

**Course Templates\***  
*for*  
**B.TECH, BS and DUAL  
DEGREE Programs**

**\* The course templates for B.Tech and BS programmes have been revised and updated at Pingala for 2020-21-I for all departments except ECO and MTH. So for the latest templates, kindly visit Pingala.**

## Guidelines for understanding course templates

1. Each course template has been given a number (visible in the top right corner) as <DEPT><NO.> which may be referred to at any point in the UG Manual.
2. Every course template is followed by a list of minimum graduation requirements for the concerned degree / programme as well as a 'Remarks' section detailing particular department / programme constraints regarding courses / credit calculations. Students have flexibility in choosing electives as well as scheduling of courses between semesters keeping in mind these graduation requirements and specific department / programme constraints. At all times, STUDENTS ARE RESPONSIBLE FOR ENSURING COMPLETION OF MINIMUM GRADUATION REQUIREMENTS WITHIN THE GIVEN CONSTRAINTS.
3. Courses listed by specific number rather than only a category (HSS/ESO/SO) will be available in the specified semester. Students need to ensure that they register for these compulsory courses in the given semester to ensure fulfillment of graduation requirements.
4. ESO/SO courses are available in a range of 6 to 14 credits. If all ESO/SO courses are not specified by the department, then students need to choose ESO/SO courses so that their total ESO/SO course credits, including any ESO/SO courses specified by the department, total up to at least 40 credits. Students also need to ensure that their ESO/SO course choices include at least one course of each type.
5. Students are allowed to register for a maximum of 65 credits per semester. The total number of credits listed in the template at the bottom of each semester indicates only a possible range, based on suggested courses for the semester. Students are free to choose electives and/or extra courses that go beyond the suggested credits so long as they remain within the upper limit of 65 credits per semester.
6. Institute core (IC) credits for all B.Tech. and B.S. programmes is 124. A list detailing Institute core credit courses is attached as Appendix – 1.
7. Planning in advance to clear pre-requisites for courses in upcoming semesters is the sole responsibility of the student.
8. UGP-1 and UGP-4 are optional for all departments and are counted as extra credits. In any case, UGP-1 & UGP-4 shall not be counted towards DE/OE credits or graduation requirements for the 4-year UG programme.
9. If students are planning to register for a Dual Degree or Double Major programme, they are advised to plan well in advance (even before applying for the other programme), so that they can use their electives as well as extra credit opportunities in each semester effectively to register for the courses of the other programme and complete their degree in a timely fashion.
10. Course credits and Thesis credits mentioned under the dual degree templates are only for the M.Tech./ M.S. part of the programme. In addition to these credits, students are required

to follow and complete all the graduation requirements for the UG program in their parent department.

11. The UG Pre-Requisites listed in the dual degree template are additional requirements that are NOT counted towards the minimum credit requirement for the dual degree programme. Students are expected to use their UG elective slots and/or extra credit opportunities in each semester to fulfill these pre-requisites in a timely fashion.
12. Credits for the courses listed under 'Pre-Requisites' in the Double Major template are NOT counted towards the minimum graduation credit requirement for the Double Major. Students are expected to use their UG elective slots and/or extra credit opportunities in each semester to fulfill these pre-requisites in a timely fashion.
13. DE / PG / DE PG slots in the Double Major and Dual Degree templates are meant for courses in the second programme / department, not for courses from the students' parent department.
14. Upto 36 OE credits from the UG parent department's graduation requirements may be waived for Double Major and Dual Degree students so that these credits may be used to fulfill Double Major / Dual Degree requirements. These credits would then be counted as part of the minimum graduation requirement for the Double Major / Dual Degree, and not for the parent department UG programme.
15. For all programmes, the credit requirements listed below the templates are the MINIMUM graduation requirements. Students may exceed this requirement depending on the electives they choose and/or courses they take on the advice of the DUGC / Thesis Supervisor.

\*\*\*\*\*

### Institute core (IC) courses:

Sl. No.	Course No.	Course Title	Credits	Grade type
1.	CHM101A	CHEMISTRY LABORATORY	03	Letter grade
2.	CHM102A	GENERAL CHEMISTRY	08	Letter grade
3.	ESC101A	FUNDAMENTAL OF COMPUTING	14	Letter grade
4.	ESC201A	INTRODUCTION TO ELECTRONICS	14	Letter grade
5.	MTH101A	MATHEMATICS - I	11	Letter grade
6.	MTH102A	MATHEMATICS - II	11	Letter grade
7.	PHY101A	PHYSICS LABORATORY	03	Letter grade
8.	PHY102A	PHYSICS-I	11	Letter grade
9.	PHY103A	PHYSICS-II	11	Letter grade
10.	LIF101A	INTRODUCTION TO BIOLOGY	06	Letter grade
11.	TA101A	ENGINEERING GRAPHICS	09	Letter grade
12.	TA201A	MANUFACTURING PROCESSES - I	06	Letter grade
13.	TA202A	MANUFACTURING PROCESSES - II	06	Letter grade
14.	PE101A	MORNING EXERCISE	03	S/X
15.	PE102A	EVENING EXERCISE	03	S/X
16.	COM200	COMMUNICATION SKILLS: COMPOSITION	05	S/X
<b>Total Credits</b>			<b>124</b>	-

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## AEROSPACE ENGINEERING

B.TECH.					Template No. AE-1			
SEMESTER								
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C O U R S E S	MTH101A [11]	MTH102A [11]	ESC201A [14]/ HSS-2 (Level-1) [11]	HSS-2 (Level-1) [11]/ ESC201A [14]	AE311A [09]	AE341A [11]	AE441A [05]	AE462A [04]
	PHY102A [11]/ PHY103A [11]	PHY103A [11]/ PHY102A [11]	ESO/SO-1 ESO204A [11]	ESO/SO-3 ESO201A [11]	AE321A [09]	AE351A [05]	AE451A [05]	AE421A [03]
	PHY101A [03]/ CHM101A [03]	CHM101A [03]/ PHY101A [03]	ESO/SO-2 MSO202a[06] AND MSO203b [06]	ESO/SO-4 ESO202A [11]	AE331A [09]	AE361A [03]	AE461A [07]	HSS-5 (Level-2) [09] OE-4 [09]
	TA101A [09] + LIF101A [06]/ ESC101A [14]	ESC101A [14]/ TA101A [09] + LIF101A [06]	AE201A [05]	TA202A [06]/ TA201A [06]	HSS-3 (Level-2) [09]	AE322A [09]	AE401A [02]	OE-5 [09] DE-3 [09]
	ENG112A/HSS-1 (Level-1).[11]	CHM102A [08]	TA201A [06]/ TA202A [06]	AE211A [11]	OE-1 [09]	HSS-4 (Level-2) [09]	DE-1/ OE-3 [09]	OE-6 / UGP-3 [09] (AE472A)
	PE101A [03]	PE102A [03]	AE231A [06]/ ESO209A [08]*	AE251A [08]	UGP-1 [04] (AE371A) (Extra Credits)	OE-2 [09]	DE-2 [09]	UGP-4 (Extra Credits) (May be taken in the summer after 8 <sup>th</sup> semester)
	-	-	COM200A [05]	-	-	OE-3/ DE-1 [09]	UGP-2 [09] (AE471A)	-
	54	50	56 – 61	58/61	45/49	55	46	52

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 111	Credits
UGP-2	: 09	Credit
**Department Elective (DE)	: 27	Credits
Open Elective (OE)	: 54	Credits
ESO/ SO	: 45	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 419</b>	<b>Credits</b>

**Basket-A**

AE641A [09]
AE662A [09]
AE673A [09]
AE777A [09]

**REMARKS:**

- 1) \*AE231A may be replaced by ESO209A. In either case, these credits will be counted as part of the department compulsory credits.
- 2) \*\*At least 9 credits of DE must be taken from Basket-A.
- 3) OE credits may include 9 credits of UGP-3.
- 4) UGP-1 and UGP-4 are optional and do not count towards graduation requirements. UGP-4 may be taken as extra credits by a student in the summer after the 8<sup>th</sup> semester.
- 5) 09 credits of UGP-2 and upto 27 credits of OE may be waived from the minimum requirements for students opting for dual degree in AE itself.
- 6) Upto 36 OE credits may be waived for students opting either for Dual Degree in another department or the Double Major programme.

BT-MT (PG Part – Category – A) (from the same department)			Template No. AE-2	
C O U R S E S	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
	DE PG-1 [09]	DE PG-4 [09]	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	DE PG-2 [09]	DE PG-5 [09]	-	-
	DE PG-3 [09]	DE PG-6 [09]		
	27	27	36	36

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 54 Credits

Thesis Component : 72 Credits

**REMARKS:**

- 1) DE PG-1 may be taken instead of UGP-2 in the BT programme.
- 2) Upto 27 OE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements.
- 3) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme EXCEPT for credit waivers detailed above.
- 4) All courses to be taken with the permission of Supervisor/ DUGC Convener.

BS/BT-MT (Category – B) (from other departments)			Template No. AE-3		
	UG Pre-Requisites	PG Component			
		7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
C O U R S E S	ESO201A [11]				
	ESO202A [11]	AE601A [09]	DE PG-3 [09]	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	ESO204A [11]	DE PG-1 [09]	DE PG-4 [09]	DE PG-6 [09]	-
	ESO209A [08]	DE PG-2 [09]	DE PG-5 [09]	-	-
	41	27	27	45	36

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 63 Credits  
 Thesis Component : 72 Credits

**REMARKS:**

- 1) AE offers M.Tech. in four streams: Aerodynamics, Propulsion, Structure, and Flight Mechanics. All DE PG course choices will depend upon the chosen stream.
- 2) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 3) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT/BS-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.



DOUBLE MAJOR		Template No. AE-4
C O U R S E S	Odd Semester	Even Semester
		Pre-Requisites
	ESO204A [11] / ME231A [09] / CHE211A [09]*	
	ESO201A [11] / CHE221 [09]*	
	ESO202A [11]	
	33	
	AE Mandatory Courses	
	AE231A [06]**	AE211A [11]
	AE311A [09]	AE251A [08]
	AE321A [09]	AE341A [11]
	AE331A [09]	AE351A [05]
	AE441A [05]	AE322A [09]
	AE451A [05]	AE462A [04]
	AE461A [07]	
	50**	48

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN AEROSPACE ENGINEERING:** 98 CREDITS (\*\*may vary depending on credits of course found equivalent for AE231A)

**REMARKS:**

- 1) \*Other equivalent courses for these pre-requisites may be decided in consultation with the AE DUGC.
- 2) \*\*AE231A may be substituted by ME353 / CE455 / ESO209 or other equivalent course in consultation with the AE DUGC. If an equivalent course is found, its credits will replace the credits for AE231A.
- 3) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

MINOR		Template No.AE-5
Title AEROSPACE ENGINEERING		
C O U R S E S	AE201A [05]	
	Any THREE from:	
	AE211A [11]	
	AE321A [09]	
	AE331A [09]	
	AE650A [09]/AE753A [09]/AE341 [11]	
	32-36	

**BIOLOGICAL SCIENCES AND BIO-ENGINEERING**

BT				Template No. BSBE-1				
C	SEMESTER							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
O	MTH101A [11]	MTH102A [11]	BSE211A [09]	BSE221A [09]	BSE311A [09]	BSE321A [10]	BSE411A [11]	BSE421A [11]
O	PHY101A [03]	PHY103A [11]	ESC201A [14]	BSE222A [09]	BSE312A [09]	BSE322A [10]	BSE412A [09]	HSS-5 (Level-2) [09]
U	PHY102A [11]	ESC101A [14]	TA201A [06]	BSE223A [09]	BSE301A [02]	OE-2 [09]	OE-4 [09]	DE-3 [09]
U	LIF101A [06]	CHM101A [03]	ESO-1 [09] (ESO206A)	HSS-2 (Level-1) [11]	HSS-3 (Level-2) [09]	HSS-4 (Level-2) [09]	OE-5 [09]	DE-4 [09]
R	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	ESO-2 [~10]*	TA202A [06]	OE-1 [09]	OE-3 [09]	DE-2/UGP-3 [09] (BSE498A)	OE-6 [09]
S	PE101A [03]	PE102A [03]	-	SO-1 [11] (MSO201A)	ESO-3 [~10]*	DE-1/UGP-2 [09] (BSE399A)	-	UGP-4 [09] (BSE499A) (Extra Credits)
E	TA101A [09]	-	-	COM200A [05]	UGP-1 [04] (BSE398A) (Extra Credits)	-	-	-
S								
	54	50	48*	60	48 – 52*	56	47	47/56

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	:	124	Credits
Department Compulsory (DC)	:	107	Credits
Department Elective (DE)	:	36	Credits
Open Elective (OE)	:	54	Credits
*SO/ ESO	:	40	Credits
HSS (Level-I)	:	22	Credits
HSS (Level-II)	:	27	Credits
Total	:	410	Credits

**REMARKS:**

- 1) \*ESO/SO courses are available in a range from 6 to 14 credits each. Students may choose any ESO/SO courses in open ESO/SO slots to ensure that their 4-course ESO/SO totals up to 40 credits.
- 2) DE credits may include 18 credits of UGP-2 and UGP-3.
- 3) UGP-1 and UGP-4 are optional and do not count towards DE/OE credits.
- 4) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.
- 5) For students opting for the BT/MT dual degree programme under category A, BSE498A and BSE499A are mandatory.

