BITS Pilani
Pilani | Dubai | Goa | Hyderabad | Mumbai
An Institution of Eminence

IOWA STATE UNIVERSITY
College of Engineering

B.E. Mechanical at BITS Pilani and B.S. Mechanical Engineering at ISU

Program Plan, Semester wise Pattern and Credit Arrangements

Schedule A1 – Credit Map detailing

The collaborative 'dual degree' programmes at the international level are being offered in collaboration with Iowa State University in the same specialization and at the same qualification level. In this 4-year collaborative 'dual degree' programme, students will spend the first two years alongwith a summer term (if required) at BITS Pilani campuses before getting transferred to Iowa State University in the USA for the remaining two years (i.e., years 3 and 4) of their study period. The courses mentioned in the semester-wise pattern in years 1 and 2, along with the summer term (if any), will be offered at BITS Pilani Campuses, whereas those courses specified in years 3 and 4 will be offered at ISU. The Equivalent Unit may be considered by assuming that a course of 1 unit offered at BITS Pilani is equivalent to a 1 credit point course offered by ISU. The actual units mapping of the courses shall be decided based on the equivalent courses offered at BITS Pilani and ISU. Accordingly, the ISU credit points will be converted into BITS course units and vice versa by making appropriate equivalency of these courses.

Semester-wise Pattern for Students Admitted to B.E. Mechanical at BITS Pilani and B.S. Mechanical Engineering at ISU								
Year	**First Semester**			**U**	**Second Semester**			**U**
I	BIO	F111	General Biology①	3	BIO	F110	Biology Laboratory	1
	CHEM	F110	Chemistry Laboratory	1	MATH	F112	Mathematics II ⑥	3
	CHEM	F111	General Chemistry	3	ME	F112	Workshop Practice	2
	MATH	F111	Mathematics I②	3	MATH	F113	Probability and Statistics⑦	3
	PHY	F110	Physics Laboratory③	1	EEE	F111	Electrical Sciences⑧	3
	PHY	F111	Mechanics, Oscillations and Waves④	3	BITS	F111	Thermodynamics⑨	3
	BITS	F110	Engineering Graphics⑤	2	CS	F111	Computer Programming⑩	4
	BITS	112	Technical Report Writing	2				
				18				**19**
Year	**Summer Term**							**U**
			Humanities Elective⑪					3
			Humanities Elective⑫					3
			Humanities Elective⑬					3
								9
Year	**First Semester**			**U**	**Second Semester**			**U**
	MATH	F211	Mathematics III ⑭	3	ECON Or MGTS	F211 Or F211	Principles of Economics⑲ Or Principles of Management	3
	ME	F211	Mechanics of Solids ⑮	3	ME	F218	Advanced Mechanics of Solids⑳	2
	ME	F212	Fluid Mechanics	3	ME	F221	Mechanisms and Machines㉑	3
	ME	F216	Materials Science &	3	ME	F315	Advanced Manufacturing	3

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Year	**First Semester**			**U**	**Second Semester**			**U**
II			Engineering⑯				Processes	
	ME	F217	Applied Thermodynamics⑰	4	ME	F316	Manufacturing Management	2
	ME	F219	Manufacturing Processes⑱	4	ME	F317	Engines, Motors, and Mobility	2
					ME	F341	Prime Movers & Fluid Machines	3
					BITS	F225	Environmental Studies㉒	3
				20				**21**
Year	**First Semester**			**U**	**Second Semester**			**U**
III	CE	2740	Engineering Statics ㉓	3	EE	4420	Introduction to Circuits and Instruments	2
	ME	2700	Introduction to Mechanical Engineering Design ㉔	3	ME	3450	Engineering Dynamics ㉖	3
	LIB	1600	Introduction to College Level Research	1	ME	3240L	Manufacturing Engineering Laboratory	1
	ME	2020	Mechanical Engineering - Professional Planning	R	EE	4480	Introduction to AC Circuits and Motors ㉗	2
	ENGR	1010	Engineering Orientation	R	ME	3250	Mechanical Component Design㉘	3
	PHYS	2320/ L	Introduction to Classical Physics II **+ Laboratory** ㉕	5	ENGL	3140	Technical Communication㉙	3
	ENGL	2500	Written, Oral, Visual, and Electronic Composition	3			3000-Level Math Course ㉚	4
	UST	1100	International First-Year Experience Seminar	1				
				16				**18**
IV	AERE	4940	Make to Innovate II ㉛	3	ME	4150	Mechanical Systems Design㊱	3
	ME	4210	System Dynamics and Control ㉜	4	ME	4360	Heat Transfer ㊲	4
	ME	4250	Optimization Methods for Complex Designs ㉝	3	ME	4190	Computer-Aided Design㊳	3
	ME	3700	Engineering Measurements ㉞	3			3000-Level Math Course ㊴	4
	ME	3350	Fluid Flow ㉟	4				
				18				**14**

