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DIRECTORY OF CONSTRUCTION ENGINEERING PROGRAMS IN ORGANIZATION --ETC(U)
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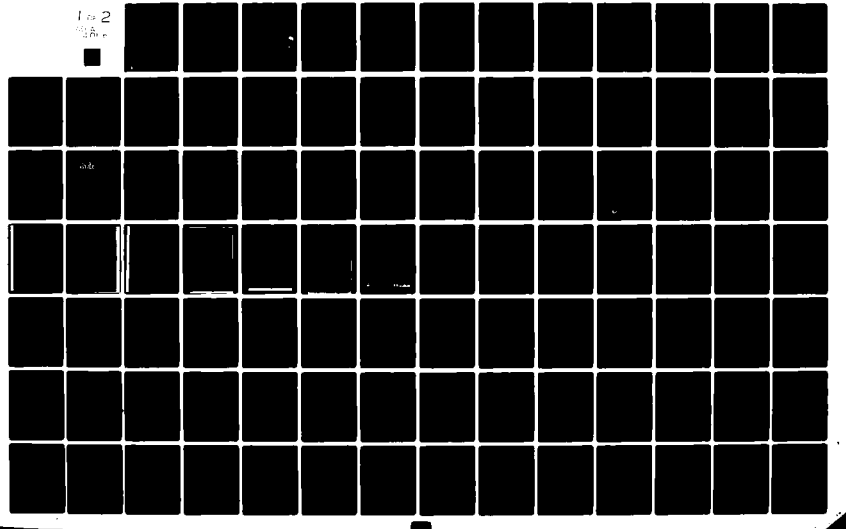

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DIRECTORY OF CONSTRUCTION ENGINEERING PROGRAMS IN ORGANIZATION AND MANAGEMENT OF CONSTRUCTION

PREPARED BY
INTERNATIONAL COUNCIL FOR BUILDING RESEARCH,
STUDIES AND DOCUMENTATION
W-65 COMMISSION ON
ORGANIZATION AND MANAGEMENT OF CONSTRUCTION

MARCH 1982

DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORY
CHAMPAIGN, ILLINOIS USA

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construction management
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directories

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*
This second edition of a directory of education programs in engineering and management covers 55 programs in 30 countries. CIB Working Commission 65, Organization and Management of Construction, plans to update the directory periodically.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

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PROLOGUE

The Working Commission W-65, Organization and Management of Construction, (OMC) consists of experts who are addressing research contained in the terms of reference which reads in part: "To develop effectiveness calculations and techniques for evaluating singularly and collectively various organizational forms utilized in planning, architecture, engineering, construction and for industrialized construction." A major aspect of the program is to effect the transfer of the research into professional practice; a vital mechanism in this transfer are the educational programs in engineering and management.

To facilitate the interchange among experts in education for OMC the Commission recommended the publication of a Directory of education programs. This is the second edition of the Directory. W-65 intends to update this Directory on a regular basis. Information on additional educational programs is welcomed; it should be forwarded to Dr. V. Handa of the Waterloo Construction Council, University of Waterloo, Waterloo, Ontario, CANADA N2L 3GI. Additional copies of the Directory are available at a modest charge from the National Technical Information Service (NTIS), Springfield, VA 22151, USA.

This Directory is the result of the efforts of many individuals. The work of the late Mr. D. Aird for the study part of the Directory is worthy of special recognition. The survey would not have been possible without the aid of the University of Waterloo and the Waterloo Construction Council.

Information on W-65 can be obtained by contacting the undersigned at the US Army Construction Engineering Research Laboratory, P. O. Box 4005, Champaign, IL 61820, USA. Information on CIB can be obtained by contacting the Secretary General CIB, Postbus 20704, Weena 704, Rotterdam, HOLLAND.

23 March 1982
Champaign, Illinois, USA

L. R. SHAFFER
Coordinator, W-65

CIB-W65 STUDY OF CONSTRUCTION PROGRAMMES

OBSERVATIONS OF REPLIES

The Study elicited responses from some 55 institutions of which 26 were located in the United States ("USA") and 29 in Other countries ("Other"). These schools offer the following programmes:

	USA	OTHER	TOTAL
BACHELOR'S	22	12	34
MASTER'S	15	14	29
DOCTORATE	9	9	18

The observations which follow are necessarily generalized since the questionnaire was subject to some interpretation; some questions were not answered; and in a few cases the response data apparently referred to other than construction programmes alone (usually departments/faculties of civil engineering or architecture). Nevertheless, the results should be of some interest.

THE INSTITUTIONS

Generally, Schools of Construction are relatively new. Most Bachelor-level programmes were established during the 1960's and 1970's, although two programmes in the USA date back over 75 years. Graduate-level programmes slightly pre-date the Bachelor schools in the USA where several were established in the 1950's. Almost all graduate programmes in the Other countries were set up only within the last decade.

Virtually all Bachelor programmes are of 4 year's duration after entry from high school. Master's degrees usually require 1 to 1½ years in the USA and 1½ to 2 years in Other countries where the entrance requirement is a Bachelor's degree. To obtain a Doctorate will uniformly require a minimum of three years beyond the Master's degree.

The size of the institutions, as defined by full-time student enrollments, varies widely:

	USA		OTHER		TOTAL	
	RANGE	AVER.	RANGE	AVER.	RANGE	AVER.
BACHELOR'S	5 - 430	105	20 - 450	130	5 - 450	114
MASTER'S	1 - 45	15	1 - 40	9	1 - 45	12
DOCTORATE	1 - 9	5	1 - 11	3	1 - 11	4

Part-time students do not comprise a significant portion of enrollments in Bachelor's programmes. Only in 4 USA and 2 Other institutions are part-time programmes substantial at the undergraduate level. On the other hand, one-quarter of the graduate programmes in the USA have large part-time enrollments, and over one-half of the Other programmes at this level provide for part-time students on a large scale.

Foreign students comprise only 3% of enrollment in Bachelor's programmes in the USA and 8% in Other countries. At the Master's level Other countries retain about the same proportion of foreign students (9%) but in the USA this figure reaches over 50%.

THE PROGRAMMES

Programmes leading to a Bachelor's degree in the USA almost uniformly require 124 - 138 semester hours, or equivalent study. Responses from Other countries are difficult to interpret but since nearly all such programmes are of 4 year durations, the course loads appear to be equivalent.

At the Master's level, typical course requirements are approximately 30 semester hours in the USA. The common response from Other countries averages 8 - 9 "courses" (range is 7 - 12 "courses") which implies a somewhat heavier course load, than in the USA, even allowing for the additional time durations discussed earlier.

Typically there is no thesis requirement for a Bachelor's degree in the USA. About one-third of the Other institutions require a thesis.

Over half the USA Master's programmes do not require a thesis, and a few others make it optional. In contrast, most Other programmes do require a thesis, and those which don't, demand completion of a major study report.

Virtually all Doctoral degrees require a thesis.

The specifics of courses which are included within the Construction programmes are almost infinately variable. Very little commonality can be observed from the survey responses except that core courses for USA programmes do display some evidence of consistency (or popularity). This is likely due to the influence of the Associated Schools of Construction or the American Council for Construction Education.

The following course topics are listed in decreasing order of their mention in the survey. (Note that more than one course of a given topic may be offered within a single programme.)

Construction Estimating and Bidding
Construction Management
Building Structures
Mechanical/Electrical Equipment
Construction Methods and Equipment
Construction Materials
Construction Planning and Control
Construction Techniques
Construction Contracts
Drawing/Graphics
Introduction/History of Construction
Computers; simulation
Site Development
Surveying
Labour Relations
Environmental Systems

SCHOLARSHIPS

Perhaps three-quarters of all the Institutions offer some scholarships or other financial incentives. However, the general impression is that these are very limited both in number and amount.

SOURCES OF FUNDING

Costs of Administration are almost entirely funded by government everywhere. Four schools (2 in USA and 2 in Other countries) are supported by industry in this respect, and represent an interesting exception. Two private schools in USA obtain administrative funding from other sources.

Scholarships are funded predominently by governments, but also substantially by industry especially in the USA. Private sources of scholarships is important to the private schools.

Research funds, again, depend heavily upon government grants or contracts, particularly in Other countries. Industry support represents probably 10 - 15% of total research funding in both the USA and Other countries.

STAFFING

Most schools function with quite restricted numbers of faculty, as summarized below:

	USA		OTHER	
	Range	Aver.	Range	Aver.
Full Time	1 - 8	3	0 - 10	4
Part Time	0 - 25	3	0 - 10	2
Guests	0 - 12	0	0 - 20	5

It is interesting to note that schools in USA split evenly between full and part-time faculty and do not utilize guest lecturers. In contrast, Other countries have a slightly larger core of full time instructors and use guest lecturers to a substantial extent.

INDUSTRY INPUT

The survey requested information on the type of input provided by industry to the programmes. This was divided into four categories with the response as shown (percentage of schools deriving support as defined):

	USA	OTHER	TOTAL
Financial, Administrative	25%	10%	20%
Scholarships, Bursaries, etc.	80	30	50
Curriculum Development	50	25	40
Overseeing Body, Industry Liaison	40	35	40

It is significant that USA schools obtain substantially larger participation by industry in both Scholarships and Curriculum Development.

RESEARCH

Educational objectives of the Construction Schools are reasonably consistent amongst both USA and Other countries.

Perhaps surprisingly not a single institution indicated Research as an objective. Almost all respondents focussed on Organizational objectives, while over one-third also saw Engineering as an objective.

The lack of emphasis on research and thesis requirements perhaps explains the insignificant amounts of research funding reported. Only nine responses indicated research funding greater than $50,000 per annum.

Research projects reported include:

- Management functions, organization, etc. (11 times)
- O.R. Techniques, Computer Simulation (9 times)
- Building economics, financing, risk (5 times)
- Building Sciences, (5 times)
- Planning, Scheduling, Estimating (5 times)
- Productivity on Site, Methods (5 times)
- Energy conservation (2 times)

No other topic received more than a single reference.

PROGRAMME LISTINGS

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution UNIVERSITY OF WATERLOO

Faculty/School address DEPT. OF CIVIL ENGINEERING, CONST. MGMT. GROUP
UNIVERSITY OF WATERLOO, WATERLOO, ONT. CANADA N2L 3G1.

Name, Title of Contact Pr. Dr. W.A. McLaughlin, Director
Name, Title of Respondee Prof. Dr. V.K. Handa. Professor.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established		1971.		1971		1961.	
Duration (years) - length of Programme		12 months.				(as part of B.Sc degree).	
Enrollment							
Current Part Time		11		-			
Current Full Time		8	1	-		60	
Other (specify) of which							
National		15	-	-		60	
Foreign		6	1	-		-	
Admission Requirements		B.Sc.(Eng.) or equivalent.					
Course Requirements - list number of courses needed whether thesis or not		8 + project.		6		N/A.	
Scholarship, Fellowship Bursaries, etc.available		Yes.		No		N/A.	

Language of Instruction ENGLISH

Total Numbers of Students Graduated . National 72 Foreign 8

Indicate % of funding by	Administration	Scoholarship	Research
Government	-	Research Agencies.	NRC. 100%
Industry	50	50	-
Other(specify)	from fees and govt. granting formula by Univ.		-

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (3) Part Time (1) Industry, Instructors Speakers ..... (20)

Industry Input (Please tick) Financial Administrative (✓) Curriculum Development (✓)
Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

CE 691 Construction Economics, Accounting and Financing
Supply demand and production, breakeven analysis, minimum-cost operations, time-value mechanics, comparison methods, economic analysis recognizing risk, cost accounting, profit and loss statements, return on investment, financing, analysis and interpretation of financial statements, fraud and waste, principles of internal control, profit centre concepts, taxes and other legal considerations.

CE 692 Organizational and Legal Responsibilities in Construction
Emergence and dimensions of management, tasks, management effectiveness, social impacts and environmental responsibilities, management skills and organizations. Construction contracts, breach of contract, mechanics liens, liability for defects, professional liability, insurance, construction safety and environmental protection legislation

CE 693 Administration of Construction Projects
Nature of the construction industry, characteristics of a project, construction projects, planning, and scheduling functions, bar charts and time-space diagrams, network systems, Resource allocation and levelling.

CE 694 Construction Methods and Equipment
Work study, data processing and computational equipment, performance characteristics of equipment, concrete placing, material flow, equipment management.

CE 695 Construction Planning
Systems and models, management information system, construction planning with matrix and input-output models, optimization of production programme using linear programming models, dynamic programming, decision making.

