B.E. Electronics and Communication at BITS Pilani and B.S. Electrical Engineering at UB

Program Plan, Semester wise Pattern and Credit Arrangements

Schedule A1 – Credit Map detailing

The collaborative 'dual degree' programmes at the international level will be offered in collaboration with University at Buffalo in the same specialization and at the same qualification level. The general curricular structure for the students admitted under Augmented Collaborative Articulation Pathway under BITS-UB collaboration is given in **Table 1**. 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 transferring to the University at Buffalo in the USA for the remaining two years (i.e., years 3 and 4) of their study period. To fulfil the requirements, the programme mapping has been done to fulfil the degree requirements of both the Universities. The semester-wise pattern for students admitted to B.E. Electronics and Communication (BITS) / B.S. Electrical Engineering (UB) programme to be offered under BITS – UB is given below.

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 UB. 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 UB. The actual units mapping of the courses shall be decided based on the equivalent courses offered at BITS Pilani and UB. Accordingly, the UB credit points will be converted into BITS course units, and for the UB degree UB will transfer the number of credits assigned by BITS to its courses.

Table 1: Semester-wise Pattern for Students Admitted to B.E. Electronics and Communication at BITS Pilani and B.S. Electrical Engineering at UB under BITS – UB 2+2 International Collaborative Programmes

Semester-wise Pattern for Students Admitted to B.E. Electronics and Communication under BITS – UB								
Year	**First Semester**			**U**	**Second Semester**			**U**
	BIO	F110	Biology Laboratory①	1	MATH	F112	Mathematics II ⑩	3
	BIO	F111	General Biology②	3	ME	F112	Workshop Practice⑪	2
	CHEM	F110	Chemistry Laboratory ③	1	BITS	F111	Thermodynamics ⑫	3
	CHEM	F111	General Chemistry ④	3	CS	F111	Computer Programming ⑬	4
	MATH	F111	Mathematics I ⑤	3	MATH	F113	Probability and Statistics ⑭	3
	PHY	F110	Physics Laboratory ⑥	1	EEE	F111	Electrical Sciences ⑮	3
	PHY	F111	Mechanics, Oscillations and Waves ⑦	3	PHY	108	Physics 2 ⑯	4
	BITS	F110	Engineering Graphics ⑧	2				
	ELI	100 or 105	Intro to Academic Writing (offered by UB to fulfill UBC CL1 requirement ⑨	3 Or 4				
				20				**22**
Summer Term								
ELI 105: Writing and Rhetoric ONLY if students were placed into ELI 100 in first fall term ⑰								4
1st Humanities Elective (The course is required to offered to fulfill Humanities Elective Requirement at BITS Only ⑱								3
	MATH	F211	Mathematics III ⑲	3	ECON Or MGTS	F211 Or F211	Principles of Economics Or Principles of Management㉖	3
	ECE	F211	Electrical Machines ⑳	4	ECE	F241	Microprocessors and Interfacing ㉗	4
	ECE	F314	EM Fields and Microwave Engineering ㉑	3	ECE	F242	Control Systems ㉘	3
	ECE	F215	Digital Design ㉒	4	ECE	F243	Signals & Systems ㉙	3

Semester-wise Pattern for Students Admitted to B.E. Electronics and Communication under BITS – UB								
Year	**First Semester**			**U**	**Second Semester**			**U**
II	EAS	360	STEM Communications ㉓	3	BITS	F225	Environmental Studies ㉚ **<PW1>**	3
	ECE	F312	EM Fields and Microwave Engineering Laboratory㉔	1	DIV		Thematic Pathway List 1 Course to satisfy Diversity requirement ㉛**<PW2>**	3
			Open Elective ㉕	3				
				21				**19**
III	EE	310	Electronic Devs & Circs 1 ㉜	3	EE	311	Electronic Devs & Circs 2 ㊳	3
	EE	352	Intro Electronics Lab ㉝	3	EE	383	Communications Systems I ㊴	3
	EAS OR MTH	230 OR 309	Engineering Computations OR Intro Linear Algebra ㉞	3 4	EE	336	Fundamentals of Energy Systems ㊵	3
			Thematic or Global Pathway Course ㉟**<PW3>**	3	EE	353	Electronic Circuits ㊶	3
	EAS	198	UB Seminar㊱	1	PHY	207	General Physics 3 ㊷	4
	PHY	158	General Physics II Lab㊲	1	PHY	257	Physics 3 Lab㊸	1
				14				**17**
IV	EE EE	408 499	Senior Seminar ㊹ Independent Study	1 3	EE	494	Senior Capstone Design Project ㊾	3
	EE	478	HDL Based Digital Design with Programmable Logic ㊺	3	EE	434	Principles of Networking ㊿	3
	EE	491	Analog Integrated Circuits ㊻	3	EE	439	Principle of Information Theory and Coding(51)	3
			EE Electives ㊼	3	ECE	434	Digital Signal Processing(52)	3
			Thematic or Global Pathway Course (Humanities Elective for BITS) ㊽**<PW4>**	3	UBC	399	UB Curriculum Capstone(53)	1
				16				**13**