Course sequences to be taken in years 3 and 4 at ISU are tentative and may change slightly. Academic advisors at ISU will work with students to set exact schedules upon entry to ISU.

Note: Units/Credit points earned for the course(s) in BITS Pilani and ISU shall be considered towards degrees to be awarded by both institutions in accordance with the following:

1. To complete the BITS Pilani Degree, students need to complete a minimum total of 144 units with a minimum number of 49 courses (Thirty-two courses with 87 units (min.) offered by BITS in first two years + Seventeen courses with 57 equivalent units offered by ISU). The Equivalent Unit is considered by assuming that a course of 1 units offered at BITS Pilani is equivalent to a 1 credit points course offered by ISU.

2. To complete the ISU Degree, students need to complete 129 credit points in total (3 waved courses with 12 units + 22 mapped courses with 68 equivalent credit points offered by BITS in the first two years + 24 courses with 65 credit points offered by ISU).
3. Upon completion of all BITS Pilani Courses during Years 1 and 2 (including summer term, if any) at the BITS Campus, students will receive 12+68 = 80 credit points as an ISU credit exemption against the 3 waived + 22 mapped Courses to complete the ISU Degree in accordance with ISU's policies and procedures.
4. Upon completion of all ISU Courses, students will receive 57 units of transfer credit for the Seventeen mapped courses to complete the BITS Pilani Degree in accordance with BITS' policies and procedures.
5. The actual units mapping of the courses shall be decided based on the equivalent courses offered at BITS Pilani and ISU.
6. The details of an encircled number given against the selected courses in the semester-wise pattern are given below:

Symbol	Description
①	BIO F111: General Biology and BIO F110: Biology Laboratory is the compulsory foundation courses at BITS. These two courses will be considered as an equivalent to BIOL 1010: Introductory Biology to fulfil the general education elective requirement at ISU. Thus, it will fulfill the requirement of 1st course under General Education Requirement Elective out of the total 6 courses required under this category at ISU.
②	MATH F111: Mathematics I is the compulsory foundation course at BITS. It will be considered as an equivalent to MATH 2650: Calculus III to fulfil the ISU requirement. MATH 2650 is considered to fill credit deficiency in ISU Basic Program.
③	PHY F110: Physics Laboratory is the compulsory foundation course at BITS. It will be considered as an equivalent to PHYS2310L: Introduction to Classical Physics I Laboratory to fulfil the ISU requirement.
④	PHY F111: Mechanics, Oscillations and Waves is the compulsory foundation course at BITS. It will be considered as an equivalent to PHYS 2310: Introduction to Classical Physics I to fulfil the ISU requirement.
⑤	BITS F110: Engineering Graphics is the compulsory foundation course at BITS. It will be considered as an equivalent to ME 1700: Engineering Graphics and Introductory Design to fulfil the ISU requirement.
⑥	Course MATH F112: Mathematics II is the compulsory foundation course at BITS. It will be considered as an equivalent to MATH 2070: Matrices and Linear Algebra to fulfil the ISU requirement.
⑦	Course MATH F113: Probability and Statistics is the compulsory foundation course at BITS. It will be considered as an equivalent to STAT 3050: Engineering Statistics to fulfil the ISU requirement. MATH 2650 is considered to fill credit deficiency in ISU Basic Program.
⑧	Course EEE F111: Electrical Sciences is the compulsory foundation course at BITS. It will be considered as an equivalent to EE 2010: Electric Circuit to fulfil the ISU requirement.
⑨	Course BITS F111: Thermodynamics is the compulsory foundation course at BITS. It will be considered as an equivalent to ME 2310: Engineering Thermodynamics I offered at ISU.