CE 690 Labour Relations in the Construction Industry
Human relations in industry, people and productivity, development of organized labour in Canada, construction contractors, construction labour law, role and powers of labour unions and management, collective bargaining, construction management bargaining organizations, construction owner-clients

Books/Texts
CE 691 - COOMBS/PALMER - CONST. ACCTG. & FINANCIAL MGMT. (McGRAW HILL)
CE 692 - GOLDSMITH - CANADIAN BUILDING CONTRACTS (CARSWELL CO).
CE 693 - R. HARRIS, PRECEDENCE AND ARROW NETWORKING TECHNIQUES FOR CONSTRUCTION. (J. WILEY)
CE 694 - CAMPBELL, CONST. EQUIPMENT MANAGEMENT (U of W).
CE 690 - P. ALLEN, MANUAL OF LABOUR RELATIONS WITH THE CONSTRUCTION TRADES. CUOR W, UNIV. OF WATERLOO)

Educational Prgramme Objectives:
TO TRAIN STUDENTS AND INDUSTRY PERSONNEL FOR THE CONSTRUCTION INDUSTRY OWNERS, CLIENTS, CONTRACTORS BY IMPARTING ADMINISTRATIVE SCIENCE/ARTS AND EXPERIENCE OF THE MORE SUCCESSFUL MANAGERS. END AIM IS TO TRAIN PROJECT MANAGERS

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)) National Research Council. $ 20,000 annually.

Describe Nature/objectives of Research and Research Facilities (if any) Productivity, Operations Research. No hard research facilities

Are there any special features of your programme. Please indicate.
A Co-op feature whereby the programme is split into two parts A & B. Part A is attended twice in one calendar year Jan - April and again Sept - December Similarly Part B is attended the next calendar year twice. Students can then enroll on a co-op basis in the consecutive year during the winter months when (field) construction activity is at a low ebb and obtain their Masters. the intervening period is spent on the Project work.

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Study of Construction Programmes

February 17th, 1981.

Name of Institution Concordia University

Faculty/School address: Centre For Building Studies, Faculty Of Engineering & Computer Science

Name, Title of Contact
Name, Title of Respondee: Dr. Alan D. Russell

Programme/s offered	Degree Bachelor	*Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established		*1976	1977				
Duration (years) - length of Programme		1½ for full-time students 3-5 for part-time students	3-4 years				
Enrollment							
Current Part Time		35	0				
Current Full Time		5	4				
Other (specify) of which							
National							
Foreign							
Admission Requirements		B. Eng. or *B. Arch.*	M. Eng or *equiv.* (MBA)				
Course Requirements - list number of courses needed whether thesis or not		13 courses & tech. report or 8 courses plus thesis	6 courses & thesis				
Scholarship, Fellowship Bursaries, etc. available		Concordia Fellowships-Prov. & Fed. Gov't Scholarships					

Language of Instruction: English

Total Numbers of Students Graduated: National 10 Foreign 5

	Administration	Scholarship	Research
Indicate % of funding by Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (3) Part Time (3) Industry, Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc. ( ) Overseeing Body Industry Liaison (X)

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

Bldg N655	Building Engineering Systems
Bldg N656	Building Economics I
Bldg N657	Project Management
Bldg N658	Decision Analysis
Bldg N680	Construction Planning and Control I
Bldg N681	Labor and Industrial Relations in Construction
Bldg N682	Legal Issues in Construction
Bldg N683	Construction Processes
Bldg N684	Construction Planning and Control II
Bldg N781	Project Acquisition and Control
Bldg N783	Building Economics II
Bldg N784	Computers and Management Information Systems in Construction
Bldg N785	Human Factors in Construction
Bldg N786	Business Practices for Construcion Management
Bldg N787	Construction Equipment Management
Bldg N789	Selected Topics in Construction Management

NB: Prerequisites are not shown. Students are also encouraged to take selected courses from the MBA programme and Computer Science.

Educational Prgramme Objectives:

To provide a grounding in the fundamentals of project and construction management and to provide an opportunity for students to synthesize their knowledge through case studies, project work and thesis work.

Research (Please tick): Organizational (Applied) (X) Engineering (Hard) (X)

Research Funding (Indicate source & amount (US $)): National Science and Engineering Research Council (NSERC). Individual construction firms.

Describe Nature/objectives of Research and Research Facilities (if any):

Development of project management information, systems for medium sized general contractors.
Risk analysis.
Modeling of construction operations and productivity improvement.
Escalation management.

Are there any special features of your programme. Please indicate.

All courses offered in the evening to facilitate attendance by practicing professionals.

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Study of Construction Programmes

February 17th, 1981.

Name of Institution University of the West Indies, St Augustine, Trinidad & Tobago.

Faculty/School address Department of Civil Engineering, Faculty of Engineering.

Name, Title of Contact T.M.LEWIS (Course Tutor) or Prof. I.D.C.Imbert (Head)
Name, Title of Respondee " "

Programme/s offered	Degree Bachelor	Degree Master	Degree PhD	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
	~~✓~~	✓	~~✓~~	✓	✓	~~✓~~	~~✓~~

Year Programme Established 1977
Duration (years) - length of Programme 1 year Full-Time
2 years Part-Time

Enrollment

Current Part Time	23
Current Full Time	16
Other (specify) of which	/ 15 of those registered have only the project to complete
National	35 (Nationals, or with residential qualifications)
Foreign	4

Admission Requirements first degree or equivalent in approved subject

Course Requirements - list number of courses needed whether thesis or not Master's Programme :- 7 courses plus Project report
Diploma Programme :- 3 courses plus Project report

Scholarship, Fellowship Bursaries, etc.available

Language of Instruction English

Total Numbers of Students Graduated National 4 Foreign -

Indicate % of funding by	Administration	Scholarship	Research
Government	100%		
Industry	-		
Other(specify)	-		

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (6) Part Time (2) Industry, Instructors Speakers ..... Varies (?)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( )
Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments
1. Certificate course planned and organised but not yet on offer..
2. Course rationalisation planned when new facilities become available in the near future.
3. Industry speakers arranged on an ad hoc basis.
4. Regular series of seminars and short courses put on for industry.

Course, Titles, Descriptions Indicate Text Title (if any)

CE600 - Construction Management and Organisation.
CE601 - Economics, Contracts and Industrial Relations.
CE602 - Construction Practice, Methods and Techniques.
CE603 - Construction Materials.
CE604 - Structural Design.
CE605 - Site Investigations and Foundations.
CE606 - Construction in the Local Environment.
Project

M.Sc. students must complete the whole programme.

Diploma students must complete three course options and the project.

Educational Prgramme Objectives:

"The purpose of this post graduate course is to provide instruction in a range of Engineering and Management subjects that may give rise to the many problems that can occur on any Construction project, and thereby to improve the quality of Project Management in Trinidad & Tobago, by allowing a wider perspective of Engineering Economy and Technology to be taken"

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) (✓)

Research Funding (Indicate source & amount (US $) No separate fund.

Describe Nature/objectives of Research and Research Facilities (if any) Research within this programme is restricted, for the students, to work necessary for their course assignments and project. Their research may be on any relevant aspect of Engineering, but the time available is restricted.

Are there any special features of your programme. Please indicate.

The availability of the new improved facilities within the next few years will enable us to rationalise and broaden the content of this post graduate programme. More emphasis will be placed on Computer Techniques, and on multi-disciplinary and group working.

PAGE END

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution: AUBURN UNIVERSITY

Faculty/School address: Auburn University
Auburn AL 36830 USA

Name, Title of Contact
Name, Title of Respondee: Dr. Lansford C. Bell
Associate Professor
Dept. of Civil Engr.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established
Duration (years) - length of Programme

Enrollment
- Current Part Time
- Current Full Time: 5+
- Other (specify) of which
  - National: 3+
  - Foreign: 2+

Admission Requirements: BSCE and GRE test

Course Requirements - list number of courses needed whether thesis or not: 45 credit hrs and thesis

Scholarship, Fellowship Bursaries, etc.available: Teaching and research assistantships available

Language of Instruction: English

Total Numbers of Students Graduated: National ____ Foreign ____

Indicate % of funding by		Administration	Scholarship	Research
	Government		80%	80%
	Industry			20%
State	Other(specify)		20%	

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (2) Part Time (1) Industry,Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

CE 415 Construction Contracting
CE 660 Construction Applications of Operations Research I
CE 661 Construction Engineering Functions
CE 662 Construction Applications of Operations Research II
CE 663 Construction Engineering Methods
CE 664 Construction Systems Planning and Control
CE 665 Construction Engineering Analysis

Educational Prgramme Objectives:

To provide qualified students with an opportunity for advanced training and specialization and to enable those students to gain experience in conducting research and in the interpretation and communication of their findings.

Research (Please tick): Organizational (Applied) (X) Engineering (Hard) (X)

Research Funding
(Indicate source & amount (US $)

Auburn University Engineering Experiment Station ($20,000) and others

Describe Nature/objectives of Research and Research Facilities (if any)

Application of statistics, computer simulation and principles of operations research to construction operations, organizational structures and highway maintenance.

Are there any special features of your programme. Please indicate.

February 17th, 1981.

Study of Construction Programmes

Name of Institution: Bowling Green State University

Faculty/School address: Construction/Design Unit
School of Technology
Bowling Green, Ohio 43403

Name, Title of Contact: Prof. William E. Brewer
Name, Title of Respondee: " "

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	12						
Duration (years) - length of Programme	4						
Enrollment							
Current Part Time							
Current Full Time	150						
Other (specify) of which							
National	145						
Foreign	5						
Admission Requirements	H.S. Dip.						
Course Requirements - list number of courses needed whether thesis or not	180 quarter hours						
Scholarship, Fellowship Bursaries, etc.available	403						
Language of Instruction	Engl.						

Total Numbers of Students Graduated: National ____ Foreign ____

	Administration	Scholarship	Research
Indicate % of funding by Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (3) Part Time (4) Industry, Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development (✓)
Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

Strength of Materials
Land Planning and Development
Surveying Practice
Commercial and Industrial Construction
Construction Equipment
Light Building Construction
Civil Construction
Problems in Construction Technology
Construction Technology
Cooperative Internship-Basic
Architectural Graphics
Commercial and Industrial Construction
Cooperative Internship-Intermediate
Estimating and Cost Control
Construction Contracting
Design and Engineering Graphics 1
Materials Processing 1
Materials Processing 11
Introduction to Technology - The Man Made World
Energy Power, Instrumentation and Control 1
Energy, Power, Instrumentation and Control 11

Introduction to Programming 1
Fortran Programming
College Physics
Basic Calculus 1
Basic Calculus 11
Calculus and Anlytic Geometry 1
Calculus and Analytic Geometry 11
Principles of Organization and Management
Organizational Theory and Behavior
General Business Law
Varieties or Writing
Principles of Speech Communication
Technical Writing
Business Communications
Visual Communication Technology
Principles of Sociology
General Psychology

Educational Prgramme Objectives:
Graduate personnel with an understanding of "construction" who could be gainfully employed by the industry.

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.

Our program contains three, 12 week, coop sessions. This gives the student to see the real world and what makes the industry function.

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Study of Construction Programmes

February 17th, 1981.

Name of Institution BRADLEY UNIVERSITY

Faculty/School address Peoria, IL 61625 U.S.A.

Name, Title of Contact M. I. Guest, AIC, Professor and Department Chairman
Name, Title of Respondee M. I. Guest, AIC, Professor and Department Chairman

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established 1968
Duration (years) - length of Programme 4

Enrollment

Current Part Time	125
Current Full Time	120
Other (specify) of which	
National	120
Foreign	5

Admission Requirements ACT Composite 20 (min) or SAT Total 950 (min); High School graduation upper one-half of class; high school physics and pre-calculus mathematics
Course Requirements - list number of courses needed whether thesis or not 124 semester hours (minimum); no thesis

Scholarship, Fellowship Bursaries, etc.available Few

Language of Instruction English

Total Numbers of Students Graduated National 415 Foreign 10

Indicate % of funding by	Administration	Scholarship	Research
Government			
Industry			
Other(specify) Institution primarily concerned with undergraduate teaching; income primarily from student tuition.			

Staff Numbers: Totals (Indicate F's) Faculty Full Time (4) Part Time (3) Industry,Instructors Speakers ..... (0)

Industry Input (Please tick) Financial Administrative (x) Curriculum Development (x) Scholarship,Bursaries etc.(x) Overseeing Body Industry Liaison (x)

Comments

PAGE SEVEN

Course, Titles, Descriptions
Indicate Text Title (if any)

20% General Education
20% Mathematics/Science
15% Business Management
45% Construction: Introduction to Construction
100% Construction Graphics
Mechanical and Electrical Equipment for Buildings
Advanced Environmental Technologies in Construction
Materials and Methods of Construction I, II
Construction Equipment and Methods
Construction Productivity
Construction Management
Construction Contracts
Construction Practice
Construction Estimating
Wood and Steel Structures
Concrete and Foundation Structures
Surveying
Soil Mechanics
Senior Seminar

Educational Programme Objectives:
To provide the basic (BS) professional degree for the Constructor. To this end the curriculum provides the balanced cultural, technical, managerial and professional foundation necessary for a career and for further individual development.

Research (Please tick) None Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $) None

Describe Nature/objectives of Research None

and

Research Facilities (if any) Time-lapse and Computer

Are there any special features of your programme. Please indicate.
Accredited by the American Council for Construction Education
Member Associated Schools of Construction

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution	Carnegie-Mellon University
Faculty/School address	Dept. of Civil Engineering Pittsburgh, PA. 15213
Name, Title of Contact Name, Title of Respondee	Dr. Dwight A Sangrey Head, Dept of Civil Engineering

Programme/s offered	Degree Bachelor	Degree* Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established	1981
Duration (years) - length of Programme	one year
Enrollment (admitted for Fall 1981)	
Current Part Time	
Expected Current Full Time (1981-82)	7
Other (specify) of which	
National	3
Foreign	4
Admission Requirements	B.S. in C.E.
Course Requirements - list number of courses needed whether thesis or not	8 courses plus thesis
Scholarship, Fellowship Bursaries, etc.available	Yes

*The name of the program is "Engineering Planning and Management" and the degree is M.S. in C.E.

