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APPENDIX 1

Curriculum of B.Sc. Engineering Degree Programme

Table A1.1: Details of Modules - Academic Year 2010/2011

Department	Module code	Module Name
CE	CE2012	Structural Mechanics II
	CE2022	Design of Steel Structures
	CE2032	Hydraulic Engineering I
	CE2042	Soil Mechanics & Geology I
	CE2052	Construction Planning and Cost Estimation
	CE2062	Surveying I
	CE2112	Structural Analysis I
	CE2122	Design of Concrete Structures I
	CE2132	Soil Mechanics & Geology II
	CE2142	Surveying II
	CE3012	Hydraulic Engineering II
	CE1822	Aspects of Civil Engineering
CH	CH2042	Fuels and Lubricants
	CH2052	Transport Phenomena 1
	CH2062	Transport Phenomena II
	CH2072	Chemical Kinetics and Thermodynamics
	CH2082	Mass Transfer Operations 1
	CH3092	Environmental Science
	CH3102	Polymer Science and Technology
CS	CS2032	Principles of Computer Communication
	CS2042	Operating Systems
	CS2062	Object Oriented Software Development
	CS3022	Software Engineering
	CS3042	Database Systems
	CS3242	Micro-controllers and Applications
	CS3032	Computer Networks

Table A1.1 continued

EE	EE2802	Applied Electricity
	EE2012	Circuit Theory
	EE2022	Electrical Machines & Drives I
	EE2033	Power Systems I
	EE2042	Electrical Measurements and Instrumentation
	EE2132	Electromagnetic Field Theory
	EE2052	Control Systems I
	EE3072	Electrical Installations I
	EE2072	Electrical Machines & Drives II
	EE2083	Power Systems II
EN	EN2052	Communication Systems
	EE2092	Theory of Electricity
	EN3022	Electronic Design and Realization
	EN2072	Communications I
	EN2082	Electromagnetics
	EN2142	Electronic Control Systems
	EN2022	Digital Electronics
	EN2062	Signals and Systems
	EN2012	Analog Electronics
	EN2852	Applied Electronics
MA	MA1013	Mathematics
	MA1023	Methods of Mathematics
	MA1032	Numerical Methods for Computer Science
	MA2013	Differential Equation
	MA2023	Calculus
	MA2033	Linear Algebra
	MA3013	Applied Statistics
	MA2042	Discrete Mathematics
ME	ME2022	Manufacturing Engineering I
	ME2112	Fluid Dynamics
	ME2092	Mechanics of Machines I
	ME2012	Mechanics of Materials I
	ME2032	Thermodynamics of Heat Engines & Work Transfer Devices
	ME3072	Manufacturing Engineering II
	ME3032	Mechanics of Machines II
	ME3062	Mechanics of Materials II
	ME2142	Machine Elements and Innovative Design
	ME1802	Introduction to Manufacturing Engineering
	ME1822	Basic Engineering Thermodynamics

Table A1.1 continued

	ME2122	Engineering Drawing & Computer Aided Modeling
	ME2842	Basic Thermal Sciences and Applications
	ME2832	Mechanics of Machines
	ME3062	Mechanics of Materials II
MT	MT2122	Principles of Materials Science & Engineering II
	MT2042	Ceramic Science
	MT2142	Electrical and Magnetic Properties of Materials
	MT2072	Metal Forming and Machining
	MT2032	Degradation of Materials
	MT2152	Polymer Technology

Table A1.2: Curriculum for Academic Year 2010/2011

	Level	**Semester**	**CE**	**CH**	**CS**	**EE**	**EN**	**ME**	**MT**
Mathematics	Level 1	S1	MA1013	MA1013	MA1013	MA1013	MA1013	MA1013	MA1013
		S2	MA1023	MA1023	MA1032	MA1023	MA1023	MA1023	MA1023
	Level 2	S3	MA2013 MA2023	MA2013 MA2023	MA2023 MA2042	MA2013 MA2023	MA2013 MA2023	MA2013 MA2023	MA2013 MA2023
		S4	MA2033 MA3013	MA2033	MA2033 MA2013	MA2033 MA2042	MA2033 MA2042	MA2033 MA2042	MA2033 MA3013
Engineering	Level 2	S3	CE 2012 CE 2022 CE 2032 CE 2042 CE 2052 CE 2062	CH 2042 CH 2052 EE 2802 EN 2852 ME 2012 ME 2122 ME 1822	CE 1822 CS 2032 CS 2042 CS 2062 EN 2022 ME 1822	CE 1822 EE 2012 EE 2022 EE 2033 EE 2292 EN 2012 EN 2022 ME 2012	EE 2092 EN 2012 EN 2022 EN 2052 EN 2062	EE 2802 EN 2852 ME 2022 ME 2112 ME 2092 ME 2012	EE 2802 EN 2852 ME 1822 ME 2012 MT 2042 MT 2122
		S4	CE 2112 CE 2122 CE 2132 CE 2142 CE 3012	CH 2062 CH 2072 CH 2082 CH 3092 CH 3102 CH 2952	CS 2212 CS 3022 CS 3032 CS 3042 CS 3242 CS 3952 EN 2062 ME 1802	EE 2042 EE 2132 EE 2052 EE 3072 EE 2072 EE 2083 EE 2192 EE 3202 ME 2842	EN 2142 EN 2072 EN 3022 EN 2902 EN 2962 EN 2082	ME 2032 ME 3072 ME 3032 ME 3062 ME 2142	ME 2832 ME 2142 ME 3062 MT 2142 MT 2072 MT 2032 MT 2152

Table A1.3: Details of Modules - Academic Year 2011/2012

Department	Module code	Module name
CE	CE 1822	Aspects of Civil Engineering
	CE 2012	Structural Mechanics II
	CE 2022	Design of Steel Structures
	CE 2032	Hydraulic Engineering I
	CE 2042	Soil Mechanics & Geology I
	CE 2052	Construction Planning and Cost Estimation
	CE 2062	Surveying I
	CE 2112	Structural Analysis I
	CE 2122	Design of Concrete Structures I
	CE 2132	Soil Mechanics & Geology II
	CE 2142	Surveying II
	CE 3012	Hydraulic Engineering II
CH	CH 2013	Heat and Mass Transfer
	CH 2023	Unit Operations 1
	CH 2033	Thermodynamics
	CH 2043	Particle Technology
	CH 2053	Fuels and Lubricants
	CH 2063	Principles of Biological Engineering Fundamentals
	CH 2073	Polymer Science and Technology
	CH 2083	Environmental Science and Technology
CS	CS 2032	Principles of Computer Communication
	CS 2042	Operating Systems
	CS 2062	Object Oriented Software Development
	CS 3022	Software Engineering
	CS 3032	Computer Networks
	CS 3042	Database Systems
	CS 3242	Micro-controllers and Applications
EE	EE 2013	Circuit Theory
	EE 2023	Electrical Machines & Drives I
	EE 2033	Power Systems I
	EE 2043	Electrical Measurements and Instrumentation
	EE 2053	Control Systems I

