B.E. Electrical & Electronics at BITS Pilani and B.S. in Electrical Engineering at RPI

Program Plan, Semester wise Pattern and Credit Arrangements

Schedule A1 – Credit Map detailing

The collaborative 'dual degree' programmes at the international level are proposed to be offered in collaboration with Rensselaer Polytechnic Institute in the same specialization and at the same qualification level. The general curricular structure and semester-wise pattern for the students admitted under Collaborative Articulation Pathway for BITS-RPI collaborative programmes is given in **Table 1.** To fulfil the requirements, a few new courses may be introduced later, if required.

In this 4-year collaborative 'dual degree' programme, students will spend the first two years along with a summer term (if required) at BITS Pilani campuses before getting transferred to Rensselaer Polytechnic Institute 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 RPI. The actual units mapping of the courses shall be decided based on the equivalent courses offered at BITS Pilani and RPI. Accordingly, the RPI credit points will be converted into BITS course units and vice versa by making appropriate equivalency of these courses.

Table 1: Semester-wise Pattern for Students Admitted to B.E. Electrical & Electronics at BITS Pilani and Bachelor of Science in Electrical Engineering at RPI under BITS – RPI 2+2 International Collaborative Programmes

Semester-wise Pattern for Students Admitted to B.E. Electrical & Electronics under BITS-RPI							
Year	First Semester			U	Second Semester		U
I	BIO	F101	Introduction to Biological Sciences①	3	ME	F112	Workshop Practice⑥	2
	CHEM	F101	Fundamentals of Chemistry②	3	BITS	F111	Thermodynamics ⑦	3
	MATH	F101	Multivariable Calculus③	3	CS	F111	Computer Programming⑧	4
	PHY	F101	Oscillations and Waves ④	3	EEE	F111	Electrical Sciences ⑨	3
	BITS	F234	Introduction to Engineering Design⑤	4	MATH	F102	Linear Algebra and Complex Variables ③	3
	BITS	F101	Navigating Campus Life and Living Well⑫	1	MATH	F113	Probability and Statistics ⑩	3
	BITS	K101	Physical Fitness, Health Well-being and Creative Arts ⑫		BITS	F112	Technical Report Writing⑪	2
					BITS	F102	Innovation and Design Thinking ⑫	1
				17				21

Summer Term		
Humanities Elective ⑬		3
Humanities Elective ⑭		3

Year	First Semester			U	Second Semester		U
II	MATH	F211	Mathematics III⑮	3	ECON	F211	Principles of Economics	3
	EEE	F211	Electrical Machines⑯	4			or	or
	EEE	F212	Electromagnetic Theory⑰	3	MGTS	F211	Principles of Management㉑	3
	EEE	F215	Digital Design⑱	4	EEE	F241	Microprocessors & Interfacing ㉒	4
	EEE	F214	Electronic Devices⑲	3	EEE	F242	Control Systems㉓	3
	EEE	F244	Microelectronic Circuits⑳	3	EEE	F341	Analog Electronics㉔	4
					BITS	F225	Environmental Studies㉕	3
							Open Elective㉖	3
				20				20

Year	First Semester			U	Second Semester		U
III	ECSE	2900	ECSE Enrichment Seminar㉗	1	ADMN	1030	Arch Exploration & Planning – Eng. ㉜	0
	ECSE	4__	ECSE Technical Elective㉘	3-4	MANE	2220	Inventor's Studio 1 (w/ PD1) ㉝	4
	ECSE	2410	Signals and Systems㉙	3	ECSE	4__	ECSE Technical Elective㉞	3-4
	PHYS	1200	Physics II ㉚	4	HASS		HASS Core Elective㉟	4
	STSO	4100	Prof. Dev.: Technical Issues & Solutions㊼	2			Free Elective㊱	4

Semester-wise Pattern for Students Admitted to B.E. Electrical & Electronics under BITS-RPI							
Year	**First Semester**			**U**	**Second Semester**		**U**
	HASS		HASS Core Elective㉛	4			
				17/18			**15/16**
Year	**First Semester**			**U**	**Second Semester**		**U**
IV	ECSE	4___	ECSE Technical Elective㊲	3-4	ENGR	4010	Prof. Dev.: Leadership Competencies ㊼	1
	ECSE	4560	Modern Communication Systems ㊳	3	ECSE	4900	Multidisciplinary Capstone Design ㊷	3
	ECSE	4030	Analog IC Design㊴	3	ECSE	4110	Power Engineering Analysis㊸	3
	ECSE	4220	VLSI Design㊴	3	HASS		HASS Core Elective ㊹	4
	HASS		HASS Core Elective㊵	4	ECSE	4080	Semiconductor Power Electronics㊺	3
	MANE	4280	Numerical Design Optimization㊶	3	ECSE	4__	ECSE Technical Elective㊻	3-4
				19/20				**17/18**

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

The details of an encircled number given against the selected courses in the semester-wise pattern are given below:

