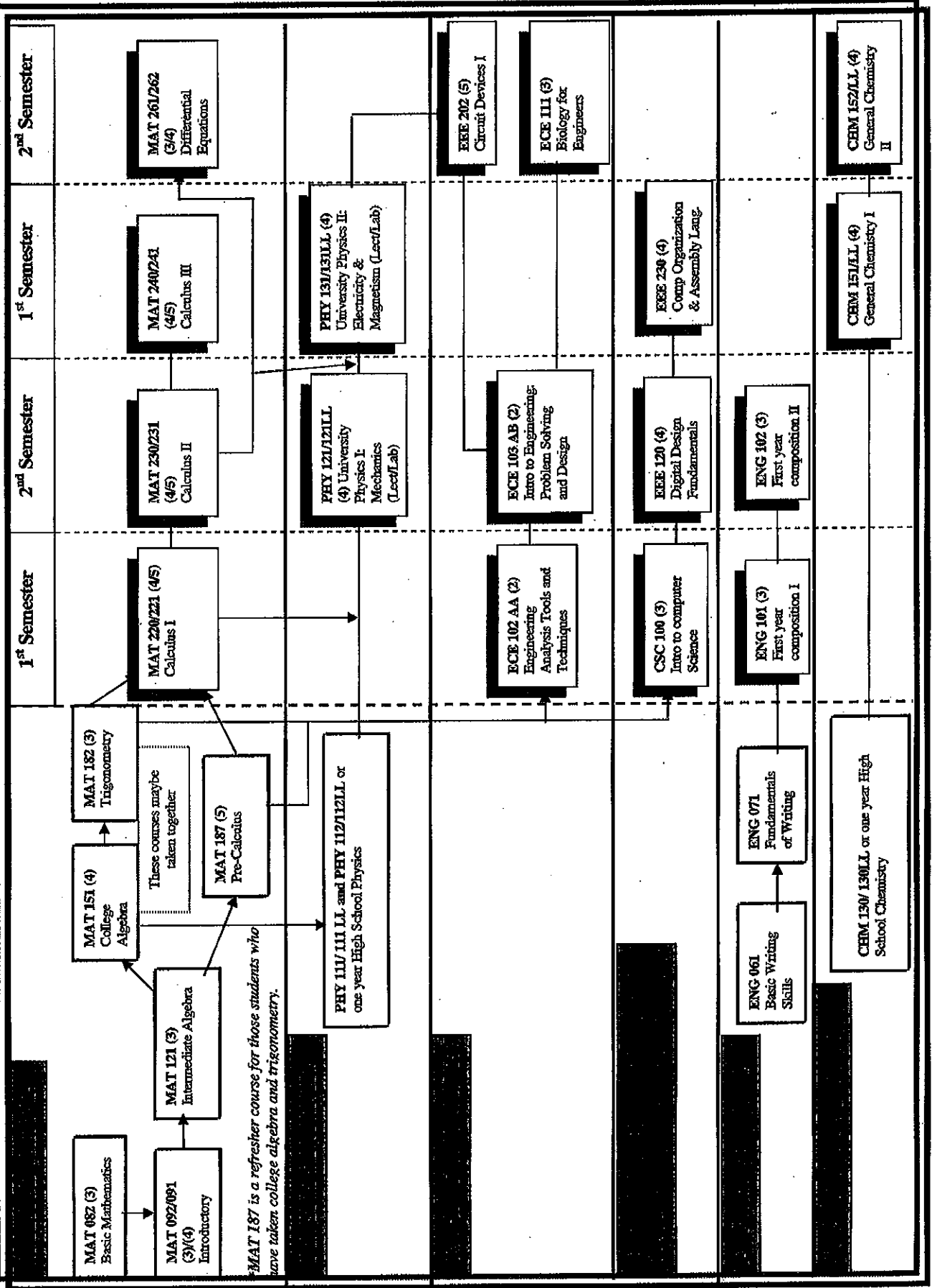
Allison Avans  
(480)965-8282

Bill Dyer  
(480)727-6212

# ELECTRICAL ENGINEERING

## Prerequisite Courses

## Required Courses





# CHANDLER-GILBERT COMMUNITY COLLEGE

<b>Electrical Engineering Recommended Study Plan</b>			
<b>Year 1</b>		<b>Year 2</b>	
<b>First Semester</b>	<b>Second Semester</b>	<b>Third Semester</b>	<b>Fourth Semester</b>
<b>ECE102 AA (2)</b> Engineering Analysis	<b>ECE103 AB (2)</b> Problem Solving	<b>CHM 151/LL (4)</b> General Chemistry 1 <i>HS algebra and HS chemistry</i>	<b>CHM 152/LL (4)</b> General Chemistry 2 <b>CHM 151/LL</b>
ECE102 AA + ECE 103 AB = CSE 101 (3)			
<b>MAT 220 (4)</b> Calc 1 <i>Mat 187 or MAT182</i> <b>MAT 265 (3)</b>	<b>MAT 230 (4)</b> Calc 2 <b>MAT 220</b> <b>MAT 266 (3)</b>	<b>MAT 240 (4)</b> Calc 3 <b>MAT 220</b> <b>MAT267 (4)</b>	<b>MAT 261 (3)</b> Differential Equation <b>MAT220</b> <b>MAT275 (3)</b>
<b>HU/SB (3)</b>	<b>EEE 120 (4)</b> Digital Design Fundamentals <b>EEE 120 (3)</b>	<b>PHY 131 (4)</b> University Physics 2 <b>PHY 121, MAT 230</b> <b>PHY131 (4)</b>	<b>ECE111 (3)</b> Biology Requirement <b>BME 111 (3)</b>
<b>ENG 101 (3)</b> First Year Composition 1 <b>ENG 101 (3)</b>	<b>ENG102 (3)</b> First Year Composition 2 <b>ENG102 (3)</b>	<b>HU/SB (3)</b>	<b>EEE 202 (4)</b> Circuits 1 <i>pre-req: PHY131, MAT261</i> <b>EEE 202 (4)</b>
<b>CSC 100/110 (3)</b> C++/Java	<b>PHY 121 (4)</b> University Physics 1 <b>MAT 220</b> <b>PHY 121 (4)</b>	<b>EEE 230 (4)</b> Comp Organization & Assembly Lang <b>CSC 100, CSC120</b>	<b>HU/SB (3)</b>
<b>15</b>	<b>16</b>	<b>19</b>	<b>17</b>
<b>Underlined = Pre-req      <i>Italic</i> = ASU Equivalence</b>			
CHM151 (4)+CHM152(4)=CHM 114 or CHM 116 (4)			
According to ASU Electrical Engineering advisement sheet: Humanities & Social Sciences (HU/SB) (15 hrs minimum) (Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)			

## Chandler Gilbert Community College

### ENGINEERING PROGRAM DIVISION OF SCIENCE

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## Arizona State University

