Supporting the Development of an Engineering Program at Northrise University

Presentation for the Board of Trustees

April 5, 2025

Fort Worth, Texas

John Tixier, LeTourneau University

Joe Aikins, JTAM Engineering (retired)

with acknowledgements to the other members of the
Northrise International Engineering Advisory Committee:
Jeff Gladstone, Dordt University (committee chair)
Ian Cosh, Northrise University Initiative
Samuel Hodges, LeTourneau University and Christian Brothers University
Nolan Van Gaalen, Dordt University
Gitogo Churu, LeTourneau University
Jan Wium, Northrise University

Scope of Presentation

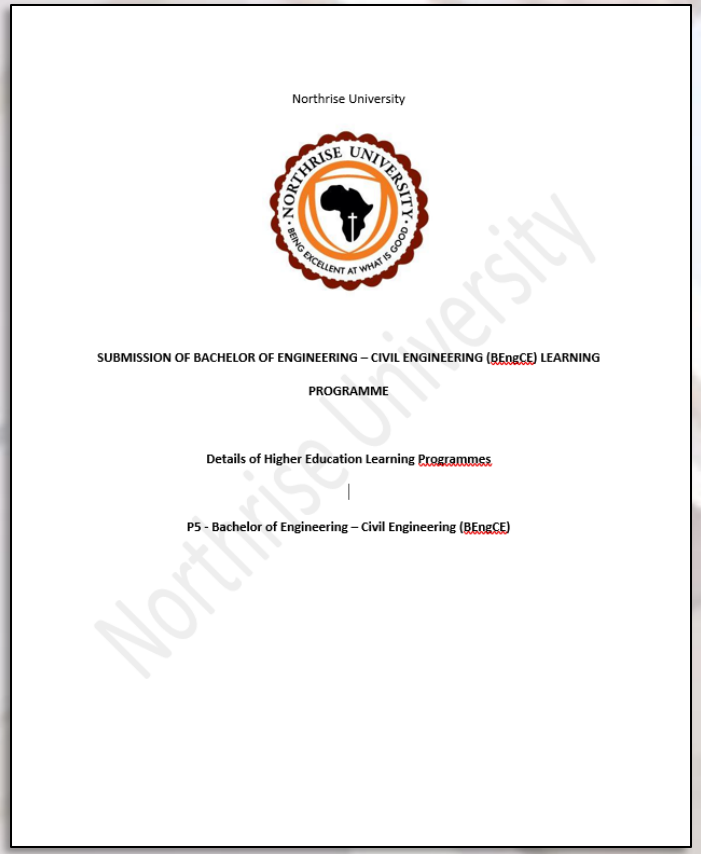
- History and Progress of Northrise Engineering
- Lessons-Learned in Developing the Engineering Program

Northrise University Engineering Development History

- **2004 – Northrise University founded**
- **2015 – Began thinking about Engineering, collaboration with Dordt**
- **2018 – President Zimba invited LeTourneau to join**
- **2018 – LeTourneau vision trip to Zambia** (Tixier, Hodges)
- **2019 – Dordt and LeTourneau working visit to Zambia** (Gladstone, VanGaalen, Churu, Tixier)
- **2019-2024 Engineering Development Team created the Engineering Curriculum Plan**
- **2019-2024 Engineering Building**
  - **Fundraising; Design; Contracts Drafted, Solicited, Awarded**
  - **Groundbreaking (May 2023),**
  - **Dedication Ceremony (May 2024),**
  - **Building Completed and Furnished (Summer/Fall 2024)**
- **2023-2024 Recruit Head of Department and other engineering faculty**
- **2025, January – Inaugural Northrise Engineering class of 31 students**

Civil Engineering Curriculum Submitted for Accreditation from Higher Education Authority (HEA)

Row	Group Category	Semesters
1	Introduction to Engineering	2
2	Calculus and Other Applied Mathematics	4
3	Computers, Software, Electrical	3
4	Fundamentals: Physics, Geology	2
5	Materials/Concrete	2
6	Solid Mechanics/Structures	6
7	Fluids/Hydraulics, Water Resources	3
8	Surveying and GIS	2
9	Environmental	1
10	Roads & Transportation	1
11	Business, Economics, Mgmnt & Contracts, Entrepreneurship	4
12	Capstone	2
13	Christian Thought and Practice (General to All Northrise)	3
14	Faith Perspective (Specific to Engineering Program)	5



