

## Civil Engineering

### Introduction

Civil Engineering is a profession in which knowledge of mathematics and physical sciences are applied, ranging from providing structures for the use of civilization to creating, improving, and protecting the environment, as well as providing facilities for transportation, infrastructures, and industries. Civil engineers are involved in the planning, design, construction and operation of complex systems such as buildings and bridges, water purification and distribution systems, flood protections, highways, rapid transit and rail systems, coastal protection and harbors, airports, tunnels and underground constructions, dams, and power generators. Civil engineers are also involved in city planning, water, energy, and land remediation, as well as hazardous waste and chemicals disposal.

Civil Engineering Study Program at BINUS UNIVERSITY offers comprehensive programs leading to a bachelor degree in Civil Engineering.

### Vision

World-Class Civil Engineering Program, with innovative knowledge to fostering and empowering the society through research and application of digital technology to achieve sustainable infrastructure in serving and building the nation.

### Mission

The missions of Civil Engineering Study Program are:

1. Educating Civil Engineering BINUSIAN to develop exemplary characters through holistic approach that meets global standards.
2. Resolving the nation's issues through innovative and applied research projects in Civil Engineering field;
3. Fostering Civil Engineering BINUSIAN as lifelong learners through self-enrichment in improving knowledge in Civil Engineering.
4. Empowering Civil Engineering BINUSIAN to continuously serve society- based needs through sustainable technology development.
5. Being the main driver to enrich the BINUS Higher Education system by using Civil Engineering knowledge and applied technology.

### Program Objective

The objectives of the program are:

1. Graduates will continue updating their professional development in Civil Engineering related field to benefit the organization and society.
2. Graduates will utilize professional and ethical related skills to work productively within their professions and communities.

### Student Outcomes

After completing the study, graduates:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. An ability to communicate effectively with a range of audiences.

4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies, and computer application based on information and communication technology (ICT).

### **Prospective Career of the Graduates**

Graduates of the Civil Engineering Study Program at Bina Nusantara University will be able to apply their knowledge and interpersonal skills in careers, both in private and public sectors, to conceive, plan, design, implement, operate and maintain the systems needed to support the physical infrastructure. Bina Nusantara University is committed to provide its undergraduate program with excellent academic preparation and interpersonal skills for direct entry into the profession, or post-graduate studies.

Graduates will be able to pursue a variety of career options in worldwide locations due to demands for improvements to civil infrastructure that are ever-present, because of population growth and deterioration of existing systems over time. Several career options are including but not limited to the following:

1. Structural Engineering: Structural Engineer, Project Civil Engineer, Precast Project Engineer, Civil Designer, Offshore Structure Engineer, Airfield Civil Engineer also applied programmer for structural engineering.
2. Hydrological, Water Resources Management (WAREM) and Environmental Engineering: Flood Mapping Services Manager, Water Resources Project Manager, Storm Water Management Engineer, Senior Municipal Engineer, Drainage Engineer and Hydraulic Engineer.
3. Transportation and Traffic Engineering: Transportation Project Manager, Transportation Design Manager, Traffic Engineer and Transportation Engineer.
4. Geotechnical Engineering: Geotechnical Engineering Manager, Reclamation Engineer, Soil Improvement Engineer and Foundation Engineer.
5. Highway Engineering: Bridge Engineer, Highway Design Project Manager, Highway Project Engineer, Highway Construction Inspector.
6. Construction Management: Senior Project Manager, Lean/Process Engineer, Construction QC Manager and BIM Expert.

### **Curriculum**

Civil Engineering Study Program at BINUS UNIVERSITY utilizes information technology as an integral part of teaching and learning process, particularly through MCL (Multi Channel Learning) using two delivery methods: Face to Face (F2F) in classrooms and Guided Self Learning Class (GSLC), which allow students to further their studies independently through all sources, whether from online reading or textbook. The Civil Engineering Study Program provides an integrated educational experience that combines basic and applied science theories with practical experience in laboratory experimentations, problems solving and civil engineering designs, as well as site visits.

