

RAI Curriculum (Revised 2020)

Minimum Credits Required for Graduation

131 credits

Curriculum Structure (Minimum Credits)

Course Group	Credits (For Regular Students)	Credits (For Co-op / Study Aboard Students)
A. General Education	30	30
A1. English Proficiency Requirement (ESL)	9	9
A2. Communication, Humanity, and Social Skills	15	15
A3. Math and Science	6	6
B. Robotics and AI Specific Courses	95	95
B1. Core Courses	20	20
B2. Major Compulsory Courses	75	75
B2.1 Fundamental Subjects	39	39
B2.2 Capstone Projects	6	6
B2.3 RAI Elective Mandatory Subjects	18	15
B2.4 RAI Elective Subjects	12	9
B2.5 Alternative Study	-	6
C. Free Electives	6	6
D. Internship	0	0
TOTAL	131	131

A. GENERAL EDUCATION**30 CREDITS**

(LECTURE-LAB-SELF STUDY)

A.1 ENGLISH PROFICIENCY REQUIREMENT (ESL)**9 CREDITS**

01416000	ACADEMIC LISTENING AND SPEAKING	3 (3-0-6)
01416001	ACADEMIC READING AND WRITING	3 (3-0-6)
01416003	INTERPRETATION AND ARGUMENTS	3 (3-0-6)

A.2 COMMUNICATION, HUMANITY, AND SOCIAL SKILLS**15 CREDITS**

01006502	PROFESSIONAL ETHICS	3 (3-0-6)
01006503	INTRODUCTION TO PSYCHOLOGY	3 (3-0-6)
01006504	PHILOSOPHY OF SCIENCE	3 (3-0-6)
01006505	CREATIVE THINKING	3 (3-0-6)
01006506	CRITICAL THINKING	3 (3-0-6)
01006507	PERSONAL ECONOMICS	3 (3-0-6)
01006508	DIGITAL ECONOMY	3 (3-0-6)
01006509	ENGINEERING AND PUBLIC POLICY	3 (3-0-6)
01006510	INTRODUCTION TO ECONOMICS	3 (3-0-6)
01006511	THAI SOCIETY AND CULTURE	3 (3-0-6)
01006512	ASIAN STUDY	3 (3-0-6)
01006514	INNOVATIVE COMMUNICATION	4 (4-0-8)
01006515	DESIGN METHODS FOR INNOVATIONS	4 (4-0-8)
01006516	INNOVATION MANAGEMENT	4 (4-0-8)
01006517	LEAN STARTUP AND AGILE BUSSINESS	4 (4-0-8)
01006518	EMERGING TRENDS IN ENGINEERING	1 (1-0-2)
01006519	INTRODUCTION TO ENVIRONMENTAL PRINCIPLES	3 (3-0-6)
01006520	LEADERSHIP AND PERSONAL DEVELOPMENT	3 (3-0-6)
01006521	MEDITATION FOR LIFE DEVELOPMENT	3 (3-0-6)
01006522	ENGLISH FOR SCIENCE AND TECHNOLOGY	3 (3-0-6)

A.3 MATH AND SCIENCE**6 CREDITS**

01006721	NUMERICAL METHODS	3 (3-0-6)
01006729	INTRODUCTION TO OPERATIONS RESEARCH	3 (3-0-6)
01006719	PROBABILITY AND STATISTICS 1	3 (3-0-6)
01006720	PROBABILITY AND STATISTICS 2	3 (3-0-6)
01006727	GENERAL CHEMISTRY	3 (3-0-6)
01006728	GENERAL CHEMISTRY LABORATORY	1 (0-3-2)
01006713	MATHEMATICAL CRYPTOGRAPHY	4 (4-0-8)
01006714	MATHEMATICS FOR 3D GAME AND COMPUTER GRAPHICS	4 (4-0-8)

01006701	MATHEMATICS OF DATA SCIENCE	4 (4-0-8)
01416801	MATHEMATICS OF DATA SCIENCE AND DATA ANALYTIC	3 (3-0-6)

TRACK UNIVERSITY OF BIRMINGHAM 2+2 DUAL DEGREE PROGRAM

(Only students in UoB 2+2 Dual Degree program may choose the courses in this course.)

01416802	ADVANCED ENGINEERING MATHEMATICS	4 (4-0-8)
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B. ROBOTICS AND AI COURSE SPECIFIC COURSES

95 CREDITS

(LECTURE-LAB-SELF STUDY)

B.1 CORE COURSE

20 CREDITS

01006710	INTRODUCTION TO CALCULUS	3 (3-0-6)
01006711	ADVANCED CALCULUS	3 (3-0-6)
01006723	GENERAL PHYSICS 1	3 (3-0-6)
01006724	GENERAL PHYSICS LABORATORY 1	1 (0-3-2)
01006725	GENERAL PHYSICS 2	3 (3-0-6)
01006726	GENERAL PHYSICS LABORATORY 2	1 (0-3-2)
01006803	ENGINEERING MECHANICS	3 (3-0-6)
01416310	STRENGTH OF MATERIALS	3 (3-0-6)