Northrise University

SUBMISSION OF BACHELOR OF ENGINEERING – CIVIL ENGINEERING (BEngCE) LEARNING PROGRAMME

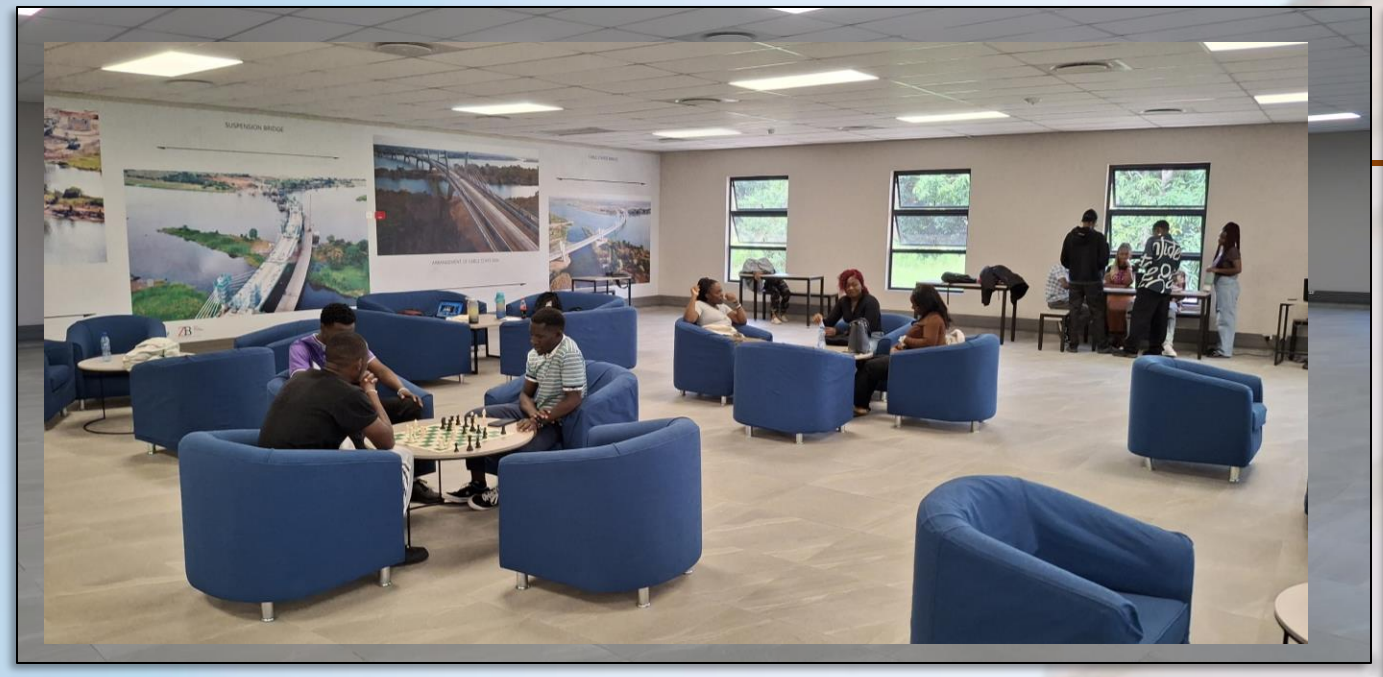
Details of Higher Education Learning Programmes

P5 - Bachelor of Engineering – Civil Engineering (BEngCE)