Symbol	Description
⑩	Course CS F111: Computer Programming is the compulsory foundation course at BITS. It will be considered as an equivalent to ME 1600: Mechanical Engineering Problem Solving with Computer Applications a foundation course offered at ISU.
⑪	This would be the 1st Humanities Elective (HUEL) out of total required 3 HUELs at BITS. Students should select this course from the pool of Humanities electives (defined for BITS-ISU students) offered at BITS in such a way that the selected course will also fulfill the requirement of a course at ISU offered under General Education Requirement Elective Category. Thus, it will fulfill the requirement of 2nd course under General Education Requirement Elective out of the total 5 courses required under this category at ISU.
⑫	This would be the 2nd Humanities Elective (HUEL) out of total required 3 HUELs at BITS. Students should select this course from the pool of Humanities electives (defined for BITS-ISU students) offered at BITS in such a way that the selected course will also fulfill the requirement of a course at ISU offered under General Education Requirement Elective Category. Thus, it will fulfill the requirement of 3rd course under General Education Requirement Elective out of the total 5 courses required under this category at ISU.
⑬	This would be the 3rd Humanities Elective (HUEL) out of total required 3 HUELs at BITS. Students should select this course from the pool of Humanities electives (defined for BITS-ISU students) offered at BITS in such a way that the selected course will also fulfill the requirement of a course at ISU offered under General Education Requirement Elective Category. Thus, it will fulfill the requirement of 4th course under General Education Requirement Elective out of the total 5 courses required under this category at ISU.
⑭	Course MATH F211: Mathematics III is the compulsory foundation course at BITS. It will be considered as an equivalent to MATH 2670: Elementary Differential Equations and Laplace Transforms, a foundation course offered at ISU. Mathematics I, II and III offered at BITS may fulfill mathematics requirements of ISU.
⑮	Course ME F211: Mechanics of Solids is the required core course at BITS. It will be considered as an equivalent to EM 3240 Mechanics of Materials a required course offered at ISU.
⑯	Course ME F216: Materials Science & Engineering is the required core course at BITS. It will be considered as an equivalent to MATE 2730 Principles of Materials Science and Engineering a required course offered at ISU.
⑰	Course ME F217: Applied Thermodynamics is the required core course at BITS. It will be considered as an equivalent to ME 3320 Engineering Thermodynamics II a required course offered at ISU.
⑱	Course ME F219: Manufacturing Processes is the required core course at BITS. It will be considered as an equivalent to ME 3240 Manufacturing Engineering a required course offered at ISU.
⑲	The course ECON F211: Principles of Economics is a required course at BITS Pilani. This course will be considered as equivalent to ECON 1010: Principles of Microeconomics course offered at ISU under General Education Requirement Elective Category. Thus, it will fulfill the requirement of 5th course under General Education Requirement Elective out of the total 5 courses required under this category at ISU.
⑳	Course ME F218: Advanced Mechanics of Solids is the required core course at BITS. It will be considered as an equivalent to EM 4240: Intermediate Mechanics of Materials a required course