BT-MT (Category – A) (from the same department)			Template No. BSBE-2			
C O U R S E S	Mandatory UG Component		PG Component			
	Odd Semester	Even Semester	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
	BSE498A [09]	BSE499A [09]	DE PG-1 [09]	DE PG-3 [09]	BSE702A/BSE701A [0]	M.Tech. Thesis [36]
	-	-	DE PG-2 [09]	DE PG-4 [09]	M.Tech. Thesis [36]	-
			BSE601A [0]	BSE701A/BSE702A [0]	-	
		-	BSE602A [0]			
09	09	18	18	36	36	

**MINIMUM CREDIT REQUIREMENT IN MT PART FOR GRADUATION:**

PG Component : 36 Credits  
 Thesis : 72 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) For students opting for the BT/MT dual degree programme under category A, BSE498A and BSE499A are mandatory.
- 3) BSE701A and BSE702A (seminar courses) are mandatory.
- 4) BSE601A (Communications course) and BSE602A (Laboratory course) are mandatory.
- 5) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 6) Upto 36 OE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements.

BS/BT-MT (Category – B) (from other departments)				Template No. BSBE-3		
C O U R S E S	UG Pre-Requisites		PG Component			
	Odd Semester	Even Semester	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
	ESO206A [09]	BSE221A [09]	BSE611A [09]	DE PG [09]*	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	BSE211A [09]	-	BSE613A [09]	BSE701A/BSE702A [0]	BSE702A/BSE701A [0]	-
	BSE311A [09]		BSE632A [09]	BSE602A [0]	-	
		BSE633A [09]				
		BSE601A [0]				
	27	09	36	09	36	36

**MINIMUM CREDIT REQUIREMENT IN MT PART FOR GRADUATION:**

PG Component : 45 Credits  
Thesis : 72 Credits

**Basket – A**

BSE629A [09]  
BSE630A [09]  
BSE631A [09]  
BSE636A [09]  
BSE638A [09]

**REMARKS:**

- 1) \*DE PG should be selected from Basket A
- 2) BSE701A and BSE702A (seminar courses) are mandatory
- 3) BSE601A (Communications course) and BSE602A (Laboratory course) are mandatory.
- 4) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 5) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.
- 6) All courses to be taken with the permission of Supervisor/ DUGC Convener.

<b>DOUBLE MAJOR</b>	<b>Template No. BSBE-4</b>
<b>Odd Semester</b>	<b>Even Semester</b>
<b>Pre-Requisites</b>	
ESO206A [09]	
<b>Mandatory BSBE Courses</b>	
BSE211A [09]	BSE221 [09]
BSE301A [02]	BSE222 [09]
BSE311A [09]	BSE223 [09]
BSE312A [09]	BSE321A [10]
BSE411A [11]	BSE322A [10]
BSE412A [11]	BSE421A [11]
51	58

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN BSBE: 109 CREDITS**

**REMARKS:**

- 1) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

<b>MINOR</b>	<b>Template No. BSBE-5</b>
<b>Title</b>	<b>TISSUE ENGINEERING</b>
<b>C</b>	BSE211A [09]
<b>O</b>	BSE411A [11]
<b>U</b>	BSE421A [11]
<b>R</b>	
<b>S</b>	
<b>E</b>	
<b>S</b>	
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# AP-157

Senate/Agenda/2015-16/1st/02.9.2015/ATR

Revised Template

## CHEMICAL ENGINEERING

BT		Template No. CHE-1												
		SEMESTER												
C	O	U	R	S	E	S	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
							MTH101A [11]	CHM102A [08]	CHE251A [09]	ESC201A [14]	CHE312A [09]	CHE331A [09]	CHE453A [11]	HSS-5 (Level-2) [09]
							ESC101A [14]	MTH102A [11]	TA202A [06]	TA201A [06]	CHE313A [09]	CHE381A [11]	CHE492A [08]	OE-5 [09]
							CHM101A [03]	LIF101A [06]	HSS-2 (Level-1) [11]	COM200A [05]	CHE352A [05]	CHE391A [08]	OE-3 [09]	OE-6 [09]
							PHY103A [11]	PHY101A [03]	ESO-1 [11]	SO-1 [11]	ESO-3 [14]	HSS-4 (Level-2) [09]	OE-4 [09]	DE-3 [09]
							PE101A [03]	PHY102A [11]	(ESO201A)	(CSO201A/CSO202A)	(ESO205A)			
							ENG112A/ HSS-1 (Level-1) [11]	TA101A [09]	ESO-2 [11]	CHE211A [09]	HSS-3 (Level-2) [09]	UGP-2/DE-1 [09]	UGP-3/DE-2 [09]	DE-4 [09]
								PE102A [03]	(ESO208A)	CHE221A [09]	CHE300A [02]	(CHE398A)	(CHE497A)	
										CHE261A [06]	OE-1 [09]	OE-2 [09]	DE-M2 [05]	UGP-4 [09]
											UGP-1 [04]		(Optional)	(CHE498A)
											(CHE349A)			(Extra Credits)
											(Extra Credits)			
											DE-M1 [05]			
											(Optional)			
							53	51	48	60	57 – 66	55	46/51	45/54

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 105	Credits
Department Elective (DE)	: 36	Credits
Open Elective (OE)	: 54	Credits
SO/ ESO	: 47	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 415</b>	<b>Credits</b>

**REMARKS:**

- 1) DE M1 & M2 are Modular Courses which are optional summer training and may count towards DE credits.
- 2) DE credits may include 18 credits from UGP-2 and UGP-3.
- 3) UGP-1 and UGP-4 are optional and do not count towards DE/OE credits.
- 4) Upto 18 DE credits may be waived from the minimum requirements for students opting for Dual Degree in Chemical Engineering itself.
- 5) Upto 36 OE credits may be waived from the minimum requirements for students opting for Dual Degree in another department or the Double Major programme.

# AP-158

Senate/Agenda/2015-16/1st/02.9.2015/ATR

BT-MT (PG Part – Category – A) (from the same department)					Template No. CHE-2
C O U R S E S	PG Component				
	7 <sup>th</sup>	8 <sup>th</sup>	SUMMER	9 <sup>th</sup>	10 <sup>th</sup>
	CHE701A [0]	CHE702A [0]	M.Tech. Thesis [09] (CHE699A) (if required)	M.Tech. Thesis [09] (CHE699A) / DE/OE PG [09] (if required)	M.Tech. Thesis [36] (CHE699A)
	OE PG-1 [09]	M.Tech. Thesis [09] (CHE699A) / DE PG-1 [09]		M. Tech. Thesis [27]	
	OE PG-2 [09]	DE PG-2 [09]			
		OE PG-3 [09]			
	OE PG-4 [09]				
	M.Tech. Thesis [09]				
18	45	09	36	36	

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 54 Credits  
Thesis : 81 Credits

**Basket - A**

CHE611A [09]  
CHE621A [09]  
CHE631A [09]  
CHE641A [09]

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) DE PG 1 & 2 should be selected from Basket – A.
- 3) CHE701A and CHE702A (seminar courses) are mandatory.
- 4) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 5) 18 DE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements.
- 6) Upto 36 OE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements.



# AP-159

Senate/Agenda/2015-16/1st/02.9.2015/ATR

BS/BT-MT (Category – B) (from other departments)			Template No. CHE-3				
C O U R S E S	UG Pre-Requisites		PG Component				
	Odd Semester	Even Semester	7 <sup>th</sup>	8 <sup>th</sup>	SUMMER	9 <sup>th</sup>	10 <sup>th</sup>
	ESO204A [11]/ CHE211A [09]*	CHE331A [09]	CHE701A [0] CHE702A [0] DE PG-1 [09], DE PG-2 [09] CHE611A [09], DE PG-3 [09] CHE621A [09]	M.Tech. Thesis [09] (CHE699A) (if required)	M.Tech. Thesis [36] (CHE699A)	M.Tech. Thesis [09] (CHE699A) (if required)	M.Tech. Thesis [27] (CHE699A)
ESO201A [11]/ CHE221A [09]*		CHE631A [09]/ CHE633A [09] M.Tech. Thesis [09] (CHE699A)					
18/22	09	63	09	36	36	36	36

**MINIMUM CREDIT REQUIREMENT IN MT PART FOR GRADUATION:**

PG Component : 54 Credits  
Thesis : 81 Credits

**REMARKS:**

- 1) \*The ESO courses may be substituted by the CHE courses only with permission of the CHE DUGC convener.
- 2) CHE701A and CHE702A (seminar courses) are mandatory.
- 3) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 4) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 5) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.

# AP-159-A

Senate/Agenda/ 2015-16/1st/02.9.2015/ATR

DOUBLE MAJOR		Template No. CHE-4
Odd Semester	Even Semester	
Pre-Requisites		
ESO201A [11]	CSO201A [11]/ CSO202A [11]	
ESO208A [11]		
ESO205A [14]		
Mandatory CHE Courses		
CHE251A [09]	CHE211A [09]	
CHE312A [09]	CHE221A [09]	
CHE313A [09]	CHE261A [06]	
CHE352A [05]	CHE331A [09]	
CHE453A [11]	CHE381A [11]	
CHE492A [08]	CHE391A [08]	
51	52	

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN CHEMICAL ENGINEERING: 103 CREDITS**

**REMARKS:**

- 1) Depending on overlap with course contents of parent department, some equivalent CHE courses may be waived on a case-to-case basis.
- 2) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

MINOR		Template No. CHE-5
Title	CHEMICAL ENGINEERING	
C	CHE251A [09]	
O	CHE261A [09]	
U	CHE313A [09]	
R	CHE331A [09]	
S		
E		
S		
	36	

## CIVIL ENGINEERING

B.TECH.				Template No. CE-1				
C O U R S E S	SEMESTER							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
	MTH101A [11]	MTH102A [11]	CE241 [09]	CE242 [11]		CE352A [07]		
					CE311 [12]		CE441b [05]	DE-B [09]
	PHY103A [11]	PHY102A [11]	ESO-1 [11] (ESO202A)	CE262A [08]	CE331A [11]	CE372A [06]		OE-4 [09]
	CHM101A [03]	PHY101A [03]	ESO-2 [11] (ESO204A)	CE272 [09]	CE351A [08]	CE382 [09]	DE-A [11]	HSS-5 (Level-2) [09]
	LIF101A [06]	ESC101A [14]	HSS-2 (Level-1) [11]		CE361A [06]	HSS-3 (Level-2) [09]	HSS-4 (Level-2) [09]	OE-5 [09]
	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	SO-1 [06] (MSO203B)	ESC201A [14]	CE371A [06]	OE-1 [09]		OE-6 [09]
	PE101A [03]	PE102A [03]	TA202A [06]	SO-2 [11] (MSO201A)	ESO-3 [11] (ESO208A)	DE-A [11]	OE-2 [09]	UGP-4 [09] (CE493A) (extra credit)
	TA101A [09]	-	COM200 [05]	TA201A [06]	CE341A [02]	UGP-1 [04] (CE332A) (Extra Credits)	OE-3 [09]	
	54	50	59	59	56	51 – 55	52	45 – 54

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 109	Credits
*Department Elective (DE)	: 40	Credits
Open Elective (OE)	: 54	Credits
SO/ ESO	: 50	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 426</b>	<b>Credits</b>

**BASKET – A**

CE412 [11]  
CE451 [11]  
CE462 [11]  
CE471 [11]  
CE481 [11]  
CE432A [11]

**BASKET – B\*\***

CE491 [09]  
CE492 [09]  
CE605 [05]  
CE606 [05]

**REMARKS:**

- 1) \*Students need to ensure that the four courses chosen as DE include a minimum of 22 credits from Basket-A, and total to a minimum of 40 credits. Students opting for the dual degree programme within CE have to do a minimum of 31 credits of DE, which should include minimum 22 credits from Basket A.
- 2) \*\*The DE-B basket may also contain departmental PG courses that may be offered as DE-B from time to time. Students opting for the dual degree programme within CE are allowed to take CE491 or CE492 as DEs from Basket B or as OE.
- 3) UGP-1 and UGP-4 do not count towards DE/OE credits or minimum graduation requirements.
- 4) Upto 45 OE credits and 09 DE credits may be waived from the minimum requirements for students opting for the dual degree programme within CE.
- 5) Upto 36 OE credits may be waived from the minimum requirements for students opting for dual degree in another department or the Double Major programme

"Eligible and interested students can take CE332A as UGP-I, CE491A as UGP-2, CE492A as UGP-3 and CE493A as UGP-4. B.Tech students can take CE491A and CE492A as DE-B only. Dual degree students can take CE491A and CE492A as either DE-B or OE. CE332A (UGP-I) and CE493A (UGP-4) are for extra credits and do not count for DE or OE credits required for graduation"

BT-MT (PG Part – Category – A) (from the same department)				Template No. CE-2
Sl. No.	Specialization	Compulsory Course Credits	Elective Credits	Thesis Credits
1.	ENVIRONMENTAL ENGINEERING	None	63 Credits	M.Tech. Thesis [72]
2.	GEOINFORMATICS	None	63 Credits	M.Tech. Thesis [72]
3.	GEOTECHNICAL ENGINEERING	None	63 Credits	M.Tech. Thesis [72]
4.	HYDRAULICS AND WATER RESOURCES	None	63 Credits	M.Tech. Thesis [72]
5.	STRUCTURAL ENGINEERING	None	63 Credits	M.Tech. Thesis [72]
6.	TRANSPORTATION ENGINEERING	None	63 Credits	M.Tech. Thesis [72]
7.	INTERDISCIPLINARY	To be decided by advisor(s).	-63 Credits	M.Tech. Thesis [72]

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Coursework : 63 Credits  
 Thesis Component : 72 Credits

**REMARKS:**

- 1) Upto one PG course may be replaced with a UG course on advice of the thesis supervisor.
- 2) Upto 45 OE credits and 09 DE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements. All other BT requirements have to be fulfilled as per the CE BT template.
- 3) Students opting for the dual degree programme within CE are allowed to take CE491 and/or CE492 as DE from Basket B or as OE.
- 4) There are no compulsory courses.