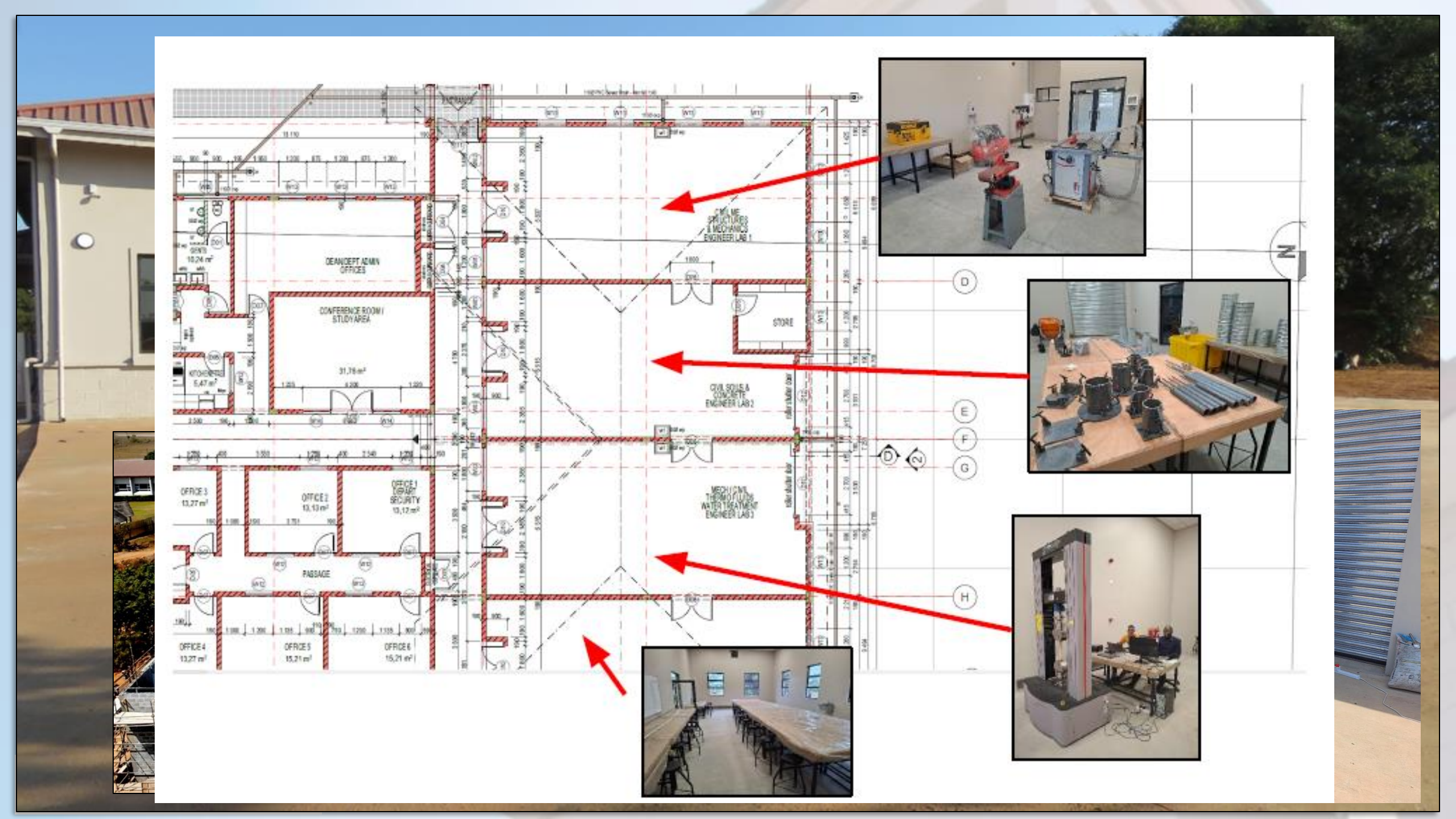
Northrise University

HIGHER EDUCATION AUTHORITY

Engineering Building Design, Construction, Dedication



One of 2 Larger Classroom Spaces


DEAN/DEPT ADMIN OFFICES
CONFERENCE ROOM / STUDY AREA
31,76 m²
KITCHENETTE
5,47 m²
OFFICE 3
13,27 m²
OFFICE 2
13,13 m²
OFFICE 1 DEPT SECURITY
13,12 m²
PASSAGE
OFFICE 4
13,27 m²
OFFICE 5
15,21 m²
OFFICE 6
15,21 m²
CIVIL ME STRUCTURES & MECHANICS ENGINEER LAB 1
STORE
CIVIL SOILS & CONCRETE ENGINEER LAB 2
MECH / CIVIL THERMO FLUIDS WATER TREATMENT ENGINEER LAB 3
N
D
E
F
G
H
1
2

First Two PhD Faculty Hired 2024

Head of CE Department:
Jan Wium, Recently Retired from Stellenbosch University, South Africa

Future Head of ME Department:
Kabaso Musonda, Transferred from Copperbelt University, Zambia

Program Distinctives

- Christ-centered Values and Worldview
- Hands-on Emphasis
- Entrepreneurial Mindset
- Robust Introductory Course Series

Lessons Learned

- **Lessons-Learned #1: The work is deeply dependent on people, and care needs to be taken to establish and maintain genuine relationships with one another.**
  - **Young institutions are likely to have a "low absorption rate" as they respond to ideas from enthusiastic supporters.**
  - **Be patient, and do not run ahead of support from institutional leadership.**
  - **Be prepared to let go.**
- **Lessons-Learned #2: What might initially feel like a clean-sheet-of-paper design problem—a new Engineering program in our case—inevitably will need to be brought into conformity with the real constraints of the institutions in which the design will operate.**
  - **HEA-imposed cap on the total number of credit-hours**

    …and semester hours
  - **Instruction for any given course is given only once per week**
  - **Far more detail than we had anticipated in the course descriptions**

Lessons Learned

- **Lessons-Learned #3: Be creative and patient with the challenge of faculty recruiting.**
  - Cast a wide net utilizing fairly standard talent search methods
  - We spent time brainstorming ideas related to personal contacts that are in each of our own personal, academic, and missions-related networks
  - We have looked for ways to recruit from within.
  - We plan to utilize on-line and in-person adjuncts and visiting instructors from the US
- **Lessons-Learned #4: This is the Lord's work; enjoy His presence in the work, enjoy the journey, and enjoy the fellowship of the larger body of Christ**
  - Don't lose sight of the fact that the work was initiated by the Lord, and He has called each of us to join in.
  - As for any work to which the Lord might call us, we are free to allow ourselves to go about the work with joy.
  - It has been a deeply life-enriching pleasure to work alongside our brothers and sisters at Northrise as they seek to be the hands and feet of Jesus to their fellow Zambians.

