



Republic of the Philippines  
OFFICE OF THE PRESIDENT  
**COMMISSION ON HIGHER EDUCATION**



**CHED MEMORANDUM ORDER (CMO)**

No. 01  
Series of 2012

**SUBJECT: MODEL EMBEDMENT OF TVET COMPETENCIES/  
QUALIFICATIONS IN THE LADDERIZED BACHELOR OF  
SCIENCE IN MECHANICAL ENGINEERING PROGRAM**

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In accordance with pertinent provisions of Republic Act (RA) No. 7722, otherwise known as the "Higher Education Act of 1994," Executive Order 358-2004 "Institutionalizing a Ladderized Interface between Technical Vocational Education Training (TVET) and Higher Education (HE), and by virtue of CEB Resolution No. 328- 2011 dated December 16, 2011, the model embedment of Technical and Vocational Education and Training (TVET) Competencies / Qualifications, contained in appropriate TVET Training Regulations (TRs), in the Ladderized Bachelor of Science in Mechanical Engineering program is hereby adopted and promulgated by the Commission.

**ARTICLE I  
AUTHORITY TO OPERATE**

**Section 1. Authority to Operate**

All Private Higher Education Institutions (PHEIs) with recognized Bachelor of Science in Mechanical Engineering (BSME) program granted by the Commission on Higher Education (CHED) and by the respective Governing Boards in the case of chartered State Universities and Colleges (SUCs), and Local Colleges and Universities (LCUs) intending to offer the ladderized BSME shall submit to CHED the necessary documents required by CMO No. 43 series 2008 - "Implementing Guidelines of Executive Order No. 694 entitled "Enabling Higher Education Institutions to Opt to Ladderize their Education Programs Without Need for Issuance of Permit from the Commission on Higher Education and the Technical Education and Skills Development Authority."

**ARTICLE II  
MODEL CURRICULUM**

**Section 2. Curriculum Description**

The model BSME curriculum with embedded TVET qualifications shall be adopted as the minimum requirement and shall be built as prescribed in "CMO 09, s. 2008 – Policies and Standards for Bachelor of Science in Mechanical Engineering Program" for the completion of the ladderized BSME program. The TVET qualifications embedded in this curriculum include but are not limited to the following:

TVET Qualification/s
<b>Track 1:</b>
Automotive Servicing NC I
Automotive Servicing NC II

<b>Track 2:</b>
RAC Servicing NC I
RAC Servicing NC II
<b>Track 3:</b>
Gas Welding NC I
Gas Welding NC II
<b>Track 4:</b>
Machining NC I
Machining NC II
<b>Track 5:</b>
Tool and Die Making NC II
<b>Track 6:</b>
Shielded Metal Arc Welding (SMAW) NC I

### **Section 3. Curriculum Outline**

The curriculum outline is divided into five (5) components namely: General Education Courses, General Engineering Courses, Basic Mechanical Engineering Courses, Professional Mechanical Courses, and Practicum / Work Integrated Learning.

Identified relevant TVET Competencies / Qualifications for BS Mechanical Engineering are embedded in General Education and Basic Mechanical Engineering Courses.

### **Section 4. Enrichment of Model Curriculum**

The HEI intending to offer the ladderized BSME program may enrich the sample/model program of study depending on the needs of the industry, provided that all prescribed courses with corresponding pre-requisites/co-requisites in the curriculum outline are complied with. Please refer to the five Attachments.

## **ARTICLE III REQUIREMENTS**

### **Section 5. Faculty Qualifications and Other Requirements**

The general requirements for the Bachelor of Science in Mechanical Engineering Program are contained in CMO 09, s.2008.

On the other hand, any higher education institution (HEI) intending to offer the ladderized BSME program should satisfy the faculty and other requirements as prescribed in CHED Memorandum Order No. 09, s.2008, and TESDA Training Standards requirements, (curriculum design, training delivery, laboratory facilities, equipment and tools, faculty/trainer



qualifications, as indicated in the specific Training Regulations and institutional assessment and national certification procedures) as prescribed in CMO No. 43, s. 2008.

**ARTICLE IV  
RECOGNITION OF TESDA NATIONAL CERTIFICATES**

**Section 6.** HEIs may admit a holder with valid relevant TESDA National Certificate/s who wishes to pursue BSME program. Such certificates may be given credit units upon verification by the concerned HEIs. Further, the Transcript of Records shall reflect the grade of "Passed" and the TESDA NC level.

**ARTICLE V  
MONITORING AND EVALUATION**

**Section 7.** The CHED together with TESDA representatives shall jointly monitor and evaluate / compliance audit, to ensure adherence with the minimum requirements. Compliance audit shall be done at least once every two years.

**ARTICLE VI  
SANCTIONS**

**Section 8.** For violations of this Memorandum Order, the Commission may impose such administrative sanction/s as it may deem appropriate pursuant to the pertinent provisions of Republic Act No. 7722, in relation to Section 69 of BP 232 otherwise known as the Higher Education Act of 1982, and Section 143 of the Manual of Regulations for Philippine Higher Education (MORPHE), and other related laws.

**ARTICLE VII  
SEPARABILITY AND REPEALING CLAUSE**

**Section 9.** Any provision of this CMO, which may hereafter be held invalid, shall not affect the remaining provisions.

**ARTICLE VIII  
EFFECTIVITY CLAUSE**

**Section 10.** This CMO shall take effect starting first (1<sup>st</sup>) semester of SY 2012-2013, after publication as required by law.