The curriculum in the Civil Engineering Study Program provides students with a solid foundation in science, with introductory courses in all of the Civil Engineering technical areas. During their final year, students choose one of the following Civil Engineering emphasis areas:

- Structural Engineering
- Hydrological, WAREM and Environmental Engineering
- Transportation and Traffic Engineering
- Geotechnical Engineering
- Highway Engineering
- Construction Management and BIM

As seniors, students will receive a more intense design experience, learning about alternative solution, feasibility, economics, and detailed design descriptions. Moreover, students will receive additional knowledge from our Guest Lecturer in one subject (Case Study in Civil Engineering) using English media (Lecturer Presentation, handbook, homework, and exams). Students will also receive General Lecture from national and international professionals (members of Associations, Industries, or Constructions). In addition, students are required to take courses in professionalism and engineering ethics. These courses will culminate in major engineering design experiences to bridge the gap between educational and professional practice.

### Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013013	Character Building: <i>Pancasila</i>	2	20
	MATH6014013	Calculus I	4	
	SCIE6004013	Physics I	4	
	SCIE6014013	Chemistry for Civil Engineering*	2	
	CIVL6108013	Drawing Construction*	2	
	CIVL6001013	Introduction to Civil Engineering*	2	
	LANG6027013	Indonesian	2	
	COMP6045013	Algorithm & Programming	2	
	<b>Foreign Language Courses</b>			
2	CHAR6014013	Character Building: <i>Kewarganegaraan</i>	2	20
	SCIE6028013	Physics II	4/2	
	MATH6160013	Calculus II	2	
	CIVL6085013	Statics*&***	4	
	CIVL6086013	Engineering Geology*	2	
	ENTR6509001	Entrepreneurship: Ideation	2	
	STAT6147013	Statistics Method	2	
	<b>Foreign Language Courses</b>			
3	CHAR6015013	Character Building: <i>Agama</i>	2	19
	MATH6072013	Numerical Analysis	2	
	CIVL6109013	Integrated Pre-Construction Laboratory	1	
	MATH6022013	Engineering Mathematics I	4	
	CIVL6073013	Mechanics of Materials**	2	
	CIVL6113013	Soil Mechanics*&***	4	
	CIVL6135013	Structural Analysis*	2	
	CIVL6144013	Construction Project Management*,&***&****	2	
<b>Foreign Language Courses</b>			0	

Sem	Code	Course Name	SCU	Total	
4	MATH6161013	Engineering Mathematics II	2	22	
	CIVL6114013	Fluid Mechanics & Hydraulics**&***	4		
	CIVL6054013	Traffic Engineering*	2		
	CIVL6110013	Integrated Infrastructure Material Laboratory	1		
	CIVL6140013	Theory and Design of Steel Structures***	2/1		
	<b>Foreign Language Courses</b>				<b>0</b>
	<b>Minor Program</b>				<b>10</b>
<b>Free Electives</b>			<b>10</b>		
5	CIVL6025013	Hydrology*&***	2	19	
	CIVL6075013	Theory and Design of Concrete Structures*	2/1		
	ENTR6511001	Entrepreneurship: Market Validation	2		
	CIVL6027013	Highway Engineering*&***	2/1		
	CIVL6087013	Foundation Engineering*&***	2/1		
	MATH6212013	Numerical Methods	2		
	<b>Elective Subjects: Computer Application****</b>				
	COMP6043013	Computer Applications in Structural Engineering*	2		
	COMP6044013	Computer Applications in Geotechnical Engineering*	2		
	COMP6046013	Computer Applications in Construction Management	2		
	<b>Elective Subjects: Infrastructure in CE****</b>				
	CIVL6007013	Harbour Engineering*	2		
	CIVL8056013	Bridge Engineering*	2		
	CIVL6035013	Airport Engineering*	2		
	CIVL6037013	Railway Engineering*	2		
	CIVL8038013	Soil Improvement Method	2		
	CIVL6015013	Geosynthetics Application in Civil Engineering	2		
	CIVL6030013	Environmental Engineering	2		
	CIVL6002013	Case Study in Civil Engineering	2		
	CIVL6134013	Project Planning & Controlling	2		
CIVL6141013	Coastal Engineering	2			
CIVL6142013	River Engineering	2			
CIVL6143013	Finite Element Methods	2			
6	<b>Enrichment Program I</b>		20	20	
7	<b>Enrichment Program II</b>		20	20	
8	CIVL6123013	Pre-Thesis	2	6	
	CIVL6124013	Thesis	4		
	CIVL6005013	Thesis	6		
			<b>Total Credits 146 SCU</b>		

\*) This course is delivered in English

\*\*) Global Learning System Course

\*\*\*) Entrepreneurship Embedded

\*\*\*\*) Elective Subjects Infrastructure in CE: Students should choose two credits from each elective courses list.