BT-MT (Category – B) (from other departments)						Template No. CE-3
Sl. No.	Specialization	Eligible BT/BS Background	Compulsory Courses		Elective Credits	Thesis Credits
			UG Pre-Requisites	PG Courses		
1.	ENVIRONMENTAL ENGINEERING	BSBE, CHE, CHM, ECO, ME, MME, MTH, PHY	-	CE664A CE665A CE666A CE667A CE668A	Compulsory + Elective Credits = 63	M.Tech. Thesis [72]
2.	GEOINFORMATICS	CSE, MTH, PHY	CE331A	CE671A CE677A	Compulsory + Elective Credits = 63	M.Tech. Thesis [72]
3.	HYDRAULICS AND WATER RESOURCES	AE, CHE, ME	-	CE610A CE611A CE612A CE613A	Compulsory + Elective Credits = 63	M.Tech. Thesis [72]
4.	TRANSPORTATION ENGINEERING	AE, ECO*, ME, MTH*, PHY*	ESO202A*  *ECO, MTH, PHY students	CE682A OR CE481A CE683A CE689A OR CE688A CE690A	Compulsory + Elective Credits = 63	M.Tech. Thesis [72]
5.	INTERDISCIPLINARY	-	To be decided by advisor(s).			M.Tech. Thesis [72]

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 63 Credits (common for all specializations)

Thesis Component : 72 Credits (common for all specializations)

**Remarks:**

- 1) Up to 2 UG courses may be taken for PG credit (including the optional PG-8) on advice of the thesis supervisor.
- 2) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.

C O U R S E S	<b>DOUBLE MAJOR</b>	Template No. <b>CE-4</b>
	<b>Odd Semester</b>	<b>Even Semester</b>
	<b>Pre-Requisites</b>	
	<b>ESO204A/ ME231 [11]</b>	
	<b>ESO202A [11]</b>	
	<b>22</b>	
	<b>MANDATORY CE COURSES</b>	
	<b>CE311A [12]</b>	<b>CE242A [11]</b>
	<b>CE241A [09]</b>	<b>CE262A [08]</b>
	<b>CE331A [11]</b>	<b>CE272A [09]</b>
	<b>CE351A [08]</b>	<b>CE352A [07]</b>
	<b>CE361A [06]</b>	<b>CE372A [06]</b>
	<b>CE371A [06]</b>	<b>CE382A [09]</b>
	<b>CE DE-A [11]</b>	<b>CE DE-A [11]</b>
<b>63</b>	<b>61</b>	

**MIMINUM CREDIT REQUIREMENT FOR SECOND MAJOR IN CIVIL ENGINEERING:** 124 CREDITS

**REMARKS:**

- 1) Both DE should be selected from Basket-A (Details of Basket-A are available in CE B.Tech. template)
- 2) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

<b>MINOR*</b>	Template No. <b>CE-5</b>
<b>Title</b>	<b>Infrastructure Engineering and Management</b>
C O U R S E S	<b>CE241 [09] [odd semester]</b>
	<b>CE640 [06] [odd semester]</b>
	<b>CE641a [05] [odd semester]</b>
	<b>CE643a [05] or CE644a [05] [even semester]</b>
	<b>CE667a [05] [even semester]</b>
-	

## COMPUTER SCIENCE & ENGINEERING

B.TECH.					Template No. CSE-1			
C O U R S E S	SEMESTER							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
	MTH101A [11]	MTH102A [11]	CS201A [09]	ESO207A [12]*	CS330A [12]	CS335A [13]	DE-4 [09]	DE-5 [09]
	PHY103A [11]	PHY102A [11]	CS202A + CS203B [10]	CS220A [12]	CS340A [09]	UGP-2/DE-1/OE-1 (CS396A) [09]	UGP-3/DE-1/OE-1 (CS498A) [09]	OE-4 [09]
	CHM101A [03]	PHY101A [03]	SO/ESO [~10]*	CS251A [06]	CS345A [09]	DE-2 [09]	OE-2 [09]	OE-5 [09]
	ESC101A [14]	LIF101A [06]	ESC201A [14]	SO [11]* (MSO201A)	CS300A [02]	DE-3 [09]	OE-3 [09]	OE-6 [09]
	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	COM200A [05]	HSS-2 (Level-1) [11]	CS252A [06]	HSS-3 (Level-2) [09]	HSS-4 (Level-2) [09]	HSS-5 (Level-2) [09]
	PE101A [03]	PE102A [03]	TA201A [06]	TA202A [06]	SO/ESO [~10]*	-	-	UGP-4 [09] (CS499) (extra credits)
	-	TA101A [09]	-	-	UGP-1 [04] (CS395A) (extra credits)	-	-	-
	<b>53</b>	<b>51</b>	<b>54*</b>	<b>58</b>	<b>48/52*</b>	<b>49</b>	<b>45</b>	<b>45/54</b>

### MINIMUM CREDIT REQUIREMENT FOR GRADUATION:

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 88	Credits
Department Elective (DE)	: 45	Credits
Open Elective (OE)	: 54	Credits
*SO/ ESO	: 40	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 400</b>	<b>Credits</b>

### BASKET – A

CS315A [09]
CS350A [09]
CS360A [09]
CS771A [09]
CS422A [09]
CS425A [09]
CS433A [09]
CS455A [09]

### REMARKS:

- 1) \* The 10 credits shown against each ESO/SO in the template are only indicative. ESO/SO courses are available in 6-14 credits each. Students need to ensure that their total ESO/SO credits total up to AT LEAST 40. ESO207A is compulsory for CSE students in the 4th semester.
- 2) UGP-2 (CS396A) & UGP-3 (CS498A) are optional but if taken, one may be counted as DE and the other as OE.
- 3) At least 2 DEs must be selected from Basket – A.
- 4) UGP-1 and UGP-4 (CS395A & CS499A) are optional and do not count towards DE/OE credits.
- 5) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.

BT-MT (PG Part – Category – A) (from the same department)				Template No. CSE-2		
C O U R S E S	SEMESTER					
	1 <sup>st</sup> to 6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	SUMMER	9 <sup>th</sup>	10 <sup>th</sup>
	COURSES SAME AS B.TECH. TEMPLATE	DE PG-1 [09]	DE PG-3 [09]	M.Tech. Thesis [09]	DE PG-6 [09]	M.Tech. Thesis [36]
		DE PG-2 [09]	DE PG-4 [09]	-	M.Tech. Thesis [27]	-
		-	DE PG-5 [09]	-	-	-
-		M.Tech. Thesis [09]	-	-	-	
	18	36	09	36	36	

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 54 Credits

Thesis Component : 81 Credits

**REMARKS:**

- 1) Upto 36 OE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements. All other minimum BT credit requirements need to be fulfilled, including those that are slotted in the 7<sup>th</sup> and 8<sup>th</sup> semester of the BT template.



<b>DOUBLE MAJOR</b>		<b>Template No. CSE-3</b>
<b>C</b>	<b>Odd Semester</b>	<b>Even Semester</b>
<b>O</b>	<b>CS202A + CS203A [10]</b>	<b>CS220A [12]</b>
<b>U</b>	<b>CS330A [12]</b>	<b>CS335A [13]</b>
	<b>CS340A [09]</b>	<b>CS251A [06]</b>
<b>R</b>	<b>CS345A [09]</b>	<b>CS DE-1 [09]</b>
	<b>CS252A [06]</b>	<b>CS DE-4 [09]</b>
<b>S</b>	<b>CS DE-2 [09]</b>	-
	<b>CS DE-3 [09]</b>	
<b>E</b>	-	
<b>S</b>	<b>64</b>	<b>49*</b>

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN COMPUTER SCIENCE: 113\* CREDITS**

**REMARKS:**

- 1) Two DEs should be selected from Basket-A (Details of Basket-A are available in CSE B.Tech. template).
- 2) Total CSE-DE credits should be at least 36.
- 3) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.
- 4) \*ESO207 is a compulsory course to be done, but its credits will be counted against the ESO requirement of the first major.

MINOR			Template No. CSE-4	
Title	ALGORITHMS	COMPUTER SYSTEMS	THEORY OF COMPUTING	ARTIFICIAL INTELLIGENCE
C	ESO207A [12] *	ESO207A [12] *	ESO207A [12] *	ESO207A [12] *
	CS345A [09]		CS340A [09]	CS365A [09]
O	Any ONE from:	Any TWO from:	Any ONE from:	Any ONE from:
U	CS645A [09]	CS220A [12]	CS640A [09]	CS671A [09]
R	CS646A [09]	CS330A [12]	CS641A [09]	CS672A [09]
S	CS647A [09]	CS315A [09]	CS642A [09]	CS674A [09]
E	CS648A [09]	CS335A [12]	CS643A [09]	CS675A [09]
S	CS663A [09]	CS422A [09]	CS644A [09]	CS676A [09]
	CS664A [09]	CS425A [09]	CS649A [09]	CS678A [09]
	CS719A [09]	CS433A [09]	CS680A [09]	CS679A [09]
	CS743A [09]	CS455A [09]	CS681A [09]	CS685A [09]
			CS687A [09]	CS686A [09]
			CS740A [09]	CS771A [09]
			CS741A [09]	CS772A [09]
			CS742A [09]	CS773A [09]
				CS774A [09]
				CS782A [09]

**REMARKS:**

- 1) For each Minor stream, the minimum total credit requirement is 30.
- 2) In each minor stream any related course(s), even if not mentioned in the list of optional courses, may be taken as optional with the permission of the CSE DUGC.
- 3) \*CS210 and ESO207 may be considered equivalent when used as course prerequisite for another course.

**ELECTRICAL ENGINEERING**

B.TECH.					Template No. EE-1			
C O U R S E	SEMESTER							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
	MTH101A [11]	MTH102A [11]	COM200 [05]	EE210A [11]	EE320A [11]	DE-1 [09]**	HSS-4 (Level-2) [09]	DE-3 [09]
	PHY101A [03]	PHY103A [11]	EE200A [11]	EE250A [11]	EE330A [11]	DE-2 [09]**	OE-2 [09]	DE-4 [09]
	PHY102A [11]	CHM101A [03]	ESC201A [14]	ESO203A [13]	EE370A [11]	EE340A [11]	OE-3 [09]	HSS-5 (Level-2) [09]
	LIF101A [06]	ESC101A [14]	ESO/SO [8]*	HSS-2 (Level-1) [11]	EE380A (Lab) [12]	EE381A [12]	OE-4 [09]	OE-5 [09]
	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	SO-1 [06] (MSO202A)	SO-3 [11] MSO201A	OE-1 [09]	HSS-3 (Level 2) [09]	OE/DE/UGP-3 (EE491A) [09]	OE-6 [09]
	PE101A [03]	PE102A [03]	SO-2 [06] (MSO203B)	TA202A [06]	EE390A [02]	OE/DE/UGP-2 (EE392A) [09]	-	UGP-4 [09] (EE492A) (Extra Credits)
	TA101A [09]	-	TA201A [06]	-	UGP-1 [04] (EE391A) (Extra Credits)	-	-	-
	54	50	56*	63	56/60	59	45	45/54

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	:	124	Credits
Department Compulsory (DC)	:	103	Credits
**Department Elective (DE)	:	36	Credits
Open Elective (OE)	:	54	Credits
*UGP2-3/DE/OE	:	18	Credits
*ESO/ SO	:	44	Credits
HSS (Level-I)	:	22	Credits
HSS (Level-II)	:	27	Credits
<b>Total</b>	:	<b>428</b>	<b>Credits</b>

**Basket – A**  
 EE311A [09]  
 EE321A [09]  
 EE360A [09]  
 EE301A [09]

**REMARKS:**

- \*The open ESO/SO slot may be filled by any ESO/SO course of 8 credits or more.
- \*\*DE-1 and DE-2 (both) should be selected from Basket-A.
- \*Out of the 18 credits for UGP-2 and UGP-3, only 09 credits may be added as OE credits (where the other 09 may be added as DE credits) OR all 18 credits may be added as DE credits.
- UGP-1 & UGP-4 are optional and do not count towards degree requirements.
- UGP-1, 2, 3 and 4 (EE391A, EE392A, EE491A and EE492A) may be taken in any order from the 5<sup>th</sup> to 8<sup>th</sup> semester.
- Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.