Table A1.3 continued

	EE 2063	Electromagnetic Field Theory
	EE 2073	Electrical Machines & Drives II
	EE 2083	Power Systems II
	EE 2092	Theory of Electricity
	EE 2803	Applied Electricity
EN	EN 2012	Analog Electronics
	EN 2022	Digital Electronics
	EN 2052	Communication Systems
	EN 2062	Signals and Systems
	EN 2072	Communications I
	EN 2142	Electronic Control Systems
	EN 2082	Electromagnetics
	EN 3022	Electronic Design and Realization
	EN 2852	Applied Electronics
MA	MA 1013	Mathematics
	MA 1023	Methods of Mathematics
	MA 2013	Differential Equation
	MA 2023	Calculus
	MA 2033	Linear Algebra
	MA 2053	Graph Theory
	MA 2063	Differential Equations and Applications
	MA 2073	Calculus for System Modeling
	MA 3013	Applied Statistics
ME	ME 2012	Mechanics of Materials 1
	ME 2023	Manufacturing Engineering I
	ME 2092	Mechanics of Machines I
	ME 2112	Fluid Dynamics
	ME 2602	Motor Vehicle Technology
	ME 2032	Thermodynamics of Heat Engines & Work Transfer Devices
	ME 2153	Design of Machine Elements
	ME 3032	Mechanics of Machines II
	ME 3062	Mechanics of Materials II
	ME 3073	Manufacturing Engineering II
	ME 1802	Introduction to Manufacturing Engineering
	ME 1822	Basic Engineering Thermodynamics
	ME 2122	Engineering Drawing & Computer Aided Modeling
	ME 2832	Mechanics of Machines
	ME 2842	Basic Thermal Sciences and Applications
	ME 2850	Fundamentals of Machine Element Design

Table A1.3 continued

MT	MT 2042	Ceramic Science
	MT 2122	Principles of Materials Science & Engineering II
	MT 2152	Polymer Technology
	MT 2032	Degradation of Materials
	MT 2072	Metal Forming and Machining
	MT 2142	Electrical and Magnetic Properties of Materials

Table A1.4: Curriculum for Academic Year 2011/2012

	Level	Semester	CE	CH	CS	EE	EN	ME	MT
Mathematics	Level 1	S1	MA1013	MA1013	MA1013	MA1013	MA1013	MA1013	MA1013
		S2	MA1023	MA1023	MA1032	MA1023	MA1023	MA1023	MA1023
	Level 2	S3	MA2013 MA2023	MA2013 MA2023	MA 2053 MA2073	MA2013 MA2023	MA2013 MA2023	MA2013 MA2023	MA2013 MA2023
		S4	MA2033 MA3013	MA2033	MA2033 MA2063	MA2033 MA2053	MA2033	MA 2033 MA 2053	MA 2033 MA 3013
Engineering	Level 2	S3	CE 2012 CE 2022 CE 2032 CE 2042 CE 2052 CE 2062	CH 2013 CH 2023 CH 2033 ME 2122	CE 1822 CS 2032 CS 2042 CS 2062 EN 2022 ME 1822	CE 1822 EE 2013 EE 2023 EE 2033 EE 2183 EN 2012 EN 2022 ME 2012	EE 2092 EN 2012 EN 2022 EN 2052 EN 2062	EE 2803 EN 2852 ME 2012 ME 2023 ME 2092 ME 2112 ME 2602	EE 2803 EN 2852 ME 1822 ME 2012 MT 2042 MT 2122 MT 2152
		S4	CE 2112 CE 2122 CE 2132 CE 2142 CE 3012	CH 2043 CH 2053 CH 2063 CH 2073 CH 2083	CS 3022 CS 3032 CS 3042 CS 3242 EN 2062 ME 1802	EE 2043 EE 2053 EE 2063 EE 2073 EE 2083 EE 2193 EE 3203 ME 2842	EN 2072 EN 2142 EN 2082 EN 3022	ME 2032 ME 2153 ME 3032 ME 3062 ME 3073	ME 2832 ME 2850 ME 3062 MT 2032 MT 2072 MT 2142

APPENDIX 2

Correlation Coefficient Matrix between Mathematics and Engineering Modules

Table A2.1: Results for CH Performance in S3 (2010)

	MA1013	MA1023	MA2013	MA2023	CH2042	CH2052	EE2802	EN2852	ME1822	ME2012	ME2122
MA1023	.486**	1.00									
MA2013	.380**	.467**	1.00								
MA2023	.301**	.342**	.339**	1.00							
CH2042	.297**	.462**	.444**	.560**	1.00						
CH2052	.250*	.469**	.562**	.480**	.655**	1.00					
EE2802	.354**	.473**	.530**	.557**	.786**	.707**	1.00				
EN2852	.131	.245*	.249*	.197*	.491**	.418**	.655**	1.00			
ME1822	.142	.118	.054	.332**	.509**	.259*	.426**	.304**	1.00		
ME2012	.262*	.463**	.464**	.507**	.496**	.584**	.542**	.268**	.183	1.00	
ME2122	.014	.173	.316**	.295**	.338**	.400**	.457**	.323**	.262*	.536**	1.00

Table A2.2: Results for CH Performance in S4 (2010)

.	MA1013	MA1023	MA2013	MA2023	MA2033	CH2062	CH2072	CH2082	CH3092	CH3102
MA1023	.486**	1.00								
MA2013	.380**	.467**	1.00							
MA2023	.301**	.342**	.339**	1.00						
MA2033	.311**	.417**	.407**	.279**	1.00					
CH2062	.345**	.522**	.434**	.338**	.438**	1.00				
CH2072	.244*	.261*	.283**	.353**	.266**	.327**	1.00			
CH2082	.273**	.482**	.508**	.471**	.469**	.646**	.346**	1.00		
CH3092	.368**	.450**	.403**	.476**	.499**	.629**	.535**	.625**	1.00	
CH3102	.286**	.473**	.465**	.476**	.437**	.617**	.434**	.643**	.779**	1.00

Table A2.3: Results for CH Performance in S3 (2011)

	MA1013	MA1023	MA2013	MA2023	CH2013	CH2023	CH2033	ME2122
MA1023	.571**	1.00						
MA2013	.474**	.571**	1.00					
MA2023	.544**	.558**	.715**	1.00				
MA2033	.489**	.602**	.754**	.670**				
CH2013	.330**	.508**	.693**	.633**	1.00			
CH2023	.386**	.482**	.576**	.632**	.727**	1.00		
CH2033	.468**	.633**	.708**	.655**	.723**	.665**	1.00	
ME2122	.152	.213*	.361**	.383**	.595**	.499**	.427**	1.00

Table A2.4: Results for CH Performance in S4 (2011)

	MA1013	MA1023	MA2013	MA2023	MA2033	CH2043	CH2053	CH2063	CH2073	CH2083
MA1023	.571**	1.00								
MA2013	.474**	.571**	1.00							
MA2023	.544**	.558**	.715**	1.00						
MA2033	.489**	.602**	.754**	.670**	1.00					
CH2043	.430**	.587**	.563**	.591**	.683**	1.00				
CH2053	.420**	.561**	.610**	.574**	.718**	.690**	1.00			
CH2063	.391**	.530**	.560**	.545**	.717**	.684**	.860**	1.00		
CH2073	.318**	.469**	.613**	.589**	.692**	.642**	.822**	.814**	1.00	
CH2083	.340**	.456**	.644**	.565**	.728**	.709**	.811**	.847**	.830**	1.00

Table A2.5: Results for CE Performance in S3 (2010)