Note: Units/Credit points earned for the course(s) in BITS Pilani and UB 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 (four courses with 12 units offered jointly by UB (online) & BITS + 27 courses with 72 units (min.) offered by BITS in first two years + 18 with 60 equivalent units offered by UB). 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 UB.
2. To complete the UB degree, students follow degree requirements in effect in the UB Undergraduate Catalogue as of the date they initially enroll in the UBITS programme; accordingly, they need to complete 40 course-based requirements in total (4 courses offered online by UB in the first two years and 14 mapped courses offered by BITS in the first two years + 22 courses offered by UB in the final two years); more than 50% of the UB degree requirements must be delivered by UB to comply with SUNY policy.
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 43 credit points as a UB credit exemption (UB transfer credit) against the 14 mapped courses to complete the UB Degree in accordance with UB's policies and procedures; not all BITS course transferred to UB will apply to UB degree requirements.
4. Upon completion of all UB Courses, students will receive 72 (=12+60) units of transfer credit for the 22 (=4+18) 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 UB.
6. The details of an encircled number given against the selected courses in the semester-wise pattern are given below:

Symbol	Description
①	Course BIO F110: Biology Laboratory is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani only.
②	Course BIO F111: General Biology is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani. This course will satisfy a 100-Level Technical Elective (EAS 199 substitute) requirement at UB. (Students may be allowed to choose other BITS courses (e.g., BITS F111, MATH F112, ECE F242) to satisfy UB's 100-level requirement, but this course seems just as good as any other and can be used consistently between programs).
③	Course CHEM F110: Chemistry Laboratory is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to CHE 113LAB: General Chemistry at UB, and an acceptable substitute for the CHE 127: General Chemistry for Engineers Laboratory 1 degree requirement at UB.
④	Course CHEM F111: General Chemistry is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to CHE 999 at UB, and an acceptable substitute for the CHE 107: General Chemistry for Engineers 1 degree requirement at UB.
⑤	Course MATH F111: Mathematics I is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to MTH 241: Calculus 3 a required course offered at UB. (Note: Though the Courses MTH 141: Calculus 1 and MTH 142: Calculus 2 are the foundation courses offered at UB, their course contents are overlapping with the NCERT syllabus, which are studied by the students at their Higher secondary level. Therefore, MTH 141: Calculus 1 and MTH 142: Calculus 2 requirements at UB shall be waived).
⑥	Course PHY F110: Physics Laboratory is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to PHY 151: Physics Lab 1 at UB. This course will not satisfy a degree requirement at UB.
⑦	Course PHY F111: Mechanics, Oscillations and Waves is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to PHY 107LR: General Physics 1, a required course offered at UB.
⑧	Course BITS F110: Engineering Graphics is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to EAS 999TR177/MAE 177: Engineering Drawing and CAD at UB. This course will not satisfy a degree requirement at UB.
⑨	Course ELI 105: Writing and Rhetoric is the required UB Curriculum course offered at UB. It would be offered by UB to fulfill UB requirement through online mode. It may be considered as Open Elective for BITS requirement by mapping with courses such as HSS F224 English Skills for Academic, GS F223 Introduction to Mass Communication or GS F325 Journalism or GS F326 Creative Thinking or GS F344 Copywriting. This course can be considered as the 1st Open Elective course out of 5 required at BITS.
⑩	Course MATH F112: Mathematics II is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani only.
⑪	Course ME F112: Workshop Practice is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani only.
⑫	Course BITS F111: Thermodynamics is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani only.
⑬	Course CS F111: Computer Programming is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to EAS 240: Introduction to Programming for Engineers, a required course offered at UB. Both courses are mapped to fulfill the requirement of the respective Institutes.
⑭	Course MATH F113: Probability and Statistics is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to EE 305: Applied Probability, a required course at UB.