Quezon City, Philippines January 24, 2012

For the Commission:

  
**PATRICIA B. LICUANAN, Ph.D.**  
Chairperson

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**MODEL EMBEDMENT OF GAS WELDING IN  
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**First Year  
1<sup>st</sup> Semester**

Higher Education Subjects					TVET Modules	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs./sem	Prereq	Units of Competency
College Algebra	3	0	3	54		
Plane and Spherical Trigonometry	3	0	3	54		
General Chemistry	3	3	4	108		
Engineering Drawing	0	3	1	54		> Interpret drawing and sketches <sup>(3)</sup>
Orientation to M.E.	1	0	1	18		> Work with others <sup>(2)</sup> > Demonstrate Work Values <sup>(2)</sup>
English 1	3	0	3	54		> Receive and respond to workplace communication <sup>(1)</sup>
Filipino 1	3	0	3	54		
Workshop Theory and Practice 1-A *(from 3rd yr. 1st Sem)	0	6	2	108		> Perform Industry Calculation <sup>(5)</sup> > Contribute to quality system (3) > Use hand tools <sup>(3)</sup> > Prepare weld materials <sup>(3)</sup> > Set-up welding equipment <sup>(3)</sup> > Fit-up materials <sup>(3)</sup> > Repair welds <sup>(3)</sup>
PE 1			2	36		
NSTP 1			3	54		
<b>TOTAL</b>	<b>16</b>	<b>12</b>	<b>25</b>	<b>594</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects					TVET Modules	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs./sem	Prereq	Units of Competency
Advanced Algebra	2	0	2	36	College Algebra	
Analytic Geometry	2	0	2	36	College Algebra, Plane and Spherical Trigonometry	
Solid Mensuration	2	0	2	36		
Physics 1	3	3	4	108		
English 2	3	0	3	54		
Filipino 2	3	0	3	54		
Workshop Theory 1-B	0	18	2	108		> Perform gas welding in carbon steel plates and tubes <sup>(4)</sup>
Safety Management (fr. 3rd yr. 2nd sem)	1	0	1	18		> Practice basic housekeeping procedure <sup>(1)</sup> > Practice occupational health and safety procedures <sup>(2)</sup> > Apply safety procedures <sup>(3)</sup>
PE 2			2	36		
NSTP 2			3	54		
<b>TOTAL</b>	<b>16</b>	<b>21</b>	<b>24</b>	<b>540</b>		

**Welding (Gas) National Certificate (NC) I will be issued by TESDA upon passing the Certification process.**

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



**MODEL EMBEDMENT OF GAS WELDING IN  
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**2nd YEAR  
1st Semester**

Higher Education Subjects						TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
Differential Calculus	4	0	4	72	Analytic Geometry, Solid Mensuration, Advance Algebra	
Physics 2	3	3	4	108	Physics 1	
English 3	3	0	3	54	English 2	> Participate in workplace communication <sup>(2)</sup> > Work in a team environment <sup>(2)</sup> > Practice career professionalism <sup>(2)</sup>
Computer Fundamentals and Programming	0	6	2	108	2nd Year Standing	
Social Science 1	3	0	3	54		
Humanities 1	3	0	3	54		
Workshop Theory and Practice II - A*	0	6	2	108		> Perform Gas Welding in alloy steel plates <sup>(5)</sup>
PE 3			2	36		
<b>TOTAL</b>	<b>16</b>	<b>15</b>	<b>21</b>	<b>558</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects						TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
Integral Calculus	4	0	4	72	Differential Calculus	
Basic Electrical Engineering	2	3	3	90	Physics 2	
Probability and Statistics	3	0	3	54	College Algebra	
Humanities 2	3	0	3	54		
Social Science 2	3	0	3	54		
Life and Works of Rizal	3	0	3	54		
Workshop Theory and Practice II - B *	0	6	2	108		> Perform Gas Welding in alloy tubes (5)
PE 4			2	36		
<b>TOTAL</b>	<b>18</b>	<b>9</b>	<b>23</b>	<b>522</b>		

*Welding (Gas) National Certificate (NC) II will be issued by the TESDA upon passing the certification process.*

**Note:** Workshop Theory and Practice I - A is equivalent to Workshop Theory for the regular BSME program, while Workshop Theory and Practice I B, II - A & B is the additional subject intended for welding.

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



## MODEL EMBEDMENT IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

### THIRD YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Computer Aided Drafting	0	3	1	54	
Environmental Engineering	2	0	2	36	
Differential Equations	3	0	3	54	
Machine Elements 1	2	3	3	90	
Thermodynamics 1	3	0	3	54	
Statics of Rigid Bodies	3	0	3		
Social Science 3	3	0	3	54	
Humanities 3	3	0	3	54	
<b>TOTAL</b>	<b>19</b>	<b>6</b>	<b>21</b>	<b>396</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Dynamics of Rigid Bodies	2	0	2	36	
Mechanics of Deformable Bodies	3	0	3	54	
Machine Elements 2	2	3	3	90	
Machine Shop Theory	0	6	2	108	
Basic Electronics	2	3	3	90	
Thermodynamics 2	3	0	3	54	
Fluid Mechanics	3	0	3	54	
Social Science 4	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>12</b>	<b>22</b>	<b>540</b>	

### FOURTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Materials Engineering	3	3	4	108	
ME Lab 1	0	6	2	36	
DC and AC Machinery	3	3	4	108	
Heat Transfer	2	0	2	36	
Machine Design 1	3	0	3	54	
Advance Engineering Mathematics for ME	3	0	3	54	
<b>TOTAL</b>	<b>17</b>	<b>12</b>	<b>21</b>	<b>450</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
ME Laboratory 2	0	6	2	108	
Fluid Machinery	3	0	3	54	
Combustion Engineering	2	0	2	36	
Engineering Economy	3	0	3	54	
Refrigeration Systems	3	0	3	54	
Machine Design 2	3	0	3	54	
Methods of Research for ME	1	0	1	18	
ME Elective 2	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>20</b>	<b>432</b>	

### FIFTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Air conditioning and Ventilation Systems	2	3	3	90	
Instrumentation and Control Engineering	2	3	3	90	
Safety Engineering for ME	2	0	2	36	
ME Laboratory 3	0	6	2	108	
Plant Visit/OJT	0	6	2	108	
Vibration Engineering	2	0	2	36	
Industrial Processes	2	0	2	36	
ME Project Study 1	0	3	1	54	
ME Elective 3	3	0	3	54	
<b>TOTAL</b>	<b>13</b>	<b>21</b>	<b>20</b>	<b>612</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Industrial Plant Engineering	3	0	3	54	
ME Laws, Ethics, Code and Standards	3	0	3	54	
Power Plant Engineering	4	3	5	126	
ME Project Study 2	0	3	1	54	
Engineering Management	3	0	3	54	
ME Elective 4	3	0	3	54	
<b>TOTAL</b>	<b>16</b>	<b>6</b>	<b>18</b>	<b>396</b>	



## MODEL EMBEDMENT OF MACHINING IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

### First Year 1<sup>st</sup> Semester

Higher Education Subjects					Prereq	TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem		Units of Competency
College Algebra	3	0	3	54		
Plane and Spherical Trigonometry	3	0	3	54		
General Chemistry	3	3	4	108		
Engineering Drawing	0	3	1	54		> Interpret drawing and sketches <sup>(3)</sup>
Orientation to M.E.	1	0	1	18		> Work with others <sup>(1)</sup> > Demonstrate Work Values <sup>(1)</sup>
English 1	3	0	3	54		> Receive and respond to workplace communication <sup>(1)</sup>
Filipino 1	3	0	3	54		
Workshop Theory and Practice 1-A <small>(from 3rd yr, 1st Sem)</small>	0	6	2	108		> Perform routine housekeeping <sup>(3)</sup> > Perform bench work (Basic) <sup>(4)</sup> > Turn workpiece (Basic) <sup>(4)</sup>
PE 1			2	36		
NSTP 1			3	54		
<b>TOTAL</b>	<b>16</b>	<b>12</b>	<b>25</b>	<b>594</b>		

### 2<sup>nd</sup> Semester

Higher Education Subjects					Prereq	TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem		Units of Competency
Advanced Algebra	2	0	2	36	College Algebra	
Analytic Geometry	2	0	2	36	College Algebra, Plane and Spherical Trigonometry	
Solid Mensuration	2	0	2	36		
Physics 1	3	3	4	108		
English 2	3	0	3	54		
Filipino 2	3	0	3	54		
Workshop Theory and Practice 1-B	0	6	2	108		> Select and cut workshop materials <sup>(3)</sup> > Perform shop computations (Basic) <sup>(3)</sup> > Measure workpiece (Basic) <sup>(3)</sup> > Perform shop computations (Intermediate) <sup>(3)</sup> > Measure workpiece using angular measuring instruments <sup>(3)</sup> > Mill workpiece (Basic) <sup>(4)</sup> > Grind workpiece <sup>(4)</sup>
Safety Management <small>(fr. 3rd yr 2nd sem)</small>	1	0	1	18		> Practice housekeeping procedures <sup>(1)</sup> > Apply safety practices <sup>(3)</sup> > Practice occupational health and safety procedures <sup>(2)</sup>
PE 2			2	36		
NSTP 2			3	54		
<b>TOTAL</b>			<b>24</b>	<b>540</b>		

**MACHINING NC1 will be issued by the TESDA upon passing the Certification Process**

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



## MODEL EMBEDMENT OF MACHINING IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

### Second Year 1<sup>st</sup> Semester

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs./sem	Prerequisites	Units of Competency
Differential Calculus	4	0	4	72	Analytic Geometry, Solid Mensuration, Advance Algebra	
Physics 2	3	3	4	108	Physics 1	
English 3	3	0	3	54	English 2	> Participate in workplace communication <sup>(2)</sup> > Work in a team environment <sup>(2)</sup> > Practice career professionalism <sup>(2)</sup>
Computer Fundamentals and Programming	0	6	2	108	2nd Year Standing	
Social Science 1	3	0	3	54		
Humanities 1	3	0	3	54		
Workshop Theory and Practice II-A*	0	6	2	108		> Perform preventive and corrective maintenance <sup>(3)</sup> > Perform bench work (Complex) <sup>(5)</sup> > Turn workpiece (Intermediate) <sup>(5)</sup>
PE 3			2	36		
<b>TOTAL</b>	<b>16</b>	<b>15</b>	<b>23</b>	<b>594</b>		

### 2<sup>nd</sup> Semester

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs./sem	Prereq	Units of Competency
Integral Calculus	4	0	4	72	Differential Calculus	
Basic Electrical Engineering	2	3	3	90	Physics 2	
Probability and Statistics	3	0	3	54	College Algebra	
Humanities 2	3	0	3	54		
Social Science 2	3	0	3	54		
Life and Works of Rizal	3	0	3	54		
Workshop Theory and Practice II-B*	0	6	2	108		> Mill Workpiece (Intermediate) <sup>(5)</sup> > Grind Workpiece (Complex) <sup>(5)</sup>
PE 4			2	36		
<b>TOTAL</b>	<b>18</b>	<b>9</b>	<b>23</b>	<b>522</b>		

**MACHINING II will be issued by the TESDA upon passing the certification process.**

**Note:** Workshop Theory and Practice I - A is equivalent to Workshop Theory for the regular BSME program, while Workshop Theory and Practice I B, II - A & B are additional subjects intended for Machining.