	MA1013	MA1023	MA2013	MA2023	CE2012	CE2022	CE2032	CE2042	CE2052	CE2062
MA1023	.477**	1.00								
MA2013	.296**	.233**	1.00							
MA2023	.388**	.397**	.275**	1.00						
CE2012	-.003	.262**	.125	.158*	1.00					
CE2022	.125	.232**	.094	.155*	.326**	1.00				
CE2032	.328**	.518**	.335**	.270**	.329**	.506**	1.00			
CE2042	.192*	.401**	.192*	.253**	.372**	.547**	.571**	1.00		
CE2052	.197*	.300**	.132	.153*	.357**	.445**	.443**	.460**	1.00	
CE2062	.258**	.323**	.104	.243**	.197*	.379**	.484**	.480**	.199*	1.00

Table A2.6: Results for CE Performance in S4 (2010)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA3013	CE2112	CE2122	CE2132	CE2142	CE3012
MA1023	.477**	1.00									
MA2013	.296**	.233**	1.00								
MA2023	.388**	.397**	.275**	1.00							
MA2033	.192*	.356**	.230**	.171*	1.00						
MA3013	.168*	.241**	.082	.093	.334**	1.00					
CE2112	.181*	.299**	.204*	.349**	.623**	.322**	1.00				
CE2122	.194*	.401**	.242**	.242**	.391**	.343**	.550**	1.00			
CE2132	.092	.290**	.180*	.204*	.452**	.405**	.638**	.583**	1.00		
CE2142	-.003	.223**	.117	.066	.325**	.232**	.470**	.474**	.565**	1.00	
CE3012	.029	.262**	.150	.204*	.506**	.500**	.610**	.586**	.633**	.488**	1.00

Table A2.7: Results for CE Performance in S3 (2011)

	MA1013	MA1023	MA2013	MA2023	CE2012	CE2022	CE2032	CE2042	CE2052	CE2062
MA1023	.302**	1.00								
MA2013	.385**	.338**	1.00							
MA2023	.301**	.450**	.570**	1.00						
CE2012	.257**	.400**	.404**	.517**	1.00					
CE2022	.111	.107	.104	.044	-.028	1.00				
CE2032	.069	.026	.015	.017	-.009	.372**	1.00			
CE2042	.204*	.380**	.350**	.350**	.424**	.088	.168*	1.00		
CE2052	.024	.213**	.242**	.288**	.326**	.064	.049	.294**	1.00	
CE2062	.016	.280**	.270**	.174*	.243**	.056	.017	.465**	.361**	1.00

Table A2.8: Results for CE Performance in S4 (2011)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA3013	CE2112	CE2122	CE2132	CE2142	CE3012
MA1023	.302**	1.00									
MA2013	.385**	.338**	1.00								
MA2023	.301**	.450**	.570**	1.00							
MA2033	.353**	.406**	.442**	.439**	1.00						
MA3013	.311**	.429**	.351**	.364**	.455**	1.00					
CE2112	.202*	.392**	.430**	.512**	.476**	.498**	1.00				
CE2122	.214**	.368**	.275**	.386**	.402**	.547**	.535**	1.00			
CE2132	.243**	.395**	.326**	.344**	.432**	.566**	.558**	.504**	1.00		
CE2142	.187*	.237**	.285**	.265**	.350**	.453**	.348**	.505**	.530**	1.00	
CE3012	.249**	.317**	.405**	.412**	.452**	.494**	.450**	.483**	.464**	.460**	1.00

Table A2.9: Results for CS Performance in S3 (2010)

	MA1013	MA1032	MA2023	MA2042	CE1822	CS2032	CS2042	CS2062	EN2022	ME1822
MA1032	.397**	1.00								
MA2023	.349**	.417**	1.00							
MA2042	.303**	.423**	.327**	1.00						
CE1822	.192*	.373**	.318**	.430**	1.00					
CS2032	.193*	.380**	.256**	.475**	.369**	1.00				
CS2042	.263**	.430**	.396**	.541**	.391**	.669**	1.00			
CS2062	.187*	.447**	.231*	.499**	.408**	.389**	.477**	1.00		
EN2022	.227*	.419**	.455**	.469**	.403**	.465**	.438**	.363**	1.00	
ME1822	.266**	.470**	.300**	.376**	.294**	.399**	.399**	.405**	.388**	1.00

Table A2.10: Results for CS Performance in S4 (2010)

	MA1013	MA1032	MA2023	MA2042	MA2013	MA2033	CS3022	CS3032	CS3042	CS3242	EN2062	ME1802
MA1032	.397**	1.00										
MA2023	.349**	.417**	1.00									
MA2042	.303**	.423**	.327**	1.00								
MA2013	.306**	.324**	.191*	.262**	1.00							
MA2033	.421**	.412**	.422**	.285**	.458**	1.00						
CS3022	.213*	.503**	.246**	.412**	.417**	.507**	1.00					
CS3032	.176*	.380**	.101	.324**	.380**	.353**	.567**	1.00				
CS3042	.166	.397**	.251**	.309**	.389**	.489**	.572**	.507**	1.00			
CS3242	.010	.141	.100	.243**	.062	.228*	.380**	.310**	.465**	1.00		
EN2062	.407**	.464**	.325**	.417**	.513**	.472**	.607**	.480**	.454**	.263**	1.00	
ME1802	.237*	.361**	.142	.360**	.445**	.392**	.554**	.566**	.485**	.321**	.525**	1.00

Table A2.11: Results for CS Performance in S3 (2011)

	MA1013	MA1032	MA2053	MA2073	CE1822	CS2032	CS2042	CS2062	EN2022	ME1822
MA1032	.353**	1.00								
MA2053	.484**	.308**	1.00							
MA2073	.427**	.389**	.620**	1.00						
CE1822	.264**	.236*	.518**	.425**	1.00					
CS2032	.428**	.417**	.596**	.590**	.438**	1.00				
CS2042	.301**	.404**	.375**	.312**	.262**	.562**	1.00			
CS2062	.341**	.395**	.561**	.519**	.572**	.669**	.537**	1.00		
EN2022	.310**	.480**	.360**	.542**	.384**	.534**	.435**	.398**	1.00	
ME1822	.217*	.281**	.326**	.378**	.303**	.500**	.291**	.475**	.355**	1.00

Table A2.12: Results for CS Performance in S4 (2011)

	MA1013	MA1032	MA2053	MA2073	MA2033	MA2063	CS3022	CS3032	CS3042	CS3242	EN2062	ME1802
MA1032	.353**	1.00										
MA2053	.484**	.308**	1.00									
MA2073	.427**	.389**	.620**	1.00								
MA2033	.432**	.345**	.537**	.606**	1.00							
MA2063	.445**	.376**	.588**	.485**	.674**	1.00						
CS3022	.377**	.361**	.539**	.410**	.455**	.507**	1.00					
CS3032	.412**	.453**	.613**	.535**	.591**	.679**	.742**	1.00				
CS3042	.379**	.401**	.525**	.418**	.459**	.524**	.673**	.653**	1.00			
CS3242	.190*	.299**	.332**	.249**	.372**	.334**	.495**	.501**	.442**	1.00		
EN2062	.454**	.530**	.563**	.535**	.688**	.675**	.494**	.673**	.564**	.347**	1.00	
ME1802	.275**	.312**	.455**	.359**	.517**	.508**	.493**	.535**	.446**	.391**	.553**	1.00

Table A2.13: Results for EE Performance in S3 (2010)