Current Status

- **HEA Approval Granted December 2024**
  - Worked closely with Engineering Institute of Zambia
  - Immediate outreach for enrolment in Spring semester
- **First Engineering Cohort in January 2025**
  - Academic year is Jan – Dec (semester 1, semester 2)
  - 31 students enrolled
  - Only one engineering course in the first year (Intro, 2nd semester)
- **Expatriate visiting faculty are welcome and encouraged to consider the teaching opportunity**
  - Sabbatical
  - Retirement
  - Remote seminar
- **Planning beginning for Mechanical Engineering**
  - Expected start Spring 2028

Northrise Mechanical Engineering Program
International Advisory Committee Suggestions

- 2025 – 2026 Program & Budget Development, now till end of July 2026
  - Prof. Wium and Musonda to research ME Program focus
  - Assess and quantify classroom and lab equipment requirements
  - Procure Textbooks from UK supplier
- 2025 – 2026 Advisory Committee Draft Curriculum,
  - Leverage CE HEA application, Dordt and LeTourneau curriculum
  - Engineering Council of South Africa (ECSA) guidelines
  - Consider basic requirements and local preferences
  - Submit to HEA August 2026
- 2027 – Final Approval by HEA for a five-year accredited ME degree program
- 2027 – Recruitment, July till November
  - Budget based on 65 CE and 35 ME students, starting in 2028
- 2028 – January: Inaugural ME Program

We Are His Workmanship

Recommended Course Sequence, Years 1-2

Year 1

SEM101	Introduction to University Studies	1	APA101	Introduction to APA	1
COM101	Comm & Study Skills 1	3	COM102	Comm & Study Skills 2	3
CIT101	Computer Literacy Basics	3	MAT104	A-Level Math II	3
CTP101	Biblical Worldview and Major World Religions I	1	PHY101	A-Level Physics	3
MAT103	A-Level Math I	3	CHE102	A-Level Chemistry II	3
CHE101	A-Level Chemistry I	3	ENG101	Introduction to Engineering - A First Look	3
	Semester Total	14		Semester Total	16

Year 2

CTP203	Biblical Worldview and Major World Religions II	5	MAT212	Advanced Calculus and Complex Analysis	5
PSP201	Understanding the Contemporary World		CMP211	Computer Programming	
MAT211	Calculus and Solid Geometry		ENG202	Introduction to Civil Engineering	
PHY201	Physics		ENG211	Basics of Electrical and Electronics Engineering	
ENG201	Introduction to Engineering Practice, Methods, and Tools		ENG221	Engineering Surveying	

Recommended Course Sequence, Years 3-5

	5	
CTP301	Conflict and Reconciliation	
PSP301	Zambia History, Law, and Land Management	
MAT311	Fourier series, Partial differential equations and its applications	
ENG341	Statics	
ENG331	Civil Engineering Materials	
	5	
PSP401	Civil Engineering Sustainability, Stewardship, and Ethics	
ENG441	Structural Analysis	
ENG411	Software Applications in Civil Engineering	
ENG451	Hydraulic Structures	
ENG481	Engineering Construction Techniques and Management	
	5	
PSP501	Technology and Society	
ENG591	Final Year Design and Research Project I	
ENG581	Quantity Surveying, Contracts, and Valuation	
ENG541	Design of Steel Structures	
ENG572	Highway Engineering	

Year 3		5
MAT312	Probability, Statistics and Numerical Methods	
ENG351	Applied Fluid Mechanics and Hydro-Machinery	
ENG342	Mechanics of Materials	
ENG312	Engineering Geology	
ENG321	Remote Sensing & Geographic Information Systems	
	Industrial Training I (4 weeks)	
Year 4		5
ENG442	Soil Mechanics and Foundation Engineering	
ENG452	Water Resources and Wastewater Design	
ENG443	Design of Concrete Structures	
ENG471	Traffic and Transportation Engineering	
ENG482	Economics and Finance for Engineers	
	Industrial Training II (4 weeks)	
Year 5		5
CTP501	Marriage and Family	
PSP502	Calling, Task, and Culture	
ENG592	Final Year Design and Research Project II	
ENG561	Environmental Impact Assessment	
ENG582	Entrepreneurship Development	