**Legend:** (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II





## MODEL EMBEDMENT IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

### THIRD YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Computer Aided Drafting	0	3	1	54	
Environmental Engineering	2	0	2	36	
Differential Equations	3	0	3	54	
Machine Elements 1	2	3	3	90	
Thermodynamics 1	3	0	3	54	
Statics of Rigid Bodies	3	0	3		
Social Science 3	3	0	3	54	
Humanities 3	3	0	3	54	
<b>TOTAL</b>	<b>19</b>	<b>6</b>	<b>21</b>	<b>396</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Dynamics of Rigid Bodies	2	0	2	36	
Mechanics of Deformable Bodies	3	0	3	54	
Machine Elements 2	2	3	3	90	
Machine Shop Theory	0	6	2	108	
Basic Electronics	2	3	3	90	
Thermodynamics 2	3	0	3	54	
Fluid Mechanics	3	0	3	54	
Social Science 4	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>12</b>	<b>22</b>	<b>540</b>	

### FOURTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Materials Engineering	3	3	4	108	
ME Lab 1	0	6	2	36	
DC and AC Machinery	3	3	4	108	
Heat Transfer	2	0	2	36	
Machine Design 1	3	0	3	54	
Advance Engineering Mathematics for ME	3	0	3	54	
<b>TOTAL</b>	<b>17</b>	<b>12</b>	<b>21</b>	<b>450</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
ME Laboratory 2	0	6	2	108	
Fluid Machinery	3	0	3	54	
Combustion Engineering	2	0	2	36	
Engineering Economy	3	0	3	54	
Refrigeration Systems	3	0	3	54	
Machine Design 2	3	0	3	54	
Methods of Research for ME	1	0	1	18	
ME Elective 2	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>20</b>	<b>432</b>	

### FIFTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Air conditioning and Ventilation Systems	2	3	3	90	
Instrumentation and Control Engineering	2	3	3	90	
Safety Engineering for ME	2	0	2	36	
ME Laboratory 3	0	6	2	108	
Plant Visit/OJT	0	6	2	108	
Vibration Engineering	2	0	2	36	
Industrial Processes	2	0	2	36	
ME Project Study 1	0	3	1	54	
ME Elective 3	3	0	3	54	
<b>TOTAL</b>	<b>13</b>	<b>21</b>	<b>20</b>	<b>612</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Industrial Plant Engineering	3	0	3	54	
ME Laws, Ethics, Code and Standards	3	0	3	54	
Power Plant Engineering	4	3	5	126	
ME Project Study 2	0	3	1	54	
Engineering Management	3	0	3	54	
ME Elective 4	3	0	3	54	
<b>TOTAL</b>	<b>16</b>	<b>6</b>	<b>18</b>	<b>396</b>	



**MODEL EMBEDMENT OF SHIELDED METAL ARC WELDING IN  
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**First Year  
1<sup>st</sup> Semester**

Higher Education Subjects					TVET Module	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
College Algebra	3	0	3	54		
Plane and Spherical Trigonometry	3	0	3	54		
General Chemistry	3	3	4	108		
Engineering Drawing	0	3	1	54		> Interpret drawing and sketches
Orientation to M.E.	1	0	1	18		> Work with others <sup>(1)</sup> > Demonstrate work values <sup>(1)</sup>
English 1	3	0	3	54		> Receive and respond to workplace communication <sup>(1)</sup>
Pilipino 1	3	0	3	54		
Workshop Theory and Practice 1-A <small>(fr. 3rd yr. 1st sem)</small>	0	6	2	108		> Perform industry calculations <sup>(3)</sup> > Contribute to quality system <sup>(3)</sup> > Use hand tools <sup>(3)</sup> > Prepare weld materials <sup>(3)</sup> > Set-up welding equipment <sup>(3)</sup> > Fit-up materials <sup>(3)</sup> > Repair weld (3)
PE 1			2	36		
NSTP 1			3	54		
<b>TOTAL</b>	<b>16</b>	<b>12</b>	<b>25</b>	<b>594</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects					TVET Modules	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
Advanced Algebra	2	0	2	36	College Algebra	
Analytic Geometry	2	0	2	36	College Algebra, Plane and Spherical Trigonometry	
Solid Mensuration	2	0	2	36		
Physics 1	3	3	4	108		
English 2	3	0	3	54		
Pilipino 2	3	0	3	54		
Workshop Theory and Practice 1-B*	0	18	2	108		> Weld Carbon Steel Plates Using SMAW <sup>(4)</sup>
Safety Management <small>(fr. 3rd yr. 2nd sem)</small>	1	0	1	18		> Practice basic housekeeping procedure <sup>(1)</sup> > Apply safety practices <sup>(3)</sup>
PE 2			2	36		
NSTP 2			3	54		
<b>TOTAL</b>	<b>16</b>	<b>21</b>	<b>24</b>	<b>540</b>		

*Shielded Metal Arc Welding (SMAW) National Certificate (NC) I will be issued by TESDA upon passing the Certification process.*

Note: Workshop Theory and Practice I - A is equivalent to Workshop Theory and Practice for the regular BSME program, while Workshop Theory and Practice I B is an additional subject intended for SMAW.

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



**MODEL EMBEDMENT OF SMAW  
IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**SECOND YEAR**

**1st Semester**

Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq
Differential Calculus	4	0	4	72	
Physics 2	3	3	4	108	
English 3	3	0	3	54	
Computer Fundamentals and Programming	0	6	2	108	
Social Science 1	3	0	3	54	
Humanities 1	3	0	3	54	
PE 3			2	36	
<b>TOTAL</b>	<b>16</b>	<b>9</b>	<b>21</b>	<b>486</b>	

**2nd Semester**

Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq
Integral Calculus	4	0	4	72	
Basic Electrical Engineering	2	3	3	90	
Probability and Statistics	3	0	3	54	
Humanities 2	3	0	3	54	
Social Science 2	3	0	3	54	
Life and Works of Rizal	3	0	3	54	
PE 4			2	36	
<b>TOTAL</b>	<b>18</b>	<b>3</b>	<b>21</b>	<b>414</b>	

**THIRD YEAR**

**1st Semester**

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Differential Equations	3	0	3	54	
Statics of Rigid Bodies	3	0	3	54	
Computer Aided Drafting	0	3	1	54	
Machine Elements 1	2	3	3	90	
Thermodynamics 1	3	0	3	54	
Environmental Engineering	2	0	2	36	
Social Science 3	3	0	3	54	
<b>TOTAL</b>	<b>16</b>	<b>6</b>	<b>18</b>	<b>396</b>	