⑮	Course EEE F111: Electrical Sciences is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to EE 202: Circuit Analysis a required course offered at UB.
⑯	Course PHY 108: Physics 2 is the required course offered at UB. It would be offered by UB to fulfill UB requirement through online mode. It will be considered as equivalent to ECE F212 Electromagnetic Theory offered at BITS.
⑰	ELI 105: Writing and Rhetoric is required only if students were placed into ELI 100 in first fall term (Students who do not meet placement requirements. These students would then take ELI 105 in the summer between Year 1 and Year 2, remotely online offered by UB).
⑱	The course is required to offered to fulfill Humanities Elective Requirement at BITS Only. This would be the 1st Humanities Elective (HUEL) out of total required 3 HUELs. Students shall choose one course from the following three courses: HSS F234 or HSS F318 or HSS F333; HSS F235 or HSS F313 or HSS F343 or HSS 353 or HSS F399.
⑲	Course MATH F211: Mathematics III is a compulsory foundation course at BITS Pilani. It will be considered as equivalent to MTH 306: Differential Equations, a required course offered at UB.
⑳	Course ECE F211: Electrical Machines is the required core course offered at BITS. It will be offered to meet the graduation requirements of BITS Pilani only.
㉑	Course ECE F314: EM Fields and Microwave Engineering is a required core course at BITS. It will be considered as equivalent to EE 324 Electromagnetic Theory required at UB.
㉒	Course ECE F215: Digital Design is a required core course at BITS in 2nd Year. Also, this course will be considered as equivalent to EE 178: Digital Principles offered at UB.
㉓	Course EAS 360: STEM Communications is the required course offered at UB. It will be considered as an equivalent to BITS F112: Technical Report Writing, a required foundation course at BITS Pilani.
㉔	Course ECE F312: EM Fields and Microwave Engineering Laboratory is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani only.
㉕	BITS-UB students are required to take and complete any single offered course to meet Open Elective requirements of BITS Pilani only. This course will be considered as the 2nd Open Elective course out of 5 required at BITS.
㉖	Course ECON F211 Principles of Economics OR MGTS F211: Principles of Managements is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani only.
㉗	Course ECE F241: Microprocessors and Interfacing is a required core course at BITS. Also, this course will be considered as equivalent to EE 379: Embedded Systems and Application a required course at UB.
㉘	Course ECE F242: Control Systems is a required course at BITS Pilani. It will be offered to meet the graduation requirements of BITS Pilani only.
㉙	Course ECE F243: Signals & Systems is a required core course offered at BITS. Also, this course will be considered as equivalent to EE 205: Signal Analysis and Transform Methods offered at UB.
㉚	BITS F225: Environmental Studies is a required foundation course at BITS. It will be considered equivalent to EVS 118: Intro Environment and Sustainability Studies offered at UB. EVS 118: Intro Environment and Sustainability Studies also fulfills the requirement of a course at UB offered under Thematic Pathway category. Thus, it will fulfill the requirement of 1st course under Thematic Pathway (Environment Track) out of the total required 9 credits required under the Thematic Pathway category.