**Minor/Free Electives:**

-) For 4<sup>th</sup> Semester: Students are required to choose Minor Program or Free Electives. For Free Electives, students are required to choose from the list of Free Electives in Appendix.

**Foreign Language Courses:**

Students will take foreign language courses according to BINUS University English proficiency test results. See foreign language courses appendix for the details. Students must pass with a minimum Grade of C.

**Appendix Foreign Language Courses**

Foreign Language Courses		SCU
ENGL6253013	English for Frontrunners	0
ENGL6254013	English for Independent Users	0
ENGL6255013	English for Professionals	0
JAPN6190013	Basic Japanese Language	0
CHIN6163013	Basic Chinese Language	0

\*) This course is optional for students

1. Students with Binus University English Proficiency Test score less than 437 are required to take English for Frontrunners and English for Independent Users.
2. Students with Binus University English Proficiency Test score less than 520 are required to take English for Independent Users and English for Professionals.
3. Students with Binus University English Proficiency Test score equal to or greater than 520 are required to take English for Professionals. Additionally, students may choose to take either Basic Japanese Language or Basic Chinese Language.
4. Students are required to pass the foreign language courses before they take enrichment.
5. Students can see the requirements to pass the foreign language courses at BINUSMAYA – Beelingua.

**Pre-thesis (2 SCU) & Thesis (4 SCU)** can be taken in the 6th and/or 7th semester by the students who meet the requirements from the Study Program.

### Minor Scheme

Minor Program	Semester 4
<b>Minor @ Binus Kemanggisan</b>	
Digital Ecosystem	-
Sustainable Development	v
Cross Cultural Communication	-
Interactive & Users Experience Design	-
Data Analytics	v
Robotic Process Automation	v
Event Business and Entertainment	v
Creative Digital Storytelling	v
<b>Minor @ Binus Alam Sutera</b>	
Digital Transformation	v
<b>Minor @ Binus Bekasi</b>	
Virtual Services Experience	v
Culinary	-
<b>Minor @ Binus Semarang</b>	
Metaverse in Business	v
Content Creation	v

The minor programs can change anytime based on the trends of knowledge and industry each year. Students will receive information about the updated minor programs during the registration period.

### 1. Sustainable Development

#### Fundamental Courses

Course	SCU
ISYE6154011 Sustainable Design and Manufacture	4
CPEN6217010 Digital for Sustainable Development	4
ARCH6119014 Introduction to Sustainable Development	2
<b>Total SCU</b>	<b>10</b>

### 2. Data Analytics

#### Fundamental Courses

Course	SCU
ISYS6680003 Introduction to Data Analytics	2
ISYS6681003 Data Management & Descriptive Analytics	4
STAT6198049 Statistical for Decision Making	4
<b>Total SCU</b>	<b>10</b>

### 3. Robotic Process Automation

#### Fundamental Courses

Course	SCU
COMP6857001 Basic Programming for Automation	2
COMP6858001 RPA Concept & Design	2
ISYS6684003 RPA Developer Fundamental	4
ISYS6687003 Business Process Improvement	2
<b>Total SCU</b>	<b>10</b>

### 4. Event Business and Entertainment

#### Fundamental Courses

Course	SCU
HTMN6151021 Event Marketing Management	2
HTMN6152021 Catering Management	4
TRSM6232022 MICE (Meeting, Incentive, Convention, Exhibition) Management	4
<b>Total SCU</b>	<b>10</b>