	MA1013	MA1023	MA2013	MA2023	EE2012	EE2022	EE2033	EN2012	EN2022	ME2012	CE1822
MA1023	.355**	1.00									
MA2013	.242*	.362**	1.00								
MA2023	.354**	.391**	.458**	1.00							
EE2012	.324**	.417**	.574**	.398**	1.00						
EE2022	.135	.368**	.427**	.426**	.445**	1.00					
EE2033	.162	.152	.395**	.221*	.291**	.344**	1.00				
EN2012	.085	.330**	.400**	.442**	.507**	.638**	.239*	1.00			
EN2022	.159	.435**	.267*	.462**	.351**	.557**	.164	.507**	1.00		
ME2012	.187	.365**	.379**	.467**	.384**	.444**	.218*	.505**	.437**	1.00	
CE1822	-.005	.205*	.116	.084	.200	.208*	.143	.176	.340**	.255*	1.00

Table A2.14: Results for EE Performance in S4 (2010)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA2042	EE2042	EE2052	EE2072	EE2083	EE2132	EE3072	ME2842	EE3202
MA1023	.355**	1.00												
MA2013	.242*	.362**	1.00											
MA2023	.354**	.391**	.458**	1.00										
MA2033	.372**	.421**	.386**	.545**	1.00									
MA2042	.349**	.344**	.402**	.236*	.539**	1.00								
EE2042	.260*	.306**	.335**	.244*	.576**	.559**	1.00							
EE2052	.239*	.328**	.204*	.237*	.504**	.383**	.336**	1.00						
EE2072	.253*	.403**	.435**	.395**	.575**	.419**	.457**	.415**	1.00					
EE2083	.376**	.414**	.531**	.475**	.658**	.396**	.441**	.320**	.621**	1.00				
EE2132	.243*	.356**	.362**	.305**	.591**	.413**	.438**	.285**	.512**	.600**	1.00			
EE3072	.167	.478**	.325**	.335**	.499**	.260*	.340**	.401**	.489**	.436**	.385**	1.00		
ME2842	.180	.251*	.341**	.378**	.580**	.432**	.338**	.400**	.613**	.583**	.659**	.505**	1.00	
EE3202	-.194	-.149	.013	.015	.307**	.057	.113	.096	.158	.204*	.248*	.272*	.295**	1.00

Table A2.15: Results for EE Performance in S3 (2011)

	MA1013	MA1023	MA2013	MA2023	CE1822	EE2013	EE2023	EE2033	EE2183	EN2012	EN2022	ME2012
MA1023	.308**	1.00										
MA2013	.395**	.517**	1.00									
MA2023	.457**	.490**	.560**	1.00								
CE1822	.220*	.330**	.140	.297**	1.00							
EE2013	.340**	.458**	.476**	.468**	.307**	1.00						
EE2023	.305**	.317**	.376**	.515**	.127	.436**	1.00					
EE2033	.190*	.398**	.309**	.480**	.458**	.461**	.304**	1.00				
EE2183	.151	.130	.201*	.064	.291**	.259**	.040	.169*	1.00			
EN2012	.272**	.356**	.325**	.379**	.317**	.320**	.340**	.370**	.031	1.00		
EN2022	.219*	.337**	.281**	.430**	.299**	.371**	.362**	.484**	.262**	.388**	1.00	
ME2012	.350**	.477**	.479**	.571**	.272**	.549**	.435**	.414**	.180*	.431**	.456**	1.00

Table A2.16: Results for EE Performance in S4 (2011)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA2053	EE2043	EE2053	EE2063	EE2073	EE2083	EE2193	EE3203	ME2842
MA1023	.308**	1.00												
MA2013	.395**	.517**	1.00											
MA2023	.457**	.490**	.560**	1.00										
MA2033	.403**	.609**	.490**	.550**	1.00									
MA2053	.180*	.149	.237**	.197*	.300**	1.00								
EE2043	.310**	.222*	.229*	.309**	.319**	.042	1.00							
EE2053	.213*	.286**	.120	.154	.374**	.158	.143	1.00						
EE2063	.292**	.311**	.337**	.484**	.455**	.110	.309**	.136	1.00					
EE2073	.310**	.546**	.421**	.546**	.526**	.390**	.387**	.195*	.325**	1.00				
EE2083	.252**	.408**	.421**	.473**	.525**	.419**	.522**	.184*	.415**	.616**	1.00			
EE2193	.132	.212*	.122	-.004	.191*	.311**	.167*	.275**	-.088	.244**	0.139	1.00		
EE3203	-.093	.233*	.101	.143	.098	.150	.064	-.049	.039	.330**	.235**	.058	1.00	
ME2842	.171*	.423**	.347**	.425**	.511**	.181*	.351**	.197*	.500**	.403**	.423**	.080	.190*	1.00

Table A2.17: Results for EN Performance in S3 (2010)

	MA1013	MA1023	MA2013	MA2023	EE2092	EN2012	EN2022	EN2052	EN2062
MA1023	.335**	1.00							
MA2013	.320**	.522**	1.00						
MA2023	.411**	.439**	.540**	1.00					
EE2092	.348**	.530**	.636**	.594**	1.00				
EN2012	.455**	.434**	.607**	.622**	.705**	1.00			
EN2022	.346**	.479**	.489**	.538**	.673**	.531**	1.00		
EN2052	.255**	.316**	.346**	.462**	.566**	.561**	.495**	1.00	
EN2062	.401**	.459**	.549**	.499**	.572**	.533**	.489**	.417**	1.00

Table A2.18: Results for EN Performance in S4 (2010)

	MA1013	MA1023	MA2013	MA2023	EN2072	EN2082	EN2142	EN3022
MA1023	.335**	1.00						
MA2013	.320**	.522**	1.00					
MA2023	.411**	.439**	.540**	1.00				
EN2072	.392**	.380**	.442**	.469**	1.00			
EN2082	.441**	.457**	.570**	.626**	.525**	1.00		
EN2142	.149	.210*	.281**	.442**	.533**	.529**	1.00	
EN3022	.106	.070	.130	.122	.331**	.194*	.364**	1.00

Table A2.19: Results for EN Performance in S3 (2011)

	MA1013	MA1023	MA2013	MA2023	EE2092	EN2012	EN2022	EN2052	EN2062
MA1013	1.00								
MA1023	.341**	1.00							
MA2013	.220*	.548**	1.00						
MA2023	.356**	.575**	.623**	1.00					
EE2092	.263**	.487**	.669**	.652**	1.00				
EN2012	.251**	.318**	.397**	.567**	.443**	1.00			
EN2022	.216*	.402**	.489**	.568**	.522**	.451**	1.00		
EN2052	.215*	.464**	.368**	.462**	.554**	.614**	.503**	1.00	
EN2062	.282**	.625**	.580**	.706**	.665**	.572**	.533**	.612**	1.00

Table A2.20: Results for EN Performance in S4 (2011)

	MA1013	MA1023	MA2013	MA2023	MA2033	EN2142	EN2072	EN2542	EN3022
MA1023	.341**	1.00							
MA2013	.220*	.548**	1.00						
MA2023	.356**	.575**	.623**	1.00					
MA2033	.357**	.598**	.485**	.602**	1.00				
EN2142	-.094	.284**	.291**	.271**	.301**	1.00			
EN2072	.143	.483**	.406**	.588**	.533**	.337**	1.00		
EN2542	.116	.300**	.334**	.369**	.406**	.202*	.382**	1.00	
EN3022	.250**	.421**	.183*	.231*	.299**	.157	.267**	.353**	1.00