BT-MT (PG Part – Category A) (from the same department)					Template No.EE-2
C O U R S E S	7 <sup>th</sup>	8 <sup>th</sup>	SUMMER	9 <sup>th</sup>	10 <sup>th</sup>
	DE PG-1 [09]	PG-3 [09]	M.Tech. Thesis [09] (EE699A)	PG-6 [09]	M.Tech. Thesis [36] (EE699A)
	DE PG-2 [09]	PG-4 [09]	-	M.Tech. Thesis [27] (EE699A)	-
		PG-5 [09]			
	18	27	09	36	36

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 54 Credits

Thesis Component : 72 Credits

**REMARKS:**

- 1) In the 7<sup>th</sup> semester, in addition to the courses listed above for the PG requirement, students will be expected to complete their UG requirements by taking HSS-4 (level 2), OE-2 and OE-3 (total of 27 credits). In the 8<sup>th</sup> semester, in addition to the courses listed above for the PG requirements, students will be expected to complete their UG requirements by taking HSS-5 (level 2), DE-3 and OE-5 (total of 27 credits).
- 2) BT-MT students are NOT permitted to take EE491A (UGP-3) and EE492A (UGP-4) as part of their UG curriculum.
- 3) Upto 36 credits (from a combination of OE, DE, UGP2-3/DE/OE credits as listed in the BT template minimum requirements) may be used to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements. The total minimum BT-MT dual degree (category A) credit requirement will be 518.
- 4) PG-3, 4, 5 & 6 are to be taken with the permission of thesis supervisor.

DOUBLE MAJOR		Template No. EE-3
C O U R S E S	Odd Semester	Even Semester
	Pre-Requisites	
	ESO203A [13]	MSO201A [11]
	MSO202a [06]	
	MSO203b [06]	
	Mandatory EE Courses	
	EE200A [11]	EE210 / EE250 [11]
	EE320A [11]	Any ONE combination from Basket – B [33-41]
	EE330A [11]	EE DE PG [09] (optional)
	EE370A [11]	-
	EE380A [12]/ EE480A [10]	
	EE DE PG [09] / EE391A [04] / EE492A [09] (Optional)	
-		
54-65	44-61	

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN ELECTRICAL ENGINEERING: 98 CREDITS**

**REMARKS:**

- 1) All PG courses should be taken in consultation with the EE DUGC.
- 2) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

**Basket – A**

EE321A [09]  
EE301A [09]  
EE340A [11]  
EE311A [09]  
EE360A [09]  
EE381 [12]/  
EE481 [06]

**Basket – B**

1. 3 PG Courses + 1 Course from Basket – A
2. 2 PG Courses + 2 Courses from Basket – A
3. 1 PG Course + 3 Courses from Basket – A
4. 1 PG Course + 2 Course from Basket – A  
+ UGP-3 (EE491A)
5. 2 PG Courses + 1 Course from Basket – A  
+ UGP-3 (EE491A)

MINOR			Template No.EE-4		
Title	MICROELECTRONICS/ DIGITAL SYSTEMS	POWER	COMMUNICATIONS & SIGNAL PROCESSING	CONTROLS	RF & PHOTONICS
C O U R S E S	EE200A [11]	EE200A [11]	EE200A [11]	EE200A [11]	EE200A [11]
	EE210A [11]	EE330A [11]	EE320A [11]	EE250A [11]	EE340A [11]
	EE311A [09]/ EE370A [11]	EE360A [09]	EE321A [09]/ EE301A [09]	EE650A [09]	EE612A [09]/ EE642A [09]/ EE648A [09]
	31/33	31	31	31	31

## INDUSTRIAL AND MANAGEMENT ENGINEERING

BT/BS-MT (Category – B) (from other department)			Template No. IME-1		
C O U R S E S	UG Requirements	PG Requirements			
	1 <sup>st</sup> to 6 <sup>th</sup>	7 <sup>th</sup> and 8 <sup>th</sup>	Summer	9 <sup>th</sup>	10 <sup>th</sup>
	MSO201A [11]	DE PG-1 [09]* DE PG-2 [09]* DE PG-3 [09]* DE PG-4 [09]* DE PG-5 [09]* -	IME697A [0]	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	45	0	36	36	

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 45 Credits  
 Thesis Component : 72 Credits  
 Summer Internship : 0 Credits

**REMARKS:**

- 1) \*The five DE PG courses should be selected from Basket – A. However, a student may be asked to take some MBA courses instead of IME courses as deemed fit by the IME DUGC and required by the thesis supervisor.
- 2) IME697A (summer internship) is mandatory.
- 3) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.

**Basket – A**

IME604A [09]  
 IME611A [09]  
 IME624A [09]  
 IME625A [09]  
 IME630A [09]  
 IME633A [09]  
 IME634A [09]  
 IME641A [09]  
 IME648A [09]  
 IME681A [09]  
 IME684A [09]  
 IME692A [09]

BT/BS – MBA (PG Part – Category C) (from other departments)			Template No. IME-2	
C O U R S E S	SEMESTER			
	7 <sup>th</sup> and 8 <sup>th</sup>	Summer	9 <sup>th</sup>	10 <sup>th</sup>
	MBA601A [09]	MBA697 [0]	MBA699A-I [09]	MBA699A-II [09]
	DE MBA-1 [09]*		DE MBA-6 [09]	DE MBA-11 [09]
	DE MBA-2 [09]*		DE MBA-7 [09]	DE MBA-12 [09]
	DE MBA-3 [09]*		DE MBA-8 [09]	DE MBA-13 [09]
	DE MBA-4 [09]*		DE MBA-9 [09]	DE MBA-14 [09]
		DE MBA-10 [09]	DE MBA-15 [09]	
	45	0	54	54

**MINIMUM GRADUATION REQUIREMENT IN MBA PART:**

PG Component : 153 Credits  
 Summer Internship : 0 Credits

**REMARKS:**

- 1) \*DE MBA-1, 2, 3 & 4 to be selected from Basket – B.
- 2) MBA697A (summer internship) is mandatory.
- 3) In place of any of the DE MBA (6 to 15), a student may substitute an IME course in consultation with the IME DUGC.
- 4) Minimum graduation requirements mentioned under the dual degree template are only for the MBA part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 5) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT/BS-MBA dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.

**Basket – B**

- MBA606A [09]
- MBA607A [09]
- MBA611A [09]
- MBA616A [09]
- MBA617A [09]
- MBA631A [09]
- MBA661A [09]

MINOR		Template No. IME-3
Title		
C	DE PG-1	
O	DE PG-2	
U	DE PG-3	
R		
S		
E		
S		
	27	

**REMARKS:**

- 1) DE PG may be from IME or MBA courses.



**MATERIALS SCIENCE & ENGINEERING**

B.TECH.				SEMESTER					Template No. MSE-1
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	
C	MTH101A [11]	MTH102A [11]	ESO-1 [11] (ESO202A)	COM200A [05]	HSS-3 (Level-2) [09]	MSE304A [06]	DE-2 [09]	DE-4 [09]	
	PHY103A [11]	PHY102A [11]	ESO-2 [14] (ESO205A)	ESC201A [14]	MSE301A [06]	MSE305A [06]	DE-3 [09]	DE-5 [09]	
O	CHM101A [03]	PHY101A [03]	MSE201A [11]	MSE202A [11]	MSE302A [09]	MSE312A [03]	OE-2 [09]	HSS-5 (Level-2) [09]	
	ESC101A [14]	LIF101A [06]	SO-1 [06] (MSO203B)	MSE203A [09]	MSE303A [09]	MSE314A [03]	OE-3 [09]	OE-6 [09]	
U	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	HSS-2 (Level-1) [11]	MSE204A [06]	MSE311A [03]	MSE315A [03]	OE-4 [09]	OE-7 [09]	
	PE101A [03]	PE102A [03]	TA202A [06]	SO-2 [08] (PSO201A)	MSE313A [03]	HSS-4 (Level-2) [09]	UGP-3 (MSE497A)/ OE-5 [09]	UGP-4 [09] (MSE449A) (extra credit)	
R		TA101A [09]			MSE300A [02]	UGP-2 (MSE398)/ DE-1 [09]			
				TA201A [06]	ESO-3 [11] (ESO208A)	OE-1 [09]			
S					UGP-1 [04] (MSE349A) (extra credit)				
	53	51	59	59	52/56	48	54	45/54	

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	:	124	Credits
Department Compulsory (DC)	:	90	Credits
Department Elective (DE)	:	45	Credits
Open Elective (OE)	:	63	Credits
SO/ ESO	:	50	Credits
HSS (Level-I)	:	22	Credits
HSS (Level-II)	:	27	Credits
<b>Total</b>	:	<b>421</b>	<b>Credits</b>

**REMARKS:**

- 1) DE credits may include UGP-2.
- 2) OE credits may include UGP-3.
- 3) UGP-1 & UGP-4 are optional and do not count towards DE/OE credits.
- 4) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.

BT-MT (Category – A) (from the same department)			Template No. MSE-2		
C O U R S E S	SEMESTER				
	7 <sup>th</sup>	8 <sup>th</sup>	SUMMER	9 <sup>th</sup>	10 <sup>th</sup>
	OE PG-1 [09]	OE PG-3 [09]	M.Tech. Thesis / DE PG 1/2 [18] (Optional)	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	OE PG-2 [09]	OE PG-4 [09]	-	-	-
	DE PG-1 [09]*	DE PG-2 [09]*			
27	27	18	36	36	

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 54 Credits  
 Thesis Component : 72 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) \*If an MSE student has taken two PG-level DEs during the UG programme, those credits may be counted for DE PG-1 and 2 here. However, if no such PG courses have been taken during the UG programme, then the student will have to take two DE PG courses during the PG part of the programme.
- 3) Since registration for thesis and/or course credits is optional in the summer, those credits are not part of the minimum M.Tech. requirement.
- 4) Upto 36 OE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements.

BT-MT (PG Part – Category B) (from other departments)			Template No.MSE-3		
C O U R S E S	7 <sup>th</sup>	8 <sup>th</sup>	SUMMER	9 <sup>th</sup>	10 <sup>th</sup>
	OE PG-1 [09]	OE PG-3 [09]	M.Tech. Thesis [18]	M.Tech. Thesis [27]	M.Tech. Thesis [27]
	OE PG-2 [09]	OE PG-4 [09]	-	PG -1 [09]	PG -2 [09]
	18	18	18	36	36

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 54 Credits

Thesis Component : 72 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) PG-1 and PG-2 may be done either in 7<sup>th</sup> and 8<sup>th</sup> Semester or 9<sup>th</sup> and 10<sup>th</sup> Semester with the permission of Supervisor/ DUGC Convener.
- 3) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.