**2nd Semester**

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Dynamics of Rigid Bodies	2	0	2	36	
Mechanics of Deformable Bodies	3	0	3	54	
Machine Elements 2	2	3	3	90	
Machine Shop Theory	0	6	2	108	
Basic Electronics	2	3	3	90	
Thermodynamics 2	3	0	3	54	
Fluid Mechanics	3	0	3	54	
Social Science 4	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>12</b>	<b>22</b>	<b>540</b>	



### FOURTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Materials Engineering	3	3	4	108	
ME Lab 1	0	6	2	36	
DC and AC Machinery	3	3	4	108	
Heat Transfer	2	0	2	36	
Machine Design 1	3	0	3	54	
Advance Engineering Mathematics for ME	3	0	3	54	
ME Elective 1	3	0	3	54	
<b>TOTAL</b>	<b>17</b>	<b>12</b>	<b>21</b>	<b>450</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
ME Laboratory 2	0	6	2	108	
Fluid Machinery	3	0	3	54	
Combustion Engineering	2	0	2	36	
Engineering Economy	3	0	3	54	
Refrigeration Systems	3	0	3	54	
Machine Design 2	3	0	3	54	
Methods of Research for ME	1	0	1	18	
ME Elective 2	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>20</b>	<b>432</b>	

### FIFTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Air conditioning and Ventilation Systems	2	3	3	90	
Instrumentation and Control Engineering	2	3	3	90	
Safety Engineering for ME	2	0	2	36	
ME Laboratory 3	0	6	2	108	
Plant Visit/OJT	0	6	2	108	
Vibration Engineering	2	0	2	36	
Industrial Processes	2	0	2	36	
ME Project Study 1	0	3	1	54	
ME Elective 3	3	0	3	54	
<b>TOTAL</b>	<b>13</b>	<b>21</b>	<b>20</b>	<b>612</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Industrial Plant Engineering	3	0	3	54	
ME Laws, Ethics, Code & Standards	3	0	3	54	
Power Plant Engineering	4	3	5	126	
ME Project Study 2	0	3	1	54	
Engineering Management	3	0	3	54	
ME Elective 4	3	0	3	54	
<b>TOTAL</b>	<b>16</b>	<b>6</b>	<b>18</b>	<b>396</b>	



**MODEL EMBEDMENT OF AUTOMOTIVE SERVICING  
IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**First Year  
1<sup>st</sup> Semester**

Higher Education Subjects						TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
College Algebra	3	0	3	54		
Plane and Spherical Trigonometry	3	0	3	54		
General Chemistry	3	3	4	108		
Engineering Drawing	0	3	1	54		
Orientation to M.E.	1	0	1	18		> Work with others <sup>(1)</sup> > Demonstrate Work Values <sup>(1)</sup>
English 1	3	0	3	54		> Receive and respond to workplace communication <sup>(1)</sup>
Filipino 1	3	0	3	54		
Workshop Theory and Practice 1-A	0	6	2	108		> Apply appropriate sealant / adhesive <sup>(3)</sup> > Move and position vehicle <sup>(3)</sup> > Read, interpret and apply specifications and manuals <sup>(3)</sup> > Use and apply lubricants / coolants <sup>(3)</sup> > Perform shop maintenance <sup>(4)</sup> > Perform diesel engine tune – up <sup>(4)</sup> > Perform gas engine tune - up <sup>(4)</sup> > Service automotive battery <sup>(4)</sup>
PE 1			2	36		
NSTP 1			3	54		
<b>TOTAL</b>	<b>16</b>	<b>12</b>	<b>25</b>	<b>594</b>		

**2nd Semester**

Higher Education Subjects						TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
Advanced Algebra	2	0	2	36	College Algebra	
Analytic Geometry	2	0	2	36		
Solid Mensuration	2	0	2	36	College Algebra, Plane and Spherical Trigonometry	> Perform Mensuration and Calculation <sup>(3)</sup>
Physics 1	3	3	4	108		
English 2	3	0	3	54		
Filipino 2	3	0	3	54		
Workshop Theory and Practice 1-B	0	6	2	108		> Service ignition system <sup>(4)</sup> > Test and repair wiring / lighting system <sup>(4)</sup> > Perform underchassis preventive maintenance <sup>(4)</sup>
Safety Management (fr. 3rd yr 2nd sem)	1	0	1	18		> Practice basic housekeeping procedures <sup>(1)</sup> > Practice occupational health and safety procedures <sup>(2)</sup>
PE 2			2	36		
NSTP 2			3	54		
<b>TOTAL</b>	<b>16</b>	<b>9</b>	<b>24</b>	<b>540</b>		

**AUTOMOTIVE SERVICING NC1 will be issued by the TESDA upon passing the Certification Process**

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



**MODEL EMBEDMENT OF AUTOMOTIVE SERVICING  
IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**Second Year  
1<sup>st</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prerequisites	Units of Competency
Differential Calculus	4	0	4	72	Analytic Geometry, Solid Mensuration, Advance Algebra	
Physics 2	3	3	4	108	Physics 1	
English 3	3	0	3	54	English 2	> Participate in workplace communication <sup>(2)</sup>  > Work in a team environment <sup>(2)</sup> > Practice career professionalism <sup>(2)</sup>
Computer Fundamentals and Programming	0	6	2	108	2nd Year Standing	
Social Science 1	3	0	3	54		
Humanities 1	3	0	3	54		
Workshop Theory and Practice II – A	0	6	2	108		> Service starting system <sup>(5)</sup> > Service Charging system <sup>(5)</sup> > Service engine mechanical system <sup>(5)</sup> > Service clutch system <sup>(5)</sup> > Service differential and front axle <sup>(5)</sup>
PE 3			2	36		
<b>TOTAL</b>	<b>16</b>	<b>15</b>	<b>23</b>	<b>594</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. per sem	Prereq	Units of Competency
Integral Calculus	4	0	4	72	Differential Calculus	
Basic Electrical Engineering	2	3	3	90	Physics 2	
Probability and Statistics	3	0	3	54	College Algebra	
Humanities 2	3	0	3	54		
Social Science 2	3	0	3	54		
Life and Works of Rizal	3	0	3	54		
Workshop Theory and Practice II - B	0	6	2	108		> Service Steering system <sup>(5)</sup> > Overhaul manual transmission <sup>(5)</sup> > Service brake system <sup>(5)</sup> > Service suspension system <sup>(5)</sup>
PE 4			2	36		
<b>TOTAL</b>	<b>18</b>	<b>9</b>	<b>23</b>	<b>522</b>		

**AUTOMOTIVE SERVICING NC II will be issued by the TESDA upon passing the certification process.**

Note: Workshop Theory and Practice I – A is equivalent to Workshop Theory for the regular BSME program, while Workshop Theory and Practice I B, II – A & B are additional subjects intended for Automotive Servicing.

