ROYAL ACADEMY OF ENGINEERING

@RAEngGlobal
#SDGs

Problem Based Learning: Teaching engineers to tackle the SDGs

IRSHAAD VAWDA
CEO, Engineers Without Borders South Africa

Developing the skills & knowledge for designing solutions to poverty

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- No Poverty and Engineering Education
- Who is EWB-SA?
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- Practical Exercise based on the Design Challenge

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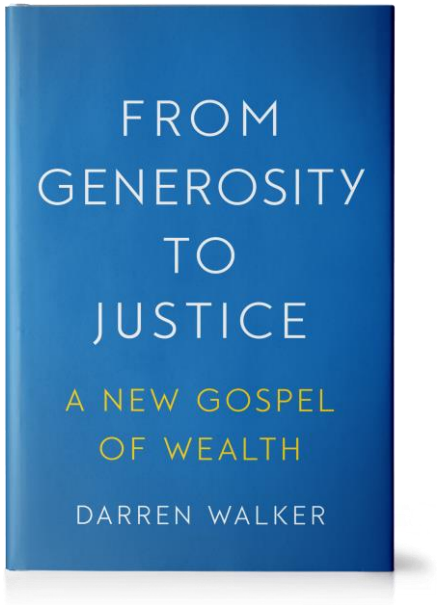
No Poverty & Engineering Education

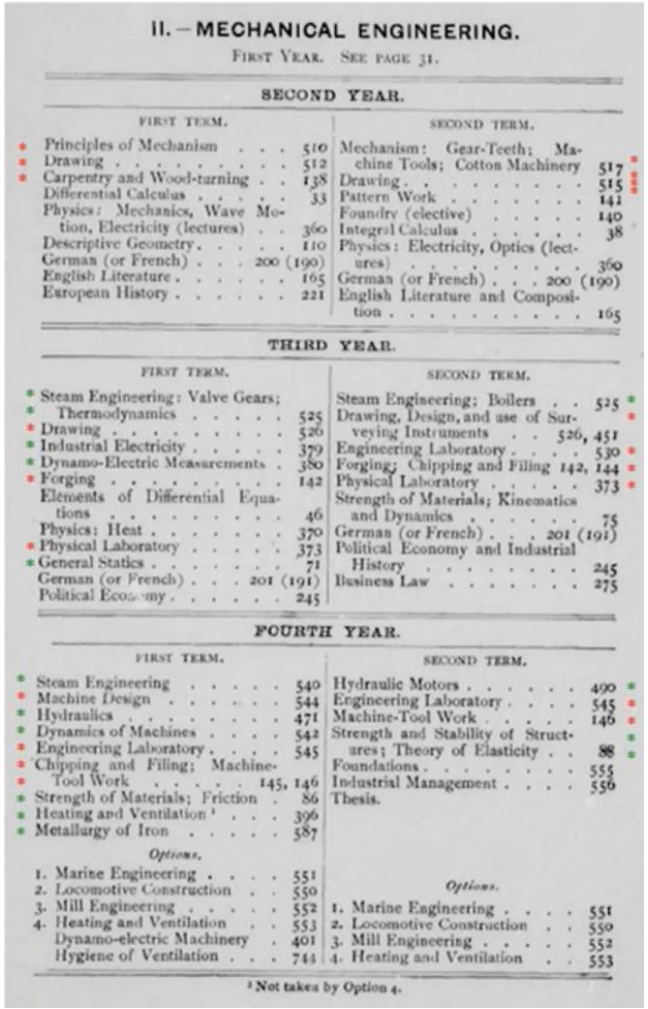
EWB ENGINEERS WITHOUT BORDERS

1 NO POVERTY



"I see it like this: If bringing canned goods to a food bank to help feed people in the community is a kind of charity—and if advocating for food stamps, free school lunches, and a living wage reflects a deeper kind of social obligation—then dismantling the systems of poverty and oppression that prevent people from being able to afford healthy food in the first place is delivering justice."

1 NO POVERTY



II. — MECHANICAL ENGINEERING.

FIRST YEAR. SEE PAGE 31.

SECOND YEAR.

