

**AY2023-24 CURRICULUM FOR ENVIRONMENTAL EARTH SYSTEMS SCIENCE (ECOLOGY AND ECOSYSTEMS)
WITH CN YANG SCHOLARS PROGRAMME_Internship
SECOND MAJOR IN DATA ANALYTICS (ESDA)
(FIRST YEAR ADMISSION)**

Last Updated : 19-Apr-23

SUMMARY OF ACADEMIC UNIT REQUIREMENT

Year of Study	School Core	CNYS Core	MPE	CC	FC	BDE	Total AU
1	19	27	0	5	0	0	51
2	18	10	0	8	0	10	46
3	10	0	0	0	3	15	28
4	15	0	0	0	10	0	25
Total	62	37	0	13	13	25	150

YEAR 1 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY1001	Cell	CNY-Core	3	CNYS Core Courses
CY1101	Molecule	CNY-Core	4	
CY1308	Physics	CNY-Core	3	
CY1500	Introduction to Research	CNY-Core	2	
CY1601	Mathematics I	CNY-Core	4	
ES1001	E2S2 Environment and Society	C	4	
CC0005	Healthy Living & Mental Wellbeing in an Aging Society	CC	3	
			23	

YEAR 1 SEMESTER 2

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY1007	Climate Change	CNY-Core	3	CNYS Core Course
CY1602^	Mathematics II	CNY-Core	4	CNYS Core Course
ES0001	Physical Environments of Singapore	C	3	
ES1003	E2S2 Solid Earth	C	4	
ES2003	E2S2 Biosphere	C	4	
CC0002	Navigating the Digital World	CC	2	
			20	

YEAR 1 SPECIAL SEMESTER

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY2003	Research Attachment 3	CNY-Core	4	CNYS Core Course
ES1006	Introductory Field Experience	C	4	ES1001
	Overseas Learning Trip			
			8	

YEAR 2 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY0002	Ethics	CNY-Core	3	CNYS Core Course
ES2001^	Computational Earth Systems Science	C	4	CY1601
ES2802	GIS and the Earth System	C	3	ES1003 + ES2001
ES2304	Microbes on Natural Ecosystems	C	3	CY1001
MH2500	Probability & Introduction to Statistics	BDE	4	CY1601
CC0006	Sustainability: Human, Social, Economics & Environment	CC	3	
			20	

YEAR 2 SEMESTER 2

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY0001	Writing Across the Disciplines	CNY-Core	3	CNYS Core Course
CY2001	Research Attachment 1	CNY-Core	4	CNYS Core Course 2-semester long, course registered only in Sem 2 (similar to URECA)
ES2301	Principles of Heredity and Ecological Genetics	C	3	ES2003 + CY1101
ES2303	Introduction to Ecology	C	3	CY1001 + ES2003
MH1403	Algorithms and Computing	BDE	3	
MH3511	Data Analysis with Computer	BDE	3	MH2500/BS1008
ML0004	Career and Entrepreneurial Development for the Future World	CC	2	
SP0061	Science & Technology for Humanity	CC	3	
			24	

YEAR 2 SPECIAL SEMESTER

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES2302	Introduction to Field Ecology	C	2	ES2003
			2	

YEAR 3 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
BS1008	Bioinformatics and Statistics	C	3	
ES3307	Experimental Design & Analysis	C	4	BS1001, MH3511

SC2207	Introduction to Database	BDE	3	MH1403
SC4020	Data Analytics and Mining	BDE	3	MH1403
SC4024	Data Visualization	BDE	3	
			16	

YEAR 3 SEMESTER 2				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES3301	Plant and Animal Physiology	C	3	CY1001 + ES2003 + ES2301
ES0002	Fundamentals of Data Science for Earth and Environmental Systems Science	FC	3	CY1601, ES2001
XXXXXX	DA Elective 1	BDE	3	
XXXXXX	DA Elective 2	BDE	3	
			12	

YEAR 3 SPECIAL SEMESTER & YEAR 4 SEMESTER 1				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES4301	Conservation Biology and Biodiversity	C	3	AAB20D + ES2301 + ES3301
ES4111	Overseas Final Year Project	C	12	CNYSP Course
			15	

YEAR 4 SEMESTER 2				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
	Attachment/Internship (10 weeks)	FC	10	
			10	

Total AU for Graduation :

150

^ These courses are double-counted towards both EESS as well as the Second Major in Data Analytics.