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



## MODEL EMBEDMENT IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

### THIRD YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Computer Aided Drafting	0	3	1	54	
Environmental Engineering	2	0	2	36	
Differential Equations	3	0	3	54	
Machine Elements 1	2	3	3	90	
Thermodynamics 1	3	0	3	54	
Statics of Rigid Bodies	3	0	3		
Social Science 3	3	0	3	54	
Humanities 3	3	0	3	54	
<b>TOTAL</b>	<b>19</b>	<b>6</b>	<b>21</b>	<b>396</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Dynamics of Rigid Bodies	2	0	2	36	
Mechanics of Deformable Bodies	3	0	3	54	
Machine Elements 2	2	3	3	90	
Machine Shop Theory	0	6	2	108	
Basic Electronics	2	3	3	90	
Thermodynamics 2	3	0	3	54	
Fluid Mechanics	3	0	3	54	
Social Science 4	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>12</b>	<b>22</b>	<b>540</b>	

### FOURTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Materials Engineering	3	3	4	108	
ME Lab 1	0	6	2	36	
DC and AC Machinery	3	3	4	108	
Heat Transfer	2	0	2	36	
Machine Design 1	3	0	3	54	
Advance Engineering Mathematics for ME	3	0	3	54	
<b>TOTAL</b>	<b>17</b>	<b>12</b>	<b>21</b>	<b>450</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
ME Laboratory 2	0	6	2	108	
Fluid Machinery	3	0	3	54	
Combustion Engineering	2	0	2	36	
Engineering Economy	3	0	3	54	
Refrigeration Systems	3	0	3	54	
Machine Design 2	3	0	3	54	
Methods of Research for ME	1	0	1	18	
ME Elective 2	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>20</b>	<b>432</b>	

### FIFTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Air conditioning and Ventilation Systems	2	3	3	90	
Instrumentation and Control Engineering	2	3	3	90	
Safety Engineering for ME	2	0	2	36	
ME Laboratory 3	0	6	2	108	
Plant Visit/OJT	0	6	2	108	
Vibration Engineering	2	0	2	36	
Industrial Processes	2	0	2	36	
ME Project Study 1	0	3	1	54	
ME Elective 3	3	0	3	54	
<b>TOTAL</b>	<b>13</b>	<b>21</b>	<b>20</b>	<b>612</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Industrial Plant Engineering	3	0	3	54	
ME Laws, Ethics, Code and Standards	3	0	3	54	
Power Plant Engineering	4	3	5	126	
ME Project Study 2	0	3	1	54	
Engineering Management	3	0	3	54	
ME Elective 4	3	0	3	54	
<b>TOTAL</b>	<b>16</b>	<b>6</b>	<b>18</b>	<b>396</b>	



**MODEL EMBEDMENT OF REFRIGERATION AND AIR-CONDITION  
IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**First Year  
1st Semester**

Higher Education Subjects						TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
College Algebra	3	0	3	54		
Plane and Spherical Trigonometry	3	0	3	54		
General Chemistry	3	3	4	108		
Engineering Drawing	0	3	1	54		
Orientation to M.E.	1	0	1	18		> Work with others <sup>(2)</sup> > Demonstrate work values <sup>(2)</sup>
English 1	3	0	3	54		> Receive and respond to workplace communication <sup>(2)</sup>
Filipino 1	3	0	3	54		
Workshop Theory and Practice 1-A (from 3rd yr. 1st Sem)	0	6	2	108		> Prepare materials and tools <sup>(3)</sup> > Observe procedures, specifications, and manuals of instructions <sup>(3)</sup> > Perform basic benchwork <sup>(3)</sup> > Perform basic electrical work <sup>(3)</sup> > Maintain tools and equipment <sup>(3)</sup> > Document work accomplished <sup>(3)</sup> > Install window –type air conditioning / domestic refrigeration units <sup>(4)</sup> > Service and maintain window – type air conditioning / domestic refrigeration units <sup>(4)</sup> > Survey site for installation <sup>(5)</sup>
PE 1			2	36		
NSTP 1			3	54		
<b>TOTAL</b>	<b>16</b>	<b>12</b>	<b>25</b>	<b>594</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects						TVET MODULES
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
Advanced Algebra	2	0	2	36	College Algebra	
Analytic Geometry	2	0	2	36	College Algebra, Plane and Spherical Trigonometry	> Perform Mensuration and Calculation <sup>(3)</sup>
Solid Mensuration	2	0	2	36		
Physics 1	3	3	4	108		
English 2	3	0	3	54		
Filipino 2	3	0	3	54		
Workshop Theory and Practice 1-B	0	6	2	108		> Trouble shoot window – type air conditioning / domestic refrigeration systems <sup>(4)</sup> > Recover and recycle refrigerant in window – type air conditioning / domestic refrigeration systems <sup>(4)</sup> > Repair and retrofit window – type air conditioning / domestic refrigeration system and accessories <sup>(4)</sup> > Perform testing and commissioning for window type air conditioning / domestic refrigeration systems <sup>(4)</sup>
Safety Management (to 3rd yr. 2nd sem)	1	0	1	18		> Practice basic housekeeping procedures <sup>(1)</sup> > Practice occupational health and safety practices <sup>(2)</sup> > Perform housekeeping and safety practices <sup>(3)</sup>
PE 2			2	36		
NSTP 2			3	54		
<b>TOTAL</b>	<b>16</b>	<b>9</b>	<b>24</b>	<b>540</b>		