Language of Instruction	English

Total Numbers of Students Graduated	National ____	Foreign ____	N.A.
	Administration	Assistantship Scholarship	Research
Indicate % of funding by Government		60%	100%
Industry		0	0%
Other(specify)	100% university (private)	40% (university faculty assist.)	0%

Staff Numbers: Totals (Indicate #'s)	*Faculty Full Time (4) Part Time ( ) Industry, Instructors Speakers ..... ( )
Industry Input (Please tick)	Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )
Comments	*The faculty members also teach undergradute courses which are not a part of this graduate program.

Course, Titles, Descriptions
Indicate Text Title (if any)

Description of core courses for the program is attached.

Educational Programme Objectives:
Preparation of civil engineers who are interested in one of the two areas
1. Transportation system planning
2. Management of constructed facilities

Research (Please tick)	Organizational (Applied) (✓) Engineering (Hard) ( )
Research Funding (Indicate source & amount (US $)	$200,000 (U.S. DOT, Pennsylvania DOT)
Describe Nature/objectives of Research and Research Facilities (if any)	1. Peak-hour travel demand analysis 2. Traffic management during the reconstruction of a major arterial highway.

Are there any special features of your programme. Please indicate.

12-701 Analysis of Network-Based Systems (Fall)

Introduction to topological and algebraic properties of networks; analysis of networks governed by potential relations, flow relations or constitutive equations; applications to network-based systems such as surveying networks, CPM-PERT networks, traffic networks, hydraulic networks and structural networks; treatment of data and information structures.

12-702 Methods of Computer-Aided Design (Spring)

Focuses on the design and implementation of programs for analysis and synthesis in architecture and civil engineering. Both batch and interactive programs are considered. Topics covered include: data structures, the design of large data bases, graphic display techniques, formal and problem-oriented languages, decision tables and other methods of program organization.

12-703 Demand Analysis and Forecasting (Fall)

Formulation and measurement of demand as a function of causal variables (such as prices, socio-economic conditions, etc.); discussion of the principal techniques for forecasting the usage of engineering systems and facilities.

12-704 Reliability and Risk Analysis (Spring)

Methods for assuring a high degree of safety and reliability in the design and operation of engineering projects: codes, inspection, quality assurance and quality control procedures, redundancy and fail-safe design. Practical measures of risk and reliability levels with applications to particular projects. Differences in philosophy and measurement techniques.

12-705 Project Management and Financing (Fall)

Studies of the planning, scheduling and evalution of large scale capital projects; construction safety and productivity; human factors in project management. Operational and financial risks of projects to an organization; cost estimates and controls; effects of inflation. Impact of large scale projects to local environments.

12-706 Public Investment Planning and Pricing (Spring)

Economic framework for identifying and analyzing investment and operating options facing both public agencies and private firms; economic efficiency, utilization, pricing and investment (both in theory and in practice); multi-objective evaluation.

CIP - USA
Study of Construction Programmes

February 17th, 1981.

Name of Institution CASE WESTERN RESERVE UNIVERSITY

Faculty/School address DEPARTMENT OF CIVIL ENGINEERING
CASE INSTITUTE OF TECHNOLOGY, CLEVELAND, OHIO, 44106, U.S.A.

Name, Title of Contact GEORGE S. BIRRELL
Name, Title of Responder ASSOCIATE PROFESSOR

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part-t Programme	Other Specify
Year Programme Established	1979						
Duration (years) - length of Programme	4 YEAR	2 YEARS	4 YEARS				
Enrollment							
Current Part Time	0	2	0				
Current Full Time	40	4	0				
Other (specify) of which	—	—	—				
National							
Foreign							
Admission Requirements	CIVIL ENG UNIVERSITY ADMISSION	UNIVERSITY BACHELORS OR EQUIVALENT	APPROPRIATE UNIVERSITY MASTERS				
Course Requirements - list number of courses needed whether thesis or not							
Scholarship, Fellowship Bursaries, etc.available	SOME	VERY FEW	VERY FEW				

Language of Instruction ENGLISH

Total Numbers of Students Graduated — National ____ Foreign ____

	Administration	Scholarship	Research
Indicate % of funding by Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s) — Faculty Full Time ( ) Part Time ( ) Industry, Instructors Speakers ..... SOME ( )

Industry Input (Please tick) — Financial Administrative (✓) Curriculum Development (✓)
Scholarship Bursaries etc. (✓) Industry Liaison (✓)

Comments

DMCT TEN

Course, Titles, Descriptions (UNDER REVIEW)
Indicate Text Title (if any)

ANALYSIS OF CONSTRUCTION OPERATIONS
TIME AND COST CONTROL IN CONSTRUCTION
LEGAL ASPECTS OF CONSTRUCTION
PLANNING, ORGANISATION AND CONTROL
HUMAN RESOURCES IN CONSTRUCTION
FINANCIAL AND MANAGERIAL ACCOUNTING
DECISION THEORY
OPERATIONS MANAGEMENT

Educational Programme Objectives:
TO PROVIDE KNOWLEDGE IN MANAGEMENT OF CONSTRUCTION AND INSTILL INNOVATIVE AND ENTREPRENEURIALLY EFFICIENT THINKING

BACHELORS
AN OPTIONAL SUB STREAM WITHIN CIVIL ENGINEERING

MASTERS
CONCENTRATED PROGRAM ON TOPICS TO ADVANCE THINKING AND EXPERTISE IN MANAGEMENT OF CONST.

PhD
SUBSTANTIAL TO A THOROUGH KNOWLEDGE OF MANAGEMENT OF CONSTRUCTION A CONCENTRATION ON HEURISTIC RESEARCH TO BE USEFUL TO THE INDUSTRY AND EDUCATION

Research (Please tick) — Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research and Research Facilities (if any)

PROBLEM SOLVING AND IMPROVED PROCESSES OF MANAGEMENT OF CONSTRUCTION USUALLY BY HEURISTIC ANALYSIS AND SOLUTION SYNTHESIS WITH VALIDITY IN USE TO THE CLIENT AND INDUSTRY AT LARGE

NORMAL ENGINEERING LABORATORIES AND A LOCAL CONSTRUCTION INDUSTRY WHICH IS INTERESTED IN THE CONSTRUCTION PROGRAM AND ITS WORK

Are there any special features of your programme. Please indicate.

THE CONSTRUCTION PROGRAM EXISTS IN A SMALL BUT HIGH QUALITY ENGINEERING SCHOOL WITHIN AN ARRAY OF ENGINEERING DISCIPLINES,
(a) CLOSE CONNECTIONS TO THE BUSINESS SCHOOL
(b) A LOCAL CONSTRUCTION INDUSTRY THAT IS WILLING TO HELP

GIB - M&S
Study of Construction Programmes

February 17th, 1981.

Name of Institution: Clemson University

Faculty/School address: Department of Civil Engineering

Name, Title of Contact Name, Title of Respondee: Dr. Herbert W. Rusching, Professor and Head

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1900	1958	1958	NA	NA	NA	NA
Duration (years) - length of Programme	(4 yrs)	(1-1/2 yrs)	(3 yrs)				
Enrollment							
Current Part Time	-	-	-				
Current Full Time	430	30	8				
Other (specify) of which	-	-	-				
National							
Foreign							
Admission Requirements	Adm Office establishes	B avg.	B avg.				
Course Requirements - list number of courses needed whether thesis or not	138 sem cr hrs	30 sem cr hrs	Usually 45-48+ 18 hrs dissertation				
Scholarship, Fellowship Bursaries, etc.available	Yes	Yes - graduate stipends of at least $400/mo are available					

Language of Instruction: English

Total Numbers of Students Graduated: BSCE 2, 025, MS 120, Phd 7
National 75 Foreign 25 in grad programs

		Administration	Scholarship	Research
Indicate % of funding by	Government	100		85
	Industry	-	50	15
	Other(specify)	-	50(individuals)	-

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (18) Part Time (-) Industry, Instructors Speakers ..... (-)

Industry Input (Please tick): Financial Administrative (X) Curriculum Development (X) Scholarship, Bursaries etc.(X) Overseeing Body Industry Liaison (X)

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

Note BSCE degree program attached and list of all CE courses

Educational Prgramme Objectives:

See attached page

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $)) see attached page

Describe Nature/objectives of Research and Research Facilities (if any): Research directed to applied and basic engineering. Facilities include structural testing laboratory (including 1,000,000 lb capacity compression machine) and a hydraulics laboratory for physical hydraulic modelling.

Are there any special features of your programme. Please indicate.

Four specialty areas are defined in graduate level programs - construction, transportation, structural engineering, water resources.

PAGE ELEVEN

CLEMSON, UNIVERSITY

List of Courses in Civil Engineering

CE 201	Surveying	3(2,3)
CE 205	Civil Engineering Computer Applications	3(2,2)
CE 301	Structural Analysis I	3(2,2)
CE 302	Structural Steel Design	3(2,2)
CE 310	Transportation Engineering	4(3,2)
CE 320	Introduction to Construction Materials	3(2,3)
CE 330	Soil Mechanics	3(2,2)
CE 402	Reinforced Concrete Design	3(2,2)
CE 403/603	Use of Computers in Structural Analysis & Design	3(2,2)
CE 404/604	Masonry Structural Design	3(3,0)
CE 410/610	Traffic Engineering: Operations	3(3,0)
CE 412/612	Urban Transportation Planning	3(3,0)
CE 417/617	Airphoto Interpretationl	3(2,3)
CE 419/619	General Photogrammetry	3(2,3)
CE 421/621	Hydrology	3(3,0)
CE 424	Introduction to Construction Engineering	3(3,0)
CE 425	Engineering Relations	3(3,0)
CE 431/631	Applied Soil Mechanics	3(2,2)
CE 432/632	Construction Project Administration	3(2,3)
CE 433/633	Construction Planning & Scheduling	3(2,3)
CE 434/634	Construction Estimating and Project Control	3(2,3)
CE 435/635	Engineering Project Analysis	3(2,2)
CE 438/638	Construction Support Operations	3(2,3)
CE 439/639	Construction Equipment Selection and Maintenance	3(2,3)
CE 441/641	Applied Hydraulics	3(3,0)
CE 453/653	Advanced Structural Analysis	3(3,0)
CE 462/662	Coastal Engineering I	3(3,0)
CE 463/663	Coastal Engineering II	3(3,0)
CE 464/664	Physical Models in Fluid Mechanics	3(2,2)
CE 470/670	Probabilistic Design in Civil Engineering	3(3,0)
CE 490,H490	Special Projects	1-3(1-3,0)
CE 499	Civil Engineering Design Project	3(2,3)
CE 801	Matrix Methods of Structural Analysis	3(3,0)
CE 802	Prestressed Concrete Analysis and Design	3(3,0)
CE 803	Reinforced Concrete Structural Systems	3(3,0)
CE 804	Theory and Design of Thin Plates	3(3,0)
CE 805	Plastic Analysis and Design of Steel Structures	3(3,0)
CE 806	Metal Compression Members	3(3,0)
CE 807	Numerical and Approximate Methods of Structural Analysis	3(3,0)
CE 808	Finite Element Method in Engineering	3(3,0)
CE 811	Highway Geometric Design	3(2,3)
CE 812	Airphoto Interpretation II	3(2,3)
CE 813	Highway and Airport Pavement Design	3(3,0)

Educational Programme Objectives:

The primary objective of the program is to prepare students for successful professional careers in civil engineering. Preparation for these careers is accomplished through the organized program of formal instruction in the courses noted in this questionnaire. In addition, student backgrounds are enhanced by contact with faculty and practicing engineers, by involvement in student chapter professional society activities, field trips, outside lecturers, and contact with research projects, and a variety of extracurricular activities.

Graduates are encouraged to become registered engineers and to continue their education throughout their professional careers.