Prof. Ravi Gorur, (480) 965-4894, GWC  
208B, Associate Chair

Kevin Anderson, (480) 727-0681, GWC  
210, Academic Specialist Coordinator

## **Bachelors of Science-Aerospace Engineering**

### Program Description

The aerospace engineering curriculum provides students with an education in technological areas critical to the design and development of aerospace vehicles and systems. The aeronautics concentration, under the B.S.E. in aerospace engineering, emphasizes aeronautical engineering. Topics in required courses cover aerodynamics, aerospace materials, aircraft structures, propulsion, flight mechanics, and stability and control. Required aeronautics topics include orbital mechanics, attitude control and rocket propulsion.

### Career Opportunities

Majority of students entering the field of aerospace engineering desire to work on the design and analysis of aerospace vehicles. Most graduates are employed in the aerospace industry or in government positions related to aerospace. Specific careers in aerospace engineering include vehicle design and performance, vehicle and component analysis using computer-aided tools, wind-tunnel and flight testing, space mission design and analysis, propulsion engineering, aeronautical and space systems integration, material and structural design and configuration development.

The objectives of the aerospace engineering program are for graduates to be employed in aerospace engineering or a related field or accepted to graduate school and:

1. Graduates will have the technical skills for career success, including the ability to think in a critical and evaluative manner and to consider a broad perspective in order to solve technical and non-technical problems.
2. Graduates will have the professional skills for career success, including an awareness of ethical responsibility, the ability to communicate well and to work successfully within diverse groups

### **Chandler Gilbert Community College Contact**

Bassam Matar

480-732-7139

[B.Matar@cgcmail.maicopa.edu](mailto:B.Matar@cgcmail.maicopa.edu)