### 5. Creative Digital Storytelling

#### Fundamental Courses

Course	SCU
ENGL6274024 Approaches in Multimodal Storytelling	2
DSIN6033007 Visual Storytelling	2
ENGL6275024 Storytelling for Business	2
FILM6118009 Script Development & Pitching	4
<b>Total SCU</b>	<b>10</b>

### 6. Digital Transformation

#### Fundamental Courses

Course	SCU
ISYS6559003 Business Models and Technology Innovation	4
ISYS6557003 Business Data Management	4
MGMT6484005 Digital Strategy	2
<b>Total SCU</b>	<b>10</b>

### 7. Virtual Services Experience

#### Fundamental Courses

Course	SCU
ISYS6561003 Fundamental of Virtual Services	2
ACCT6350020 Virtual Financial Services	4
MGMT6354005 Virtual Operation and Supply Chain	4
<b>Total SCU</b>	<b>10</b>

## 8. Metaverse In Business

### Fundamental Courses

Course	SCU
ISYS6777052 Business Model	2
COMP6889051 Virtual Reality	4
COMP6890051 Augmented reality	4
<b>Total SCU</b>	<b>10</b>

## 9. Content Creation

### Fundamental Courses

Course	SCU
FILM6105009 Filmmaking Fundamental	4
MKTG6392055 Digital marketing	4
DSIN6042053 Photography for Creators	2
<b>Total SCU</b>	<b>10</b>

## Appendix: Free Electives (4<sup>th</sup> Semester)

No	Course Owner Department	Course Code	Course Name	SCU	Semester
1	Business Management	MGMT6455005	Servitization and Customer Experience Management	2	4
2	Business Management	MGMT6456005	Fundamentals of Supply Chain Management	4	4
3	Business Management	MGMT6457005	Global Supply Chain Services	4	4
4	Business Management	MGMT6401005	Digital Supply Chain Management	2	4
5	Business Management	MGMT6365005	Current Issue in Service Business and Technology	2	4
6	Management	MGMT6464005	Corporate Governance	2	4
7	Management	MGMT6341005	Strategic Management	4	4
8	Management	BUSS6109005	Business Development	4	4
9	Management	MGMT6196005	Project Management	4	4
10	Management	BUSS6229005	Business Simulation	4	4
11	Management	MGMT6033005	Advanced Topics in Business and Organization	2	4
12	Management	LAWS6159005	Legal Aspect in Business	2	4
13	Management	ISYS6085005	Advanced Topics in E-Business	2	4
14	Global Business Marketing	MKTG6321005	Marketing Data Analytics	4	4
15	Global Business Marketing	MKTG6322005	Sales and Customer Relationship Management	4	4
16	Global Business Marketing	MKTG6272005	Marketing Research	2/2	4
17	Global Business Marketing	MGMT6358005	Managing Business Information	2/2	4
18	International Business Management	BUSS6222005	Export-Import Cost Management	2	4
19	International Business Management	MGMT6458005	Global Supply Chain Management	2	4
20	International Business Management	BUSS6191005	Export-Import Management	2	4
21	Industrial Engineering	ISYE6181011	System Engineering & Analysis	2	4