B.2 MAJOR COMPULSORY COURSE

75 CREDITS

B.2.1 FUNDAMENTAL SUBJECTS

39 CREDITS

01416301	DIFFERENTIAL EQUATIONS AND MATRIX ALGEBRA	3 (3-0-6)
01416304	FEEDBACK CONTROL	3 (3-0-6)
01416305	ARTIFICIAL INTELLIGENCE TECHNOLOGY	3 (3-0-6)
01416306	SAFETY AND STANDARDIZATION IN RAI ^{3*}	3 (3-0-6)
01416308	KINEMATICS AND DYNAMICS	3 (3-0-6)
01416309	ENGINEERING 3D DRAWING	3 (2-2-5)
01416312	ELECTRIC CIRCUIT AND ELECTRONICS	3 (3-0-6)
01416315	INDUSTRIAL ELECTRONICS ^{2*}	3 (3-0-6)
01416316	COMPUTER PROGRAMMING FOR RAI	3 (2-2-5)
01416318	MICROPROCESSOR AND INTERFACE	3 (2-2-5)
01416319	MANUFACTURING PROCESS ^{1*}	3 (3-0-6)
01416320	INTRODUCTION TO ROBOTICS AND AI	3 (3-0-6)
01416514	ROBOTICS LABORATORY 1	1 (0-3-6)
01416515	ROBOTICS LABORATORY 2	1 (0-3-6)
01416516	ROBOTICS LABORATORY 3	1 (0-3-6)

^{1*} compare to Module 04 32798 Mechatronic Design of UoB

^{2*} compare to Module 04 19505 Electronic Circuits and Devices and Electromagnetics of UoB

^{3*} compare to Module 04 32798 Mechatronic Design of UoB

B.2.2 CAPSTONE PROJECTS **6 CREDITS**

01416701 RAI ENGINEERING CAPSTONE DESIGN PREPARATION ^{4*} 3 (0-9-5)

01416702 RAI ENGINEERING CAPSTONE DESIGN ^{5*} 3 (0-9-5)

^{4*} compare to Module 04 29646 Integrated Design Project 3 of UoB

^{5*} compare to Module 04 02279 Individual Project of UoB

B.2.3 RAI ELECTIVE MANDATORY SUBJECTS

For Regular Students **18 CREDITS**

For UoB 2+2 Program Students **18 CREDITS**

For Co-op / Study Aboard Students **15 CREDITS**

01416401	THERMODYNAMICS	3 (3-0-6)
01416403	DYNAMICS OF MACHINERY	3 (3-0-6)
01416404	MECHANICAL DESIGN AND MODELING	3 (3-0-6)
01416406	MEASUREMENTS AND INSTRUMENTATION FOR MECHATRONICS	3 (3-0-6)
01416408	COMPUTER AID MECHANICAL DESIGN	3 (3-0-6)
01416409	FLUID MECHANICS	3 (3-0-6)
01416413	INTRODUCTION TO NANOTECHNOLOGY AND NANOSCIENCE	3 (3-0-6)
01416414	INTRODUCTION TO MEMS	3 (3-0-6)
01416415	INTRODUCTION TO DATA SCIENCE	3 (3-0-6)
01416416	INFORMATION SYSTEMS, DATABASES AND APPLICATION	3 (3-0-6)
01416417	DEEP LEARNING APPLICATION	3 (3-0-6)
01416500	COMPUTER VISIONS	3 (3-0-6)
01416503	DESIGNING COMPUTER VISION APPLICATIONS	3 (3-0-6)
01416504	MACHINE LEARNING IN PRACTICE	3 (3-0-6)
01416505	INTERNET OF THINGS AND SMART ROBOTICS AND AI SYSTEMS	3 (3-0-6)
01416507	PERCEPTION AND COGNITIVE ROBOTS	3 (2-2-5)
01416509	SYSTEM ENGINEERING	3 (3-0-6)
01416510	HUMAN ROBOT INTERACTION	3 (3-0-6)
01416511	MOBILE ROBOTS	3 (2-2-5)
01416512	PLANNING TECHNIQUES IN ROBOTICS	3 (2-2-5)
01416518	INDUSTRIAL AUTOMATION	3 (3-0-6)
01416519	MODERN CONTROL	3 (3-0-6)
01416520	VISION SYSTEM FOR MOBILE ROBOTICS	3 (3-0-6)
01416521	INTRODUCTION TO ALGORITHMS	3 (3-0-6)

01416528	COMMUNICATION NETWORK	3 (3-0-6)
09106551	CAPSTONE DESIGN PREPARATION FOR SMART MATERIALS	3 (0-9-5)
01006718	DISCRETE MATHEMATICS	3 (3-0-6)

FOR UNIVERSITY OF BIRMINGHAM 2+2 DUAL DEGREE PROGRAM

(Only students in UoB 2+2 Dual Degree program may choose these courses.)