### **Arizona State University Contact**

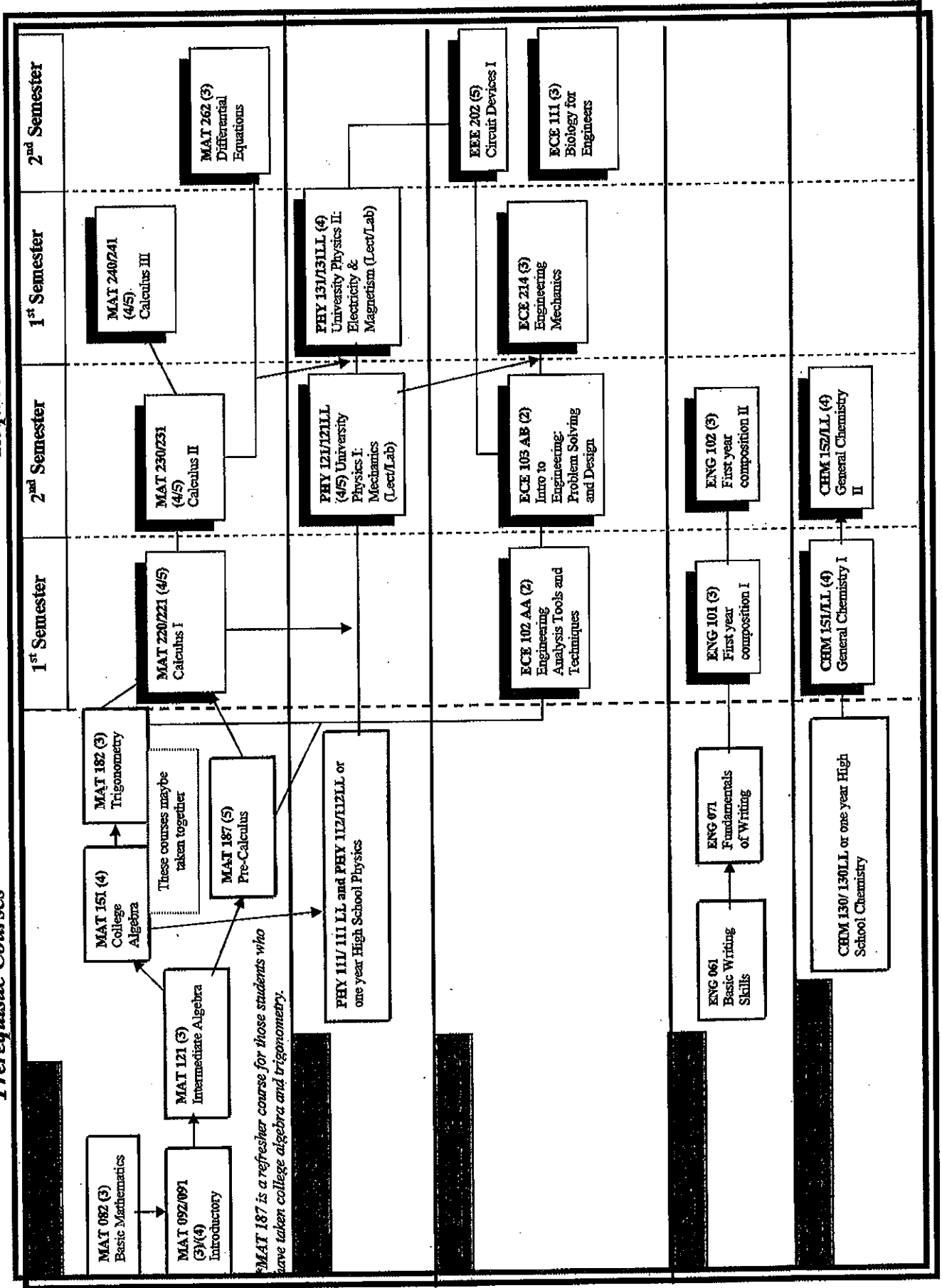
Mechanical and Aerospace Engineering Program |

[mae@asu.edu](mailto:mae@asu.edu) | 480/965-3291

# ENGINEERING ASSESSMENTS AND COURSE SEQUENCE AEROSPACE ENGINEERING

## Prerequisite Courses

## Required Courses





Aerospace Engineering Recommended Study Plan			
Year 1		Year 2	
First Semester	Second Semester	Third Semester	Fourth Semester
<b>ECE102 AA (2)</b> Engineering Analysis 1	<b>ECE 103 AB (2)</b> Problem Solving & Design	<b>HU/SB (3)</b>	<b>ECE111 (3)</b> Biology Requirement <b>BME 111 (3)</b>
<b>ECE102 (2) AND ECE103 (2)= MAE 100 (2)</b>			
<b>MAT 220 (4)</b> Calc 1 <u>Mat 187 or MAT182</u> <b>MAT 265 (3)</b>	<b>MAT 230 (4)</b> Calc 2 <u>MAT 220</u> <b>MAT 266 (3)</b>	<b>MAT 240 (4)</b> Calc 3 <u>MAT 220</u> <b>MAT267 (4)</b>	<b>EEE 202 (5)</b> Circuits 1 <u>pre-co: PHY131, MAT261</u> <b>EEE 202 (4)</b>
<b>ENG 101 (3)</b> First Year Composition 1 <b>ENG 101 (3)</b>	<b>ENG102 (3)</b> First Year Composition 2 <b>ENG102 (3)</b>	<b>ECE 214 (4)</b> Mechanics <u>PHY121, pre-co MAT240</u> <b>ECE214 (4)</b>	<b>MAT 262 (3)</b> Modern Differential Equation <u>MAT230</u> <b>MAT275 (3)</b>
<b>CHM 151/LL (4)</b> General Chemistry 1 <u>HS algebra and HS chemistry</u>	<b>CHM 152/LL (4)</b> General Chemistry 2 <u>CHM 151/LL</u>	<b>PHY 131 (4)</b> University Physics 2 <u>PHY121, MAT 230</u> <b>PHY131 (4)</b>	<b>General Elective (3)</b>
<b>CHM151 (4)+CHM152(4)=CHM 114 or CHM 116 (4)</b>			
<b>HU/SB (3)</b>	<b>PHY 121 (4)</b> University Physics 1 <u>MAT 220</u> <b>PHY 121 (4)</b>	<b>HU/SB (3)</b>	<b>HU/SB (3)</b>
<b>16</b>	<b>17</b>	<b>15</b>	<b>17</b>
<b><u>Underlined</u> = Pre-req      <i>Italic</i>= ASU Equivalence</b>			
<p>According to ASU Aerospace &amp; Mechanical Engineering advisement sheet:            Humanities &amp; Social Sciences (HU/SB) (15 hrs minimum) (Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)</p>			