FIRST TERM.		SECOND TERM.	
* Principles of Mechanism	510	Mechanism: Gear-Teeth; Machine Tools; Cotton Machinery	517
* Drawing	512	Drawing	515
* Carpentry and Wood-turning	138	Pattern Work	141
Differential Calculus	33	Foundry (elective)	140
Physics: Mechanics, Wave Motion, Electricity (lectures)	360	Integral Calculus	38
Descriptive Geometry	110	Physics: Electricity, Optics (lectures)	360
German (or French)	200 (190)	German (or French)	200 (190)
English Literature	165	English Literature and Composition	165
European History	221		

THIRD YEAR.

FIRST TERM.		SECOND TERM.	
* Steam Engineering: Valve Gears; * Thermodynamics	525	Steam Engineering: Boilers	525
* Drawing	526	Drawing, Design, and use of Surveying Instruments	526, 451
* Industrial Electricity	379	Engineering Laboratory	530
* Dynamo-Electric Measurements	380	Forging; Chipping and Filing	142, 144
* Forging	142	Physical Laboratory	373
Elements of Differential Equations	46	Strength of Materials; Kinematics and Dynamics	75
Physics: Heat	370	German (or French)	201 (191)
* Physical Laboratory	373	Political Economy and Industrial History	245
* General Statics	71	Business Law	275
German (or French)	201 (191)		
Political Economy	245		

FOURTH YEAR.

FIRST TERM.		SECOND TERM.	
* Steam Engineering	540	Hydraulic Motors	490
* Machine Design	544	Engineering Laboratory	545
* Hydraulics	471	Machine-Tool Work	146
* Dynamics of Machines	542	Strength and Stability of Structures; Theory of Elasticity	88
* Engineering Laboratory	545	Foundations	555
* Chipping and Filing; Machine-Tool Work	145, 146	Industrial Management	556
* Strength of Materials; Friction	86	Thesis.	
* Heating and Ventilation [1]	396		
* Metallurgy of Iron	587		
Options.			
1. Marine Engineering	551		
2. Locomotive Construction	550	*Options.*	
3. Mill Engineering	552	1. Marine Engineering	551
4. Heating and Ventilation	553	2. Locomotive Construction	550
Dynamo-electric Machinery	401	3. Mill Engineering	552
Hygiene of Ventilation	743	4. Heating and Ventilation	553

[1] Not taken by Option 4.

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Requirements 1975

	Departmental Program[2]				
	Required Subjects				**135**
2.01	Mechanics of Solids	4	0	8	
2.02	Introduction to System Dynamics	4	0	8	
2.03J	Dynamics	4	0	8	
2.20	Fluid Mechanics	4	0	8	
2.30	Mechanical Behavior of Solids	3	2	7	
2.40	Thermodynamics	4	0	8	
2.671	Measurement and Instrumentation	2	3	4	
2.672	Project Laboratory	1	3	2	
2.70	Introduction to Design	2	3	4	
2.73	Design Projects	2	3	4	
2.86	Manufacturing Processes Laboratory	3	3	3	
18.03	Differential Equations	4	0	8	
	Thesis[1]			9	

YouTube

https://www.youtube.com/watch?v=_CNLBbtPmBc&t=368s

EWB ENGINEERS WITHOUT BORDERS

1 NO POVERTY

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The second anticipated trend is a move towards socially-relevant and outward-facing engineering curricula. Such curricula emphasize student choice, multidisciplinary learning and societal impact, coupled with a breadth of student experience outside the classroom, outside traditional engineering disciplines and across the world.

Graham, Ruth. 2018. 'Global State of the Art in Engineering Education - MIT School of Engineering', March, 170.

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ROYAL ACADEMY OF ENGINEERING

Who is EWB-SA?

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ROYAL ACADEMY OF ENGINEERING

Empowering Engineers to Empower People

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What is the “Engineering for People Design Challenge”?

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DESIGN BRIEF 2019/20

MAKERS VALLEY

SOUTH AFRICA

Produced by a partnership of Engineers Without Borders South Africa, UK and USA

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What is “Design a Difference”?

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This programme aims to 1) bring the skills of experienced engineers to the benefit of under-served communities, 2) develop "socio-technical systems design" capacity among engineers, and 3) train engineers to take this skill back into their everyday work

EWB-SA

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Practical Exercise

Thank you!

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