DOUBLE MAJOR		Template No. MSE-4
C O U R S E S	Odd Semester	Even Semester
	Pre-Requisite	
	ESO205A [14]	-
	Mandatory MSE Courses	
	MSE201A [11]	MSE202A [11]
	MSE301A [06]	MSE203A [09]
	MSE302A [09]	MSE204A [06]
	MSE303A [09]	MSE304A [06]
	MSE311A/MSE313A [03]	MSE305A [06]
	MSE DE-1 [09]	MSE DE-2 [09]
	/	
	47	47

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN MATERIALS SCIENCE & ENGINEERING: 94 CREDITS**

**REMARKS:**

- 1) It is preferred that students have exposure to ESO202A and PSO201A, but this is not mandatory.
- 2) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

MINOR		Template No.MSE-5
C O U R S E S	FUNCTIONAL MATERIALS	
	Any THREE from:	
	MSE604A [09]	
	MSE624A [09]	
	MSE628A [09]	
	MSE631A [09]	
	MSE693A [09]	
	27	

**MECHANICAL ENGINEERING**

B.TECH.				Template No. ME-1				
SEMESTER								
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C	MTH101A [11]	MTH102A [11]	ESC201A [14]	HSS-2 (Level-1) [11]	HSS-3 (Level-2) [09]	HSS-4 (Level-2) [09]	HSS-5 (Level-2) [09]/ DE-2 [09]	DE-2 [09]/ HSS-5 (Level-2) [09]
O	PHY102A [11]/ PHY103A [11]	PHY103A [11]/ PHY102A [11]	ESO/SO-1 ESO201A [11]	ESO/SO-5 ESO202A [11]	ME301A [06]	ME341A [10]	ME401A [10]	ME461A [09]
U	PHY101A [03]/ CHM101A [03]	CHM101A [03]/ PHY101A [03]	ESO/SO-2 ESO209A [08]	ESO/SO-6 ESO203A [13]	ME321 [07]	ME351A [08]	ME451A [09] (UGP-2)	ME452 [06] (UGP-3)
R	TA101A [09]	ESC101A [14]	ME251A [05]	ME222A [07]	ME352A [07]	ME354A [10]	OE-3 [09]	OE-4 [09]/ DE-3 [09]
S	LIF101A [06]	CHM102A [08]	TA202A [06]/ TA201A [06]	ME231 [10]	ME361A [10]	OE-2 [09]	OE-4 [09]/ DE-3 [09]	OE-5 [09]
E	ENG112A/HSS-1 (Level-1) [11]	PE102A [03]	ESO/SO-3 MSO202a [06]	COM200A [05]	ME399A [02]	DE-1 [09]	UGP-4 [09] (ME498A) (Extra Credits)	OE-6 [09]
S	PE101A [03]		ESO/SO-4 MSO203b [06]	TA201A [06]/ TA202A [06]	OE-1 [09]	UGP-1 [04] (ME398A) (Extra Credits)		
	54	50	56	63	50	55/59	55/64	51

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	:	124	Credits
Department Compulsory (DC)	:	101	Credits
UGP-2 and UGP-3	:	15	Credits
Department Elective (DE)	:	27	Credits
Open Elective (OE)	:	54	Credits
ESO/ SO	:	55	Credits
HSS (Level-I)	:	22	Credits
HSS (Level-II)	:	27	Credits
<b>Total</b>	:	<b>425</b>	<b>Credits</b>

**REMARKS:**

- 1) UGP-2 (ME451A) and UGP-3 (ME452A) are departmental compulsory courses for BTech students. However, these are optional for BT-MT students who apply for conversion to BT-MT program before the end of the sixth semester. Such students may do any two DE PG courses as substitute for UGP-2 and UGP-3. If a student opts to take ME451A or ME452A after applying for the dual degree programme before the end of the 6<sup>th</sup> semester, these courses WILL NOT count towards his/her DE-PG requirement.
- 2) Students registering for ME451A (UGP-2) must form BTP groups and inform Convener, DUGC, by April 30<sup>th</sup> of 6<sup>th</sup> Semester.
- 3) ME students applying for BT-MT in ME after the formation of BTP groups will have to take UGP-2 and UGP-3. Neither of these courses may be dropped. Out of UGP-2 and UGP-3, only UGP-3 may be counted towards DE-PG credits for these students.
- 4) UGP-1 & UGP-4 are optional and do not count towards graduation requirements.
- 5) 15 credits of UGP-2&3 and 18 OE credits may be waived from the minimum BT requirements for students opting for dual degree in ME itself.
- 6) Upto 36 OE credits may be waived from the minimum requirements for students opting for Dual Degree in any other department or the Double Major programme.

BT-MT (PG Part – Category A) (from the same department)			Template No. ME-2		
C O U R S E S		7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
		DE PG-1 [09]	DE PG-4 [09]	M.TECH. THESIS [36]	M.TECH. THESIS [36]
		DE PG-2 [09]	DE PG-5 [09]	-	-
		DE PG-3 [09]/ OE PG-1 [09]	DE PG-6 [09]/ OE PG-1 [09]		
		27	27	36	36

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 54 Credits

Thesis Component : 72 Credits

**REMARKS:**

- 1) UGP-2 and UGP-3 are compulsory for UG ME students, but not for BT-MT ME students. BT-MT ME students have to take 18 credits of DE PG instead of 15 credits of UGP-2 and UGP-3. However, ME students applying for BT-MT in ME after the start of 7<sup>th</sup> semester will have to take UGP-2 and UGP-3. Neither of these courses may be dropped. Out of UGP-2 and UGP-3, only UGP-3 may be counted towards DE-PG credits. In that case, students will have to make up the remaining 12 credits of DE PG with additional PG level ME courses.
- 2) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 3) AE675A may count as DE PG in lieu of ME623A. Similar equivalences can be established by the DUGC after deliberating the course content on a case to case basis.
- 4) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 5) Upto 18 OE credits may be used from the BT minimum requirements to fulfil requirements for the BT-MT dual degree programme. These will be waived from the BT programme and counted towards PG requirements.

BT-MT (PG Part – Category – B) (from other departments)				Template No. ME-3
Sl. No.	Specialization	Compulsory Course Credits	Elective Credits	Thesis Credits
1.	SOLID MECHANICS AND DESIGN (SMD)	ME621A [09] ME625A [09] ME681A [09]	DE PG-1 [09] DE PG-2 [09] DE PG-3 [09]	M.TECH. THESIS [72]
2.	FLUID & THERMAL SCIENCES (FTS)	ME631A [09] ME641A [09] ME642A [09] ME681A [09]	DE PG-1 [09] DE PG-2 [09]	M.TECH. THESIS [72]
3.	MANUFACTURING SCIENCES (MFS)	ME661A [09] ME662A [09] ME663A [09] ME681A [09]	DE PG-1 [09] DE PG-2 [09]	M.TECH. THESIS [72]

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 54 (27 Compulsory + 27 Electives) Credits for SMD  
 PG Component : 54 (36 Compulsory + 18 Electives) Credits for FTS and MFS  
 Thesis Component : 72 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) Some of the compulsory courses in any of the above streams may be replaced with DE PG by the DUGC Convener based on the UG courses done by the student for his UG graduation requirement.
- 3) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT/BS-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.

DOUBLE MAJOR		Template No. ME-4
C O U R S E S	Odd Semester	Even Semester
	Pre-Requisites	
	ESO201A [11]/ ESO202A [11]	ESO201A [11]/ ESO202A [11]
	ESO209A [08]	
	19	11
	ME Mandatory Courses	
	ME251A [05]	ME231A [10] *
	ME301A [06]	ME341A [10] **
	ME321A [07]	ME351A [08]
	ME352A [07]	ME354A [10]
	ME361A [10]	ME461A [09]
	ME401A [10]	
	45	47

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN MECHANICAL ENGINEERING: 92 CREDITS**

**REMARKS:**

- 1) \*Equivalent courses for ME231A are (ESO204A + AE311A) or (ESO204A + CE262A).
- 2) \*\*Equivalent course for ME341A is CHE312A.
- 3) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

MINOR		Template No. ME-5
Title	MANUFACTURING SCIENCES	COMPUTATIONAL TECHNIQUES IN MECHANICAL ENGINEERING
C O U R S E S	Any THREE from:	Any THREE from:
	ME661A [09] (Prerequisite TA202A)	ME623A [09] (Prerequisite ESO202A, MSO203B)
	ME662A [09] (Prerequisite TA202A)	ME630A [09] (Prerequisite ESO201A, ESO204A, MSO203B)
	ME663A [09] (Prerequisite ESO202A, MSO203B)	ME685A [09] (Prerequisite – No backlog in core courses)
	ME664A [09] (Prerequisite TA202A, ESO204A or Equivalent Heat Transfer Course)	ME751A [09] (Prerequisite TA101A)
	ME665A [09] (Prerequisite TA202A)	MEXXXA [09] (Nonlinear Finite Element Techniques in Solid Mechanics)
	ME774A [09] (Prerequisite ESO202A, MSO203B)	MEXXXA [09] (Atomistic Simulations in Engineering)
	ME751A [09] (Prerequisite TA101A)	
	ME761A [09] (Prerequisite TA202A)	
	27	27



## CHEMISTRY

BS		Template No. <b>CHM-1</b>						
C	SEMESTER							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
O	MTH101A [11]	MTH102A [11]	CHM201A [09]**	CHM202A [09]	CHM303A [09]	CHM322A [09]	CHM423A [06]	HSS-5 (Level-2) [09]
	PHY101A [03]	PHY103A [11]	ESO/SO-1 [~10]*	CHM222A [09]	CHM305A [06]	CHM342A [09]	HSS-4 (Level-2) [09]	OE-4 [09]
U	PHY102A [11]	ESC101A [14]	ESO/SO [~10]*	CHM242A [09]	CHM321A [09]	CHM344A [06]	OE-1 [09]	OE-5 [09]
R	LIF101A [06]	CHM101A [03]	HSS-2 (Level-1) [11]	ESC201A [14]	CHM345A [09]	DE-1 [09]	OE-2 [09]	OE-6 [09]
S	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	TA202A [06]	ESO/SO-3 [~10]*	ESO/SO-4 [~10]*	DE-2 [09]	OE-3 [09]	OE-7 [09]
E	PE101A [03]	PE102A [03]	COM200A [05]	TA201A [06]	CHM361A [02]	HSS-3 (Level-2) [09]	UGP-3/DE [09] (CHM491A)	UGP-4 [09] (CHM492A) (Extra Credits)
S	TA101A [09]	-	-	-	UGP-1 [04] (CHM391A) (Extra Credits)	UGP-2/DE [09]/ (CHM392A)	-	-
	54	50	51*	57*	45/49*	60	51	45/54

### MINIMUM CREDIT REQUIREMENT FOR GRADUATION:

Institute Core (IC)	:	124	Credits
Department Compulsory (DC)	:	101	Credits
Department Elective (DE)	:	36	Credits
Open Elective (OE)	:	63	Credits
*SO/ ESO	:	40	Credits
HSS (Level-I)	:	22	Credits
HSS (Level-II)	:	27	Credits
<b>Total</b>	:	<b>413</b>	<b>Credits</b>

### REMARKS:

- 1) \*ESO/SO courses are available in a range from 6 to 14 credits each. CHM students may choose any four courses EXCEPT CSO201A, ensuring a minimum of 8 SO credits and totalling up to a minimum of 40 ESO/SO credits.
- 2) DE credits may include 18 credits of UGP-2 and UGP-3.
- 3) UGP-1 and UGP-4 are optional and does not count towards DE/OE credits.
- 4) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.
- 5) \*\*EXCEPTION: CHM201A to be done by Y14 and onward batches. Y11, Y12 and Y13 batches shall do CHM203A. Course title, content and credits are same. Just the course number has been changed.

<b>BS-MS (Category – A) (from the same department)</b>			<b>Template No. BS-CHM-2</b>	
<b>C O U R S E S</b>	<b>UG Pre-Requisites</b>		<b>PG Component</b>	
	<b>Odd Semester</b>	<b>Even Semester</b>	<b>9<sup>th</sup></b>	<b>10<sup>th</sup></b>
	<b>CHM503A [06]</b>	<b>CHM402A [09]</b>	<b>CHM611A [09]</b>	<b>MS Project [48]</b>
	-	<b>CHM443A [06]</b>	<b>CHM621A [09]</b>	-
		-	<b>CHM664A [09]</b>	
			<b>DE PG-1 [09]</b>	
		<b>DE PG-2 [09]</b>		
		<b>DE PG-3 [09]</b>		
	<b>06</b>	<b>15</b>	<b>54</b>	<b>48</b>

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 54 Credits

MS Project component : 48 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) DE PG-1, 2 and 3 may include any CHM6XX level course EXCEPT CHM609A, CHM629A, and CHM649A.
- 3) Mandatory UG component must be completed before the 9<sup>th</sup> semester.
- 4) Course credits and Thesis credits mentioned under the dual degree template are only for the MS part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 5) Upto 36 OE credits may be used from the BS minimum requirements to fulfil requirements for the BS-MS dual degree programme. These will be waived from the BS programme and counted towards PG requirements.