Table A2.21: Results for ME Performance in S3 (2010)

	MA1013	MA1023	MA2013	MA2023	EE2802	EN2852	ME2012	ME2022	ME2092	ME2112
MA1023	.333**	1.00								
MA2013	.280**	.452**	1.00							
MA2023	.229*	.297**	.421**	1.00						
EE2802	.235**	.297**	.388**	.281**	1.00					
EN2852	.316**	.182*	.154	.247**	.482**	1.00				
ME2012	.154	.280**	.406**	.320**	.215*	.020	1.00			
ME2022	.191*	.290**	.260**	.241**	.498**	.444**	.170*	1.00		
ME2092	.333**	.553**	.379**	.426**	.334**	.249**	.498**	.369**	1.00	
ME2112	.178*	.256**	.282**	.401**	.442**	.418**	.190*	.536**	.279**	1.00

Table A2.22: Results for ME Performance in S4 (2010)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA2042	ME2032	ME3072	ME3032	ME3062	ME2142
MA1023	.333**	1.00									
MA2013	.280**	.452**	1.00								
MA2023	.229*	.297**	.421**	1.00							
MA2033	.135	.025	.118	.255**	1.00						
MA2042	.021	.285**	.282**	.330**	.404**	1.00					
ME2032	.330**	.242**	.119	.251**	.297**	.413**	1.00				
ME3072	.182*	.280**	.268**	.360**	.260**	.395**	.430**	1.00			
ME3032	.278**	.299**	.210*	.370**	.463**	.513**	.412**	.430**	1.00		
ME3062	.034	.113	.011	.070	.081	.171*	.358**	.414**	.293**	1.00	
ME2142	.188*	.225*	.170*	.199*	.246**	.414**	.446**	.517**	.406**	.554**	1.00

Table A2.23: Results for ME Performance in S3 (2011)

	MA1013	MA1023	MA2013	MA2023	EE2803	EN2852	ME2012	ME2023	ME2092	ME2112	ME2602
MA1023	.279**	1.00									
MA2013	.264**	.430**	1.00								
MA2023	.365**	.488**	.624**	1.00							
EE2803	.108	.341**	.485**	.490**	1.00						
EN2852	-.022	.433**	.228*	.200*	.436**	1.00					
ME2012	.223*	.406**	.437**	.582**	.524**	.331**	1.00				
ME2023	.135	.380**	.273**	.318**	.453**	.426**	.376**	1.00			
ME2092	.121	.314**	.366**	.274**	.421**	.312**	.225*	.369**	1.00		
ME2112	.211*	.452**	.586**	.575**	.504**	.293**	.445**	.428**	.420**	1.00	
ME2602	.038	.376**	.237*	.256**	.587**	.480**	.408**	.643**	.389**	.483**	1.00

Table A2.24: Results for ME Performance in S4 (2011)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA2053	ME2032	ME2153	ME3032	ME3062	ME3073
MA1023	.279**	1.00									
MA2013	.264**	.430**	1.00								
MA2023	.365**	.488**	.624**	1.00							
MA2033	.222*	.429**	.456**	.449**	1.00						
MA2053	.018	.353**	.253**	.111	.260**	1.00					
ME2032	.078	.457**	.340**	.414**	.339**	.353**	1.00				
ME2153	.207*	.499**	.310**	.481**	.332**	.487**	.487**	1.00			
ME3032	.228*	.477**	.345**	.466**	.356**	.269**	.442**	.472**	1.00		
ME3062	.255**	.321**	.424**	.530**	.288**	.165	.512**	.402**	.348**	1.00	
ME3073	.089	.344**	.163	.301**	.149	.416**	.551**	.559**	.221*	.395**	1.00

Table A2.25: Results for MT Performance in S3 (2010)

	MA1013	MA1023	MA2013	MA2023	EE2802	EN2852	ME1822	ME2012	MT2042	MT2122
MA1023	.401**	1.00								
MA2013	.460**	.540**	1.00							
MA2023	.233	.568**	.513**	1.00						
EE2802	.161	.470**	.409**	.383**	1.00					
EN2852	.224	.467**	.244	.275*	.735**	1.00				
ME1822	.191	.241	.299*	.197	.499**	.469**	1.00			
ME2012	.245	.512**	.491**	.577**	.519**	.352*	.329*	1.00		
MT2042	.089	.689**	.521**	.420**	.721**	.690**	.400**	.517**	1.00	
MT2122	.248	.631**	.526**	.349*	.681**	.646**	.601**	.517**	.889**	1.00

Table A2.26: Results for MT Performance in S4 (2010)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA3013	ME2142	ME2832	ME3062	MT2032	MT2072	MT2142	MT2152
MA1023	.401**	1.00											
MA2013	.460**	.540**	1.00										
MA2023	.233	.568**	.513**	1.00									
MA2033	.273*	.432**	.365**	.645**	1.00								
MA3013	.142	.501**	.402**	.380**	.482**	1.00							
ME2142	.101	.473**	.344*	.524**	.551**	.544**	1.00						
ME2832	.153	.648**	.278*	.485**	.581**	.632**	.590**	1.00					
ME3062	.368**	.487**	.550**	.559**	.624**	.514**	.684**	.458**	1.00				
MT2032	-.051	.601**	.416**	.407**	.373**	.601**	.516**	.734**	.450**	1.00			
MT2072	.032	.543**	.453**	.266*	.389**	.553**	.526**	.592**	.476**	.820**	1.00		
MT2142	.099	.572**	.423**	.399**	.389**	.576**	.428**	.687**	.413**	.758**	.663**	1.00	
MT2152	.025	.560**	.394**	.437**	.491**	.614**	.488**	.644**	.411**	.827**	.791**	.735**	1.00

Table A2.27: Results for MT Performance in S3 (2011)

	MA1013	MA1023	MA2013	MA2023	EE2803	EN2852	ME1822	ME2012	MT2042	MT2122	MT2152
MA1013	1.00										
MA1023	.460**	1.00									
MA2013	.657**	.525**	1.00								
MA2023	.461**	.581**	.734**	1.00							
EE2803	.196	.441**	.312*	.449**	1.00						
EN2852	.189	.371**	.242	.266*	.568**	1.00					
ME1822	.277*	.090	.178	.259*	.358**	.154	1.00				
ME2012	.239	.577**	.458**	.577**	.627**	.437**	.419**	1.00			
MT2042	-.021	.228	-.032	.000	.454**	.649**	.266*	.353**	1.00		
MT2122	.181	.206	.042	.139	.517**	.508**	.253*	.251*	.637**	1.00	
MT2152	.096	.272*	.226	.303*	.512**	.521**	.277*	.436**	.750**	.621**	1.00

Table A2.28: Results for MT Performance in S4 (2011)

	MA1013	MA1023	MA2013	MA2023	MA2033	MA3013	ME2832	ME2850	ME3062	MT2032	MT2072	MT2142
MA1023	.460**	1.00										
MA2013	.657**	.525**	1.00									
MA2023	.461**	.581**	.734**	1.00								
MA2033	.461**	.578**	.571**	.702**	1.00							
MA3013	.321*	.300*	.382**	.336*	.319*	1.00						
ME2832	.187	.405**	.211	.385**	.354**	.296*	1.00					
ME2850	.190	.360**	.243	.408**	.370**	.519**	.589**	1.00				
ME3062	.250	.409**	.476**	.589**	.460**	.464**	.561**	.556**	1.00			
MT2032	.088	.287*	.219	.143	.110	.559**	.545**	.706**	.467**	1.00		
MT2072	-.034	.234	.033	.074	.023	.559**	.436**	.565**	.455**	.777**	1.00	
MT2142	-.047	.391**	.169	.311*	.382**	.444**	.562**	.753**	.523**	.727**	.724**	1.00