㉛	This would be the 2nd Humanities Elective (HUEL) out of total required 3 HUELs. Students should select this course in such a way that the selected course will not only fulfill the requirement of a course at UB offered under Thematic or Global Pathway category but also fulfill Humanities electives requirement of BITS Pilani. Thus, it will fulfill the requirement of 2nd course under Thematic or Global Pathway category out of the total required 4 courses required under this category.
㉜	Course EE 310: Electronic Devs & Circs 1 is a required course at UB. Also, this course will be considered as equivalent to ECE F214: Electronic Devices, a required core course offered at BITS.
㉝	Course EE 352: Introduction to Electronic Laboratory is a required course offered at UB. Also, this course will be considered as 1st Discipline Elective course out of 4 required at BITS.
㉞	Course EAS 230: Engineering Computations/ MTH 309: Introductory Linear Algebra is the required course offered at UB. This will be as the 3rd Open Elective course required at BITS.
㉟	This would be the 3rd Humanities Elective (HUEL) out of total required 3 HUELs. Students should select this course in such a way that the selected course will not only fulfill the requirement of a course at UB offered under Thematic or Global Pathway category but also fulfill Humanities electives requirement of BITS Pilani. Thus, it will fulfill the requirement of 3rd course under Thematic or Global Pathway category out of the total required 4 courses required under this category.
㊱	Course EAS 198: UB Seminar is the required course offered at UB. It will be offered to meet graduation requirements of UB only.
㊲	Course PHY 158: General Physics II Lab is the required course offered at UB. It will be offered to meet graduation requirements of UB only.
㊳	Course EE 311: Electronic Devs & Circs 2 is a required course at UB. Also, this course will be considered as equivalent to ECE F244: Microelectronic Circuits a required core course offered at BITS.
㊴	Course EE 383: Communications Systems is a required course offered at UB. Also, this course will be considered as equivalent to a required core course ECE F311: Communication Systems offered at BITS.
㊵	Course EE 336: Fundamentals of Energy Systems is a required course offered at UB. Also, this course will be considered as 2nd Discipline Elective course out of 4 required at BITS.
㊶	Course EE 353: Electronic Circuits is a required course offered at UB. Also, this course will be considered as 3rd Discipline Elective course out of 4 required at BITS.
㊷	Course PHY 207: General Physics 3 is a required course offered at UB. Also, this course will be considered as 4th Open Elective course required at BITS.
㊸	Course PHY 257: Physics 3 Lab is the required course offered at UB. It will be offered to meet graduation requirements of UB only.
㊹	The students would be registering in both Courses EE 408: Senior Seminar and EE 499: Independent Study that would be tied to the senior design project for these students. Also, these two courses can be considered as equivalent to First Capstone Project, namely BITS F456: Capstone Project I to be offered at BITS Pilani. All BITS-UB students have to do two Capstone Projects in place of Practice School II/Thesis. EE 499 will not satisfy a degree requirement at UB.
㊺	Course EE 478: HDL Based Digital Design with Programmable Logic is the required course offered at UB. Also, this course will be considered as 5th Open Elective course required at BITS.

㊻	BITS-UB Students shall be advised to take the course EE 491: Analog Integrated Circuits mandatorily. This will be the 1st Technical Elective course out three from list of Technical Electives required at UB and will be treated as equivalent to a required core course offered at BITS, namely ECE F341: Analog Electronics.
㊼	BITS-UB Students will take the 1st course out two from list of Electrical Engineering Electives required at UB. Also, this course will be considered as 4th Discipline Elective course out of 4 required at BITS.
㊽	This would be the 4th course at UB offered under Thematic or Global Pathway category. Also, this course will be considered as the 6th Open Elective course required at BITS.
㊾	Course EE 494: Senior Capstone Design Project is the core course offered at UB. Also, this will be equivalent to BITS F457: Capstone Project II to be offered at BITS Pilani. All BITS-UB students have to do two Capstone Projects in place of Practice School II/Thesis.
㊿	BITS-UB Students shall be advised to take the course EE 434: Principles of Networking mandatorily. This will be the 2nd course out two from list of EE Electives required at UB and will be treated as a required core course offered at BITS, namely ECE F343: Communication Networks.
(51)	Course EE 439: Principle of Information Theory and Coding is to be offered at UB. BITS-UB Students shall be advised to take this course mandatorily as one of the Technical Electives required at UB and will be considered as equivalent to a required core course namely ECE F344 Information Theory and Coding offered at BITS.
(52)	Course ECE F434: Digital Signal Processing is a required core course at BITS. The UB Team shall develop a course that aligns with BITS' ECE F434. Once a course is developed by UB Team, the new introduced course will be substituted with it (=ECE F434 Digital Signal Processing) as one of the Technical Electives required at UB for UBITS students.
(53)	Course UBC 399: UB Curriculum Capstone is the required course offered at UB. It will be offered to meet graduation requirements of UB only.