Continued-

CE 814	Traffic Flow Theory	3(3,0)
CE 815	Transportation Safety Engineering	3(3,0)
CE 816	Highway Planning	3(3,0)
CE 817	Mass Transit Planning	3(3,0)
CE 818	Airport Planning and Design	3(3,0)
CE 819	Transportation Research 2-4	
CE 822	Aggregates as Construction Materials	3(2,3)
CE 830	Advanced Soil Mechanics	3(3,0)
CE 831	Foundation Engineering	3(2,3)
CE 835	Construction Project Modeling and Control	3(2,3)
CE 837	Construction Specifications and Contracts	3(2,3)
CE 840	Construction of Nuclear Power Plants	3(2,3)
CE 846	Flow in Open Channels	3(3,0)
CE 861	Mechanics of Sediment Transport	3(2,2)
CE 862	Heat Transfer at Water Surfaces	3(3,0)
CE 865	Hydrology I	3(3,0)
CE 866	Hydrology II	3(3,0)
CE 871	Coastal Hydrodynamics	3(3,0)
CE 872	Marine Pollution Control	2(2,0)
CE 889	Special Problems I 1-3	
CE 890	Special Problems II 1-3	
CE 891	Master's Research. Credit to be arranged	
CE 901	Theory and Design of Shell Structures	3(3,0)
CE 902	Dynamic Analysis of Structures	3(3,0)
CE 991	Doctoral Research. Credit to be arranged	

CIJ - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution: Ferris State College

Faculty/School address: Construction Department

Name, Title of Contact: James B. Shane, AIA
Name, Title of Respondee: Head - Construction Department

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Speci

Year Programme Established: 1981*
Duration (years) - length of Programme: 4

Enrollment
- Current Part Time
- Current Full Time
- Other (specify) of which
- National
- Foreign

Admission Requirements

Course Requirements - list number of courses needed whether thesis or not

Scholarship, Fellowship Bursaries, etc.available

PAGE FOURTEEN

Language of Instruction: English

Total Numbers of Students Graduated: National ____ Foreign ____

	Administration	Scoholarship	Research
Indicate % of funding by Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time ( ) Part Time ( ) Industry,Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

* Baccalaureate degree program in Construction Management to be initiated Fall Term 1981/82 (September, 1981).

Educational Prgramme Objectives:

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $))
Describe Nature/objectives of Research
and
Research Facilities (if any)

Research not currently anticipated

None

Are there any special features of your programme. Please indicate.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution GEORGIA INSTITUTE OF TECHNOLOGY

Faculty/School address SCHOOL OF CIVIL ENGINEERING
ATLANTA, GEORGIA, USA 30332

Name, Title of Contact DANIEL W. HALPIN, Professor of Civil Engineering
Name, Title of Respondee DANIEL W. HALPIN, Professor of Civil Engineering

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	N/A	1968	1973	N/A	N/A		
Duration (years) - length of Programme		1 yr	3 yr (average)				
Enrollment		27	3				
Current Part Time		2	0				
Current Full Time		25	3				
Other (specify) of which							
National		12	1				
Foreign		13	2				

Admission Requirements Undergraduate degree in Engineering or related Technical Area

Course Requirements - list number of courses needed whether thesis or not: 50 quarter hours are required for the MS degree of which 6 hours minimum relate to a research topic.(Thesis optional) 50 hours beyond MS level to PhD plus Thesis

Scholarship, Fellowship Bursaries, etc.available: Assistantships available - Applications required in February of each year.

Language of Instruction English

Total Numbers of Students Graduated: National 70 Foreign 30 (Approx. since 1973)

Indicate % of funding by	Administration	Scholarship	Research
Government	100	80	80
Industry			
Other(specify)	Grants	20	20

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (2) Part Time (2) Industry, Instructors Speakers ..... (3*)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.(X) Overseeing Body Industry Liaison ( )

Comments

*Industry Speakers involved in Seminar Course.

Course, Titles, Descriptions
Indicate Text Title (if any)

Construction Management - Text:	Halpin and Woodhead-Construction Managem
Design of Construction - Operations	Halpin and Woodhead-Design of Constructi and Process Operations
Construction Administration	Barrie and Paulson - Professional Constr tion Management
C. E. Management I	Harris - Precedence and Arrow Networking
C. E. Management II	Readings in Cost Engineering - ASCE
Construction Law	
Construction Seminar	
Special Topics	
Computer Applications in Construction	
Experimental Statistics	Hines and Montgomery - Probability and Statistics in Engineering
Operations Research	Daellenbach and George - Intro to OR
Construction Economics	

Educational Prgramme Objectives:

Graduate Education of Construction Managers

Research (Please tick) Organizational (Applied) (X) Engineering (Hard) ( )
Microcomputer Analysis of Construction Operations

Research Funding (Indicate source & amount (US $) U. S. Navy - $40,000

Describe Nature/objectives of Research and Research Facilities (if any): Investigate the Use of Microcomputers for Construction Management Planning and Control

Several small Microcomputers
At Higher Level a DEC VAX midi- computer

Are there any special features of your programme. Please indicate.

Program relies heavily on Professional Problems or Term Projects carried out by students in contact with the local Construction and Contracting Community. Atlanta has a wide range of projects and construction related firms who are very cooperative in supporting our program. Emphasis is on actual field construction and site situations.

February 17th, 1981.

Study of Construction Programmes

Name of Institution: Jackson State University

Faculty/School address: School of Industrial and Technical Studies

Name, Title of Contact: Joe King, Head, Industrial Technology Department
Name, Title of Respondce: Joe King, Head, Industrial Technology Department

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established: 1973
Duration (years) - length of Programme: 8 years

Enrollment

Current Part Time	5
Current Full Time	26
Other (specify) of which	
National	21
Foreign	10

Admission Requirements: High School
ACT or SAT

Course Requirements - list number of courses needed whether thesis or not: 10

Scholarship, Fellowship Bursaries, etc.available: University scholarship

Language of Instruction

Total Numbers of Students Graduated		National 21	Foreign 8	
		Administration	Scholarship	Research
Indicate % of funding by	Government	0	80	0
	Industry	10	0	10
	Other(specify)			

Staff Members: Totals (Indicate #'s): Faculty Full Time (2) Part Time ( ) Industry, Instructors Speakers ..... (3)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development (x)
Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

1. ITC 205 (3) Materials, Construction Procedures, and Practices. A study of the materials, building codes, techniques and procedures employed in building construction.
2. ITC 300 Mechanical and Electrical Equipment. Prerequisite: Consent of instructor. The basic principles and design of air conditioning, plumbing, electrical systems and equipm used in building.
3. ITC 305 Introduction to Plumbing. A course designed to acquaint the student with the fu mentals of basic residential and commercial plumbing.
4. ITC 317 Estimating and Scheduling. Prerequisite ITC 205. The methods of preparing labo and material quantity estimates.
5. ITC 319 Structural Design. Prerequisite ITC 404. Structural design procedures with cor reinforced concrete and steel
6. ITC 324 Site Planning and Development. Prerequisite: Consent of instructor. The influ of climate, geography, topography, and geology on the design of a building site and the different uses of the transit in squaring up forms.
7. ITC 404 Strength of Materials. Prerequisite ITC 205. Problems related to the strength the different types of building materials will be experienced by the student.
8. ITC 414 Contracts, Specifications, and Law. Prerequisite ITD 205. The preparation of c specifications and conditions which forms the contractural relationship between owner an builder.
9. ITC 499 Building Seminar. Prerequisite Consent of instructor. Emphasis will be placed on problem solving as it relates to the different area where students have found problem

Educational Pngramme Objectives:

1. To develop an understanding of procedures and techniques used by tradesmen.
2. To develop ability and skill in a wide variety of construction operations.
3. To provide knowledge in areas related to construction.

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) (

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.

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CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution Massachusetts Institute of Technology

Faculty/School address: Dept. of Civil Engineering, 77 Mass. Ave., Room 1-253, Camb., MA 02139

Name, Title of Contact / Name, Title of Respondee: Robert D. Logcher, Professor of Civil Engineering

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1978	1972	1977				
Duration (years) - length of Programme	4	1	3				
Enrollment							
Current Part Time							
Current Full Time	12	22	6				
Other (specify) of which							
National	9	12	1				
Foreign	3	10	5				
Admission Requirements	Prior Degree, Analytic Background, C.E. preferred						
Course Requirements - list number of courses needed whether thesis or not	36 No Th.	8 Th.	17 Th.				
Scholarship, Fellowship Bursaries, etc.available		Yes	Yes				

Language of Instruction: English

Total Numbers of Students Graduated: National 60 Foreign 28

Indicate % of funding by	Administration	Scobolarship	Research
Government	0	0	80%
Industry	10%	100%	20%
Other(specify)	0		

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (3) Part Time (3) Industry, Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

1.40	Project Management
1.411J	Basic Building Construction
1.412J	Design of Building Systems
1.413	The Construction of Buildings
1.431	Project Company Organizations
1.432	Project Control
1.441	Modeling of Construction Processes
1.442	Modeling of Project Management Decisions
1.451	Construction Labor Economics and Labor Relations
1.46	Analysis in Real Estate Development
1.471J	Legal Problems in Construction
1.481	*Seminar in Construction Engineering and Management*
1.482	Engineering Risk-Benefit Analysis

Educational Programme Objectives: Provide graduates with a sound understanding of all *aspects of the construction industry and working knowledge of methodological tools* applicable to decision-making in this industry.

Research (Please tick): Organizational (Applied) (X) Engineering (Hard) (X)

Research Funding (Indicate source & amount (US $)): $165,000
U.S. Department of Transportation
The Business Roundtable
U.S. State Department Agency for Int. Dev.

Describe Nature/objectives of Research and: Varied

Research Facilities (if any)
Variety of computer facilities, timelapse photographic equipment

Are there any special features of your programme. Please indicate.

Research is strongly risk analysis based.

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February 17th, 1981.

Study of Construction Programmes

Name of Institution MEMPHIS STATE UNIVERSITY

Faculty/School address DEPARTMENT OF ENGINEERING TECHNOLOGY, MEMPHIS, TN 38152

Name, Title of Contact
Name, Title of Respondee CHAIRMAN

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1968	1969					
Duration (years) - length of Programme	4	1					
Enrollment							
Current Part Time	12	7					
Current Full Time	60	0					
Other (specify) of which							
National							
Foreign	2	0					
Admission Requirements	[redacted] 18 ACT	2.5 GPA 800 GRE					
Course Requirements - list number of courses needed whether thesis or not	132 SEM HRS	30-33 SEM HRS					
Scholarship, ~~Fellowship~~ ~~Bursaries, etc. available~~	SCHOLARSHIPS 12	ASSISTANSHIPS 6					

Language of Instruction ENGLISH

Total Numbers of Students Graduated National ____ Foreign ____

Indicate % of funding by	Administration	Scholarship	Research
Government	100%	45%	
Industry		55%	
Other(specify)			

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (3) Part Time (3) Industry, Instructors Speakers .... (5)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison ( )

Comments

0880 CONSTRUCTION TECHNOLOGY (TECH)

February 17th, 1981.

Study of Construction Programmes

Name of Institution	*Michigan Technological University*
Faculty/School address	*Department of Civil Engineering* *Houghton, Michigan 49931*
Name, Title of Contact	*Dr. V. B. Watwood, Department Chairman*
Name, Title of Respondee	*C. Edwin Haltenhoff, Lecturer*

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established	*Note (1)*
Duration (years) - length of Programme	
Enrollment	
Current Part Time	*5*
Current Full Time	*1*
Other (specify) of which	*X*
National	*6*
Foreign	*0*
Admission Requirements	*BSCE*
Course Requirements - list number of courses needed whether thesis or not	*59 Cr.* *Report*
Scholarship, Fellowship Bursaries, etc.available	*X*

Language of Instruction *English*

Total Numbers of Students Graduated — National ____ Foreign _____

(No Records Available)

Indicate % of funding by	Administration	Scholarship	Research
Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s) — Faculty Full Time *Note (2)* ( ) Part Time ( ) Industry, Instructors Speakers ..... *Note (3)*

Industry Input (Please tick) — Financial Administrative ( ) Curriculum Development (X) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison (X)

Comments

Note(1): Construction option available to undergraduates.
(2): Program is interdisciplinary with the school of Business Administration.
(3): Varies - no set pattern or number.

Course, Titles, Descriptions
Indicate Text Title (if any)

- ⁴ *CE 432 Heavy Construction*
- ⁴ *CE 433 Building Construction*
- ⁴ *CE 434 Construction Engineering*
- *CE 501 Civil Engineering I - Project Delivery Systems*
- *CE 502 Civil Engineering II - Financial and Management Control of Projects*
- *CE 503 Civil Engineering III - Decision Making - Value Management*
- *BA 570 Management Theory and Practice*
- *BA 510 Computer Applications in Business*
- *BA 524 Managerial Accounting I*
- *BA 525 Managerial Accounting II*
- *BA 547 Managerial Finance*

Plus

4 CE Technical Electives (8 CE electives if courses marked ⁴ have been taken as undergraduate)
and
Technical Report

Educational Programme Objectives: *To expand the Civil Engineer's knowledge of project delivery systems both in theory and practice, and to broaden his perspective to the business management area. To follow through with the premis that project delivery is the physical goal of design and the responsibility of the Civil Engineering profession.*

Research (Please tick) — Organizational (Applied) (X) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research

and

Research Facilities (if any)

Are there any special features of your programme. Please indicate.