No	Course Owner Department	Course Code	Course Name	SCU	Semester
22	Industrial Engineering	ISYE6041011	Engineering Economy	2	4
23	Computer Science	COMP6696001	Research Methodology in Computer Science	2	4
24	Computer Science	COMP6823001	Multimedia Systems	2	4
25	Marketing Communication	COMM6613019	Introduction to Media Industry	2	4
26	Marketing Communication	COMM6625019	Theory of Mass Communication	2	4
27	Marketing Communication	COMM6425019	Event Management	2	4
28	Accounting	ACCT6116020	Social and Environmental Accounting	2	4
29	Accounting	ACCT6461020	Accounting Syariah	2	4
30	Accounting	ACCT6313020	Public Sector Accounting	2	4
31	Taxation	TAXN6055020	Customs, Export and Import Tax Planning	2	4
32	Cyber Security	COMP6549001	Software Security	2	4
33	Data Science	DTSC6005001	Data Mining and Visualization	2/1	4
34	Mathematics	MATH6187016	Machine Learning	2/1	4
35	Information Systems	ISYS6016003	Social Media Fundamental	2	4
36	Information Systems	ISYS6169003	Database Systems	4/2	4
37	Information Systems	ISYS6210003	Data Visualization	2	4
38	Information Systems	ISYS6280003	Database Systems	4/2	4
39	Information Systems	ISYS6285003	Digital and New Media	2	4
40	Information Systems	ISYS6478003	Research Methods in Information Systems	2	4
41	Information Systems	ISYS6594003	Coding for Finance	2	4
42	Business Information Technology	ISYS6577003	Machine Learning & Foundations	2	4
43	Business Information Technology	ISYS6606003	Smart Application	2	4
44	Interior Design	DSGN6888008	Interior Accessories Design	2	4
45	Civil Engineering	CIVL6136013	Dynamics of Structures and Earthquake Engineering	4	4
46	Civil Engineering	CIVL6138013	Construction Material Technology	3	4
47	Civil Engineering	CIVL6111013	Surveying	3	4
48	Civil Engineering	CIVL6137013	Matrix Structural Analysis	3	4
49	Civil Engineering	CIVL6145013	Construction Methods & Heavy Equipment	3	4
50	Civil Engineering	CIVL6146013	Urban Drainage	3	4

**Enrichment Program I (6<sup>th</sup> Semester) & Enrichment Program II (7<sup>th</sup> Semester):**

-) Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.

**Enrichment Track Scheme**

Track	Semester 6							Semester 7							
	IN	RS	EN	CD	SA	IS	etc	IN	RS	EN	CD	SA	IS	FS	etc
1				v				v							
2					v			v							
3		v						v							
4	v							v							
5						v		v							
6	v								v						
7	v										v				
8	v											v			
9	v													v	
10	v												v		

**Note:**

IN : Certified Internship  
 RS : Certified Research  
 EN : Certified Entrepreneurship  
 CD : Certified Community Development  
 SA : Certified Study Abroad  
 IS : Certified Specific Independent Study  
 FS : Further Study  
 etc : Study Program Special Purposes

**Description:**

Student will take one of enrichment program tracks

Students are required to take the Internship track on the Enrichment Program I or Enrichment Program II with one of the following courses: CIVL6125013 - Technical Design in Civil Engineering or CIVL6126013 - Technical Project, which is a Capstone Project with minimum 8 credits.

**Certified Internship Track**

Code	Course Name	SCU	Total
<b>Enrichment Program I</b>			
CIVL6077013	Industrial Experience	8	20
CIVL6125013	Technical Design in Civil Engineering	8	
CIVL6116013	Professional Ethics and Communication	4	
<b>Enrichment Program II</b>			
CIVL6081013	Project Experience	8	20
CIVL6126013	Technical Project	8	
CIVL6083013	Leadership and Organization Behavior	4	

**Certified Research Track**

Code	Course Name	SCU	Total
<b>Enrichment Program I/II</b>			
RSCH6223013	Research Experience	8	20
RSCH6514013	Scientific Writing in Civil Engineering	8	
RSCH6181013	Global EES in Civil Engineering	4	

**Certified Community Development Track**

Code	Course Name	SCU	Total
<b>Enrichment Program I/II</b>			20
CMDV6123013	Community Outreach Project Implementation	8	
CMDV6294013	Community Outreach Project Design in Civil Engineering	8	
CMDV6097013	Employability and Entrepreneurial Skills in Civil Engineering	4	

**Certified Study Abroad Track**

Code	Course Name	SCU	Total
<b>Enrichment Program I/II</b>			20
GLOB6005013	Elective Course for Study Abroad 1	4	
GLOB6006013	Elective Course for Study Abroad 2	4	
GLOB6007013	Elective Course for Study Abroad 3	4	
GLOB6008013	Elective Course for Study Abroad 4	4	
GLOB6009013	Elective Course for Study Abroad 5	2	
GLOB6010013	Elective Course for Study Abroad 6	2	
GLOB6011013	Elective Course for Study Abroad 7	2	
GLOB6012013	Elective Course for Study Abroad 8	2	
GLOB6013013	Elective Course for Study Abroad 9	2	
GLOB6014013	Elective Course for Study Abroad 10	2	
GLOB6015013	Elective Course for Study Abroad 11	2	
GLOB6016013	Elective Course for Study Abroad 12	2	
GLOB6251013	Elective Course for Study Abroad 29	4	

\*) Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.