Schedule B1: Credit Map details from the perspective of the BITS Pilani degree BITS Pilani Credit Arrangements in Years 1 and 2 BITS Campus locations

Students are enrolled into BE Electrical & Electronics program at BITS Pilani and the BS Electrical Engineering program at University at Buffalo (UB) during Years 1 and 2 of the program, completing the following courses. There will be 26 courses with 74 Units offered by BITS Pilani (during Year I and Year II to fulfill partial requirement of award of BITS Pilani Degree). These courses will be entirely taught by BITS with the number of delivery hours being determined by BITS.

S. No.	Course Code	Course Title	Unit
1	BIO F110	Biology laboratory	1
2	BIO F111	General Biology	3
3	CHEM F110	Chemistry Laboratory	1
4	CHEM F111	General Chemistry	3
5	PHY F110	Physics Laboratory	1
6	PHY F111	Mechanics, Oscillations and Waves	3
7	BITS F110	Engineering Graphics	2
8	MATH F111	Mathematics I	3
9	MATH F112	Mathematics II	3
10	MATH F113	Probability & Statistics	3
11	MATH F211	Mathematics III	3
12	BITS F111	Thermodynamics	3
13	EEE F111	Electrical Sciences	3
14	CS F111	Computer Programming	4
15	ME F112	Workshop Practice	2
16	BITS F225	Environmental Studies	3
17	ECE F211	Electrical Machines	4
18	ECE F215	Digital Design	4
19	ECE F314	EM Fields & Microwave Engineering	3
20	ECE F312	EM Fields & Microwave Engineering Lab	1
21	ECE F241	Microprocessors & Interfacing	4
22	ECE F242	Control Systems	3
23	ECE F243	Signals & Systems	3
24	ECON F211/ MGTS F211	Principles of Economics/ Principles of Management	3
25	-	Humanities Elective	3
26	-	Open Elective	3
27			
			74

BITS Pilani Credit Arrangements in Years 1 and 2 UB Campus locations (Online mode)

Students are enrolled into BE Electronics and Communication program at BITS Pilani and the BS Electrical Engineering program at University at Buffalo (UB) during Years 1 and 2 of the program, completing the following courses offered by UB in online mode. There will be 4 courses with 12 Units offered by UB (during Year I and Year II to fulfill partial requirement of award of BITS Pilani and UB Degree). These courses will be entirely taught by UB through online mode with the number of delivery hours being determined by UB.

S. No.	UB Courses			BITS Pilani Courses		
	Code	Course Title	Unit	Code	Course Title	Unit
1	ENG/ELI 105	Writing and Rhetoric	4	-	Open Elective	4
2	PHY 108	Physics 2	4	ECE F212	Electromagnetic Theory	3
3	EAS 360	STEM Communications	3	BITS F112	Technical Report Writing	2
4	Thematic or Global Pathway category		3		2nd Humanities Elective	3
		Total	14			12

Note: UB and BITS may agree to change the division of student contact hours between both parties, subject to Indian regulatory requirements and UB policy. Any changes must be agreed in writing between both parties.

BITS Pilani Credit Arrangements in Years 3 and 4 at University at Buffalo Campus locations

Upon successful completion of Years 1 and 2 of the program, students will relocate to the UB campus and transfer into the BITS-UB program plan. Students will have to be completed 60 credit points for 22 Courses at UB in Year 3 and 4 to fulfil UB requirements. Out of these 22 courses, 17 Courses with 58 credit points/units (listed below) offered by UB during 3rd & 4th Year would be considered for the requirement of BITS Pilani Degree.