Compulsory Courses for Second Major in Data Analytics					
Course Type	Course Code	Course Title	AU	Offering Sem	Pre-req
BDE	MH2500	Probability & Introduction to Statistics	4	1	CY1601
Core	CY1602	Mathematics II	4	2	CY1601
Core	ES2001	Computational Earth Systems Science	4	1	CY1601
BDE	MH1403	Algorithms and Computing	3	2	BS1009
BDE	SC2207	Introduction to Database	3	1,2	MH1403
BDE	SC4020	Data Analytics and Mining	3	1	MH1403
BDE	SC4024	Data Visualization	3	1	BS1009 & MH2500

Suggested Electives for Second Major in Data Analytics					
Course Type	Course Code	Course Title	AU	Offering Sem	Pre-req
BDE	MH3511	Data Analysis with Computer	3	2	MH2500/BS1008
BDE	SC4002	Natural Language Processing	3	1	MH1403
BDE	SC4022	Network Science	3	2	MH1403

List of Eligible Electives can be found at the following link: <https://www.ntu.edu.sg/engineering/admissions/ug/allprogrammes/highlights/da>

**AY2023-24 CURRICULUM FOR ENVIRONMENTAL EARTH SYSTEMS SCIENCE (GEOSCIENCES)
WITH CN YANG SCHOLARS PROGRAMME_Internship
SECOND MAJOR IN DATA ANALYTICS (ESDA)
(FIRST YEAR ADMISSION)**

Last Updated : 19-Apr-23

SUMMARY OF ACADEMIC UNIT REQUIREMENT

Year of Study	School Core	CNYS Core	MPE	CC	FC	BDE	Total AU
1	19	27	0	5	0	0	51
2	13	10	0	8	0	7	38
3	9	0	0	0	3	18	30
4	17	0	0	0	10	0	27
Total	58	37	0	13	13	25	146

YEAR 1 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY1001	Cell	CNY-Core	3	CNYS Core Courses
CY1101	Molecule	CNY-Core	4	
CY1308	Physics	CNY-Core	3	
CY1500	Introduction to Research	CNY-Core	2	
CY1601	Mathematics I	CNY-Core	4	
ES1001	E2S2 Environment and Society	C	4	
CC0005	Healthy Living & Mental Wellbeing in an Aging Society	CC	3	
			23	

YEAR 1 SEMESTER 2

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY1007	Climate Change	CNY-Core	3	CNYS Core Courses
CY1602^	Mathematics II	CNY-Core	4	CNYS Core Course
ES0001	Physical Environments of Singapore	C	3	
ES1003	E2S2 Solid Earth	C	4	
ES2003	E2S2 Biosphere	C	4	
CC0002	Navigating the Digital World	CC	2	
			20	

YEAR 1 SPECIAL SEMESTER

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY2003	Research Attachment 3	CNY-Core	4	CNYS Core Course
ES1006	Introductory Field Experience	C	4	ES1001
	Overseas Learning Trip			
			8	

YEAR 2 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY0002	Ethics	CNY-Core	3	CNYS Core Course
ES2001^	Computational Earth Systems Science	C	4	CY1601
ES2802	GIS and the Earth System	C	3	
MH2500	Probability & Introduction to Statistics	BDE	4	CY1601
CC0006	Sustainability: Human, Social, Economics & Environment	CC	3	
			17	