Symbol	Description
①	Course BIO F101: Introduction to Biological Sciences is a required course at BITS Pilani. It will be considered as equivalent to BIOL 1010: Introduction to Biology & BIOL 1015: Introduction to Biology Laboratory at RPI.
②	Courses CHEM F101: Fundamentals of Chemistry is required course at BITS Pilani. It will be considered equivalent to CHEM 1100: Principles of Chemistry I, a required course at RPI.
③	Courses MATH F101: Multivariable Calculus I and MATH F102: Linear Algebra and Complex Variables are required courses at BITS Pilani. In combination, they will be considered equivalent to MATH 2010: Multivariable Calculus and Matrix Algebra, a required course at RPI.
④	Courses PHY F101: Oscillations and Waves is required courses at BITS Pilani. It will be considered equivalent to PHYS 1100: Physics I, a required course at RPI.
⑤	Course BITS F234: Introduction to Engineering Design is a required course at BITS Pilani. It will be considered equivalent to ENGR 2050: Introduction to Engineering Design, a required course at RPI.
⑥	Course ME F112: Workshop Practice is a required course at BITS Pilani. It will be considered equivalent to ENGR 1300: Engineering Processes, a required course at RPI.
⑦	Course BITS F111: Thermodynamics is a required course at BITS Pilani. It will be considered equivalent to MANE 2710: Thermodynamics, a required course at RPI.
⑧	Course CS F111: Computer Programming is a required course at BITS Pilani. It will be considered equivalent to CSCI 1100: Computer Science I at RPI.

⑨	Course EEE F111: Electrical Sciences is a required course at BITS Pilani. It will be considered equivalent to ECSE 2010: Electric Circuits at RPI.
⑩	Course MATH F113: Probability and Statistics is a required course at BITS Pilani. It will be considered equivalent to ENGR 2600: Modeling and Analysis of Uncertainty, a required course at RPI.
⑪	Course BITS F112: Technical Report Writing is a required course at BITS Pilani. It will be considered equivalent to COMM 1000: Communications Elective at RPI.
⑫	Course BITS F101: Navigating Campus Life and Living Well, course BITS K101: Physical Fitness, Health Well-being and Creative Arts, and course BITS F102: Innovation and Design Thinking are the required courses at BITS Pilani. These will be offered to meet the graduation requirements of BITS Pilani only.
⑬	The course is required to offered to fulfill Humanities Elective Requirement at BITS Pilani. This would be the 1st Humanities Elective (HUEL) out of total required 3 HUELs. It will be offered to meet the graduation requirements of BITS Pilani only.
⑭	The course is required to offered to fulfill Humanities Elective Requirement at BITS Pilani. This would be the 2nd Humanities Elective (HUEL) out of total required 3 HUELs. It will be offered to meet the graduation requirements of BITS Pilani only.
⑮	Course MATH F211: Mathematics III is a required course at BITS Pilani. It will be considered equivalent to MATH 2400: Introduction to Differential Equations, a required course at RPI.
⑯	Course EEE F211: Electrical Machines is a required course at BITS Pilani. It will be considered equivalent to ECSE 2110: Electrical Energy Systems, a required course at RPI.
⑰	Course EEE F212: Electromagnetic Theory is a required course at BITS Pilani. It will be considered equivalent to ECSE 2100: Fields and Waves, a required course at RPI.
⑱	Course EEE F215: Digital Design is a required course at BITS Pilani. It will be considered equivalent to ECSE 2610: Computer Components and Operations, a required course at RPI.
⑲	Course EEE F214: Electronic Devices is a required course at BITS Pilani. It will be considered equivalent to ECSE 2210: Microelectronic Technology, a required course at RPI.
⑳	Course EEE F244: Microelectronic Circuits is a required course at BITS Pilani. It will be considered equivalent to ECSE 2050: Introduction to Electronics, a required course at RPI.
㉑	Either ECON F211: Principles of Economics or MGTS F211: Principles of Management are required at BITS Pilani. They will be considered equivalent to INQR 1200: Principles of Economics or MGMT 1100: Management in the Digital Age, respectively, at RPI.
㉒	Course EEE F241: Microprocessors & Interfacing is a required course at BITS Pilani. It will be considered equivalent to ENGR 2350: Embedded Control, a required course at RPI.
㉓	Course EEE F242: Control Systems is a required course at BITS Pilani. It will be considered equivalent to ECSE 4440: Control Systems Engineering, an elective course at RPI.
㉔	Course EEE F341: Analog Electronics is a required course at BITS Pilani. It will be considered equivalent to ECSE 4030: Analog Design, an elective course at RPI.
㉕	Course BITS F225: Environmental Studies is a required course at BITS Pilani. It will be considered equivalent to STSO 2300: Environment and Society at RPI.