S. No.	UB Courses			BITS Pilani Courses		
	Code	Course Title	Unit	Code	Course Title	Unit
1	EE 352	Introduction to Electronic Laboratory	3	-	1st Discipline Elective	3
2	EE 324	Applied Electromagnetics	4	-	2nd Open Elective	4
3	EE 230	Engineering Computations	3	-	3rd Open Elective	3
4	-	Thematic or Global Pathway	3	-	3rd Humanities Elective	3
5	PHY 207	General Physics 3 Laboratory	4	-	3rd Open Elective	4
6	EE 383	Communications Systems	3	EEE F311	Communications Systems (Core Course)	4
7	EE 336	Fundamentals of Energy Systems	3	-	2nd Discipline Elective	3
8	EE 353	Electronic Circuits	3	-	3rd Discipline Elective	3
9	EE 408	Senior Seminar	1	BITS F456	Capstone Project I	4
10	EE 499	Independent Study	3			
11	EE 494	Senior Capstone Design Project	3	BITS F457	Capstone Project II	4
12	EE 478	HDL Based Digital Design with Programmable Logic	3	-	4th Open Elective	3
13	EE 491	Analog Integrated Circuits (EE Elective)	3	EEE F341	Analog Electronics (Core Course)	4
14	-	Thematic or Global Pathway	3	-	5th Open Elective	3
15	-	Technical Elective (34)	3	-	4th Discipline Elective	3
16	EE 467	Power Electronics (EE Elective)	3	EEE F342	Power Electronics (Core Course)	4
17	CSE 493	Introduction to VLSI Electronics (3rd Technical Elective)	4	EEE F313	Analog & Digital VLSI Design (Core Course)	3

18	EE 482	Power Systems Engineering I (EE Elective)	4	EEE F312	Power Systems (Core Course)	3
		Total	**56**		**Total**	**58**

Schedule A2 – Credit Map detailing to be considered by UB

UB Credit Arrangements in Years 1 and 2 at BITS Campus locations

During Years 1 and 2, students enrolled in the BE Electronics and Communication program at BITS Pilani and as prospective/non-matriculated students in the BS Electrical Engineering program at University at Buffalo (UB) receive 14 credits from online courses delivered by UB and 43 credits taught at BITS. In addition, two math courses (8 credits in total) will be waived. Overall, a total of 57 credits from 18 courses (14 online UB and 43 BITS courses) earned from Years 1 and 2 count toward UB degree requirements, and 8 credits from two math courses that are required for UB degree will be waived.

Upon successful completion of Year 1 and Year 2 study at BITS Campus locations and subject to the issue of an US student visa by the relevant Authorities, students will be transferred to the UB Campus (BS Electrical Engineering) and shall be waived following two courses by with 8 credit points by UB.

S. No.	Course Code	Course Title	Unit
1	MATH 141	College Calculus I	4
2	MATH 142	College Calculus 2	4
	Total		**8**

UB Credit Arrangements in Years 1 and 2, UB Campus locations (Online mode)

Students are enrolled into BE Electronics and Communication program at BITS Pilani and the BS Electrical Engineering program at University at Buffalo (UB) during Years 1 and 2 of the program, completing the following courses offered by UB in online mode. There will be 4 courses with 14 Units offered by UB (during Year I and Year II to fulfill partial requirement of award of BITS Pilani and UB Degree). These courses will be entirely taught by UB in online mode with the number of delivery hours being determined by UB.

S. No.	UB Courses			BITS Pilani Courses		
	Code	Course Title	Unit	Code	Course Title	Unit
1	*ELI 105	Writing and Rhetoric	4	-	Open Elective	4
2	PHY 108	Physics 2	4	ECE F212	Electromagnetic Theory	3
3	EAS 360	STEM Communications	3	BITS F112	Technical Report Writing	2
4		Thematic or Global Pathway category	3		2nd Humanities Elective	3
		Total	14			10

Note: UB and BITS may agree to change the division of student contact hours between both parties, subject to Indian regulatory requirements and UB policy. Any changes must be agreed in writing between both parties.

** To be eligible to enroll in ELI 105 students for whom English is not a first or dominant language (Placement determined by English Proficiency Test Type & Minimum Scores section of the admission brochure), must successfully complete ELI 100 with a "C" grade or higher.*

Upon successful completion of the Courses delivered at BITS Campus locations in Year 1 and Year 2, students will receive **43** Credit points transfer by the UB for the following **14** BITS mapped Courses in the first two years.