- *The program is oriented toward the management of construction, but places emphasis on "Construction Management" as a unique project delivery system.*
- *Both the theory and the practice of CM is covered, including strategy, financial and management control, operations, administration and marketing of services.*

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution: New Mexico State University

Faculty/School address: Civil Engineering Dept. / College of Engineering

Name, Title of Contact: Conrad G. Keyes, Jr., Prof. & Head
Name, Title of Respondee: Conrad G. Keyes, Jr., Prof. & Head

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Speci
Year Programme Established	1908	1955	1969				
Duration (years) - length of Programme	4	1-2	2-3				
Enrollment							
Current Part Time							
Current Full Time	400	27	9				
Other (specify) of which							
National							
Foreign							
Admission Requirements	ACT	GRE	GRE				
Course Requirements - list number of courses needed whether thesis or not	46	10	30				
Scholarship, Fellowship Bursaries, etc.available							

Language of Instruction: English

Total Numbers of Students Graduated: Masters 210 (National ~~National~~) Doctors 29 (~~Foreign~~ Foreign)
Undergraduate 1175

		Administration	Scholarship	Research
Indicate % of funding by	Government	90	0	80
	Industry	5	50	15
Individuals	~~Other (specify)~~	5	50	5

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (15) Part Time (7) Industry, Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative (✓) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

CE450 – Engineering Economy and Law – Discounted cash flows, economics of engineering projects, contracts and specifications – Engineering Economy by Grant, et.al.

CE471 – Highway Enginering – Administration, planning, control, construction, and pavements – Highway Engineering by Oglesby.

CE477 – Construction Engineering – Construction planning, equipment, and methods – Construction Planning, Equipment and Methods by Peurifoy.

CE485 – Design of Earth Dams – Engineering designs of earth dams, site selection, foundation inspection & treatment, stability analysis, seepage analysis, and construction.

GEM452 – Site Investigation – Geological factors affecting engineering construction and geological investigation methods and techniques for engineering site selection.

Educational Prgramme Objectives: Designed to provide a broad background in design, construction, and the operation of engineering works. The curriculum is so arranged that students may do specialized work in one or more areas

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) (✓)

Research Funding (Indicate source & amount (US $)): DOE and State of New Mexico – #1,000,000

Describe Nature/objectives of Research and Research Facilities (if any): Design and Inspection of Campus Geothermal Project. Design and Analysis of Pavement Construction.

Materials Testing Laboratories. Structural Analysis Laboratory. Rock Mechanics & Soil Mechanics Laboratories.

Are there any special features of your programme. Please indicate.

New joint AGC student chapter between NMSU and UTEP.
Scholarships in construction amount to #3000.

DO NOT TUMBLE

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution NORTH CAROLINA STATE UNIVERSITY

Faculty/School address: Department of Civil Engineering, Raleigh, NC 27650, USA

Name, Title of Contact: Prof. S. W. Nunnally
Name, Title of Respondee: same

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1954	1976	1976				Professional 1976
Duration (years) - length of Programme	4	1	3-6				1
Enrollment							
Current Part Time	0	0	0				0
Current Full Time	192	11	0				0
Other (specify) of which							
National	184	5					
Foreign	8	6					
Admission Requirements	HS 2.25 PGPA	BS 3.0 GPA					BS 2.5 GPA
Course Requirements - list number of courses needed whether thesis or not	138 s. hr.	30 s. hr.					30 s. hr.

Scholarship, Fellowship Bursaries, etc.available: Limited scholarships & fellowships; teaching and research assistantships

Language of Instruction: English

Total Numbers of Students Graduated: National 814 Foreign 99

Indicate % of funding by	Administration	Scholarship	Research
Government	100	0	20
Industry	0	100	80
Other(specify)		Industry & private	

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (4) Part Time ( ) Industry, Instructors Speakers ..... (1)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc. (X) Overseeing Body Industry Liaison (X)

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

Undergraduate:
- Construction Engineering I (text: CONSTRUCTION METHODS AND MANAGEMENT)
- Construction Engineering II (text: BUILDING CONSTRUCTION)
- Cost Analysis and Control (text: CONSTRUCTION PROJECT MANAGEMENT)
- Legal Aspects of Contracting (text: CONTRACTS, SPECIFICATIONS & LAW FOR ENGRS)
- Construction Engineering Project (no text)
- Other courses common to civil engineering curriculum

Graduate:
- Construction Planning and Scheduling (text: CONST PERFORMANCE CONTROL BY NETWOR.
- Construction Productivity (text: METHODS IMPROVEMENT FOR CONST MANAGERS)
- Building Construction Systems (text: none)
- Construction Equipment Systems (text: MANAGING CONSTRUCTION EQUIPMENT)
- C.E. Project (no text)
- Plus 2 other courses in major and 3 courses in minor

Educational Programme Objectives: Develop technically competent, innovative construction engineers and managers

Research (Please tick): Organizational (Applied) (X) Engineering (Hard) (X)

Research Funding (Indicate source & amount (US $)): State of NC $29,000; Industry $118,000

Describe Nature/objectives of Research and Research Facilities (if any): Construction materials, methods, and management. Laboratories: structural, materials, soils, water; extensive computer facilities, incl. computer graphics; time-lapse photography equipment.

Are there any special features of your programme. Please indicate.
BS degree "Civil engineering/Construction Option" is ABET-accredited as a construction engineering degree. Graduate students may incorporate courses at Duke Univ. and UNC-Chapel Hill in their program at no additional cost.

Course, Titles, Descriptions: Indicate Text Title (if any)

1. CE 431 - Civil Engineering Construction: Estimating the production of major construction equipment, Drilling and blasting of rock, Concrete methods, and Design of formwork.
2. CE 432 - Construction Operations Analysis: Techniques for measuring construction productivity, Principles of preplanning, Use of Timelapse photography, Critical Path Method (CPM), Cost accounting, and Construction safety.
3. AE 472 - Building Construction Management I: Components of building industry; Design and construction contracts; Bidding procedures; Project scheduling, Planning and organization.
4. AE 473 - Building Construction Management II: Building Construction sequences; Bonds, Liens and arbitration; Subcontracting.
5. AE 474 - Building Construction Estimating: Construction estimating and cost engineering; Quantity take off, Pricing and bid preparation; Estimating and cost accounting by computer.
6. AE 475 - Building Construction Engineering I: Project planning, Supervision, and Inspection of architectural and structural operations in major buildings.
7. AE 476 - Building Construction Engineering II: Project planning, Supervision and Inspection of HVAC, electrical and plumbing systems in major buildings.
8. CE 531 - Legal Aspects of Construction: Basic legal doctrines and techniques, Legal and contractual responsibilities of each party, Analysis of a construction contract, Professional practice problems.
9. CE 532 - Powerplant Construction: Planning, engineering, and construction of large projects such as electric powerplants, Regulatory and quality assurance impact, Project control systems, Construction labor considerations.
10. CE 550 - Engineering Construction Management: Organization, Project planning, Scheduling and control, Development of a Construction Management system, Requirements for bonding and insurance.
11. CE 598 - Personal Project Courses in: Construction Labor Relations, Advanced Scheduling Techniques, Statistical Quality Control of Construction Materials, etc.

Educational Programme Objectives: The objective of the Master's Degree program is to provide specialized preparation for addressing the difficult technical, managerial, and organizational problems confronted by construction managers on residential, building, heavy and highway or industrial projects. The Ph.D. program is designed for those students who desire to prepare for a teaching or research career at the university level or a research career in the construction industry

Research (Please tick) — Organizational (Applied (✓) Engineering (Hard) (✓)

Research Funding (Indicate source & amount (US $)) — 1. Industry - $50,000 } fluctuates from year to year; 2. Government - $70,000

Describe Nature/objectives of Research and Research Facilities (if any)

(1) Management, Construction and QA/QC Control practices on powerplant projects.
(2) Statistical Quality Control of bituminous, base course, and embankment materials on construction projects.
(3) Methods Improvement and Productivity Analysis on construction projects using Work Sampling and Timelapse Photography techniques.
(4) Computer Simulation of construction processes.
(5) Legal aspects related to contract administration.
(6) Competitive bidding strategy models.
(7) Organizational and contract staffing requirements of state transportation departments.

Are there any special features of your programme? Please indicate. The program has established excellent contact with the construction industry in Pennsylvania and neighboring states as well as with branches of the federal government. The faculty are active nationally in various professional societies and have published widely in the fields of Quality Control, Methods Improvement and Construction Management. A text entitled "Planning Engineering, and Construction of Electric Generation Facilities" has been written by programme Professors Jack H. Willenbrock and H. Randolph Thomas. (Wiley Interscience)

Cln = W65
Study of Construction Programmes

February 17th, 1981

Name of Institution	The Pennsylvania State University	
Faculty/School address	Dept. of Civil Engineering 212 Sackett Bldg. University Park, PA 16802	Dept. of Architectural Engineering 104 Eng. Unit A University Park, PA 16802
Name, Title of Contract Name, Title of Respondee	Jack H. Willenbrock, Ph.D. Associate Professor, Dept. of Civil Engineering	Gifford H. Albright Head of Department of Architectural Engineering

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D.	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Speci
Year Programme Established	Extended Elective in Construction as Part of Civil Eng. Degree Program	1965	1968	-	-	-	-
Duration (years) - length of Programme		1 year	3 years				
Enrollment							
Current Part Time		2	0				
Current Full Time		18	0				
Other (specify) of which							
National		17	0				
Foreign		3	0				
Admission Requirements		BS in Civil Engineering					
Course Requirements - list number of courses needed whether thesis or not		8 Courses + Thesis	18 Courses + Thesis				
Scholarship, Fellowship Bursaries, etc. available		Limited	Limited				

Language of Instruction English

Total Numbers of Students Graudated — National 35 — Foreign 5

		Administration	Scholarship	Research
Indicate % of funding by	Government	--	50%	60%
	Industry	--	20%	40%
	Other (specify)	Penn State	Personal or Penn State	

Staff Numbers: Totals (Indicate #'s) — Faculty Full Time (3) Part Time (-) Industry, Instructors Speakers ..... (-)

Industry Input (Please tick) — Financial Administrative (✓) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liason (✓)

Comments: Advisory groups from the residential, building, power plant and heavy construction areas assist in program development and analysis.

Study of Construction Programmes

February 17th, 1981.

Name of Institution: Pittsburg State University

Faculty/School address: Pittsburg, KS 66762

Name, Title of Contact: Gene Russell, Asst. Professor
Name, Title of Respondee: Gene Russell, Asst. Professor

Programme/s offered	(Degree Bachelor)	Degree Master	Degree Ph.D	(Non-deg. Diploma)	Non-deg. Certificate	Part of Programme	Other Specif.
Year Programme Established	1966			1968			
Duration (years) - length of Programme	4			2			

Enrollment

Current Part Time: 8

Current Full Time: 132

Other (specify) of which

National: 132
Foreign: 8

Admission Requirements: High School Diploma

Course Requirements - list number of courses needed whether thesis or not: see attached sheet

Scholarship, Fellowship Bursaries, etc.available: Associated General Contractors, Metal Building Dealers, Heavy Constructors Scholarships

Language of Instruction: English

Total Numbers of Students Graduated: National 25/yr Foreign 8/yr

Indicate % of funding by	Administration	Scholarship	Research
Government	100%		100%
Industry		90%	
Other(specify) University		10%	

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (3) Part Time (0) Industry, Instructors Speakers ..... ( ) Variable

Industry Input (Please tick): Financial Administrative (✓) Curriculum Development (✓) Scholarship, Bursaries etc.(✓) Overseeing Body Industry Liaison (✓)

Comments

Course, Titles, Descriptions Indicate Text Title (if any)

See attached sheet.

Educational Prgramme Objectives:

It is our primary objective to educate our students so that they may gain a competence to obtain challenging and career-oriented jobs in the construction industry and related fields.

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.