**RAC SERVICE (DOMESTIC) NC1 will be issued by the TESDA upon passing the Certification Process**

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II





**Second Year**

**1<sup>st</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. per sem	Prereq	Units of Competency
Differential Calculus	4	0	4	72	Analytic Geometry, Solid Mensuration, Advance Algebra	
Physics 2	3	3	4	108	Physics 1	
English 3	3	0	3	54	English 2	> Participate in workplace communication <sup>(2)</sup> > Work in a team environment <sup>(2)</sup> > Practice career professionalism <sup>(2)</sup>
Computer Fundamentals and Programming	0	6	2	108	2nd Year Standing	
Social Science 1	3	0	3	54		
Humanities 1	3	0	3	54		
Workshop Theory and Practice II - A	0	6	2	108		> Install PACU / CRE piping systems <sup>(5)</sup> > Install PACU / CRE electrical systems <sup>(5)</sup> > Install PACU / CRE <sup>(5)</sup> > Service and maintain PACU / CRE units <sup>(5)</sup>
PE 3			2	36		
<b>TOTAL</b>	<b>16</b>	<b>15</b>	<b>23</b>	<b>594</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. per sem	Prereq	Units of Competency
Integral Calculus	4	0	4	72	Differential Calculus	
Basic Electrical Engineering	2	3	3	90	Physics 2	
Probability and Statistics	3	0	3	54	College Algebra	
Humanities 2	3	0	3	54		
Social Science 2	3	0	3	54		
Life and Works of Rizal	3	0	3	54		
Workshop Theory and Practice II - B	0	6	2	108		> Troubleshoot PACU / CRE <sup>(5)</sup> > Recover and recycle refrigerant in PACU / CRE systems <sup>(5)</sup> > Repair / Retrofit PACU / CRE <sup>(5)</sup> > Perform start-up and commissioning for PACU-CRE systems <sup>(5)</sup>
PE 4			2	36		
<b>TOTAL</b>	<b>18</b>	<b>9</b>	<b>23</b>	<b>522</b>		

**PACU / CRE NCII will be issued by the TESDA upon passing the certification process.**

**Note:** Workshop Theory and Practice I - A is equivalent to Workshop Theory for the regular BSME program, while Workshop Theory and Practice I B, II - A & B are additional subjects intended for refrigeration and air conditioning.

**Legend:** (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



## MODEL EMBEDMENT IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

### THIRD YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Computer Aided Drafting	0	3	1	54	
Environmental Engineering	2	0	2	36	
Differential Equations	3	0	3	54	
Machine Elements 1	2	3	3	90	
Thermodynamics 1	3	0	3	54	
Statics of Rigid Bodies	3	0	3		
Social Science 3	3	0	3	54	
Humanities 3	3	0	3	54	
<b>TOTAL</b>	<b>19</b>	<b>6</b>	<b>21</b>	<b>396</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Dynamics of Rigid Bodies	2	0	2	36	
Mechanics of Deformable Bodies	3	0	3	54	
Machine Elements 2	2	3	3	90	
Machine Shop Theory	0	6	2	108	
Basic Electronics	2	3	3	90	
Thermodynamics 2	3	0	3	54	
Fluid Mechanics	3	0	3	54	
Social Science 4	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>12</b>	<b>22</b>	<b>540</b>	

### FOURTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Materials Engineering	3	3	4	108	
ME Lab 1	0	6	2	36	
DC and AC Machinery	3	3	4	108	
Heat Transfer	2	0	2	36	
Machine Design 1	3	0	3	54	
Advance Engineering Mathematics for ME	3	0	3	54	
<b>TOTAL</b>	<b>17</b>	<b>12</b>	<b>21</b>	<b>450</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
ME Laboratory 2	0	6	2	108	
Fluid Machinery	3	0	3	54	
Combustion Engineering	2	0	2	36	
Engineering Economy	3	0	3	54	
Refrigeration Systems	3	0	3	54	
Machine Design 2	3	0	3	54	
Methods of Research for ME	1	0	1	18	
ME Elective 2	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>20</b>	<b>432</b>	

### FIFTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Air conditioning and Ventilation Systems	2	3	3	90	
Instrumentation and Control Engineering	2	3	3	90	
Safety Engineering for ME	2	0	2	36	
ME Laboratory 3	0	6	2	108	
Plant Visit/OJT	0	6	2	108	
Vibration Engineering	2	0	2	36	
Industrial Processes	2	0	2	36	
ME Project Study 1	0	3	1	54	
ME Elective 3	3	0	3	54	
<b>TOTAL</b>	<b>13</b>	<b>21</b>	<b>20</b>	<b>612</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Industrial Plant Engineering	3	0	3	54	
ME Laws, Ethics, Code and Standards	3	0	3	54	
Power Plant Engineering	4	3	5	126	
ME Project Study 2	0	3	1	54	
Engineering Management	3	0	3	54	
ME Elective 4	3	0	3	54	
<b>TOTAL</b>	<b>16</b>	<b>6</b>	<b>18</b>	<b>396</b>	