NOTE: For the General Elective please check with your ASU advisor on what is approved by the department. Possible courses are EEE120 and CHM230 (Elementary Organic Chemistry)

Course Subject and Title (courses in <b>bold</b> are critical)	Hrs.	Upper Division	Completed ATP: <input type="checkbox"/> Yes <input type="checkbox"/> No		Completed AGE: <input type="checkbox"/> Yes <input type="checkbox"/> No	
			Transfer Course/Grade	Minimum Grade if Required	Additional Critical Requirement Notes	
<b>TERM ONE: 0-15 CREDIT HOURS</b>						
<b>+ASU 101-PSR: The ASU Experience</b>	1	<input type="checkbox"/>				<ul style="list-style-type: none"> <li>Complete CHM 114 or 116 or 115; MAT 265 each with a minimum grade of "C"</li> <li>+ ASU 101-FSE and MAE 100 required for freshmen and should be completed first semester. Non-freshmen see advisor for petitioning replacement electives.</li> <li>An SAT, ACT, Accuplacer, or TOEFL score determines placement into first-year composition courses</li> <li>ASU Math Placement Exam score determines placement in Mathematics course</li> <li>*CHM 113 is a prerequisite and does not apply towards degree credit</li> <li>**If ENG 105 a 3 hr applicable elective must also be taken prior to graduation. See Advisor.</li> </ul>
<b>MAE 100: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	4	<input type="checkbox"/>		Grade of C		
<b>MAE 200: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	2	<input type="checkbox"/>		Grade of C in MAE 100		
<b>MAE 201: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	3	<input type="checkbox"/>		Grade of C		
<b>MAE 202: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	3	<input type="checkbox"/>		Grade of C		
<b>TERM TWO: 16-30 CREDIT HOURS</b>						
<b>MAE 203: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	3	<input type="checkbox"/>		Grade of C		<ul style="list-style-type: none"> <li>Complete MAT 266; PHY 121, 122 each with a minimum grade of "C"</li> </ul>
<b>MAE 204: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	3/1	<input type="checkbox"/>		Grade of C		
<b>BME 111: Engineering Perspectives on Biological Systems</b>	3	<input type="checkbox"/>				
<b>Social &amp; Behavioral Science (SB) AND Cultural Diversity in the US (C), Global Awareness (G), or Historical Awareness (H)</b>	3	<input type="checkbox"/>		Grade of C		
<b>TERM THREE: 31-45 CREDIT HOURS</b>						
<b>MAE 205: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	4	<input type="checkbox"/>		Grade of C		<ul style="list-style-type: none"> <li>Complete ENG 102 or 108 or 105; MAE 212; MAT 275; PHY 131, 132 with a minimum grade of "C"</li> <li>Complete First Year Composition requirement: ENG 101 &amp; 102 or ENG 107 &amp; 108 or ENG 105</li> </ul>
<b>MAE 206: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	3	<input type="checkbox"/>		Grade of C		
<b>MAE 207: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	3/1	<input type="checkbox"/>		Grade of C		
<b>MAT 267: Calculus for Engineers III</b>	3	<input type="checkbox"/>		Grade of C		
<b>TERM FOUR: 46-60 CREDIT HOURS</b>						
<b>MAE 208: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	3	<input type="checkbox"/>		Grade of C		<ul style="list-style-type: none"> <li>Complete MAE 213, 240 each with a minimum grade of "C".</li> </ul>
<b>MAE 209: Introduction to Mechanical and Aerospace Engineering (or Department Approved Elective)</b>	4	<input type="checkbox"/>		Grade of C		
<b>MAE 214: Computer-Aided Engineering I</b>	1	<input type="checkbox"/>		Grade of C		
<b>EBE 202: Circuits I</b>	4	<input type="checkbox"/>		Grade of C		
<b>MAT 343: Applied Linear Algebra</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>TERM FIVE: 61-75 CREDIT HOURS</b>						
<b>MAE 318: Sensors and Controls</b>	5	<input checked="" type="checkbox"/>		Grade of C		<ul style="list-style-type: none"> <li>MAE 360 and 362 must be completed for L credit.</li> </ul>
<b>MAE 322: Structural Mechanics</b>	4	<input checked="" type="checkbox"/>		Grade of C		
<b>MAE 360: Aerodynamics (L)</b>	4	<input checked="" type="checkbox"/>		Grade of C		
<b>MAE 384: Numerical Methods for Engineers (CS)</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>TERM SIX: 76-90 CREDIT HOURS</b>						
<b>MAE 313: Aircraft Dynamics and Control</b>	3	<input checked="" type="checkbox"/>		Grade of C		<ul style="list-style-type: none"> <li>MAE 360 and 362 must be completed for L credit.</li> </ul>
<b>MAE 344: Fundamentals of Aerospace Design</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>MAE 362: High-Speed Aerodynamics (L)</b>	4	<input checked="" type="checkbox"/>		Grade of C		
<b>Social &amp; Behavioral Science (SB) AND Cultural Diversity in the US (C), Global Awareness (G), or Historical Awareness (H)</b>	3	<input type="checkbox"/>				
<b>Humanities, Fine Arts &amp; Design (HU) AND Cultural Diversity in the US (C), Global Awareness (G), or Historical Awareness (H)</b>	3	<input type="checkbox"/>				
<b>TERM SEVEN: 91-105 CREDIT HOURS</b>						
<b>MAE 415: Vibration Analysis</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>MAE 462: Space Vehicle Dynamics and Control</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>MAE 463: Propulsion</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>Upper division Humanities, Fine Arts &amp; Design (HU) OR Social &amp; Behavioral Science (SB)</b>	3	<input checked="" type="checkbox"/>				
<b>Technical Elective</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>TERM EIGHT: 106-120 CREDIT HOURS</b>						
<b>MAE 400: Engineering Profession (L)</b>	3	<input checked="" type="checkbox"/>		Grade of C		<ul style="list-style-type: none"> <li>See advisor for approved electives.</li> </ul>
<b>MAE 468: Aerospace Systems Design (L)</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>Upper division technical elective</b>	3	<input checked="" type="checkbox"/>		Grade of C		
<b>General Elective</b>	3	<input type="checkbox"/>				
<b>Humanities, Fine Arts &amp; Design (HU) AND Cultural Diversity in the US (C), Global Awareness (G), or Historical Awareness (H)</b>	3	<input type="checkbox"/>				