01416525	ENGINEERING MECHANICS 2	4 (4-0-8)
01416526	MICROPROCESSOR AND CONTROL SYSTEMS	4 (4-0-8)
01416527	DIGITAL ELECTRONICS AND ELECTRICAL MACHINES	4 (4-0-8)

B.2.4 RAI ELECTIVE SUBJECTS

For Regular Students **12 CREDITS**

For UoB 2+2 Program Students **12 CREDITS**

For Co-op / Study Aboard Students **9 CREDITS**

01416601	MECHANICAL SYSTEM AND LABORATORY	3 (2-3-6)
01416602	EMBEDDED SYSTEM DEVELOPMENT	3 (3-0-6)
01416616	MOBILE APPLICATION DEVELOPMENT	3 (3-0-6)
01416604	MECHANICAL VIBRATIONS	3 (3-0-6)
01416617	PNEUMATIC AND HYDRAULIC SYSTEM DESIGN AND CONTROL	3 (3-0-6)
01416607	STARTUP ENGINEERING	3 (3-0-6)
01416608	DATA VISUALIZATION	3 (3-0-6)
01416609	COGNITIVE COMPUTING APPLICATIONS	3 (3-0-6)
01416610	SOFTWARE-DEFINED DATA CENTER	3 (3-0-6)
01416611	WIRELESS SENSOR NETWORK	3 (3-0-6)
01416612	INFORMATION SECURITY MANAGEMENT	3 (3-0-6)
01416613	FUNDAMENTALS OF AR, VR AND MIXED REALITY	3 (3-0-6)
01416614	ADVANCED COMPUTER PROGRAMMING FOR RAI	3 (2-2-5)
01416615	CYBER PHYSICAL ROBOTICS	3 (3-0-6)
01416618	ADVANCED ARTIFICIAL INTELLIGENCE TECHNOLOGY	3 (3-0-6)
01416522	BIG DATA	3 (3-0-6)
01416619	USER EXPERIENCE AND USER INTERFACE DESIGN	3 (2-2-5)
01416523	IT PROJECT MANAGEMENT	3 (3-0-6)
01416620	BLOCKCHAIN TECHNOLOGY AND APPLICATION	3 (3-0-6)
01416621	LEAN MANAGEMENT	3 (3-0-6)
01416628	EXPERIENCE AND EXERCISE FOR INTELLIGENT CONTROL SYSTEM	3 (2-2-5)
01416629	INFORMATION AND CYBER SECURITY	3 (3-0-6)
01416630	INFORMATION SYSTEM SECURITY AND IT LAW	3 (3-0-6)

01416631	ROBOTICS AND AI EXPERIENCE	9 (2-14-12)
01006006	INDUSTRIAL EXPERIENCE FOR ENGINEERS	3 (0-16-0)
01416632	SPACE SCIENCE	4 (4-0-8)

FOR UNIVERSITY OF BIRMINGHAM 2+2 DUAL DEGREE PROGRAM

(Only students in UoB 2+2 Dual Degree program may choose these courses.)

01416622	INTEGRATED DESIGN PROJECT 2	4 (2-4-10)
01416623	ENGINEERING MATHEMATICS 3	4 (4-0-8)
01416624	POWER ELECTRONICS AND POWER SYSTEMS	4 (4-0-8)
01416625	THE INTERNET OF THINGS	4 (4-0-8)
01416626	TELEROBOTICS, TELEPRESENCE AND AUGMENTED REALITY	4 (4-0-8)
01416627	ELECTRONIC ENGINEERING	4 (4-0-8)

TRACK SMART MATERIALS TECHNOLOGY

(Only students in Smart Materials Technology and Robotics and AI Dual-degree program may choose these courses.)

09106400	MATERIALS INVESTIGATION	3 (3-0-6)
09106401	PHOTONICS	3 (3-0-6)
09106402	SMART MATERIALS FOR ENERGY STORAGE	3 (3-0-6)
09106403	LIGHT EMITTING DEVICES AND DISPLAY TECHNOLOGY	3 (3-0-6)
09106404	SOLAR CELL AND NANOSTRUCTURE PHOTOVOLTAIC	3 (2-2-5)
09106405	LAB-ON-CHIP TECHNOLOGY	3 (2-2-5)
09106406	MICROELECTROMECHANICAL SYSTEM (MEMS)	3 (3-0-6)
09106407	CHEMISTRY	3 (2-2-5)

B.2.5 ALTERNATIVE STUDY

For Co-op / Study Aboard Students **6 CREDITS**

01006301	COOPERATIVE EDUCATION	6 (0-45-0)
01006302	STUDY ABROAD	6 (6-0-12)

C. FREE ELECTIVES **6 CREDITS**

Students must complete at least 6 additional credits from any courses offered by the institution.

D. RAI INTERNSHIP **0 CREDITS**

01006805	INDUSTRIAL INTERNSHIPS	0 (0-45-0)
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