**MODEL EMBEDMENT OF TOOL AND DIE MAKING  
IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**First Year  
1<sup>st</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs./sem	Prereq	Units of Competency
College Algebra	3	0	3	54		
Plane and Spherical Trigonometry	3	0	3	54		
General Chemistry	3	3	4	108		
Engineering Drawing	0	3	1	54		
Orientation to M.E.	1	0	1	18		
English 1	3	0	3	54		
Pilipino 1	3	0	3	54		
Workshop Theory and Practice 1-A <small>(from 3rd yr. 1st Sem)</small>	0	6	2	108		> Perform shop computations (Intermediate) <sup>(3)</sup> > Measure workpiece (Intermediate) <sup>(3)</sup> > Perform preventive and corrective maintenance <sup>(3)</sup>
PE 1			2	36		
NSTP 1			3	54		
<b>TOTAL</b>	<b>16</b>	<b>12</b>	<b>25</b>	<b>594</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs./sem	Prereq	Units of Competency
Advanced Algebra	2	0	2	36	College Algebra	
Analytic Geometry	2	0	2	36	College Algebra, Plane and Spherical Trigonometry	
Solid Mensuration	2	0	2	36		
Physics 1	3	3	4	108		
English 2	3	0	3	54		
Pilipino 2	3	0	3	54		
Workshop Theory and Practice 1-B	0	6	2	108		> Machine die components <sup>(3)</sup>
Safety Management <small>(fr. 3rd yr. 2nd sem)</small>	1	0	1	18		> Practice occupational health and safety procedures <sup>(2)</sup>
PE 2			2	36		
NSTP 2			3	54		
<b>TOTAL</b>	<b>16</b>	<b>9</b>	<b>24</b>	<b>540</b>		

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



**MODEL EMBEDMENT OF TOOL AND DIE MAKING  
IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

**Second Year**

**1<sup>st</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prerequisites	Units of Competency
Differential Calculus	4	0	4	72	Analytic Geometry, Solid Mensuration, Advance Algebra	
Physics 2	3	3	4	108	Physics 1	
English 3	3	0	3	54	English 2	> Participate in workplace communication <sup>(2)</sup> > Work in a team environment <sup>(2)</sup> > Practice career professionalism <sup>(2)</sup>
Computer Fundamentals and Programming	0	6	2	108	2nd Year Standing	
Social Science 1	3	0	3	54		
Humanities 1	3	0	3	54		
Workshop Theory and Practice II-A*	0	6	2	108		> Fit and assemble dies <sup>(5)</sup>
PE 3			2	36		
<b>TOTAL</b>	<b>16</b>	<b>15</b>	<b>23</b>	<b>594</b>		

**2<sup>nd</sup> Semester**

Higher Education Subjects					TVET MODULES	
Description of Subjects	Lec (Hrs)	Lab (Hrs)	Units	Hrs. / sem	Prereq	Units of Competency
Integral Calculus	4	0	4	72	Differential Calculus	
Basic Electrical Engineering	2	3	3	90	Physics 2	
Probability and Statistics	3	0	3	54	College Algebra	
Humanities 2	3	0	3	54		
Social Science 2	3	0	3	54		
Life and Works of Rizal	3	0	3	54		
Workshop Theory and Practice II-B*	0	6	2	108		> Test and try dies <sup>(5)</sup>
PE 4			2	36		
<b>TOTAL</b>	<b>18</b>	<b>9</b>	<b>23</b>	<b>522</b>		

**TOOL AND DIE NC II will be issued by the TESDA upon passing the certification process.**

**Note:** Workshop Theory and Practice I - A is equivalent to Workshop Theory for the regular BSME program, while Workshop Theory and Practice I B is an additional subjects intended for Tool and Die.

Legend: (1) Basic Competency NC I, (2) Basic Competency NC II, (3) Common Competency, (4) Core Competency NC I, (5) Core Competency NC II



## MODEL EMBEDMENT IN BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

### THIRD YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Computer Aided Drafting	0	3	1	54	
Environmental Engineering	2	0	2	36	
Differential Equations	3	0	3	54	
Machine Elements 1	2	3	3	90	
Thermodynamics 1	3	0	3	54	
Statics of Rigid Bodies	3	0	3		
Social Science 3	3	0	3	54	
Humanities 3	3	0	3	54	
<b>TOTAL</b>	<b>19</b>	<b>6</b>	<b>21</b>	<b>396</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Dynamics of Rigid Bodies	2	0	2	36	
Mechanics of Deformable Bodies	3	0	3	54	
Machine Elements 2	2	3	3	90	
Machine Shop Theory	0	6	2	108	
Basic Electronics	2	3	3	90	
Thermodynamics 2	3	0	3	54	
Fluid Mechanics	3	0	3	54	
Social Science 4	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>12</b>	<b>22</b>	<b>540</b>	

### FOURTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Materials Engineering	3	3	4	108	
ME Lab 1	0	6	2	36	
DC and AC Machinery	3	3	4	108	
Heat Transfer	2	0	2	36	
Machine Design 1	3	0	3	54	
Advance Engineering Mathematics for ME	3	0	3	54	
<b>TOTAL</b>	<b>17</b>	<b>12</b>	<b>21</b>	<b>450</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
ME Laboratory 2	0	6	2	108	
Fluid Machinery	3	0	3	54	
Combustion Engineering	2	0	2	36	
Engineering Economy	3	0	3	54	
Refrigeration Systems	3	0	3	54	
Machine Design 2	3	0	3	54	
Methods of Research for ME	1	0	1	18	
ME Elective 2	3	0	3	54	
<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>20</b>	<b>432</b>	

### FIFTH YEAR

#### 1st Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Air conditioning and Ventilation Systems	2	3	3	90	
Instrumentation and Control Engineering	2	3	3	90	
Safety Engineering for ME	2	0	2	36	
ME Laboratory 3	0	6	2	108	
Plant Visit/OJT	0	6	2	108	
Vibration Engineering	2	0	2	36	
Industrial Processes	2	0	2	36	
ME Project Study 1	0	3	1	54	
ME Elective 3	3	0	3	54	
<b>TOTAL</b>	<b>13</b>	<b>21</b>	<b>20</b>	<b>612</b>	

#### 2nd Semester

SUBJECT	LEC	LAB	UNITS	Hrs / Sem	Prereq
Industrial Plant Engineering	3	0	3	54	
ME Laws, Ethics, Code and Standards	3	0	3	54	
Power Plant Engineering	4	3	5	126	
ME Project Study 2	0	3	1	54	
Engineering Management	3	0	3	54	
ME Elective 4	3	0	3	54	
<b>TOTAL</b>	<b>16</b>	<b>6</b>	<b>18</b>	<b>396</b>	