OPTION I
CONSTRUCTION ENGINEERING TECHNOLOGY

First Semester		Second Semester	
FRESHMAN		**FRESHMAN**	
English Comp 101	3	English Comp 102	3
College Algebra 113	3	Construction Graphics 133	3
Plane Trigonometry 122	3	Calculus 150	5
Social & Behavioral Science	3	Chemistry 105-106	5
Construction Materials 234	3		16
	15		
SOPHOMORE		**SOPHOMORE**	
Construction Methods 235	3	Mechanics of Materials	3
Intro Physics I 100-130	5	Intro Physics II 101,131	5
Statics 220	3	Speech 207	3
Humanities Elective	3	Economics 207	3
	14	Financial Accounting 201	3
			17
JUNIOR		**JUNIOR**	
Mechanical Systems 330	5	Electrical Systems 331	3
Str. Design Wood 536	4	Building Design 432	3
Residential Design 332	3	Str. Design Steel 632	4
Const. Surveying 537	3	Humanities Elective	3
Technical Writing 301	3	Computer Elective	3
	18		16
SENIOR		**SENIOR**	
Str. Design Concrete 633	4	Const. Contracts & Specs 635/3	
Working Drawings 534	3	Const. Management	3
Intro. Industrial Safety 593	3	Fdn. & Soil Mechanics 638	3
Approved Electives	2	Approved Electives	6
Const. Cost & Estimating 631	3		15
	15		

TWO-YEAR ARCHITECTURAL DRAFTING TECHNOLOGY

FIRST YEAR		**FIRST YEAR**	
Engineering Graphics I 121	3	Const. Graphics 123	3
English Comp. 101	3	Residential Design 332	3
College Algebra	3	English Comp. 102	3
Const. Materials	3	Plane Trig. 122	3
Elective	3	Intro. to Computer 121	3
	15		15
SECOND YEAR		**SECOND YEAR**	
Bldg. Design 432	3	Working Drawings 534	3
Const. Surveying 537	3	Const. Cost & Est. 631	3
Basic Speech 207	3	Pictorial Drafting 526	3
Mechanical Systems 330	5	Electrical Systems	3
Elective	3	Elective	3
	17		15

OPTION II
CONSTRUCTION MANAGEMENT

First Semester		Second Semester	
FRESHMAN		**FRESHMAN**	
English Comp. 101	3	English Comp. 102	3
College Algebra 113	3	Const. Graphics 133	3
Economics 200	3	Plane Trigonometry 122	3
Humanities	3	Science Electives	5
Const. Materials	3	Approved Elective	2
	15		16
SOPHOMORE		**SOPHOMORE**	
Construction Methods 235	3	Mechanics of Materials 224	3
Statics 221	3	Basic Speech 207	3
General Psychology 155	3	Humanities	3
Approved Electives	6	Financial Accounting 201	3
	15	Approved Electives	3
			15
JUNIOR		**JUNIOR**	
Mechanical Systems 330	5	Electrical Systems 331	3
Str. Design Wood 536	4	Building Design II 432	3
Residential Design 332	3	Str. Design Steel 632	4
Construction Surveying 537	3	Computer Elective	3
Technical Writing	3	Approved Elective	3
	18		16
SENIOR		**SENIOR**	
Str. Design Concrete 633	4	Const. Contracts & Specs.	3
Working Drawings 534	3	Const. Management.	3
Intro. Indust. Safety 593	3	Fnd. and Soil Mechanics 638	3
Business Elective	3	Human Rel. in Ind. Set. 680	3
Const. Cost & Est. 631	3	Approved Elective	3
	16		15

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution PRATT INSTITUTE

Faculty/School address CONSTRUCTION MANAGEMENT
HIGGINS HALL, BROOKLYN, NEW YORK 11205

Name, Title of Contact NATHAN STREITMAN, CHAIRMAN
Name, Title of Respondee SAME

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
CONSTRUCTION MGMT.							
Year Programme Established	1963				1954		
Duration (years) - length of Programme	4				2		
Enrollment	119						
Current Part Time	77						
Current Full Time	42						
Other (specify) of which							
National	109						
Foreign	10						

Admission Requirements SATISFACTORY HIGH SCHOOL DIPLOMA OR EQUAL.

Course Requirements - list number of courses needed whether thesis or not 132 CREDITS, TOTAL IN 5 AREAS: LIBERAL ARTS & SCIENCES, BUSINESS MANAGEMENT, DRAWING & DESIGN, CONSTRUCTION THEORY & CONSTRUCTION MANAGEMENT

Scholarship, Fellowship Bursaries, etc.available REED SCHOLARSHIP; RUDIN SCHOLORSHIP; GENERAL SCHOLARSHIPS.

Language of Instruction BROOKLYNESE ENGLISH

Total Numbers of Students Graduated National 544 Foreign 55

		Administration	Scholarship	Research
Indicate % of funding by	Government	—	10	—
	Industry	—	10	—
	Other(specify)	100 (PRIVATE)	80 (PRIVATE)	—

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (0) Part Time (25) Industry, Instructors Speakers ..... (12)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development (✓)
Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments

PAGE TWENTY-FIVE

Course, Titles, Descriptions
Indicate Text Title (if any)

Intro to Constr Mgmt
Real Estate Finance
Constr Cost Analysis I & II
Intro to Value Engineering
Basic Real Estate
Constr Mgmt Theory
Pract'l Constr Mgmt
Building Codes and Zoning
Senior Seminar & Thesis I & II
Construction Law
Wood/Steel Constr
Concrete & Spec Constr
Contemp Constr Techniques
Wood/Steel Str Des
Conc Str Des
Mech & Elect Equip I & II
Site Engineering I & II
Specifications
Hist of Arch & Tech I & II
Graphic Presentation
Architectural Drawing
Space Design
Arch Design Principles I & II
Fundamentals of Accounting
Business Law
Labor Relations
Intro to Management
Computer Appreciation & Programming
English Comp
English Lit
Interpersonal Speech Communication
Reports & Correspondance
Cultural History Electives
General Psychology
Introductory Economics
Elem of Math Anal
Elem of Calculus
Physics I (Mechanics)& II (Elect/Sound)

ELECTIVES Professional, Liberal, Science: Free

Educational Programme Objectives: TO PREPARE STUDENTS FOR PROFESSIONAL CAREERS IN CONSTRUCTION AS CONTRACTORS, CONSTRUCTION MANAGERS, PROJECT MANAGERS, E? AND TO WORK ALONGSIDE ARCHITECTS AND ENGINEERS AS KEY MEMBERS OF THE OWNER'S CONSTRUCTION TEAM.

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $) —

Describe Nature/objectives of Research —
and
Research Facilities (if any) NEW YORK CITY AND ENVIRONS

Are there any special features of your programme. Please indicate.

ONE UNIQUE FEATURE OF PRATT'S CONSTRUCTION MANAGEMENT PROGRAM IS THAT IT IS THE ONLY ONE IN THIS AREA THAT IS OFFERED IN THE EVENING.

Study of Construction Programmes

Name of Institution: Purdue University School of Engineering and Technology at Indianapolis

Faculty/School address: Department of Construction Technology, 799 West Michigan St., Indianapolis, IN 46202

Name, Title of Contact: Professor Glenn A. Brackney, Chairperson

Name, Title of Respondee: Same

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specif

Year Programme Established: 1968

Duration (years) - length of Programme: 4 years

Enrollment

Current Part Time	160 (12 semester credit hours or less)
Current Full Time	110
Other (specify) of which	Full time equivalent (FTE) 195
National	265
Foreign	5

Admission Requirements: High school graduate with 6 semesters English, 2 semesters algebra, 2 semesters geometry and two semesters laboratory science.

Course Requirements - list number of courses needed whether thesis or not: Minimum of forty-four courses requiring 133 semester credit hours of work.

Scholarship, Fellowship Bursaries, etc.available: Some scholarships available.

Language of Instruction: English

AAS	337	5
BS	227	3

Total Numbers of Students Graduated (Fall 1968 to spring - 1980): National ___ Foreign ____

Indicate % of funding by	Administration	Scholarship	Research
Government	67% (State of Indiana)		
Industry			
Other(specify)	33% Tuition		

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (8) Part Time (10) Industry, Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development (X) Scholarship, Bursaries etc. (X) Overseeing Body Industry Liaison ( )

The department has Industry Advisory Councils for each program of study. These are Architectural Technology, Civil Engineering Technology and Construction Technology.

Comments: The Department of Construction Technology does not have maximum enrollment for resident, non resident, or foreign students.

Course, Titles, Descriptions
Indicate Text Title (if any)

See attached sheets for the two programs of study granting the B.S. degree in Construction Technology.

See attached sheets for course descriptions.

See attached sheets for course number, title, text and reference texts.

Educational Prgramme Objectives:

To educate and train Professional Constructors to manage construction and become the master builders of the future.

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)): None

Describe Nature/objectives of Research and Research Facilities (if any): Would like to have research for improving productivity in the construction industry. Soils laboratory, materials test laboratory, structural test laboratory.

Are there any special features of your programme. Please indicate.

The Department of Construction Technology offers two year programs in Architectural Technology and Civil Engineering Technology granting the Associate in Applied Science (AAS). These are combined with the upper division in construction for two 2+2 programs granting the B.S. degree in Construction Technology. The two 2+2 programs make it easier for students to transfer from junior and community colleges with similar programs and receive their B.S. degree from Purdue University. Day and evening courses are offered in all programs of study so that students may work full time and go to school part-time to complete their education.

The 1981 Construction Management Programme builds on the carefully considered shift in emphasis introduced last year. Then we offered elective courses to strengthen the programme's appeal to all sectors of the industry without diluting the core of the curriculum. This new dimension to the CMP proved extremely successful and in 1981 it will again be possible for delegates involved in either project or resource management to obtain specialist instruction in their particular area of interest. As always basic disciplines provide the academic base for the programme and lead into pragmatic industry-orientated courses which stress the application of both techniques and concepts in the dynamic construction environment.

The maturity of the programme is further reflected in the fact that every member of this year's teaching team has had experience on previous CMPs. Professor Boyd Paulson will again visit, continuing our long established links with the Construction Faculty at Stanford University. Mr Peter Thompson from the Project Management Group at the University of Manchester Institute of Science and Technology will be visiting South Africa for a third time.

Over sixty different firms have sponsored delegates to attend the programme and each year the mix of organisations represented includes both small and large contractors as well as clients and consultants. We believe that the CMP provides a unique opportunity for all parties involved in the construction process to meet in a stimulating non-competitive atmosphere to learn from each other and to discuss problems of mutual interest. We, as well as the industry, are the beneficiaries.

PROFESSOR JOHN SIMPSON
Director

The Construction Management Programme is an intensive six week executive programme which has been designed:

- To provide professional management education to experienced managers active in the construction industry so that their technical expertise will be extended to cope with their changing responsibilities.
- To provide an opportunity for managers drawn from all sectors of the industry to meet and share valuable knowledge, in order to gain fresh perspectives over a wide area of management experience.

The curriculum has been designed to incorporate a number of elective courses in specialist areas and as such, it has definite practical appeal to clients, consulting engineers, contractors and project managers.

The Construction Management Programme will run at the Graduate School of Business, University of Cape Town from July 19 to August 28 1981. Delegates will be required to live in residence.

Delegates attending the programme will have had substantial management experience within the industry and will carry a corresponding level of responsibility. The programme is of post graduate standard and a degree is desirable though not essential. Delegates should be nominated by their employers.

Areas of Instruction

BASIC DISCIPLINES

THE HUMAN FACTOR
Human relations within the construction process are becoming increasingly sophisticated. This course refines skills in working and communicating with both individuals and groups.
(8%)

FINANCIAL MANAGEMENT
The course reviews the bases of accounting systems as they relate to management's need for planning and control information. An understanding of the preparation and analysis of financial statements is developed.
(10%)

ENGINEERING ECONOMY
The course analyses techniques for economic decision-making in the selection of alternative designs, methods and materials. Means of determining minimum cost solutions are considered with due regard for the time value of money.
(8%)

PROJECT PLANNING AND CONTROL
Numerous techniques for the control of time in construction have been developed and tested. The course seeks to identify those which have been successful and to develop a pragmatic approach to the use of sophisticated project control systems.
(8%)

CONTRACT LAW
The objective of this course is to study the general principles of South African law in relation to construction contracts. The management skills necessary to identify and resolve legal problems are stressed.
(5%)

INDUSTRIAL RELATIONS
The course reviews South Africa's industrial relations system, analyses sources of conflict in a company, presents channels through which communication and conflict reduction can be achieved and introduces skills necessary to use these effectively.
(9%)

BUSINESS PLANNING AND CONTROL
The course addresses the problems associated with long term planning and budgeting in a changing environment. Techniques for the design and implementation of control systems necessary to monitor performance within responsibility centres are reviewed as are the motivational aspects of control.
(10%)

CONSTRUCTION TECHNOLOGY
There is a need to recognise the role of construction engineering as a high value technical discipline. This course reviews the state of the art internationally, to provide a base for technological improvement in the management and execution of construction projects.
(11%)

CONTRACT STRATEGY
The course has been designed to illustrate the manner in which the conditions of contract, methods of measurement and bills of quantities affect the final value of a contract. Various forms of escalation clauses are also studied.
(10%)

APPLICATIONS

MARKETING
The marketing concept has applications in the construction environment. The course defines the role of marketing and describes the elements of a marketing mix for construction and professional services.
(4%)

DOCUMENTATION AND DISPUTES
The principles of contract law are applied to the preparation and interpretation of contract documents. The use of standard forms of contract is investigated. Avenues for the resolution of contractual disputes are explored.
(6%)

OPERATIONS ANALYSIS
This course is directed at managers responsible for the efficient use of construction resources. It develops an awareness of current operations analysis techniques and their application in attaining meaningful cost reductions.
(6%)

PROJECT MANAGEMENT
The course introduces the concepts of professional project and construction management. The full project life cycle, from conception to commissioning is considered. The attributes, role and qualification of the construction manager are stressed.
(6%)

SPECIAL ELECTIVES

EQUIPMENT MANAGEMENT
This course applies engineering economy theory to the management of construction equipment. A philosophy is developed for maintenance and replacement and emphasis is placed on equipment information systems.
(7%)

PROJECT EVALUATION
The course applies engineering economy theory to broaden an understanding of and outline the clients' thinking in the area of capital project budgeting for both private and public sectors.
(7%)

NOTE: The figures in brackets denote the percentage that each course contributes to the Programme.

CIB - W65
Study of Construction Programmes

Name of Institution Southwest Missouri State University

Faculty/School address: Industrial Education & Technology Department
901 South National
Springfield, MO 65802

Name, Title of Contact: Dr. Charles McKenzie
Name, Title of Respondee: Professor of Industrial Education & Technology

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established
Duration (years) - length of Programme: 4 yr. B.S. Degree — Assoc. of Sci. 2 yr.