APPENDIX 3

Results of CCA – CE Student Performance

Table A3.1: Results of CCA – Performance of CH in S3 (2010)

Canonical Correlation Analysis

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation
1	0.592206	0.553967	0.060285	0.350708
2	0.255006	0.132121	0.086810	0.065028
3	0.185275	.	0.089661	0.034327
4	0.039313	-.163882	0.092704	0.001546

	Eigenvalue	Difference	Proportion	Cumulative	likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.5401	0.4706	0.8351	0.8351	0.58532466	2.59	24	374.49	<.0001
2	0.0696	0.0340	0.1075	0.9426	0.90148208	0.76	15	298.54	0.7195
3	0.0355	0.0340	0.0550	0.9976	0.96418086	0.50	8	218	0.8544
4	0.0015		0.0024	1.0000	0.99845450	0.06	3	110	0.9821

Multivariate Statistics and F Approximations

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.58532466	2.59	24	374.49	<.0001
Pillai's Trace	0.45160871	2.33	24	440	0.0004
Hotelling-Lawley Trace	0.64678583	2.85	24	244.36	<.0001
Roy's Greatest Root	0.54014026	9.90	6	110	<.0001

Standardized Canonical Coefficients for the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4
CE2012	CE2012	0.1239	-0.8777	0.2507	-0.1516
CE2022	CE2022	-0.2697	-0.0123	0.2183	0.1875
CE2032	CE2032	0.8216	0.1226	-0.9702	0.3174
CE2042	CE2042	0.2453	-0.4245	0.3049	0.2029
CE2052	CE2052	0.0962	0.5012	0.1097	-1.0955
CE2062	CE2062	0.0887	0.5902	0.8333	0.2081

Standardized Canonical Coefficients for the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4
MA1012	MA1012	0.0320	1.1855	-0.1163	0.0400
MA1022	MA1022	0.8050	-0.4152	0.1397	-0.7460
MA2012	MA2012	0.3458	-0.2944	-0.8304	0.4924
MA2022	MA2022	0.0755	-0.1921	0.7991	0.7849

Canonical Structure

Correlations Between the Engineering Measurements and Their Canonical Variables

		ENG1	ENG2	ENG3	ENG4
CE2012	CE2012	0.4491	-0.7040	0.3195	-0.2613
CE2022	CE2022	0.3965	-0.0217	0.3405	0.0004
CE2032	CE2032	0.9515	0.0926	-0.1517	0.0938
CE2042	CE2042	0.7002	-0.1738	0.4133	0.0261
CE2052	CE2052	0.5146	0.1583	0.1728	-0.7909
CE2062	CE2062	0.5450	0.3682	0.6642	0.2823

Table A3.1 continued

Correlations Between the Mathematics Measurements and Their Canonical Variables

		MAT1	MAT2	MAT3	MAT4
MA1012	MA1012	0.5477	0.8257	0.0149	0.1342
MA1022	MA1022	0.9310	0.0054	0.2079	-0.2999
MA2012	MA2012	0.5640	-0.0937	-0.6123	0.5461
MA2022	MA2022	0.5031	0.0218	0.5809	0.6395

Correlations Between the Engineering Measurements and the Canonical Variables of the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4
CE2012	CE2012	0.2659	-0.1795	0.0592	-0.0103
CE2022	CE2022	0.2348	-0.0055	0.0631	0.0000
CE2032	CE2032	0.5635	0.0236	-0.0281	0.0037
CE2042	CE2042	0.4147	-0.0443	0.0766	0.0010
CE2052	CE2052	0.3048	0.0404	0.0320	-0.0311
CE2062	CE2062	0.3227	0.0939	0.1231	0.0111

Correlations Between the Mathematics Measurements and the Canonical Variables of the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4
MA1012	MA1012	0.3244	0.2106	0.0028	0.0053
MA1022	MA1022	0.5514	0.0014	0.0385	-0.0118
MA2012	MA2012	0.3340	-0.0239	-0.1134	0.0215
MA2022	MA2022	0.2979	0.0056	0.1076	0.0251

Canonical Redundancy Analysis

Standardized Variance of the Engineering Measurements Explained by

Canonical Variable Number	Their Own Canonical Variables: Proportion	Their Own Canonical Variables: Cumulative Proportion	Canonical R-Square	The Opposite Canonical Variables: Proportion	The Opposite Canonical Variables: Cumulative Proportion
1	0.3861	0.3861	0.3507	0.1354	0.1354
2	0.1159	0.5020	0.0650	0.0075	0.1429
3	0.1471	0.6491	0.0343	0.0051	0.1480
4	0.1305	0.7796	0.0015	0.0002	0.1482

Standardized Variance of the Mathematics Measurements Explained by

Canonical Variable Number	Their Own Canonical Variables: Proportion	Their Own Canonical Variables: Cumulative Proportion	Canonical R-Square	The Opposite Canonical Variables: Proportion	The Opposite Canonical Variables: Cumulative Proportion
1	0.4345	0.4345	0.3507	0.1524	0.1524
2	0.1728	0.6073	0.0650	0.0112	0.1636
3	0.1889	0.7962	0.0343	0.0065	0.1701
4	0.2038	1.0000	0.0015	0.0003	0.1704

Table A3.2: Results of CCA – Performance of CH in S4 (2010)

Canonical Correlation Analysis

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation
1	0.723606	0.697686	0.044232	0.523606
2	0.392196	0.303442	0.078566	0.153818
3	0.308681	0.275805	0.084001	0.095284
4	0.159312	0.107476	0.090491	0.025380
5	0.019951	-.186466	0.092811	0.000398

	Eigenvalue	Difference	Proportion	Cumulative	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	1.0991	0.9173	0.7780	0.7780	0.35530797	4.19	30	426	<.0001
2	0.1818	0.0765	0.1287	0.9067	0.74582787	1.64	20	355.83	0.0407
3	0.1053	0.0793	0.0746	0.9813	0.88140316	1.16	12	286.03	0.3081
4	0.0260	0.0256	0.0184	0.9997	0.97423187	0.48	6	218	0.8248
5	0.0004		0.0003	1.0000	0.99960194	0.02	2	110	0.9783

Multivariate Statistics and F Approximations

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.35530797	4.19	30	426	<.0001
Pillai's Trace	0.79848574	3.48	30	550	<.0001
Hotelling-Lawley Trace	1.41263938	4.93	30	271.75	<.0001
Roy's Greatest Root	1.09910257	20.15	6	110	<.0001

Standardized Canonical Coefficients for the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4	ENG5
CE2112	CE2112	0.5878	-1.2724	-0.1046	0.1155	-0.1111
CE2122	CE2122	0.0634	0.2017	1.2367	-0.2531	-0.4229
CE2132	CE2132	0.1129	0.4115	0.0021	-0.3958	1.4053
CE2142	CE2142	-0.0973	0.1912	0.0083	1.2370	-0.0759
CE3012	CE3012	0.4418	0.7343	-0.8497	-0.2844	-0.7346