<b>BS/BT-MS (Category – B) (from other departments)</b>		<b>Template No. BS-CHM-3</b>	
<b>C O U R S E S</b>	<b>Mandatory UG Component</b>	<b>PG Component</b>	
		<b>9<sup>th</sup></b>	<b>10<sup>th</sup></b>
	<b>UG CHM DE-1 [09]</b>	<b>MS Project -1 [24]</b>	<b>MS Project -2 [24]</b>
	<b>UG CHM DE-2 [09]</b>	<b>CHM305A [06]</b>	<b>CHM344A [06]</b>
	<b>UG CHM DE-3 [09]</b>	<b>CHM423A [06]</b>	<b>CHM DE-8 [09]</b>
	<b>UG CHM DE-4 [09]</b>	<b>CHM DE-6 [09]</b>	<b>CHM DE-9 [09]</b>
	<b>UG CHM DE-5 [09]</b>	<b>CHM DE-7 [09]</b>	<b>-</b>
<b>45</b>	<b>54</b>	<b>48</b>	

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 54 Credits  
MS Project component : 48 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) All UG DE (from 1 to 5) should be selected from Basket –A.
- 3) \*EXCEPTION: CHM201A to be done by Y13 and onward batches. Y11 and Y12 batch shall do CHM203A. Course title, content and credits are same. Just the course number has been changed.
- 4) Courses in DE-6 to DE-9 may be any from CHM department core or electives (including any CHM6XX level course EXCEPT CHM609A, CHM629A, and CHM649A), which have not been credited by the student as SO / UG CHM DE during the student’s UG program.
- 5) Course credits and Thesis credits mentioned under the dual degree template are only for the MS part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 6) Upto 36 OE credits may be used from the parent department’s BT/BS minimum requirements to fulfil requirements for the dual degree programme. These will be waived from the parent department’s BT/BS programme requirements and counted towards PG requirements.

**Basket – A**

CHM201A [09]\*  
CHM202A [09]  
CHM222A [09]  
CHM242A [09]  
CHM303A [09]  
CHM321A [09]  
CHM345A [09]  
CHM322A [09]  
CHM342A [09]

<b>DOUBLE MAJOR</b>	<b>Template No. CHM-4</b>
<b>Odd Semester</b>	<b>Even Semester</b>
CHM201A [09]*	CHM222A [09]
CHM303A [09]**	CHM242A [09]
CHM321A [09]	CHM202A [09]
CHM345A [09]	CHM322A [09]
CHM305A [06]	CHM342A [09]
CHM423A [06]	CHM344A [06]
<b>48</b>	<b>51</b>

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN CHEMISTRY:** 99 CREDITS

**REMARKS:**

1. \*EXCEPTION: CHM201A to be done by Y13 and onward batches. Y11 and Y12 batch shall do CHM203A. Course title, content and credits are same. Just the course number has been changed.
2. \*\*Pre-requisite for CHM303A is waived for double major students.
3. Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

MINOR		Template No. CHM-5	
Title	PHYSICAL CHEMISTRY*	INORGANIC CHEMISTRY	ORGANIC CHEMISTRY
C O U R S E S	CHM321A [09]	CHM345A [09]	CHM201A [09]**
	CHM322A [09]	CHM342A [09]	CHM202A [09]
	Any TWO from:  CHM621A [09] CHM622A [09] CHM626A [09] CHM636A [09] CHM637A [09] CHM650A [09] CHM664A [09] CHM685A [09] CHM689A [09] CHM695A [09] CHM696A [09] CHM699A [09]	Any TWO from:  CHM616A [09] CHM631A [09] CHM646A [09] CHM647A [09] CHM651A [09] CHM654A [09] CHM668A [09] CHM691A [09]	CHM303A [09]
			CHM402A [09]
			-
			-
			-
			-
			-
			-
36	36	36	

**REMARKS:**

- 1) \*CSO202A is a pre-requisite for Minor in Physical Chemistry
- 2) \*\*EXCEPTION: CHM201A to be done by Y13 and onward batches. Y11 and Y12 batch shall do CHM203A. Course title, content and credits are same. Just the course number has been changed.

## ECONOMICS

BS				Template No. ECO-1				
SEMESTER								
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C	MTH101A [11]	MTH102A [11]	COM200A [05]	ESO/SO-3 [~10]*	ECO301A [09]	ECO311A [09]	ECO321A [09]	ECO413A [09]
O	PHY102A [11]/ PHY103A [11]	PHY103A [11]/ PHY102A [11]	ECO201A [09]	OE-1 [09/11]	ECO341A [12]	ECO342 [12]	ECO411A [09]	DE-4 [09]
U	PHY101A [03]/ CHM101A [03]	CHM101A [03]/ PHY101A [03]	ESO/SO-1 [~10]*	ESC201A [14]/ HSS-2 (Level-1) [11]	OE-2 [09]	HSS-4 (Level-2) [09]	ECO412A [09]	HSS-5 (Level-2) [09]
R	PE101A [03]	CHM102A [08]	ESO/SO-2 [~10]*	ECO221A [09]	HSS-3 (Level-2) [09]	DE-1 [09]	DE-3 [09]	OE-6 [09]
S	ENG112A/HSS-1 (Level-1) [11]	PE102A [03]	HSS-2 (Level-1) [11]/ ESC201A [14]	ECO261A [09]	ESO/SO-4 [~10]*	OE-3 [09]	OE-4 [09]	OE-7 [09]
E	LIF101A [06] + TA101A [09]/ ESC101A [14]	ESC101A [14]/ LIF101A [06] + TA101A [09]	TA202A [06]/ TA201A [06]	TA201A [06]/ TA202A [06]	ECO397A [02]	UGP-2/ DE-2 [09] (ECO399A)	UGP-3/ OE-5 [09] (ECO498A)	UGP-4 [09] (extra credits)
S					UGP-1 [04] (extra credits)			
	53/54	50/51	51/54*	54-59*	51/55*	57	54	45/54

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 107	Credits
Department Elective (DE)	: 36	Credits
Open Elective (OE)	: 63	Credits
*SO/ ESO	: 40	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 419</b>	<b>Credits</b>

**REMARKS:**

- 1) \*ESO/SO courses are available in 6-14 credits each. Students need to ensure that their total ESO/SO credits total up to AT LEAST 40, including minimum one course from each of the two categories (ESO and SO), without going over 65 credits in any given semester.
- 2) UGP-1 & UGP-4 are optional and do not count towards DE/OE credits.
- 3) DE credits may include UGP-2.
- 4) OE credits may include UGP-3.
- 5) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.

BS –MS PG (Part- Category A) (from the same department)		Template No. ECO-2
C	9 <sup>th</sup>	10 <sup>th</sup>
O	DE-PG-1(09) course of Economics must be taken	PG-3(09)
U	DE-PG-2(09) course of Economics must be taken	PG-4(09)
R	Ms Project (18)	Ms Project (27)
S		
E	36	45
S		

MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION

PG Component : 36 Credits  
 MS Project Component : 45 Credits

REMARKS:

- 1) All courses to be taken with the permission of Supervisor/ PUGC Convener.
- 2) Course credits and MS Project credits mentioned under dual degree template are only for MS part of the Programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG Programme.
- 3) Up to 36 OE credits may be used from the BS requirements to fulfil requirements for the BS-MS dual degree programme. These will be waived from the BS programme and counted towards PG requirements.

BT/BS-MS (Category –B)(from other departments)		Template No. ECO3		
UG Pre Requisites		PG Requirements		
U	Odd Semester	Even Semester	Odd Semester	Even Semester
R	ECO201 A(09)/ECO101 A(11)	ECO 221A(09)	DE-PG-1(09) course of Economics must be taken	DE-PG-3(09) course of Economics must be taken
S	ECO341A(12)	ECO 342A(12)	DE-PG-2(09) course of Economics must be taken	PG-4(09)
E	ECO301A(09)		Ms Project (18)	Ms Project (27)
S	Eco321A(09)			
	39	21	36	45

MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION

PG Component : 36 Credits  
 MS Project Component : 45 Credits

REMARKS:

- 1) All courses to be taken with the permission of Supervisor/ PUGC Convener.
- 2) Course credits and MS Project credits mentioned under dual degree template are only for MS part of the Programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG Programme.
- 3) Up to 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT/BT-MS dual degree programme. These will be waived from the department's BT/BS programme and counted towards PG requirements.

DOUBLE MAJOR	Template No. ECO-4
Odd Semester	Even Semester
ECO201A [09]/ ECO101A [11]	ECO221A [09]
ECO341A [12]/ MTH416A [11]	ECO261A [09]
ECO301A [09]	ECO311A [09]
ECO321A [09]	ECO342A [12]
ECO411A [09]	ECO413A [09]
ECO412A [09]	
56 – 59	48

**MINIMUM MANDATORY CREDITS FOR SECOND MAJOR IN ECONOMICS: 104 CREDITS**

**REMARKS:**

1. Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.



## EARTH SCIENCES

BS					TEMPLATE No.BS			
SEMESTER								
	1st	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C O U R S E S	MTH101A[11]	MTH102A[11]	ESC201A[14]	HSS-2(Level 1)[11]	<b>ESO204A[11]</b>	HSS-3(Level 2)[09]	HSS-4(Level 2)[09]	HSS-5(Level 2)[09]
	PHY102A[11]/PHY103A[11]	PHY103A[11] /PHY102A(Lab)[11]	ESO213A[09]	<b>MSO-201A[11]</b>	ES411A[09]	ES413A[06]	ES417A[06]	ES418A[04]
	PHY101A[03] /CHM101(Lab)[03]	CHEM101A[03]/PHY101A(La b)[03]	<b>ESO-201A[11]</b>	TA202A[06]	ES412A[08]	ES414A[06]	DE-2[08-11]	DE-4[08-11]*
	TA101A[09]	ESC101A[14]	TA201A[06]	ES312A[03]	ES400 [02]	ES415A[8]	DE-3[08-11]*	DE-5[08-11]*
	LIF101A[06]	CHM102A[08]	COM200[05]	ES313A[09]	DE-1 [09]	ES416A[08]	OE-3[09]	OE-5[09]
	ENG112A/HSS-1(Level-1)[11]	PE102A[03]	ES311A[11]	ES314A[09]	OE-1[09]	ES419A[06]	OE-4[09]/ UGP-3 [09] (ES393A)	OE-6[09]
	PE101A[03]			ES315A[11]	UGP-1 [04] [ES391A] (Extra Credits)	OE-2[09]/ UGP-2(ES392A) [09]		UGP-4 [09] [ES394A] (Extra Credits)
	54	50	56	60	48	52	49-55	47-53

### MINIMUM CREDIT REQUIREMENT FOR GRADUATION:

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 106	Credits
Department Elective (DE)	: 40	Credits
Open Elective (OE)	: 54	Credits
ESO/ SO	: 42	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	: <b>415</b>	<b>Credits</b>

### Basket A\*\*

ES450 [09]  
ES455[09]

### REMARKS:

- 1) \*The 8 credits shown against each DE in the template are only indicative. DE courses are available in 8-11 credits each. Students need to ensure that their total DE credits total up to AT LEAST 40.
- 2) \*\*DE-1 should be selected from Basket A.
- 3) UGP-1 and UGP-4 are optional courses and do not count towards graduation requirements, also do not count towards DE/OE credits.
- 4) UGP-2 & 3 are optional but if taken, OE credits may include 18 (9+9) credits of UGP-2 and UGP-3.
- 5) A student will be allowed to do UGP-3 only if s/he has done UGP-2.
- 6) Up to 36 OE credits may be waived for students opting either for Dual Degree or Double Major program.
- 7) Those students who decide to go for MS later after V Semester, and if they have taken UGPs 1 & 2, these UGPs will be adjusted as OE at the Department level.
- 8) Those who decide to go for MS should not do UGPs.
- 9) The field work for ES312A, ES414A, and ES418A will be conducted during the winter vacation period after the END Semester exam of respective ODD semester (e.g., III, V, and VII) but credits will be counted in the successive EVEN semester (i.e., IV, VI, and VIII). Therefore, students have to register for these courses for the respective EVEN semester.

BS-MS (PG Part – Category – A)(from the same department)					Template No. MS
C O U R S E S	1 <sup>st</sup> to 6 <sup>th</sup>	7th	8th	9 <sup>th</sup>	10 <sup>th</sup>
	COURSES AS DETAILED IN THE BS TEMPLATE	HSS-4(Level 2)[09]	HSS-5(Level 2)[09]	DEPG-1[08-11]*	MS PROJECT ES599
		ES417A[06]	ES418A[04]	DEPG -2[08-11]*	
		DE-2[08-11]	DE -4[08-11]	DEPG-3[08-11]*	
		DE-3[08-11]	DE -5[08-11]	DEPG-4[08-11]*	
		OE-3[09]	OE-5[09]	DEPG-5[08-11]*	
		OE-4[09]	OE-6[09]	MS Project [09] ES599	
	49-55	47-53	49-64	36	

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 40 Credits  
MS Project : 45 Credits

**REMARKS:**

- 1) \*The 8 credits shown against each PGDE in the template are only indicative. PGDE courses are available in 8 – 11 credits each. Students need to ensure that their total PGDE credits total up to AT LEAST 40.
- 2) Course credits and Thesis credits mentioned under the dual degree template are only for the MS part of the program. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG program EXCEPT for credit waivers detailed above.
- 3) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 4) Those students who decide to go for MS later after V Semester, and if they have taken UGPs 2& 3, these UGPs will be adjusted as OE.
- 5) Those who decide to go for MS should not do UGPs.