**Graduation Requirements Summary:**

Total Hours Regular Curriculum (120)	Total UD Hrs (45 min)	Total Hrs at ASU (30 min)	Cumulative GPA (2.00 minimum)	Major GPA (2.00 minimum GPA)	Hrs Resident Credit for Academic Recognition (56 min)	Total Comm. College Hrs. (64 Max)

**General University Requirements: Legend**

- General Studies Core Requirements:
  - Literacy and Critical Inquiry (L)
  - Mathematical Studies (MA)
  - Computer/Statistics/Quantitative applications (CS)
  - Humanities, Fine Arts, and Design (HU)
  - Social and Behavioral Sciences (SB)
  - Natural Science-Quantitative (SQ)
  - Natural Science-General (SG)
- General Studies Awareness Requirements
  - Cultural Diversity in the US (C)
  - Global Awareness (G)
  - Historical Awareness (H)
- First-Year Composition

**Additional Notes:**

**Official Course Description: MCCCCD Approval: 6-26-01****ECE102 2001 Fall – 2009 Spring**

L+L 2.0 Credit(s) 4.0 Period(s)

**Engineering Analysis Tools and Techniques**

Learning culture of engineering, engineering use of computer tools, and computer modeling as applied to engineering analysis and design. Prerequisites: Two years of high school algebra or MAT122 or departmental approval. Corequisites: MAT151 or MAT182 or MAT187.

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**MCCCCD Official Course Competencies:****ECE102 2001 Fall – 2009 Engineering Analysis Tools and Techniques  
Spring**

1. Contrast cooperative and competitive learning environments. (I)
2. Use basic social and communication skills in a group setting. (I)
3. Demonstrate self-evaluation of progress through developmental assessment techniques, such as student learning journals, check-sheets, or portfolios. (I)
4. Define functions and expressions using engineering/mathematical modeling software. (II)
5. Plot two- and three-dimensional representations of data and functions using engineering/mathematical modeling software. (II)
6. Fit functions to discrete sets of data using engineering/mathematical modeling software. (II)
7. Solve linear and nonlinear equations using engineering/mathematical modeling software. (II)
8. Solve systems of linear and nonlinear equations using engineering/mathematical modeling software. (II)
9. Use programming structures to implement algorithms for computer models. (II)
10. Develop and refine computer models using engineering/mathematical modeling software. (II, III)
11. Describe the structure of a spreadsheet. (II)
12. Use cell references to evaluate expressions in a spreadsheet. (II)
13. Manipulate cells and ranges of cells to construct a spreadsheet. (II)
14. Use conditional structures in the development of a spreadsheet. (II)
15. Develop two- and three-dimensional graphs of data using a spreadsheet. (II)
16. Use graph types to represent different types of data generated with a spreadsheet. (II)
17. Import and export data to and from other computer applications using a spreadsheet. (II)
18. Develop and refine computer models using a spreadsheet. (II, III)
19. Explain what a computer model is and why engineers use computer models. (III)
20. Contrast deterministic and stochastic computer models. (III)
21. Define the term heuristic, and explain how heuristics are used in the modeling process. (III)
22. Describe a sensitivity analysis, and explain how it relates to the modeling process. (III)
23. Build and apply a deterministic computer model to the solution of a design-oriented problem. (III)
24. Build and apply a stochastic computer model to the solution of a design-oriented problem. (III)
25. Explain how probability is used in the development of stochastic computer models. (III)