YEAR 2 SEMESTER 2

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY0001	Writing Across the Disciplines	CNY-Core	3	CNYS Core Course
CY2001	Research Attachment 1	CNY-Core	4	CNYS Core Course 2-semester long, course registered only in Sem 2 (similar to URECA)
ES2002	Earth Materials	C	3	ES1003
ES2004	Sedimentary Geology	C	3	ES1003
MH1403	Algorithms and Computing	BDE	3	
ML0004	Career and Entrepreneurial Development for the Future World	CC	2	
SP0061	Science & Technology for Humanity	CC	3	
			21	

YEAR 3 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES3003	Introduction to Geochemistry	C	3	ES1003
SC2207	Introduction to Database	BDE	3	MH1403
SC4020	Data Analytics and Mining	BDE	3	MH1403
SC4024	Data Visualization	BDE	3	
XXXXXX	DA Elective 1	BDE	3	
			15	

YEAR 3 SEMESTER 2				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES3002	Structural Geology and Tectonics	C	3	ES1003
ES3004	Introduction to Geophysics	C	3	ES1003
ES0002	Fundamentals of Data Science for Earth and Environmental Systems Science	FC	3	CY1601, ES2001
XXXXXX	DA Elective 2	BDE	3	
XXXXXX	DA Elective 3	BDE	3	
			15	

YEAR 3 SPECIAL SEMESTER & YEAR 4 SEMESTER 1				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES3005	Advanced Field Course in Geology	C	5	ES2002, ES2004, ES2101, ES3002
ES4111	Overseas Final Year Project	C	12	CNYSP Course
			17	

YEAR 4 SEMESTER 2				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
	Attachment/Internship (10 weeks)	FC	10	
			10	
Total AU for Graduation :			146	

^ These courses are double-counted towards both EESS as well as the Second Major in Data Analytics.

Compulsory Courses for Second Major in Data Analytics					
Course Type	Course Code	Course Title	AU	Offering Sem	Pre-req
BDE	MH2500	Probability & Introduction to Statistics	4	1	CY1601
Core	CY1602	Mathematics II	4	2	CY1601
Core	ES2001	Computational Earth Systems Science	4	1	CY1601
BDE	MH1403	Algorithms and Computing	3	2	BS1009
BDE	SC2207	Introduction to Database	3	1,2	MH1403
BDE	SC4020	Data Analytics and Mining	3	1	MH1403
BDE	SC4024	Data Visualization	3	1	BS1009 & MH2500

Suggested Electives for Second Major in Data Analytics					
Course Type	Course Code	Course Title	AU	Offering Sem	Pre-req
BDE	SC4002	Natural Language Processing	3	1	MH1403
BDE	SC4021	Information Retrieval	3	2	MH1403
BDE	SC4022	Network Science	3	2	MH1403

List of Eligible Electives can be found at the following link: <https://www.ntu.edu.sg/engineering/admissions/ug/allprogrammes/highlights/da>

**AY2023-24 CURRICULUM FOR ENVIRONMENTAL EARTH SYSTEMS SCIENCE (SOCIETY AND THE EARTH SYSTEM)
WITH CN YANG SCHOLARS PROGRAMME_Internship
SECOND MAJOR IN DATA ANALYTICS (ESDA)
(FIRST YEAR ADMISSION)**

Last Updated : 19-Apr-23

SUMMARY OF ACADEMIC UNIT REQUIREMENT

Year of Study	School Core	CNYS Core	MPE	CC	FC	BDE	Total AU
1	22	27	0	5	0	0	54
2	16	10	0	8	0	7	41
3	9	0	0	0	3	15	27
4	12	0	0	0	10	0	22
Total	59	37	0	13	13	22	144

YEAR 1 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY1001	Cell	CNY-Core	3	CNYS Courses
CY1101	Molecule	CNY-Core	4	
CY1308	Physics	CNY-Core	3	
CY1500	Introduction to Research	CNY-Core	2	
CY1601	Mathematics I	CNY-Core	4	
ES1001	E2S2 Environment and Society	C	4	
CC0005	Healthy Living & Mental Wellbeing in an Aging Society	CC	3	
			23	