**MATHEMATICS AND SCIENTIFIC COMPUTING-OLD TEMPLATE**

BS				Template No. BS-MTH-1				
SEMESTER								
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C	MTH101A [11]	MTH102A [11]	MTH204A [11]	MTH302A [09]	MTH305A [11]	MTH308A [11]	DE-1 [09]	HSS-5 (Level-2) [09]
	PHY103A [11]	PHY102A [11]	MTH301A [11]	MTH421A [11]	MTH403A [11]	MTH424A [11]	DE-2 [09]	DE-3 [09]
O	CHM101A [03]	PHY101A [03]	COM200A [05]	HSS-2 (Level-1) [11]	ESO/SO-4 [09] (ESO207A)	HSS-4 (Level-2) [09]	MTH401A [09]	OE-4 [09]
U	ESC101A [14]	LIF101A [06]	ESO/SO-1 [~10]*	ESO/SO-2 [11] (MSO201A)	HSS-3 (Level-2) [09]	OE-2 [09]	MTH423 [11]	OE-5 [09]
R	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	ESC201A [14]	ESO/SO-3 [~10]*	OE-1 [09]	OE-3 [09]	UGP-3 (MTH393A)/ DE/OE [09]	OE-6 [09]
S	PE101A [03]	PE102A [03]	TA201A [06]	TA202A [06]	MTH399A [02]	UGP-2 (MTH392A)/ DE/OE [09]	-	UGP-4 [09] (MTH394A) (extra credits)
E	-	TA101A [09]	-	-	UGP-1 [04] (MTH391A) (extra credits)	-	-	-
S	-	-	-	-	-	-	-	-
	53	51	57*	58*	51/55	58	47	45/54

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 108	Credits
Department Elective (DE)	: 27	Credits
Open Elective (OE)	: 54	Credits
UGP-2/UGP-3/DE/OE	: 18	Credits
*ESO/ SO	: 40	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 420</b>	<b>Credits</b>

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**MATHEMATICS AND SCIENTIFIC COMPUTING-NEW TEMPLATE**

BS				SEMESTER				Template No. BS-MTH-1
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C	MTH101A [11]	MTH102A [11]	MTH201A [11]	MTH204A [11]	MTH305A [11]	MTH.SCI.COMP-1 [10]	OE-3 [09]	HSS-5 (Level-2) [09]
O	PHY103A [11]	PHY102A [11]	MTH302A [11]	MTH301A [11]	MTH403A [11]	MTH421A [11]	DE-2 [09]	DE-3 [09]
U	CHM101A [03]	PHY101A [03]	COM200A [05]	HSS-2 (Level-1) [11]	ESO/SO-4 [09] (ESO207A)	HSS-4 (Level-2) [09]	MTH424A [11]	OE-4 [09]
R	ESC101A [14]	LIF101A [06]	ESO/SO-1 [~10]*	ESO/SO-2 [11] (MSO201A)	HSS-3 (Level-2) [09]	OE-1 [09]	MTH.SCI.COMP-2 [10]	OE-5 [09]
S	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	ESC201A [14]	ESO/SO-3 [~10]*	DE-1 [09]	OE-2 [09]	UGP-3 (MTH393A)/ DE/OE [09]	OE-6 [09]
E	PE101A [03]	PE102A [03]	TA201A [06]	TA202A [06]	MTH399A [02]	UGP-2 (MTH392A)/ DE/OE [09]	-	UGP-4 [09] (MTH394A) (extra credits)
S	-	TA101A [09]	-	-	UGP-1 [04] (MTH391A) (extra credits)	-	-	-
	53	51	57*	60*	51/55	57	48	45/54

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	:	124	Credits
Department Compulsory (DC)	:	110	Credits
Department Elective (DE)	:	27	Credits
Open Elective (OE)	:	54	Credits
UGP-2/UGP-3/DE/OE	:	18	Credits
*ESO/ SO	:	40	Credits
HSS (Level-I)	:	22	Credits
HSS (Level-II)	:	27	Credits
<b>Total</b>	:	<b>422</b>	<b>Credits</b>

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**OLD TEMPLATE**

DOUBLE MAJOR		Template No. BS-MTH-4
C O U R S E S	Odd Semester	Even Semester
	Pre-Requisites	
	ESO207A [11]	MSO201A [11]
	Mandatory MTH Courses	
	MTH204A [11]	MTH302A [09]
	MTH301A [11]	MTH421A [11]
	MTH305A [11]	MTH308A [11]
	MTH403A [11]	MTH424A [11]
	MTH401A [09]	
	MTH423A [11]	
	64	42

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN MATHEMATICS & SCIENTIFIC COMPUTING: 106 CREDITS**

**REMARKS:**

- 1) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

**NEW TEMPLATE**

DOUBLE MAJOR		Template No. BS-MTH-4
C O U R S E S	Odd Semester	Even Semester
	Pre-Requisites	
	ESO207A [11]	MSO201A [11]
	Mandatory MTH Courses	
	MTH201A [11]	MTH204A [11]
	MTH302A [11]	MTH301A [11]
	MTH305A [11]	MTH SCI COMP-1 [10]
	MTH403A [11]	MTH421A [11]
	MTH424A [11]	
	MTH SCI COMP-2 [10]	
	65	43

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**OLD TEMPLATE**

BS-MS (PG Part – Category – A) (from the same department)		Template No. BS-MTH-2	
1 <sup>st</sup> to 8 <sup>th</sup>		9 <sup>th</sup>	10 <sup>th</sup>
C O U R S E S	COURSES AS DETAILED IN THE BS TEMPLATE	MS THESIS (MTH598A) [09]/ DE PG-1 [09]	MS THESIS (MTH599A) [09]/ DE PG-6 [09]
		DE PG-2 [09]	OE PG-1 [09]
		DE PG-3 [09]	OE PG-2 [09]
		DE PG-4 [09]	OE PG-3 [09]
		DE PG-5 [09]	OE PG-4 [09]
		45	45

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 90 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) Minimum credit requirement mentioned under the dual degree template is only for the MS part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 3) Upto 36 OE credits may be used from the BS minimum requirements to fulfil requirements for the BS-MS dual degree programme. These will be waived from the BS programme and counted towards PG requirements.

**NEW TEMPLATE**

BS-MS (PG Part – Category – A) (from the same department)		Template No. BS-MTH-2	
1 <sup>st</sup> to 8 <sup>th</sup>		9 <sup>th</sup>	10 <sup>th</sup>
C O U R S E S	COURSES AS DETAILED IN THE BS TEMPLATE	MS THESIS-1 [9+9]	MS THESIS-2 [9+9]
		DE PG-1 [09]	DE PG-3 [09]
		DE PG-2 [09]	DE PG-4 [09]
		OE PG-1/DE PG-5 [09]	OE PG-2/DE PG-6 [09]
		45	45

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 90 Credits

**OLD TEMPLATE**

BT/BS-MS (PG Part – Category – B) (from other departments)			Template No. BS-MTH-3	
C O U R S E S	UG Pre-Requisites		PG Requirements	
	Odd Semester	Even Semester	Odd Semester	Even Semester
	MTH204A [11]	MTH302A [09]	MS THESIS (MTH598A) [09]/ DE PG-1 [09]	MS THESIS (MTH599A) [09]/ DE PG-5 [09]
	MTH301A [11]	MTH421A [11]	DE PG-2 [09]	DE PG-6 [09]
	MTH305A [11]	MTH308A [11]	DE PG-3 [09]	
	MTH403A [11]	MTH424A [11]	DE PG-4 [09]	
	MTH401A [09]			
	MTH423A [11]			
64	42	36	18	

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 54 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) Minimum credit requirement mentioned under the dual degree template is only for the MS part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 3) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the dual degree programme. These will be waived from the parent department's BT/BS programme requirements and counted towards PG requirements.

**NEW TEMPLATE**

BT/BS-MS (PG Part – Category – B) (from other departments)			Template No. BS-MTH-3	
C O U R S E S	UG Pre-Requisites		PG Requirements	
	Odd Semester	Even Semester	Odd Semester	Even Semester
	MTH201A [11]	MTH204A [11]	MS THESIS-1 [9+9]	MS THESIS-2 [9+9]
	MTH302A [09]	MTH301A [11]	DE PG-1 [09]	DE PG-3 [09]
	MTH305A [11]	MTH SCI COMP-1 [10]	DE PG-2 [09]	DE PG-4 [09]
	MTH403A [11]	MTH421A [11]		
	MTH424A [11]			
	MTH SCI COMP-2 [10]			
63	43	36	36	

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## PHYSICS

BS					Template No. BS-PHY-1			
SEMESTER								
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C	MTH101A [11]	MTH102A [11]	PHY224A [12]	SO-1 [08] (PSO201A)	PHY315A [09]	PHY412A [11]	PHY461A [08]	HSS-5 (Level-2) [09]
O	PHY101A [03]	PHY103A [11]	ESO-1 [~10]*	ESC201A [14]	PHY401A [11]	PHY473A [08]	PHY552A [11]	DE-3 [09]/ UGP-3 [09] (PHY557)
U	PHY102A [11]	ESC101A [14]	ESO-2 [~10]*	PHY210A [06]	PHY421A [11]	PHY399A [02]	HSS-4 (Level-2) [09]	DE-4 [09]
R	LIF101A [06]	CHM101A [03]	HSS-2 (Level-1) [11]	PHY226B [06]	PHY431A [11]	HSS-3 (Level-2) [09]	DE-2 [09]	OE-5 [09]
S	ENG112A/HSS-1 (Level-1) [11]	CHM102A [08]	TA202A [06]	TA201A [06]	ESO-3 [~10]*	DE-1 [09]	OE-3 [09]/ UGP-2 [09] (PHY556A)	OE-6 [09]
E	PE101A [03]	PE102A [03]	COM200A [05]	OE-1 [09]	-	OE-2 [09]	OE-4 [09]	UGP-4 [09]
S	TA101A [09]	-	-	-	-	-	UGP-1 [04] (PHY555A) (extra credits)	(PHY558A) (extra credits)
	54	50	54*	49	52*	48	55	45

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 106	Credits
Department Elective (DE)	: 36	Credits
Open Elective (OE)	: 54	Credits
*SO/ ESO	: 40	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 409</b>	<b>Credits</b>

**REMARKS:**

- 1) \*SO/ESO courses should be selected to ensure that the four courses add up to 40 credits.
- 2) OE credits may include 09 credits of UGP-2.
- 3) DE credits may include 09 credits of UGP-3.
- 4) UGP-1 and UGP-4 are optional and does not count towards DE/OE credits.
- 5) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.



BS-MS (Category – A) (from the same department)		Template No. BS-PHY-2	
	Mandatory UG Component	PG Component	
		9 <sup>th</sup>	10 <sup>th</sup>
C O U R S E S	PHY422A [11] / PHY692A [12]	DE PG-1 [09]	DE PG-2 [09]
	PHY432A [11]	OE PG-1 [09]	OE PG-2 [09]
	PHY462A [08]	MS Project-1 [11]	MS Project-3 [11]
	PHY553A [11]	(PHY563A)	(PHY566A)
	PHY543A [11]/ PHY524A [11]/ PHY526A [11]	MS Project-2 [11]	MS Project-4 [11]
		(PHY565A)	(PHY568A)
	52 / 53	40	40

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 36 Credits  
MS Project component : 44 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) Mandatory UG component is pre-requisite for the MS Project. These courses must be completed during the BS part of the Program.
- 3) Course credits and Project credits mentioned under the dual degree template are only for the MS part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the BS minimum requirements to fulfil requirements for the BS-MS dual degree programme. These will be waived from the BS programme and counted towards PG requirements.

BS/BT-MS (Category – B) (from other departments)			Template No. BS-PHY-3	
C O U R S E S	Mandatory UG Pre-Requisites for MS in Physics		9 <sup>th</sup>	10 <sup>th</sup>
	PSO201A	PHY431A	DE PG-1 [09]	DE PG-2 [09]
	PHY210A*	PHY432A	OE PG-1 [09]	OE PG-2 [09]
	PHY224A	PHY462A	MS Project-1 [11] (PHY563A)	MS Project-3 [11] (PHY566A)
	PHY226A	PHY543A/PHY524A/PHY526A		
	PHY401A	PHY473A*	MS Project-2 [11] (PHY565A)	MS Project-4 [11] (PHY568A)
	PHY412A	PHY552A		
	PHY421A*	PHY553A		
PHY422A/PHY692A	PHY315A	40	40	

**MINIMUM CREDIT REQUIREMENT IN MS PART FOR GRADUATION:**

PG Component : 36 Credits  
MS Project component : 44 Credits

**REMARKS:**

- 1) Courses marked with \* in the UG pre-requisites list may be replaced by equivalent courses in consultation with Physics DUGC.
- 2) All optional / PG courses to be taken with the permission of Supervisor/ Physics DUGC Convener.
- 3) Course credits and Project credits mentioned under the dual degree template are only for the MS part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the dual degree programme. These will be waived from the parent department's BT/BS programme requirements and counted towards PG requirements.