26. Interpret and analyze the results of computer models. (III)
27. Explain how feasibility constraints are used in the modeling process. (III)
28. Present the results of computer models. (III)

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### **MCCCD Official Course Outline:**

#### **ECE102 2001 Fall – 2009   Engineering Analysis Tools and Techniques Spring**

##### **I. Learning Culture**

- A. Principles of cooperative learning
- B. Cooperative learning environments vs. competitive learning environments
- C. Social skills necessary to be successful in cooperative settings
- D. Self-assessment techniques

##### **II. Engineering Tools**

- A. Engineering/mathematical modeling software
  1. General syntax and structure
  2. Expression syntax
  3. Function definition
  4. Plotting of functions
  5. Solution of a linear equation
  6. Solution of a nonlinear equation
  7. Solution of systems of linear and nonlinear equations
  8. Plotting discrete data sets
  9. Fitting linear and nonlinear functions to discrete data sets
  10. Algorithmic structure (If, For, While, etc.)
  11. Uses in computer modeling
- B. Spreadsheet
  1. General spreadsheet structure
  2. Expressions and cell references
  3. Manipulation of cells and ranges of cells
  4. Conditional structures
  5. Graphing sets of data
  6. Importing and exporting data
  7. Uses in computer modeling

##### **III. Computer Modeling**

- A. Principles of the modeling process
- B. Heuristics and how they are used in the modeling process
- C. Interpretation of results and solutions from computer models
- D. Stochastic and deterministic computer models
- E. Organizing and representing data effectively
- F. Optimization
- G. Comparing algorithms and effective use of models
- H. Probability and stochastic modeling
- I. Knowledge models and their importance
- J. Modeling examples and case studies

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**Official Course Description: MCCCCD Approval: 04/23/96****ECE101 19952-19965**

L+L .3 Credit(s) 6 Period(s)

**Pre-Engineering Technology**

Designed to prepare students with insufficient background for ECE110. Introduces beginning engineering students to career opportunities, engineering responsibilities to society, and functions of various engineering fields. Prepares students to use computer engineering applications required in ECE110. Prerequisites: One year of high school algebra, or MAT077, or BLE101, or ELT101, or departmental approval.

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**MCCCCD Official Course Competencies:****ECE101 19952-19965 Pre-Engineering Technology**

1. Describe the roles of the members of a technical team, including skills, expertise, and educational requirements for each member. (I)
2. Use recommended study techniques designed for maximizing success in a college engineering program. (I)
3. Identify social and environmental problems that require solutions involving the technical team. (I)
4. Describe the principal fields of specialization in the engineering profession. (I)
5. Explain the importance of ethics in engineering problem solving. (I)
6. Explain the use of statistics, including probability and the correlation of data, in describing engineering problems and detecting errors. (II)
7. Describe the process of design/development and provide examples of the engineer's function in the process. (III)
8. Explain the use of the concepts of Total Quality Management (TQM) in an engineering project. (IV)
9. Describe project management tools for managing an engineering project. (V)
10. Explain the role of engineering documentation in an engineering project. (VI)
11. Use computer software tools to document and solve engineering problems. (VI, VII)

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**MCCCCD Official Course Outline:****ECE101 19952-19965 Pre-Engineering Technology**

- I. Practice of engineering
  - A. Introduction and study habits
  - B. Opportunities and challenges
  - C. Engineering specialties
  - D. Work opportunities
  - E. Engineering ethics
- II. Principles of engineering analysis
  - A. Documentation and data presentation
  - B. Concepts of probability and statistics

- III. Engineering design
  - A. The design/development cycle
  - B. Design perceptions and constraints
  - C. Idea generation and solution
- IV. Elements of Total Quality Management (TQM)
  - A. Principles and philosophy
  - B. Continuous improvement cycle
  - C. Basic teaming skills and group problem solving
  - D. TQM tools
- V. Engineering project management
  - A. Using menus and forms
  - B. Organizing an outline
  - C. Assigning tasks and resources
- VI. Engineering documentation and report writing
  - A. Elements of an engineering report
  - B. Engineering documentation
  - C. Creating graphs and presentations
- VII. Engineering design tools
  - A. Computer equation solver
  - B. Visual communication techniques
  - C. Engineering use of spreadsheets
  - D. Programming fundamentals
  - E. Data base concepts

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**Maricopa Community Colleges**  
25 Matches Found