Enrollment

Current Part Time	57
Current Full Time	5
Other (specify) of which	
National	98%
Foreign	2%

Admission Requirements: High School Diploma

Course Requirements - list number of courses needed whether thesis or not: 64 semester hours, major 15 semester hrs., minor 124 sem hrs total

Scholarship, Fellowship Bursaries, etc.available: 5 Private Scholarships and regents scholarships

Language of Instruction: English

Total Numbers of Students Graduated: National ____ Foreign ____

Indicate % of funding by	Administration	Scholarship	Research
Government	99%	0	0
Industry	0	.01%	0
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (4) Part Time (3) Industry, Instructors Speakers ..... (1)

Industry Input (Please tick): Financial Administrative (0) Curriculum Development (0)
Scholarship, Bursaries etc.(X) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

IED 190 Introduction to Construction, Construction Materials, Methods, Careers
390 Building Cost and Estimating, Building Estimator's Reference Book
391 Advanced Construction Practices, Principles and Practices of Heavy Construction
392 Internship, No text required
MTH 175 Plane Surveying
GEO 110 & 111 Physical Geology Lecture and Laboratory
IED 356 Industrial Supervision, What Every Supervisor Should Know
337 Materials Testing, Technology of Industrial Materials
322 Building Construction Practices, Construction Materials, Methods, Careers
310 Architectural Mechanical Systems, Mechanical and Electrical Systems in Constructi and Architecture
252 Industrial Processes and Materials, Materials and Processes in Manufacturing
250 Industrial Safety, Accident Prevention Manual for Industrial Operations
214 Commercial Architectural Design, Structural Detailing for Technicians
210 Architectural Drafting, Architectural Residential Drawing and Design
150 Introduction to Manufacturing Management, Organization for Production
141 Applied Electricity, Industrial Electricity & Student Guide
132 Welding I, Modern Welding
121 Woods, Machines, and Processes, Woodworking for Industry & Student Guide
110 Technical Drafting, Engineering Drafting & Graphic Technology

Educational Prgramme Objectives:
To provide students with the basic technical knowledge and managerial skills necessary for an entry level mid-management position in the construction industry.

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)): NA

Describe Nature/objectives of Research and Research Facilities (if any): NA

Are there any special features of your programme. Please indicate.
Internship available

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution: University of Florida

Faculty/School address: Department of Civil Engineering Rm 346 Weil Hall
Gainesville, Fla. 32611

Name, Title of Contact
Name, Title of Respondee: Prof. F. Schaub

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1963	1971					
Duration (years) - length of Programme							
Enrolment							
Current Part Time							
Current Full Time	300	12	0				
Other (specify) of which							
National	270	10					
Foreign	30	2					
Admission Requirements	Upper division standing	Graduate standing					
Course Requirements - list number of courses needed whether thesis or not	140 semester hours.	30 semester hours					
Scholarship, Fellowship Bursaries, etc.available	Yes	Yes					

Language of Instruction: English

Total Numbers of Students Graduated: National Many Foreign Many

Indicate % of funding by	Administration	Scholarship	Research
Government	100%	90%	80%
Industry	0	10%	20%
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (7) Part Time (2) Industry, Instructors Speakers ..... (5)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments

Course, Titles, Descriptions
Indicate Text Title (if any): See Catalogue

Educational Prgramme Objectives: Research experience for graduate students

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research
and
Research Facilities (if any)

Are there any special features of your programme. Please indicate.

PAGE THIRTY

CHM 6520—Chemical Physics (3) Interatomic and intermolecular forces. Energy transfer and reaction in molecular collision processes. Computational aspects of scattering theory.
CHM 6580—Special Topics in Physical Chemistry (1-3; max: 12) Lectures or conferences covering selected topics of current interest in physical chemistry.
CHM 6590—Physical Chemistry Seminar (1) *Attendance required of graduate majors in physical chemistry. Prereq: graduate course in physical chemistry.* Presentation of one seminar. S/U option.
CHM 6620—Advanced Inorganic Chemistry (3) The crystalline state, acid-base, nonaqueous solvent, inorganic mechanisms.
CHM 6622C—Inorganic Preparations (4) Lectures and laboratory experiments showing the reactions and techniques used in the synthesis of inorganic compounds.
CHM 6623—Chemistry of the Metals (3) *Prereq: CHM 6471, 6730.* Relation of properties to atomic, molecular, and crystal structures.
CHM 6624—Chemistry of the Nonmetals (3) *Prereq: CHM 6730.* Relations of properties to atomic, molecular and crystal structures.
CHM 6680—Special Topics in Inorganic Chemistry (1-3; max: 12) Lectures or conferences on selected topics of current research interest in inorganic chemistry.
CHM 6690—Inorganic Chemistry Seminar (1) *Attendance required of graduate majors in inorganic chemistry. Prereq: graduate course in inorganic chemistry.* Presentation of one seminar. May be repeated for credit. S/U option.
CHM 6710—Applied Molecular Spectroscopy (3) Applications and comparison of methods in analysis and molecular structure determination.
CHM 6720—Chemical Dynamics (3) Basic concepts of rate laws, collision theory, and transition state theory; an introduction to reaction dynamics, structural dynamics, and quantitative structure-reactivity correlations.
CHM 6730—Chemical Transformations (3) Important types of chemical reactions and their application to organic and inorganic synthesis.
CHM 6905—Individual Problems, Advanced (3-5; max: 10) *Prereq: consent of faculty member supervising the work.* Double registration permitted. Assigned reading program or development of assigned experimental problem. S/U Option.
CHM 6910—Supervised Research (1-5)
CHM 6935—Chemistry Colloquium (1; max: 7) Topics presented by visiting scientists and local staff members. S/U.
CHM 6940—Supervised Teaching (1-5)
CHM 6971—Research for Master's Thesis (1-15)
CHM 7485—Special Topics in Theory of Atomic and Molecular Structure (1-3; max: 9) *Prereq: CHM 6482 or PHS 6226, or equivalent.* Mathematical techniques used in atomic, molecular, and solid-state theory. The one-electron approximation and the general quantum-mechanical many-body problem. Selected advanced topics.
CHM 7980—Research for Doctoral Dissertation (1-15)
CHS 5110—Radiochemistry (2) *Prereq: CHM 3401 or CHM 4412 or consent of instructor.* Properties of radioactive nuclei, nature of radioactivity, nuclear structure, nuclear reactions, interaction of radiation with matter, chemical aspects of radioactivity, and applications of nucleonics to chemistry.
CHS 5110L—Radiochemistry Laboratory (1) *Prereq: CHM 3120C and 3401 or 4412, or consent of instructor.* Radioactivity detection, radiochemical separations and analyses, radiochemistry laboratory techniques, the practice of radiological safety, and tracer applications of radioisotopes in chemistry and other fields.
CHS 6120—Nuclear Chemistry (3) *Prereq: CHS 5110.* Radioactivity, nuclear structure, decay processes, nuclear reactions.

CIVIL ENGINEERING
College of Engineering

GRADUATE FACULTY 1980-81

Chairman & Graduate Coordinator: J. H. Schaub. *Professors:* B. A. Benedict; H. K. Brooks; B. A. Christensen; D. U. Deere; B. E. Ruth; J. H. Schaub; J. H. Schmertmann; M. W. Self; B. D. Spangler; J. A. Wattleworth. *Associate Professors:* C. A. Collier; K. G. Courage; J. L. Davidson; J. L. Eades; C. O. Hays; G. Long; J. D. Rumble; W. H. Zimpfer. *Assistant Professor:* J. M. Lybas.

The following graduate degrees are offered to prepare qualified students for the professional practice of civil engineering: Master of Engineering, Master of Science, Engineer, and Doctor of Philosophy. All degree programs include areas of concentration in the specialties of construction, geotechnical engineering, hydraulics, structures, and transportation engineering. All degrees except the Ph.D. are available in a thesis or nonthesis program.

Resident graduate students are required to register for a minimum of two credits at one credit per semester for ECI 6936. This credit is not applicable to the requirement for any degree. Nonthesis degree students must successfully complete a report of substantial engineering content for a minimum of two hours credit in ECI 6974. Minor or supporting work is encouraged from a variety of related or allied fields of study.

CES 5305—Design of Structural Systems (2) *Prereq: CES 4705, 4607.* Fundamental characteristics of structural systems. Economic and architectural considerations. Building frames and connections. Plate girders. Special structures.
CES 5325—Design of Highway Bridges (3) *Prereq: CES 4607, 5726.* Analysis by influence lines, slab and girder bridges, composite design, prestressed concrete, continuity, arch bridges, design details, highway specifications.
CES 5607—Behavior of Steel Structures (3) *Prereq: CES 4607.* Plastic analysis and design of beams and frames. Buckling and stability problems. Connections.
CES 5726—Design of Concrete Systems (3) *Prereq: CES 4705.* Strength design of members and frames, torsion, two-way slabs, design of building systems, prestressed concrete.
CES 5801—Design and Construction in Timber (2) *Prereq: consent of instructor.* Analysis and design in timber. Beams, columns and connections. Timber structure. Plywood beams, panels, diaphragms. Laminated beams and frames. Formwork.
CES 6106—Advanced Structural Analysis II (4) *Prereq: EGM 3400, CES 6108.* Continuation of CES 6108. Finite element method. Numerical methods, topics in structural dynamics, code provisions for seismic and wind loading.
CES 6108—Advanced Structural Analysis I (4) *Prereq: CES 4607, 4705.* Traditional methods of analyses for forces and deformations; modern matrix methods including direct stiffness method.
CES 6136—Advanced Structural Laboratory (2) *Prereq: CES 4607, 4705.* Model studies and analysis. Mechanics of similitude and dimensional analysis applied to static and dynamic structural problems. Research topics.
CES 6526—Nonlinear Structural Analysis and Design (2) *Prereq: CES 6108.* Sources of nonlinearity. Tangent stiffness method. Beam-columns on elastic foundations. Discrete methods for soil-structure interaction.
CES 6551—Design of Folded Plates and Shells (3) *Prereq: CES 4607, 4705.* Analysis for membrane stresses; pressure vessels, secondary bending stresses. Design of shell systems and folded plates. Design details.
CES 6706—Advanced Reinforced Concrete (3) *Prereq: CES 4704, 5726.* Torsion in structural members. Ultimate load theories and application to design. Yield-line theory for slabs. Shear walls, combined shear walls and frames. Research topics.
CES 6716—Advanced Prestressed Concrete (2) *Prereq: CES 4704, 5726.* Continuity in prestressed concrete; design of connections, post-tensioning applications, segmental construction. Circular prestressing. Research topics.
ECI 5124—Civil Engineering Systems (3) Civil engineering applications of operations research techniques, models of scheduling, linear programming, queueing theory, and simulation.

ECI 5125—Construction Equipment and Procedures (2) *Prereq: ECI 4145 or consent of instructor.* Design and optimization of equipment systems for heavy construction.

ECI 5147—Construction Planning and Scheduling (2) *Prereq: ECI 4145.* Planning, scheduling, organizing and control of civil engineering projects with CPM and PERT. Application of optimization techniques.

ECI 5156—Value Engineering Theory (3) Value engineering concepts, function analysis system techniques (FAST), diagramming, creativity, matrix evaluation, design-to-cost, life cycle costing, human relations and strategies for organizing, performing and implementing value engineering work.

ECI 5157—Civil Engineering Feasibility Analysis (3) *Prereq: ECI 4137 or equivalent studies in time-value of money.* Theory and practice of feasibility studies for proposed civil engineering projects and other related areas of interest.

ECI 5166—Legal Aspects of Civil Engineering (3) Engineer's view of contracts for design and construction. Legislation and policy affecting labor-management relationships in construction.

ECI 5186—Public Works Planning (3) Functional approach to planning and implementing public works for urban areas. Examines public works needs of residential, commercial, industrial and other land uses.

ECI 5235—Open Channel Hydraulics (3) *Prereq: ECI 4214 or consent of instructor.* Classification of flow. Normal depth. Specific energy and critical depth. Gradually varied flow. Transitions.

ECI 5265—Hydraulics Machinery (2) *Prereq: ECI 4214 or consent of instructor.* Selection and operation of hydraulic motors, pumps and transmissions. Specific speed. Cavitation. Surge tanks.

ECI 5325—Foundation Design (3) *Prereq: CES 4705, ECI 4305 or consent of instructor.* Investigations, bearing capacity, and the analysis and design of shallow footings, walls, and deep piled foundations.

ECI 5335—Insitu Measurement of Soil Properties (3) *Prereq: ECI 4305, 4314 or consent of instructor.* Methods of soil exploration; techniques of soil sampling and insitu testing. Emphasis on field work and demonstrations.

ECI 5355—Earth and Rockfill Dams (2) *Prereq: ECI 4305.* Design requirements, construction techniques, compaction control, soil testing and sampling, foundation preparation, and field instrumentation.

ECI 5437—Experimental Determination of Soil Properties I (3) *Prereq: ECI 4305.* Advanced laboratory determination of engineering properties of soils; hydrometer analysis, controlled rate of strain consolidation, soil suction, permeability, and triaxial testing.