S. No.	UB			BITS Pilani		
	Code	**Course Title**	**Unit**	**Code**	**Course Title**	**Unit**
1	BIO 200	Evolutionary Biology (satisfies 100-level technical elective)	3	BIO F111	General Biology	3
2	CHE 113	General Chemistry for Engineers Laboratory I	0.5	CHEM F110	Chemistry Laboratory	1
3	CHE 999	Chemistry 1	3.5	CHEM F111	General Chemistry	3
4	MTH 241	Calculus 3	4	MATH F111	Mathematics I	3
5	PHY 107	General Physics 1	4	PHY F111	Mechanics, Oscillations and Waves	3
6	EAS 240	Introduction to Programming for Engineers	3	CS F111	Computer Programming	4
7	EE 305	Applied Probability	4	MATH F113	Probability & Statistics	3
8	EE 202	Circuit Analysis	3	EEE F111	Electrical Sciences	3
9	MTH 306	Differential Equations	4	MATH F211	Mathematics III	3
10	EE 324	Applied Electromagnetics	4	ECE F314	EM Fields and Microwave Engineering	3
11	EE 178	Digital Principles	4	ECE F215	Digital Design	4
12	EE 379	Embedded Systems and Application	3	ECE F241	Microprocessors & Interfacing	4
13	EE 205	Signal Analysis and Transform Methods	3	ECE F243	Signals & Systems	3
14	EVS 118	Introduction to Environment and Sustainability Studies	3	BITS F225	Environmental Studies	3
		Total	**46**			**43**

Students enrolled into the 2+2 UBITS International Collaborative Programme are required to transfer to the UB Campus in USA to complete Year 3 and Year 4 program requirements. In order to progress to the University at Buffalo as part of the BITS-UB International Collaboration Programme, students should have at the end of their first two years a CGPA of at least 6.0, with no BITS course fulfilling a UB degree requirement having a grade below D (grade point 4.0) in such courses. In addition, students must receive passing grades (D grade or better) in courses completed via the UB online mode that serve as prerequisites for other UB degree requirements.

For more details of UB conditions, UB website may be referred.

UB Credit Arrangements in Years 3 and 4 at University at Buffalo Campus locations

Upon successful completion of Years 1 and 2 of the program, students will relocate to the UB campus and transfer into the BITS-UB program plan. Students will have to completed 60 credit points for 23 Courses at UB in Year 3 and 4 to fulfil BITS Pilani & UB requirements. These **23 Courses** with **60 credit points/units** (listed below) offered by UB during 3rd & 4th Year would be considered for the requirement of UB Degree. Also, some of these courses would also be considered as the compulsory core courses requirement of BITS Degree.

S. No.	Code	Course Title	Unit
1	EE 310	Electronic Devices and Circuits 1	3
2	EE 352	Introduction to Electronic Laboratory	3
3	EAS 230	Engineering Computations	3
4	-	Thematic or Global Pathway	3
5	EAS 198	UB Seminar	1
6	PHY 158	General Physics II Lab	1
7	PHY 207	General Physics 3	4
8	PHY 257	General Physics 3 Laboratory	1
9	EE 311	Electronic Devices and Circuits 2	3
10	EE 383	Communications Systems	3
11	EE 336	Fundamentals of Energy Systems	3
12	EE 353	Electronic Circuits	3
13	EE 408	Senior Seminar	1
14	EE 494	Senior Capstone Design Project	3
15	EE 478	HDL Based Digital Design with Programmable Logic	3
16	EE 491	Analog Integrated Circuits (1st Technical Elective at UB and a core course for BITS)	3
17	-	Thematic or Global Pathway	3
18	-	EE Elective (It will be considered as 1st EE Elective at UB and a discipline elective at BITS)	3
19	EE 434	Principles of Networking (2nd EE Elective at UB but core course for BITS)	3
20	EE 439	Principle of Information Theory and Coding (2nd Technical Elective at UB and a core course for BITS)	3
21	EE NEW	Course to be developed by UB that aligns with ECE F434 at BITS (3rd Technical Elective at UB but core course for BITS)	3
22	UBC 399	UB Curriculum Capstone	1
		Total	**57**