Course	ASU	NAU	UA
ECE 101 (3) ORIGINS OF SCIENCE & ENGINEER	Elective Credit	Elective Credit	Elective Credit
ECE 102 (2) Engineering Analysis Tools an	Elective Credit  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] FULFILL FSE 100 [CS] (2) & FSE 101 (1) & ELECTIVE CREDIT (1). CS VALID THROUGH SPRING 2009. FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100.	EGR Departmental Elective	ENGR Departmental Elective
ECE 102 (2) and ECE 103 (2) Engineering Analysis Tools an / Engineering Problem Solving	(FSE 100 (2) & FSE 101 (1) & Elective Credit (1)) OR (EGR 101 (3) & Elective Credit (1))  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] FULFILL FSE 100 [CS] (2) & FSE 101 (1) & ELECTIVE CREDIT (1). CS VALID THROUGH SPRING 2009. FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100.	EGR Departmental Elective (1) --and-- EGR 186 (3)	ENGR102 (3) --and-- Elective Credit (1)
ECE 102 (2) and ECE 103AB (2) Engineering Analysis Tools an / Engineering Problem Solving	Valid thru Fall 2009: FSE 100 (2) & FSE 101 (1) & Elective Credit (1) & EGR 101 , Computer/Stats (CS), Computer/Stats (CS)  Spring 2010 and beyond: FSE 100 & FSE 101 & Elective Credit & EGR 101  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] FULFILL FSE 100 [CS] (2) & FSE 101 (1) & ELECTIVE CREDIT (1). CS		

	VALID THROUGH SPRING 2009. FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100.		
ECE 102AA (2) <i>Engineering Analysis Tools an</i>	Elective Credit  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] FULFILL FSE 100 [CS] (2) & FSE 101 (1) & ELECTIVE CREDIT (1). CS VALID THROUGH SPRING 2009. FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100.	EGR Departmental Elective	ENGR Departmental Elective
ECE 102AA (2) and ECE 103 (2) <i>Engineering Analysis Tools an / Engineering Problem Solving</i>	Valid thru Fall 2009: FSE 100 (2) & FSE 101 (1) & Elective Credit (1) & EGR 101 , Computer/Stats (CS), Computer/Stats (CS)  Spring 2010 and beyond: FSE 100 (2) & FSE 101 (1) & Elective Credit (1) & EGR 101  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] FULFILL FSE 100 [CS] (2) & FSE 101 (1) & ELECTIVE CREDIT (1). CS VALID THROUGH SPRING 2009. FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100.		
ECE 102AA (2) and ECE 103AB (2) <i>Engineering Analysis Tools an / Engineering Problem Solving</i>	Valid thru Fall 2009: FSE 100 (2) & FSE 101 (1) & Elective Credit (1) & EGR 101 , Computer/Stats (CS), Computer/Stats (CS)  Spring 2010 and beyond: FSE 100 (2) & FSE 101 (1) & Elective Credit & EGR 101  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] ARE EQUIVALENT TO FSE 100 [CS] FOR TWO CREDITS).	EGR Departmental Elective (1) --and-- EGR 186 (3)	ENGR102 (3) --and-- Elective Credit (1)

	FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100		
ECE 103 (2) <i>Engineering Problem Solving a</i>	Elective Credit  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] FULFILL FSE 100 [CS] (2) & FSE 101 (1) & ELECTIVE CREDIT (1). CS VALID THROUGH SPRING 2009. FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100.	EGR Departmental Elective also satisfies: Science/Applied Science [SAS]	ENGR Departmental Elective
ECE 103AB (2) <i>Engineering Problem Solving a</i>	Elective Credit  Note: [ECE 102 & ECE 103AB] OR [ECE 102AA & ECE 103] OR [ECE 102AA & ECE 103AB] FULFILL FSE 100 [CS] (2) & FSE 101 (1) & ELECTIVE CREDIT (1). CS VALID THROUGH SPRING 2009. FSE 100 = BME 100, CEE 100, CHE 100, CSE 101, EEE 101, IEE 100, MAE 100 OR MSE 100.	EGR Departmental Elective also satisfies: Science/Applied Science [SAS]	ENGR Departmental Elective
ECE 105 (1) <i>MATLAB Programming</i>	Elective Credit	Elective Credit	ENGR Departmental Elective
ECE 106 (1) <i>Survey of Nanotechnology</i>	Elective Credit	Elective Credit	ENGR Departmental Elective
ECE 111 (3) <i>Bioengineering Systems</i>	BME 111	Elective Credit	ABE Departmental Elective
ECE 112 (3) <i>General Principles of Nanotec</i>		Spring 2010 and beyond: ME DEC	Spring 2010 and beyond: Non Transferable
ECE 201 (2) <i>Introduction to Engineering S</i>	Elective Credit	Summer I 2009 and beyond: Elective Credit	
ECE 201 (2) and ECE 202 (2) and ECE 203 (2) <i>Introduction to Engineering S / Introduction to Engineering</i>		Summer I 2009 and beyond: CENE251 (3) --and-- ME 252 (3)	
ECE 202 (2) <i>Introduction to Engineering D</i>		Summer I 2009 and beyond: Elective Credit	