Standardized Canonical Coefficients for the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4	MAT5
MA1012	MA1012	-0.1666	-0.5009	0.3157	-0.5501	0.6173
MA1022	MA1022	0.0527	0.5122	0.8070	0.5404	-0.5304
MA2012	MA2012	0.0466	0.1975	0.3560	0.0747	0.5233
MA2022	MA2022	0.3294	-0.4205	-0.1665	-0.5468	-0.7180
MA2032	MA2032	0.6955	-0.5568	-0.3444	0.5136	0.2448
MA3012	MA3012	0.3772	0.7741	-0.2456	-0.5736	0.1233

Correlations Between the Engineering Measurements and Their Canonical Variables

		ENG1	ENG2	ENG3	ENG4	ENG5
CE2112	CE2112	0.9186	-0.3607	0.0623	0.1319	0.0689
CE2122	CE2122	0.6652	0.2623	0.6866	-0.0009	-0.1315
CE2132	CE2132	0.7497	0.2900	0.1226	0.0489	0.5800
CE2142	CE2142	0.4882	0.2789	0.1316	0.8094	0.1068
CE3012	CE3012	0.8618	0.4296	-0.1837	-0.0095	-0.1974

Correlations Between the Mathematics Measurements and Their Canonical Variables

		MAT1	MAT2	MAT3	MAT4	MAT5
MA1012	MA1012	0.1966	-0.3380	0.6343	-0.4802	0.3079
MA1022	MA1022	0.4533	0.1409	0.7928	0.1223	-0.2822
MA2012	MA2012	0.2909	-0.0113	0.4927	-0.0412	0.4506
MA2022	MA2022	0.4528	-0.3805	0.2928	-0.4901	-0.4918
MA2032	MA2032	0.8756	-0.2385	-0.0259	0.3321	0.2127
MA3012	MA3012	0.6289	0.6046	-0.0994	-0.4085	0.1568

Table A3.2 continued

Correlations Between the Engineering Measurements and the Canonical Variables of the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4	MAT5
CE2112	CE2112	0.6647	-0.1415	0.0192	0.0210	0.0014
CE2122	CE2122	0.4814	0.1029	0.2119	-0.0001	-0.0026
CE2132	CE2132	0.5425	0.1138	0.0378	0.0078	0.0116
CE2142	CE2142	0.3533	0.1094	0.0406	0.1289	0.0021
CE3012	CE3012	0.6236	0.1685	-0.0567	-0.0015	-0.0039

Correlations Between the Mathematics Measurements and the Canonical Variables of the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4	ENG5
MA1012	MA1012	0.1423	-0.1326	0.1958	-0.0765	0.0061
MA1022	MA1022	0.3280	0.0553	0.2447	0.0195	-0.0056
MA2012	MA2012	0.2105	-0.0044	0.1521	-0.0066	0.0090
MA2022	MA2022	0.3276	-0.1492	0.0904	-0.0781	-0.0098
MA2032	MA2032	0.6336	-0.0935	-0.0080	0.0529	0.0042
MA3012	MA3012	0.4551	0.2371	-0.0307	-0.0651	0.0031

Standardized Variance of the Engineering Measurements Explained by

	Their Own Canonical Variables		The Opposite Canonical Variables		
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.5659	0.5659	0.5236	0.2963	0.2963
2	0.1091	0.6750	0.1538	0.0168	0.3131
3	0.1083	0.7832	0.0953	0.0103	0.3234
4	0.1350	0.9182	0.0254	0.0034	0.3268
5	0.0818	1.0000	0.0004	0.0000	0.3269

Standardized Variance of the Mathematics Measurements Explained by

	Their Own Canonical Variables		The Opposite Canonical Variables		
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.2827	0.2827	0.5236	0.1480	0.1480
2	0.1169	0.3996	0.1538	0.0180	0.1660
3	0.2283	0.6279	0.0953	0.0218	0.1877
4	0.1274	0.7553	0.0254	0.0032	0.1910
5	0.1149	0.8702	0.0004	0.0000	0.1910

Table A3.3: Results of CCA – Performance of CH in S3 (2011)

Canonical Correlation Analysis

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation
1	0.623157	0.591551	0.054930	0.388324
2	0.260196	0.152498	0.083723	0.067702
3	0.181356	0.135503	0.086849	0.032890
4	0.025870	-.276066	0.089743	0.000669

	Eigenvalue	Difference	Proportion	Cumulative	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	0.6349	0.5622	0.8554	0.8554	0.55113923	3.12	24	402.4	<.0001
2	0.0726	0.0386	0.0978	0.9533	0.90103152	0.82	15	320.63	0.6525
3	0.0340	0.0333	0.0458	0.9991	0.96646286	0.50	8	234	0.8533
4	0.0007		0.0009	1.0000	0.99933075	0.03	3	118	0.9942

Multivariate Statistics and F Approximations

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.55113923	3.12	24	402.4	<.0001
Pillai's Trace	0.48958516	2.74	24	472	<.0001
Hotelling-Lawley Trace	0.74214920	3.52	24	263.26	<.0001
Roy's Greatest Root	0.63485280	12.49	6	118	<.0001

Standardized Canonical Coefficients for the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4
CE2012	CE2012	0.6855	-0.5350	0.0306	0.2283
CE2022	CE2022	0.1746	0.1436	-0.5493	0.8507
CE2032	CE2032	-0.0847	-0.2038	-0.0663	-0.2047
CE2042	CE2042	0.3535	0.0262	-0.4951	-0.6930
CE2052	CE2052	0.1305	-0.0069	0.8034	0.2984
CE2062	CE2062	0.0854	0.9490	0.0587	0.0310

Standardized Canonical Coefficients for the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4
MA1013	MA1013	0.0271	-0.6592	-0.8756	0.1491
MA1023	MA1023	0.4332	0.6128	-0.3335	-0.7962
MA2013	MA2013	0.3350	0.8024	-0.0249	0.9217
MA2023	MA2023	0.4677	-0.9232	0.7525	-0.1784

Correlations Between the Engineering Measurements and Their Canonical Variables

		ENG1	ENG2	ENG3	ENG4
CE2012	CE2012	0.8948	-0.2980	0.1128	0.0172
CE2022	CE2022	0.1682	0.1373	-0.5639	0.7279
CE2032	CE2032	0.0415	-0.1252	-0.3133	0.0084
CE2042	CE2042	0.7237	0.2169	-0.2781	-0.4534
CE2052	CE2052	0.4958	0.1676	0.6507	0.2245
CE2062	CE2062	0.4715	0.8333	0.0941	-0.0845

Table A3.3 continued

Correlations Between the Mathematics Measurements and Their Canonical Variables

		MAT1	MAT2	MAT3	MAT4
MA1013	MA1013	0.4276	-0.4430	-0.7595	0.2098
MA1023	MA1023	0.7649	0.2697	-0.2679	-0.5200
MA2013	MA2013	0.7584	0.2295	-0.0457	0.6083
MA2023	MA2023	0.8617	-0.3884	0.3249	0.0338

Correlations Between the Engineering Measurements and the Canonical Variables of the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4
CE2012	CE2012	0.5576	-0.0775	0.0205	0.0004
CE2022	CE2022	0.1048	0.0357	-0.1023	0.0188
CE2032	CE2032	0.0259	-0.0326	-0.0568	0.0002
CE2042	CE2042	0.4510	0.0564	-0.0504	-0.0117
CE2052	CE2052	0.3090	0.0436	0.1180	0.0058
CE2062	CE2062	0.2938	0.2168	0.0171	-0.0022