YEAR 1 SEMESTER 2

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY1007	Climate Change	CNY-Core	3	CNYS Course
CY1602^	Mathematics II	CNY-Core	4	CNYS Course
ES0001	Physical Environments of Singapore	C	3	
ES1003	E2S2 Solid Earth	C	4	
ES2003	E2S2 Biosphere	C	4	
CC0002	Navigating the Digital World	CC	2	
			20	

YEAR 1 SPECIAL SEMESTER

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY2003	Research Attachment 3	CNY-Core	4	CNYS Course
ES1006	Introductory Field Experience	C	4	ES1001
	Overseas Learning Trip			
			8	

YEAR 2 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY0002	Ethics	CNY-Core	3	CNYS Course
ES2001^	Computational Earth Systems Science	C	4	CY1601
ES2802	GIS and the Earth System	C	3	
HE5091	Principles of Economics	C	3	
MH2500	Probability & Introduction to Statistics	BDE	4	CY1601
CC0006	Sustainability: Human, Social, Economics & Environment	CC	3	
			20	

YEAR 2 SEMESTER 2

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
CY0001	Writing Across the Disciplines	CNY-Core	3	CNYS Course
CY2001	Research Attachment 1	CNY-Core	4	CNYS Course 2-semester long, course registered only in Sem 2 (similar to URECA)
ES2201	Law & Economics, Sustainable Development and Environmental Protection	C	3	
ES2202	Global Environmental Politics and Governance	C	3	ES1001, ES2003
ES2303	Introduction to Ecology	C	3	CY1001, ES2003
MH1403	Algorithms and Computing	BDE	3	
ML0004	Career and Entrepreneurial Development for the Future World	CC	2	
SP0061	Science & Technology for Humanity	CC	3	
			24	

YEAR 3 SEMESTER 1

Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES3202	Resilient Urban Systems	C	3	ES2802
SC2207	Introduction to Database	BDE	3	MH1403
SC4020	Data Analytics and Mining	BDE	3	MH1403
SC4024	Data Visualization	BDE	3	
XXXXXX	DA Elective 1	BDE	3	
			15	

YEAR 3 SEMESTER 2				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES3201	Coupled Human and Natural Systems	C	3	ES1001
ES0002	Fundamentals of Data Science for Earth and Environmental Systems Science	FC	3	CY1601, ES2001
MH3511^	Data Analysis with Computer	C	3	MH2500/BS1008
XXXXXX	DA Elective 2	BDE	3	
			12	

YEAR 3 SPECIAL SEMESTER & YEAR 4 SEMESTER 1				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
ES4111	Overseas Final Year Project	C	12	CNYSP Course
			12	

YEAR 4 SEMESTER 2				
Course Code	Course Title	Type	AU	Pre-Requisite/Remarks
	Attachment/Internship (20-weeks)	FC	10	
			10	
Total AU for Graduation :			144	

^ These courses are double-counted towards both EESS as well as the Second Major in Data Analytics.

Compulsory Courses for Second Major in Data Analytics					
Course Type	Course Code	Course Title	AU	Offering Sem	Pre-req
BDE	MH2500	Probability & Introduction to Statistics	4	1	CY1601
Core	CY1602	Mathematics II	4	2	CY1601
Core	ES2001	Computational Earth Systems Science	4	1	CY1601
BDE	MH1403	Algorithms and Computing	3	2	BS1009
BDE	SC2207	Introduction to Database	3	1,2	MH1403
BDE	SC4020	Data Analytics and Mining	3	1	MH1403
BDE	SC4024	Data Visualization	3	1	BS1009 & MH2500

Suggested Electives for Second Major in Data Analytics					
Course Type	Course Code	Course Title	AU	Offering Sem	Pre-req
Core	MH3511	Data Analysis with Computer	3	2	MH2500/BS1008
BDE	SC4002	Natural Language Processing	3	1	MH1403
BDE	SC4022	Network Science	3	2	MH1403

List of Eligible Electives can be found at the following link: <https://www.ntu.edu.sg/engineering/admissions/ug/allprogrammes/highlights/da>