ECE 203 (2) <i>Applications of Engineering M</i>		Summer I 2009 and beyond: Elective Credit	
ECE 211 (3) <i>Engineering Mechanics-Statics</i>	CEE 210 (3), CON 221 (3), GIT Dept Elective (3) OR (EGR 221 (1) & EGR DEC (2))	CENE251	C E 214
ECE 211 (3) and ECE 212 (3) <i>Engineering Mechanics-Statics / ENGINEERING MECH-DYNAMICS</i>	MAE 212 (4) & Elective Credit (2)		
ECE 212 (3) <i>ENGINEERING MECH-DYNAMICS</i>	CEE 212 (3) OR (EGR 231 (1) & EGR DEC (2))	ME 252	A ME250
ECE 214 (4) <i>Engineering Mechanics</i>	MAE 212	Elective Credit	C E Departmental Elective
ECE 215 (3) <i>Mechanics of Materials</i>	CEE 213 (3), MAE 213 (3), MSE 211 (3), OR (EGR 222 (1) & EGR DEC (2))	CENE253	C E 215
ECE 282AA (1) <i>VOL ENGINEER SC:SERVICE LEARN</i>	Elective Credit	Elective Credit	Elective Credit
ECE 282AB (2) <i>VOL ENGINEER SC:SERVICE LEARN</i>	Elective Credit	Elective Credit	Elective Credit
ECE 282AC (3) <i>VOL ENGINEER SC:SERVICE LEARN</i>	Elective Credit	Elective Credit	Elective Credit

**Fountain Hills High School**

**New Curriculum/Course Proposal**

1. Name(s) of person(s)/group(s) submitting this proposal:

Dr. Paul McElligott

2. Proposed course title:

Engineering Analysis Tools and Techniques

Equivalent to ECE 102 – approved by MCCC and is approved for credit transfer to ASU/UofA and NAU

3. Proposed course description:

Learning culture of engineering, engineering use of computer tools, and computer modeling as applied to engineering analysis and design. Prerequisites: Two years of high school algebra or MAT122 or departmental approval. Corequisites: MAT151 or MAT182 or MAT187.

4. Additional information about the proposed course (enter information in the table below.):

Academic Department	Math and Science
Recommended Grade Level(s)	11 or 12
Prerequisite(s)	Physics First and Algebra II
Credit Per Semester (usually 0.5)	0.5
Semester or Year Long Course	Year long
Graduation Requirement(s) Met	Elective

5. What is the reason for the proposal? Identify the target audience (grade level), define any innovation and provide data that specifically supports the need of the course proposed (e.g. research, student survey, SIP, assessment data.)

**This is the first of what I hope will be a series of courses set to help students evaluate engineering as a career as well as prepare students to innovate in the invention process. There is a course need for high level students that want to explore engineering, science and applied science as career choices. The number of students who wish to find an applied alternative to math and science beyond AP is growing. At least half of the 11<sup>th</sup> / 12<sup>th</sup> grade AP students in science (10) and a number of research club students 5 – 8 students would like a chance to try an engineering course before leaving for college.**

**In addition, this course serves to extend the STEM platform we are building for students to engage in science, technology and engineering careers. Last year I counted 25 graduates who were declared in one of those three areas. These students are growing each year.**

6. What is the impact of this course on other courses in the department? Similar courses in other departments?

**There is no course like this in either math or science. Research is the closest and I see it to align with the ideals of research.**

**The career group (CTE) is nervous about the entry but I have assured them and still maintain that the student population does not come from their ranks.**

7. Is this course replacing another course(s)? If so, which one(s)?

NO

8. What is the impact on building FTE (staffing) if this course is approved and taught? On other available resources?

**I will teach the course for free to maintain economic harmony and will do it on my prep period. (1<sup>st</sup>)**

9. Can other currently employed teachers at our school teach the class?

**Yes with some minimal training the course could be taught by Ms. Barsema in math and Ms. Fortune in Science. ASU will approve me as a co-curriculum instructor. They will approve 3 undergraduate credits to this course that transfers to all state colleges.**

10. How would teaching this course impact the number of preparations of staff? How would it impact individual teacher's schedule?

**No Impact will be experienced for preparation. No Impact will be experienced for the schedule.**

11. How would this course, if offered and taught, impact programs outside the department in which it is offered? **It is being offered as both a Math and Science elective and will inspire students to do well in Algebra II and Physics.**

12. Are there variables that limit enrollment in this course?

**Just the successful completion Algebra II and physics with a B or better is required.**

13. Specify the needs to run this program (e.g. technology, textbooks, unique materials, staffing configurations etc.)

**Pending enrollment, some robotics and software will be purchased. The course will occur in the Science computer lab. The text book has not been chosen but on line MIT course materials can suffice for the course. Probe ware has already been purchased for computers. The robotics exists and the programming could be purchased.**

14. What are the implications of this course for the District's summer school program?

**I have already been requested to have a robotics course for 3-5<sup>th</sup> graders. This course will be taught by Elyse Johnson. I am planning a co team experience with her using my 8<sup>th</sup> graders in a VEX competition this spring. I could extend this to the summer school program if the need and interest arose. I might see if Ms. Barsema and or Fortune would team teach it while I do my regular duties as the director.**