DOUBLE MAJOR		Template No. BS-PHY-4	
Odd Semester		Even Semester	
Pre-Requisites			
		PSO201A [08]	
Mandatory Physics Courses			
PHY224A [12]		PHY210A [06]*	
PHY315A [09]		PHY226B [06]	
PHY401A [11]		PHY412A [11]	
PHY421A [11]*		PHY473A [08]*	
PHY431A [11]		PHY461A [08]	
PHYS52A [11]			
65		39	

**TOTAL MANDATORY CREDITS FOR SECOND MAJOR IN PHYSICS: 104 CREDITS**

**REMARKS:**

- 1) Courses marked with \* may be replaced by equivalent courses.
- 2) Upto 36 OE credits may be waived from the parent department BT/BS graduation requirements when they are used to fulfill requirements for the double major.

MINOR		Template No. BS-PHY-5	
	STATISTICAL MECHANICS		QUANTUM MECHANICS
C O U R S E S	PSO201A [08]		PSO201A [08]
	PHY210A [06]		PHY210A [06]
	PHY226B [06]		PHY226B [06]
	PHY412A [11]		PHY431A [11]
	31		31

## DESIGN PROGRAMME

BT/BS-M.Des. (Category – C) (from other departments)		Template No. DES-1			
UG Pre-Requisites		PG Requirements			
C O U R S E S	1 <sup>st</sup> to 6 <sup>th</sup>	7 <sup>th</sup> and 8 <sup>th</sup>	SUMMER	9 <sup>th</sup>	10 <sup>th</sup>
	UG OE-1* [05/12]	DES601A [09]	M.Tech. Thesis [18]	M.Tech. Thesis [27]	M.Tech. Thesis [27]
	-	DES602A [09]	-	-	-
		DES603A [09]			
		DES682A [09]			
		DES681A [09]			
	DE PG-1 [09]*				
	<b>05/12</b>	<b>54</b>	<b>18</b>	<b>27</b>	<b>27</b>

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

UG Component : 05 Credits  
 PG Component : 54 Credits  
 Thesis Component : 72 Credits

**Basket – A**

ART105A [11]  
 ART102A [11]  
 ME251A [05]  
 CS220A [12]  
 EE200A [11]

**Basket – B**

DES626A [09]  
 DES630A [09]  
 DES633A [09]

**REMARKS:**

- 1) \*UG OE should be selected from Basket – A.
- 2) DE PG should be selected from Basket – B.
- 3) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Des. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the dual degree programme. These will be waived from the parent department's BT/BS programme requirements and counted towards PG requirements.

**ENGINEERING SCIENCE: ENERGY, ENVIRONMENT AND CLIMATE (ES-EEC)**

B.TECH.				SEMESTER					Template No. ES-EEC-1
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	
C	MTH101A [11]	MTH102A [11]	ESO-1 [11] (ESO201A)	ESC201A [14]	ESO-5 [11] (ESO208A)	HSS-5 (Level-2) [09]	ME401A [10]	EEC421A [09]	
O	PHY103A [11]	PHY102A [11]	ESO-2 [11] (ESO204A)	SO-2 [11] (MSO201A)	ESO203A [11]	ME301A [06]	EEM606A [09]	OE-3/ DE-3 [09/11]	
U	CHM101A [03]	PHY101A [03]	SO-1 [06] (MSO203B)	HSS-3 (Level-2) [09]	HSS-4 (Level-2) [09]	EEC321A [09]	DE-1/ OE-2 [9/11]	DE-4 [09/11]	
R	TA101A [09]	ESC101A [14]	HSS-2 (Level-2) [11]	TA202A [06]	ME341A [10]	EEC322A [09]	DE-2 [09/11]	OE-4 [09]	
	LIF101A [06]	CHM102A [08]	TA201A [06]	CE412A [11]	EEC311A [09]	OE-1 [09]	DE-3/ OE-3 [09/11]	OE-5 [09]	
S	ENG112A/ HSS-1 (Level-1) [11]	PE102A [03]	COM200A [05]	-	ESXXXX [02]	OE-2/ DE-1 [09/11]	UGP-2 [09] (EEC411A)	UGP-3 [09] (EEC422A)	
E	PE101A [03]	-	CE211A [12]	-	-	UGP-1 [04] (EEC323) (Extra Credits)	-	UGP-4 [06] (EEC423A) (Extra Credits)	
S									
	54	50	62	51	52	51 – 57	55 – 61	54 - 64	

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 125	Credits
Department Elective (DE)	: 36	Credits
Open Elective (OE)	: 45	Credits
ESO/ SO	: 50	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 429</b>	<b>Credits</b>

**Basket – A**

EEM603A [09]	PH304A [??]
NT602A [09]	CE414A [??]
EE330A [11]	ME402A [??]
EE360A [09]	ART405A [??]
ME401A [10]	ECO442A [??]
EEM613 [09]	EEM609A [09]
CE442A [09]	ME690A [09]
CE717A [09]	NT611A [09]
ECO341A [12]	AE650A [09]
ART406A [09]	

**REMARKS:**

- 1) UGP-2 and UGP-3 are compulsory and are included under total DC credits.
- 2) ESO203A is a compulsory course for ES-EEC students and hence, cannot be counted towards ESO/SO credits.
- 3) All 4 DEs must be selected from Basket – A.
- 4) UGP-1 and UGP-4 are optional and do not count towards OE/DE or graduation requirements.
- 5) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.

**ENGINEERING SCIENCE: MECHANICS (ES-MCH)**

B.TECH.					Template No. ES-MCH-1			
SEMESTER								
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
C O U R S E S	MTH101A [11]	MTH102A [11]	ESC201A [14]	HSS-2 (Level-1) [11]	ESO-3 [14] (ESO205A)	PHY306A [09]	CHE391A [08]	HSS-5 (Level-2) [09]
	PHY102A [11]/ PHY103A [11]	PHY103A [11]/ PHY102A [11]	SO-1 [11] (MSO202A)	ESO-2 [11] (ESO208A)	MCH394A [09]	HSS-3 (Level-2) [09]	HSS-4 (Level-2) [09]	OE-2 [09]
	PHY101A [03]/ CHM101A [03]	CHM101A [03]/ PHY101A [03]	SO-2 [06] (MSO203B)	MCH201A [11] / ESO201A [11]	ME341A [08]	DE-1 [09/11]	UGP-3 [09] (MCH498)/ DE/OE [09/11]	DE-3 [09]
	ESC101A [14]/ TA101A [09] + LIF101A [06]	TA101A [09] + LIF101A [06]/ ESC101A [14]	ESO – 1 [08] (ESO209A)	MCH202A [09] / ESO202A [11]	ME353A [11]  ESXXXX [02]	UGP-2 [09] (MCH399A)/ OE/DE [09/11]		DE-4 [09]  OE-3 [09]
	ENG112A [11]/ HSS-1 (Level-1) [11]	CHM102A [08]	MCH204A [09] / ESO204A [11]	AE251A [08]		DC-1 [09] (Refer to basket-A)	DC-3/DC-4 [09] (Refer to basket- C/D)*	DC-4/DC-3 [09] (Refer to basket- D/C)*
	PE101A [03]	PE102A [03]	TA201A [06]/ TA202A [06]	TA202A [06]/ TA201A [06]	AE351A [05]	DC-2 [09] (Refer to basket-B)	DE-2 [09/11]	UGP-4 [09] (MCH499A) (Extra Credits)
	-	-	COM200A [05]	-	UGP-1 [04] (MCH398A) (Extra Credits)	-	OE-1 [09]	
	53/54	51/50	59/61	56/58	49/53	54 – 60	53 – 59	54 – 65

**MINIMUM CREDIT REQUIREMENT FOR GRADUATION:**

Institute Core (IC)	: 124	Credits
Department Compulsory (DC)	: 125	Credits
Department Elective (DE)	: 36	Credits
Open Elective (OE)	: 27	Credits
ESO/ SO	: 50	Credits
UGP/OE/DE	: 18	Credits
HSS (Level-I)	: 22	Credits
HSS (Level-II)	: 27	Credits
<b>Total</b>	<b>: 429</b>	<b>Credits</b>

**REMARKS:**

- 1) Since ESO201A, ESO202A & ESO204A are equivalent compulsory courses for ES-MCH, these may not be counted towards ESO/SO credits.
- 2) \*If DC-2 is selected from Basket – C then DC-4 should be from Basket – D, and vice-versa.
- 3) In 8<sup>th</sup> semester, if all electives and DC are selected with each of more than 11 credits, and UGP-4 is also opted, then the total credits may go up to 69 which is not allowed. Hence, students are advised to choose such courses by which they can register for maximum 65 credits.
- 4) UGP-1 and UGP-4 are optional and do not count towards OE/DE or graduation requirements.
- 5) Upto 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.

(ES-MCH... Continued)

Basket – A	Basket – B	Basket – C	Basket – D
XXXXXXX [11] Statistical Mechanics	AE670A [09]	BSE314A [09]	XXXXXXX [09] Earth Systems
XXXXXXX [09] MICROSCALE THERMAL SC.	AE676A [09]	BSE441A [09]	XXXXXXX [09] Atmosphere and environment
ME637A [09]/ AE747A [09]	AE675A [09]/ ME425A [09]/ ME623A [09]	PHY309A [09]	CE423A [09]
AE211A [11]	AE683A [09]/ ME628 [09]	PHY314A [09]	CE434A [09]
AE311A [09]	ME321A [09]/ ME622A [09]	XXXXXXX [11] Physics of Biomaterials: S&D	CE640A [09]
AE481A [09]	AE678A [09]/ ME626A [09]	XXXXXXX [09] Biosystems	CE642A [09]
AE453A [11]/ AE615A [11]/ AE622A [11]/ ME634A [11]	CHE678A [09]/ MEXXXX [09]	MCH412A [09]	PHY304A [09]/ PHY670A [09]
AE617A [11]/ AE625A [11]/ AE621A [11]/ ME647A [11]/ PHY672A [11]	ME671A [09]	-	ME725A [09]
ME355A [09]	ME721A [09]	-	-
MEXXXX [09] Hydrodynamic instabilities	ME728A [09]	-	-
	ME723A [09]	-	-
	-	-	-

## ENRRONMENTAL ENGINEERING AND MANAGEMENT

BT/BS-MT (Category – B) (from other departments)		Template No. EEM-1	
PG Requirements			
C O U R S E S	7 <sup>th</sup> and 8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
	EEM602A [09]	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	EEM603A [09]		
	EEM606A [09]		
	EEM614A [09]		
	DE PG-1 [09]		
	DE PG-2 [09]		
	DE PG-3 [09]		
	63	36	36

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 63 Credits  
 Thesis Component : 72 Credits

**REMARKS:**

- 1) All DE PG courses should be selected from amongst offered EEM courses in consultation with the thesis supervisor.
- 2) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 3) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the BT/BS-MT dual degree programme. These will be waived from the parent department's BT programme requirements and counted towards PG requirements.



## NUCLEAR ENGINEERING & TECHNOLOGY

BT/BS-MT (PG Part – Category – B) (from other departments)			Template No.NET-1	
C O U R S E S	SEMESTER			
	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
	NT602A [09]	NT621A [09]	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	NT611A [09]	NT614A [09]	-	-
	-	DE PG-1 [09]		
	DE PG-2 [09]			
18	36	36	36	

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 54 Credits

Thesis Component : 72 Credits

**REMARKS:**

- 1) At least one DE PG should be opted from NET courses.
- 2) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 3) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 4) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the dual degree programme. These will be waived from the parent department's BT/BS programme requirements and counted towards PG requirements.

## PHOTONICS SCIENCE AND ENGINEERING PROGRAMME

BT/BS – MT (PG Part – Category B) (from other departments)		Template No. LTP-1		
C O U R S E S	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
	PG-1 [09] (PSE601A)	PG-3 [09] (PSE604A)	M.Tech. Thesis [36]	M.Tech. Thesis [36]
	PG-2 [09] (PSE602A)	PG-4 [09] (PSE605A)		
	18	18	36	36

**MINIMUM CREDIT REQUIREMENT IN M.TECH PART FOR GRADUATION:**

PG Component : 36 Credits

Thesis Component : 72 Credits

**REMARKS:**

- 1) All courses to be taken with the permission of Supervisor/ DUGC Convener.
- 2) Course credits and Thesis credits mentioned under the dual degree template are only for the M.Tech. part of the programme. In addition to these credits, students are required to follow and complete all their graduation requirements for their UG programme.
- 3) Upto 36 OE credits may be used from the parent department's BT/BS minimum requirements to fulfil requirements for the dual degree programme. These will be waived from the parent department's BT/BS programme requirements and counted towards PG requirements.