Correlations Between the Mathematics Measurements and the Canonical Variables of the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4
MA1013	MA1013	0.2664	-0.1153	-0.1377	0.0054
MA1023	MA1023	0.4767	0.0702	-0.0486	-0.0135
MA2013	MA2013	0.4726	0.0597	-0.0083	0.0157
MA2023	MA2023	0.5369	-0.1011	0.0589	0.0009

Canonical Redundancy Analysis

Standardized Variance of the Engineering Measurements Explained by

	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.3037	0.3037	0.3883	0.1180	0.1180
2	0.1488	0.4526	0.0677	0.0101	0.1280
3	0.1564	0.6090	0.0329	0.0051	0.1332
4	0.1322	0.7412	0.0007	0.0001	0.1333

Standardized Variance of the Mathematics Measurements Explained by

	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.5214	0.5214	0.3883	0.2025	0.2025
2	0.1181	0.6395	0.0677	0.0080	0.2105
3	0.1891	0.8286	0.0329	0.0062	0.2167
4	0.1714	1.0000	0.0007	0.0001	0.2168

Table A3.4: Results of CCA – Performance of CH in S4 (2011)

Canonical Correlation Analysis

	Canonical Correlation	Adjusted Canonical Correlation	Approximate Standard Error	Squared Canonical Correlation
1	0.766469	0.747800	0.037046	0.587475
2	0.285908	0.181809	0.082462	0.081743
3	0.170767	0.062308	0.087184	0.029161
4	0.085904	.	0.089140	0.007380
5	0.047681	.	0.089598	0.002273

	Eigenvalue	Difference	Proportion	Cumulative	Likelihood Ratio	Approximate F Value	Num DF	Den DF	Pr > F
1	1.4241	1.3351	0.9171	0.9171	0.36421360	4.39	30	458	<.0001
2	0.0890	0.0590	0.0573	0.9744	0.88288874	0.73	20	382.36	0.7936
3	0.0300	0.0226	0.0193	0.9937	0.96148341	0.38	12	307.2	0.9691
4	0.0074	0.0052	0.0048	0.9985	0.99036374	0.19	6	234	0.9796
5	0.0023		0.0015	1.0000	0.99772654	0.13	2	118	0.8743

Multivariate Statistics and F Approximations

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.36421360	4.39	30	458	<.0001
Pillai's Trace	0.70803259	3.24	30	590	<.0001
Hotelling-Lawley Trace	1.55286626	5.84	30	293.07	<.0001
Roy's Greatest Root	1.42409601	28.01	6	118	<.0001

Standardized Canonical Coefficients for the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4	ENG5
CE2112	CE2112	0.3881	-1.0140	-0.4203	-0.1604	-0.5799
CE2122	CE2122	0.2293	0.6729	-0.8222	0.7070	0.2955
CE2132	CE2132	0.2597	0.8338	0.1179	-1.0383	0.0045
CE2142	CE2142	0.0859	-0.0467	0.7647	0.6041	-0.8196
CE3012	CE3012	0.3202	-0.3922	0.5358	0.0423	0.9938

Standardized Canonical Coefficients for the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4	MAT5
MA1013	MA1013	-0.0624	0.2776	0.2223	0.0290	1.0543
MA1023	MA1023	0.0985	0.2967	-0.5460	-1.0217	-0.0732
MA2013	MA2013	0.1249	-0.5702	0.7938	-0.5128	-0.3734
MA2023	MA2023	0.2625	-0.5728	-0.8587	0.6942	0.2906
MA2033	MA2033	0.2874	-0.1952	0.2622	-0.0470	0.0256
MA3013	MA3013	0.5716	0.7024	0.1875	0.5444	-0.3957

Canonical Structure

Correlations Between the Engineering Measurements and Their Canonical Variables

		ENG1	ENG2	ENG3	ENG4	ENG5
CE2112	CE2112	0.8295	-0.3815	-0.2874	-0.1327	-0.2572
CE2122	CE2122	0.7655	0.3375	-0.3429	0.4238	0.0534
CE2132	CE2132	0.7858	0.4000	0.1235	-0.4319	-0.1436
CE2142	CE2142	0.6215	0.2023	0.5123	0.3742	-0.4126
CE3012	CE3012	0.7655	-0.1580	0.3563	0.1072	0.5006

Correlations Between the Mathematics Measurements and Their Canonical Variables

		MAT1	MAT2	MAT3	MAT4	MAT5
MA1013	MA1013	0.3739	0.1251	0.2557	-0.1152	0.8617
MA1023	MA1023	0.6015	0.1522	-0.4101	-0.6596	0.0904
MA2013	MA2013	0.6116	-0.5292	0.3871	-0.2807	0.0456
MA2023	MA2023	0.6933	-0.5113	-0.4015	0.1284	0.2293
MA2033	MA2033	0.7361	-0.1607	0.1785	-0.1249	0.1510
MA3013	MA3013	0.8646	0.4187	0.1086	0.1662	-0.1127

Correlations Between the Engineering Measurements and the Canonical Variables of the Mathematics Measurements

		MAT1	MAT2	MAT3	MAT4	MAT5
CE2112	CE2112	0.6358	-0.1091	-0.0491	-0.0114	-0.0123
CE2122	CE2122	0.5868	0.0965	-0.0586	0.0364	0.0025
CE2132	CE2132	0.6023	0.1144	0.0211	-0.0371	-0.0068
CE2142	CE2142	0.4764	0.0578	0.0875	0.0321	-0.0197
CE3012	CE3012	0.5867	-0.0452	0.0608	0.0092	0.0239

Correlations Between the Mathematics Measurements and the Canonical Variables of the Engineering Measurements

		ENG1	ENG2	ENG3	ENG4	ENG5
MA1013	MA1013	0.2866	0.0358	0.0437	-0.0099	0.0411
MA1023	MA1023	0.4611	0.0435	-0.0700	-0.0567	0.0043
MA2013	MA2013	0.4688	-0.1513	0.0661	-0.0241	0.0022
MA2023	MA2023	0.5314	-0.1462	-0.0686	0.0110	0.0109
MA2033	MA2033	0.5642	-0.0459	0.0305	-0.0107	0.0072
MA3013	MA3013	0.6627	0.1197	0.0185	0.0143	-0.0054

Standardized Variance of the Engineering Measurements Explained by

	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.5728	0.5728	0.5875	0.3365	0.3365
2	0.0971	0.6699	0.0817	0.0079	0.3444
3	0.1210	0.7908	0.0292	0.0035	0.3480
4	0.1071	0.8979	0.0074	0.0008	0.3488
5	0.1021	1.0000	0.0023	0.0002	0.3490

Standardized Variance of the Mathematics Measurements Explained by

	Their Own Canonical Variables			The Opposite Canonical Variables	
Canonical Variable Number	Proportion	Cumulative Proportion	Canonical R-Square	Proportion	Cumulative Proportion
1	0.4409	0.4409	0.5875	0.2590	0.2590
2	0.1302	0.5712	0.0817	0.0106	0.2697
3	0.0980	0.6692	0.0292	0.0029	0.2726
4	0.0978	0.7670	0.0074	0.0007	0.2733
5	0.1402	0.9072	0.0023	0.0003	0.2736