㉖	BITS RPI students have to take any one minimum 3 credit (Unit) course as an Open Elective. It will be the 1st Open Elective course out of 5 required at BITS.
㉗	Course ECSE 2900: ECSE Enrichment Seminar is the required course offered at RPI. It will be offered to meet graduation requirements of RPI only.
㉘	BITS-RPI students are advised to take any one 3-4 credit course from the list of ECSE Technical Electives offered at RPI. This course would be considered as ECSE Technical Electives at RPI. Also, this will be considered as the 1st Discipline Elective course out of 4 required courses at BITS.
㉙	Course ECSE 2410: Signals and Systems is a required course offered at RPI. Also, this course will be considered as equivalent to EEE F243: Signals & Systems a required core course offered at BITS Pilani.
㉚	Course PHYS 1200: Physics II is the required course offered at RPI. Also, this will be considered as the 2nd Discipline Elective course out of 4 required courses at BITS.
㉛	This course would be the 1st HASS Core Elective out of the total required 4 courses under this category at RPI. This would also be considered as the 3rd Humanities Elective (2 Humanities Electives will be completed at BITS Pilani during first two years) course out of 3 required at BITS. Students should select this course from the pool of HASS Core electives offered at RPI. Students should consult: https://hass.rpi.edu/advising/hass-integrative-pathways.
㉜	Course ADMN 1030: Arch Exploration & Planning is the required course offered at RPI. It will be offered to meet graduation requirements of RPI only.
㉝	Course MANE 2220: Inventor's Studio 1 (w/ PD1) is an elective course offered at RPI that fulfills the Engineering Design Elective at RPI. This course is equivalent to BITS F456: Capstone Project I to be offered at BITS Pilani.
㉞	BITS-RPI students are advised to take any one 3-4 credit course from the list of ECSE Technical Electives offered at RPI. Student should consult: https://ecse.rpi.edu/academics/undergraduate-programs#concentration. This course would be considered as ECSE Technical Electives at RPI. Also, this will be considered as the 3rd Discipline Elective course out of 4 required courses at BITS
㉟	This course would be the 2nd HASS Core Elective out of the total required 4 courses under this category at RPI. This would also be considered as the 2nd Open Elective course out of 5 required at BITS. Students should select this course from the pool of HASS Core electives offered at RPI.
㊱	BITS-RPI students are advised to take any one 4 credits course offered at RPI. This would also be considered as the 3rd Open Elective course out of 5 required at BITS.
㊲	BITS-RPI students are advised to take any one 3-4 credit course from the list of ECSE Technical Electives offered at RPI. This course would be considered as ECSE Technical Electives at RPI. Also, this will be considered as the 4th Discipline Elective course out of 4 required courses at BITS.
㊳	BITS-RPI students are advised to take the course ECSE 4560: Modern Communication System compulsorily at RPI. This will be considered as ECSE Laboratory Elective at RPI. Also,

	this will be considered as equivalent to EEE F311: Communication Systems a required core course at BITS Pilani.
�39	BITS-RPI students are advised to take the course ECSE 4030: Analog IC Design and ECSE 4220: VLSI Design compulsorily at RPI. Course ECSE 4030 will be considered as ECSE Restricted Elective and course ECSE 4220 will be considered as extra free elective to complete graduation credit requirements at RPI. Also, these two courses will be combinedly considered as equivalent to EEE F313: Analog & Digital VLSI Design a required core course at BITS Pilani.
㊵	This course would be the 3rd HASS Core Elective out of the total required 4 courses under this category at RPI. This would also be considered as the 4th Open Elective course out of 5 required at BITS. Students should select this course from the pool of HASS Core electives offered at RPI.
㊶	BITS-RPI students are advised to take the Course MANE 4280: Numerical Design Optimization compulsorily. This course would be considered as Free Electives offered at RPI. Also, this course will be considered as equivalent to ME F344: Engineering Optimization a required core course offered at BITS Pilani.
㊷	Course ECSE 4900: Multidisciplinary Capstone Design is the required course offered at RPI. Also, this will be equivalent to BITS F457: Capstone Project II to be offered at BITS Pilani. All BITS-RPI students have to do two Capstone Projects in place of Practice School II/Thesis.
㊸	BITS-RPI students are advised to take the course ECSE 4110: Power Engineering Analysis compulsorily at RPI. This will be considered as ECSE Restricted Elective at RPI. Also, this will be considered as equivalent to EEE F312: Power Systems a required core course at BITS Pilani.
㊹	This course would be the 4th HASS Core Elective out of the total required 4 courses under this category at RPI. This would also be considered as the 5th Open Elective course out of 5 required at BITS. Students should select this course from the pool of HASS Core electives offered at RPI.
㊺	BITS-RPI students are advised to take the course ECSE 4080: Semiconductor Power Electronics compulsorily at RPI. This will be considered as Free Elective at RPI. Also, this will be considered as equivalent to EEE F342: Power Electronics a required core course at BITS Pilani.
㊻	BITS-RPI students are advised to take any one 3-4 credit course from the list of ECSE Technical Electives offered at RPI. This course would be considered as ECSE Technical Electives at RPI. This course will be considered as an extra open elective to meet the graduation requirements at BITS Pilani.
㊼	The STSO 4100: Prof. Dev. – Technical Issues & Solutions and ENGR 4010: Prof. Dev. – Leadership Competencies are required courses offered at RPI. This course will be considered as an extra open elective to meet the graduation requirements at BITS Pilani.