**Certified Specific Independent Study**

Code	Course Name	SCU	Total
<b>Elective courses list for certified specific independent study*</b>			20
<b>Enrichment Program I/II</b>			
CSIS6001013	Course Certification	3	
CSIS6002013	Technical Skill Enrichment	4	
CSIS6003013	Industrial Project	9	
CSIS6004013	Soft Skill Enrichment	4	
CSIS6005013	Elective Course for Specific Independent Study 1	8	
CSIS6006013	Elective Course for Specific Independent Study 2	8	
CSIS6007013	Elective Course for Specific Independent Study 3	6	
CSIS6008013	Elective Course for Specific Independent Study 4	6	
CSIS6009013	Elective Course for Specific Independent Study 5	6	
CSIS6010013	Elective Course for Specific Independent Study 6	5	
CSIS6011013	Elective Course for Specific Independent Study 7	5	
CSIS6012013	Elective Course for Specific Independent Study 8	5	
CSIS6013013	Elective Course for Specific Independent Study 9	5	

Code	Course Name	SCU	Total
CSIS6014013	Elective Course for Specific Independent Study 10	4	
CSIS6015013	Elective Course for Specific Independent Study 11	4	
CSIS6016013	Elective Course for Specific Independent Study 12	4	
CSIS6017013	Elective Course for Specific Independent Study 13	4	
CSIS6018013	Elective Course for Specific Independent Study 14	4	
CSIS6019013	Elective Course for Specific Independent Study 15	3	
CSIS6020013	Elective Course for Specific Independent Study 16	3	
CSIS6021013	Elective Course for Specific Independent Study 17	3	
CSIS6022013	Elective Course for Specific Independent Study 18	3	
CSIS6023013	Elective Course for Specific Independent Study 19	3	
CSIS6024013	Elective Course for Specific Independent Study 20	3	
CSIS6025013	Elective Course for Specific Independent Study 21	2	
CSIS6026013	Elective Course for Specific Independent Study 22	2	
CSIS6027013	Elective Course for Specific Independent Study 23	2	
CSIS6028013	Elective Course for Specific Independent Study 24	2	
CSIS6029013	Elective Course for Specific Independent Study 25	2	
CSIS6030013	Elective Course for Specific Independent Study 26	2	
CSIS6031013	Elective Course for Specific Independent Study 27	2	
CSIS6032013	Elective Course for Specific Independent Study 28	2	
CSIS6033013	Elective Course for Specific Independent Study 29	1	
CSIS6034013	Elective Course for Specific Independent Study 30	1	
CSIS6035013	Elective Course for Specific Independent Study 31	1	
CSIS6036013	Elective Course for Specific Independent Study 32	1	

\*) For students who take BINUS certified specific independent study courses, they should take the first 4 courses on the list above (20 credits). Meanwhile, electives courses 1 to 32 are transferred courses for students who take certified specific independent study outside BINUS University. Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.

**The Table of Prerequisite for Civil Engineering Study Program**

Course		SCU	Sem.	Prerequisite Course		SCU	Sem.
MATH6022013	Engineering Mathematics I	4	3	MATH6014013	Calculus I	4	1
CIVL6135013	Structural Analysis	2	3	CIVL6085013	Statics	4	2

**Student should pass all of these quality controlled courses as listed below:**

No.	Course Code	Course Name	Minimal Grade
1.	CHAR6013013	Character Building: <i>Pancasila</i>	B
2.	CIVL6085013	Statics*	C
3.	CIVL6113013	Soil Mechanics*	C
4.	CIVL6144013	Construction Project Management	C
5.	CIVL6114013	Fluid Mechanics & Hydraulics	C
6.	CIVL6027013	Highway Engineering*	C
7.	CIVL6075013	Theory and Design of Concrete Structure	C
8.	ENTR6511001	Entrepreneurship: Market Validation	C

\*) Tutorial & Multipaper