Symbol	Description
	offered at ISU.
㉑	Course ME F221: Mechanisms and Machines is the required core course at BITS. It will be considered as an equivalent to ME 4160: Mechanism Design and Analysis a required course offered at ISU.
㉒	The course BITS F225: Environmental Studies is a required course under general awareness courses at BITS Pilani. This course will be considered as equivalent to ENVS 3340: Environmental Ethics course offered at ISU under General Education Requirement Elective Category. Thus, it will fulfill the requirement of 5th course under General Education Requirement Elective out of the total 5 courses required under this category at ISU.
㉓	Course CE 2740: Engineering Statics is the core course offered at ISU. Also, this course will be treated as 1st Open Elective (OPEL) out of total required 5 at BITS.
㉔	Course ME 2700: Introduction to Mechanical Engineering Design is the core course offered at ISU. Also, this course will be treated as 1st Discipline Elective course required at BITS Pilani.
㉕	Course PHYS 2320: Introduction to Classical Physics II & course PHYS 2320L: Introduction to Classical Physics II Laboratory are the core courses offered at ISU. Also, these courses will be treated as 2nd Open Elective (OPEL) out of total required 5 at BITS.
㉖	Course ME 3450: Engineering Dynamics is the core course offered at ISU. Also, this course will be treated as 2nd Discipline Elective course required at BITS Pilani.
㉗	Course EE 4480: Introduction to AC Circuits and Motors is a core course offered at ISU. Also, this course will be treated as 3rd Open Elective (OPEL) out of total required 5 at BITS.
㉘	Course ME 3250: Mechanical Component Design is the core course offered at ISU. Also, this course will be considered as equivalent to ME F314: Design of Machine Elements at BITS a, required core course offered at BITS Pilani.
㉙	Course ENGL 3140: Technical Communication would be a course under the requirement of Communication requirement at ISU. Also, will be treated as 4th Open Elective (OPEL) out of total required 5 at BITS.
㉚	This course would be a course under the requirement of 3000-Level Math course required at ISU. BITS-ISU students should select this course from the pool of 3000-Level Math courses offered at ISU. Also, will be treated as 5th Open Elective (OPEL) out of total required 5 at BITS.
㉛	Course AERE 4940: Make to Innovate II is a project-based technical elective course for mechanical engineering students offered at ISU. This will be considered as equivalent to BITS F456: Capstone Project I, which is the required course offered at BITS Pilani. This is the 1st Capstone Project out of 2 required at BITS.
㉜	Course ME 4210: System Dynamics and Control is the core course offered at ISU. Also, this course will be considered as equivalent to ME F319: Vibrations and Control a, required core course offered at BITS Pilani.
㉝	The course ME 4250: Optimization Methods for Complex Designs is a required course at ISU. Also, this course will be considered as equivalent to ME F320: Engineering Optimization, a required core course offered at BITS Pilani.
㉞	Course ME 3700: Engineering Measurements is the core course offered at ISU. Also, this course will be treated as 3rd Discipline Elective course required at BITS Pilani.

Symbol	Description
㉟	Course ME 3350: Fluid Flow is the core course offered at ISU. Also, this course will be treated as 4th Discipline Elective course required at BITS Pilani.
㊱	Course BITS F457: Capstone Project II is the required course offered at BITS Pilani. Also, this course will be considered as equivalent to the course ME 4150: Mechanical Systems Design offered as Capstone Design at ISU. This is the 2nd Capstone Project out of 2 required at BITS.
㊲	Course ME 4360: Heat Transfer is the core course offered at ISU. Also, this course will be considered as equivalent to ME F220: Heat Transfer a required core course offered at BITS Pilani.
㊳	The course ME 4190: Computer-Aided Design required to be offered by ISU as a Technical Elective at ISU. Also, this course will be considered as equivalent to a required core course ME F318: Computer-Aided Design offered at BITS Pilani.
㊴	This course would be a course under the requirement of 3000-Level Math course required at ISU. BITS-ISU students should select this course from the pool of 3000-Level Math courses offered at ISU. Also, will be treated as 6th Open Elective (OPEL) required at BITS.