ECI 5575—Remote Sensing Methods and Engineering Applications (3) *Prereq: TTE 4104.* Introduction into remote sensing and imaging systems including photographic and digital processing methods for image analysis. Emphasis on use of LANDSAT imagery and aerial photography for engineering applications.

ECI 5625—Groundwater Flow I (3) *Prereq: ECI 4214 or consent of instructor.* Porous media flow. Darcy's law. Conservation of mass. LaPlace equation. Flownets. Well hydraulics.

ECI 6045—Computer Applications in Geotechnical Engineering (2) *Prereq: ECI 4041, 6316 or consent of instructor.* Application of computer solutions to geotechnical engineering problems.

ECI 6153—Civil Engineering Practice (2-4; max: 4) *Prereq: graduate status.* Problems and case histories of civil engineering projects including social, legal, environmental, and technical aspects.

ECI 6154—Civil Engineering Operations (2-4; max: 4) *Prereq: graduate status.* Applications of quantitative methods of decision making to major civil engineering problem areas.

ECI 6223—Numerical Models in Hydraulics (3) *Prereq: ECI 4214 or consent of instructor.* Application of numerical methods to hydraulic engineering problems; dispersion, porous media flow, river and estuarine mechanics, thermal diffusion.

ECI 6227—Diffusive and Dispersive Transport (2) *Prereq: ECI 4214 or consent of instructor.* Introduction to diffusive and dispersive transport processes in flowing water. Fick's law.

ECI 6228—Hydraulic Laboratory and Field Practice (3) *Prereq. ECI 4214 or consent of instructor.* Hydraulic model laws and their use in undistorted and distorted models with movable or fixed beds. Instrumentation. Data acquisition system.

ECI 6233—Sediment Transport II (2) *Prereq: ECI 6237 or consent of instructor.* Review of fundamental laws of scour initiation and sediment transport. River morphology. Movable bed hydraulic models.

ECI 6234—Hydraulics of Stratified Flow (2) *Prereq: ECI 5235 or consent of instructor.* Uniform and nonuniform flow in multilayered systems. Oscillatory motion and interfacial mixing.

ECI 6237—Sediment Transport I (2) *Prereq: ECI 5235 or consent of instructor.* Sediment properties. Scour initiation. Influence of slope. Stable channels. Bed forms. Transport as bed load and suspended transport.

ECI 6238—Transient Flow in Channels and Pipes (3) *Prereq: ECI 5235 or consent of instructor.* Water hammers in singular pipes and systems. Governing differential equations. Numerical methods. Unsteady open channel flow equations.

ECI 6316—Advanced Soil Mechanics (3) *Prereq: ECI 4305, 4314, or consent of instructor.* Nature and origin of soil. Stresses within a soil body. Stress-strain behavior and shear strength of dry, saturated no flow, and saturated transient flow soils.

ECI 6317—Theoretical Soil Mechanics (2) *Prereq: consent of instructor.* Nature of soil-water systems; analysis of stress, strains, equations of states; rheological behavior of soils; failure in soil media.

ECI 6346—Soil Dynamics (2) Dynamic principles; lumped systems; elastic half-space theory; soil behavior under dynamic loading; foundation design problems, earthquakes.

ECI 6416—Properties, Design and Control of Concrete (3) *Prereq: ECI 3403.* Portland cement and aggregate properties relating to design, control, and performance of concrete. Concrete forming and construction methods. Laboratory testing and analysis.

ECI 6426—Bituminous Materials (3) *Prereq: TTE 4104.* Analysis of strength and deformation mechanism for asphalt concrete, properties, and their effect on flexible pavement performance. Pavement construction and quality assurance methods, testing and evaluation of asphalts and mixture.

ECI 6436—Experimental Determination of Soil Properties II (3) *Prereq: ECI 5437 or consent of instructor.* Factors influencing stress-deformation response, elastic-plastic constitutive relationships, failure criteria, centrifugal modeling, stress path effects.

ECI 6576—Air Photo Interpretation: Terrain Analysis (3) *Prereq: ECI 4314 or consent of instructor.* Interpretive techniques used to identify landforms, soils, rocks, and potential engineering problems from aerial photography. Analysis for site selection and planning of soil exploration programs.

ECI 6605—Rock Mechanics and Engineering Geology (2) *Prereq: ECI 4305.* Behavior of rock subjected to stress. Application of rock mechanics and geology to the planning, design and construction of engineering structures.

ECI 6610—Groundwater Problems in Geotechnical Engineering (2) *Prereq: ECI 4305, 4314 or consent of instructor.* Darcy's law, coefficient of permeability, flow nets; seepage forces. Engineering applications—dewatering systems, slope stability, filter design, earth dams, drainage.

ECI 6616—Groundwater Flow II (2) *Prereq: ECI 5625 or consent of instructor.* Continuation of ECI 5625. Two and three-dimensional groundwater flow cases. Transient flow. Solute transport in porous media. Saltwater intrusion.

ECI 6645—Advanced Geotechnical Engineering I (4) *Prereq: ECI 6316 or consent of instructor.* Application of soil mechanics to the design and analysis of settlement and slope stability problems.

ECI 6646—Advanced Geotechnical Engineering II (4) *Prereq: ECI 6316 or consent of instructor.* Application of soil mechanics to the design and analysis of bearing capacity and earth pressure problems.

ECI 6905—Special Problems in Civil Engineering (1-6; max: 10) Studies in areas not covered by other graduate courses.

ECI 6910—Supervised Research (1-5)

ECI 6936—Graduate Civil Engineering Seminar (1; max: 2)

ECI 6940—Supervised Teaching (1-5)

ECI 6971—Research for Master's Thesis (1-15)

ECI 6974—Master of Engineering or Engineer Degree Report (1-6) Individual work culminating in a professional practice-

oriented report suitable for the requirements of the Master of Engineering or Engineer degree. Two credits only are applicable toward the requirements of each degree.

ECI 7980—Research for Doctoral Dissertation (1-15)

ENV 5625—Water Resources Engineering Design (3) *Prereq: ECI 4214 or consent of instructor.* Design oriented courses based on methods developed in ECI 4214. Introduction to water resources systems and management.

TTE 5006—Transportation Systems Planning (4) *Prereq: graduate standing or consent of instructor.* Analytical techniques for estimating future travel demands, planning, transportation facilities and locations. Review of transportation technology and future systems.

TTE 5105—Pavement Design (2) *Prereq: TTE 4104 or consent of instructor.* Design of flexible and concrete pavements.

TTE 5256—Traffic Engineering (4) *Prereq: TTE 4007 or equivalent.* Traffic studies, operations, flow, signals, signs and markings; regulation of traffic, pedestrian and bicycle operation, parking lot operations, highway lighting.

TTE 5701—Geometric Design of Transportation Facilities (3) *Prereq: TTE 4104 or consent of instructor.* Geometric design criteria and controls of highways and intersections.

TTE 6106—Soil Stabilization (2) *Prereq: graduate standing or consent of instructor.* Highway soil stabilization, methods of stabilization and behavior of materials.

TTE 6107—Highway Safety Analysis (2) Statistics and characteristics of accidents, accident reconstruction, accident causation and reduction.

TTE 6257—Traffic Control Systems (4) *Prereq: TTE 5256.* Traffic controller operation, computer controlled signal systems, modeling and optimization of traffic control systems, system selection implementation and management.

TTE 6267—Traffic Flow Theory (3) *Prereq: TTE 5256.* Operational techniques used to optimize traffic flow including control systems. Maintenance operations. Freeway operations and control. Intersection channelization.

TTE 6307—Freeway Design and Operations (3) *Prereq: TTE 5256.* Operation of freeway systems, effects of design, advanced analysis techniques, freeway optimization techniques.

TTE 6516—Transportation Planning Decisions (2) *Prereq: ECI 4137 or equivalent.* Decisions on public investment analysis methods, cost-benefit and delphi techniques, identification and assessment of physical, social, and economic impacts of transportation alternatives, costs of vehicle operations, accidents, value of time, safety, other factors.

TTE 6526—Airport Planning and Operations (2) *Prereq: TTE 6257.* Location, configuration, air connections; ground, baggage, and freight movements; passenger transfers; aircraft delay analysis; airport access; parking needs; simulation of operations; flight scheduling and control.

TTE 6606—Urban Transportation Models (4) *Prereq: TTE 5006, ECI 4041 or consent of instructor.* Calibration and application of UTPS computer models for urban transportation planning; land use and urban activity models for forecasting and allocation. H.

CLASSICS
College of Liberal Arts and Sciences

GRADUATE FACULTY 1980-81

Chairman: G. L. Schmeling. *Professor:* G. L. Schmeling. *Associate Professors:* S. K. Dickison; K. V. Hartigan; D. G. Miller; L. A. Sussman.

The department offers a program leading to the Master of Arts with a major in Latin, which may be combined with a minor in Greek, history, or philosophy.

LAT 6840—History of the Latin Language (3)

LNW 5905—Special Study in Latin (3)

LNW 6902—Special Study in Latin Literature (3; max: 9) Sample topics: Horace, Juvenal, Roman comedy, Roman historians.

LNW 6905—Individual Work (2-4; max: 10) Readings, conferences and reports. Subjects in language, literature, and civilization for which there are no special course offerings.

LNW 6910—Supervised Research (1-5)

LNW 6940—Supervised Teaching (1-5)

LNW 6971—Research for Master's Thesis (1-15)

CLINICAL PSYCHOLOGY
College of Health Related Professions

GRADUATE FACULTY 1980-81

Chairman: N. W. Perry, Jr. *Graduate Coordinator;* H. Davis. *Professors:* B. Barger; E. Cohen; L. D. Cohen; H. Davis; J. R. Goldman; K. M. Heilman; M. Hollower (Emeritus); F. D. McGlynn; W. L. Mealiea; B. G. Melamed; M. E. Meyer; N. W. Perry, Jr.; A. S. Schumacher (Emeritus). *Associate Professors:* C. D. Belar; R. K. Blashfield; M. K. Goldstein; R. K. Hornberger; J. H. Johnson; W. J. Rice; V. D. Van De Riet. *Assistant Professors;* D. Bowers; E. B. Fennell; S. B. Johnson; M. H. McCauiley; J. Tucker; R. E. Vuchinich.

The Department of Clinical Psychology is a graduate program department in the College of Health Related Professions. The department's programs are its predoctoral clinical psychology program leading to the Ph.D. degree in psychology; the Psychology Clinic, a teaching and service unit of the J. Hillis Miller Health Center's Teaching Hospital and Clinics; a predoctoral internship program, and postdoctoral studies and research. The master's degree is offered as part of the doctoral program studies.

The clinical psychology program involves academic ties with other colleges and departments within the University and with the Veteran's Administration training and service programs.

Courses offered by the faculty of the department are listed below. Progress of the program is determined by departmental policies which are consistent with American Psychological Association accreditation standards.

Admission to the department is through appropriate application to the department's admissions committee. A bachelor's degree, along with one undergraduate course in both experimental psychology and statistics and courses in at least three of the following areas: developmental, learning, perception, personality, physiological and social, is generally adequate preparation for graduate admission.

CLP 6375—Introduction to Clinical Psychology (3) *Prereq: admission to CLP program.* Seminar on issues and concepts concurrent with field observation and participation.

CLP 6407—Psychological Treatment I (3) *Prereq: admission to CLP program or consent of instructor.* Current dynamic and personality theories, practices, and related research in psychotherapy.

CLP 6417—Psychological Treatment II (4) *Prereq: admission to CLP program or consent of instructor.* Current behavorial theories, practices, and related research.

CLP 6437—Behavioral Assessment (3) *Prereq: admission to CLP program or consent of instructor.* Research, theory, and basic procedures including observational and interview techniques.

CLP 6441—Intellectual Assessment (3) *Prereq: admission to CLP program or consent of instructor.* Research, theory, and basic procedures in assessing intellectual functions.

CLP 6448—Personality Assessment (3) *Prereq: admission to CLP program or consent of instructor.* Research, theory, and basic procedures including objective and projective techniques.

CLP 6449—Life History Research in Psychopathology (3) *Prereq: CLP 6497 or consent of instructor.* Recent and longitudinal developments in life history approaches to psychopathology and related behavioral disorders.

CHM 6630—Chemical Physics (3) Intramolecular and intermolecular forces. Energy transfer and reaction in molecular collision processes. Computational aspects of scattering theory.

CHM 6680—Special Topics in Physical Chemistry (1-3; max: 12) Lectures or conferences covering selected topics of current interest in physical chemistry.

CHM 6998—Physical Chemistry Seminar (1) *Attendance required of graduate majors in physical chemistry. Prereq: graduate course in physical chemistry.* Presentation of one seminar. S/U option.

CHM 6620—Advanced Inorganic Chemistry (3) The crystalline state, acid-base, nonaqueous solvent, inorganic mechanisms.

CHM 6622C—Inorganic Preparations (4) Lectures and laboratory experiments showing the reactions and techniques used in the synthesis of inorganic compounds.

CHM 6623—Chemistry of the Metals (3) *Prereq: CHM 6471, 6730.* Relation of properties to atomic, molecular, and crystal structures.

CHM 6624—Chemistry of the Nonmetals (3) *Prereq: CHM 6730.* Relations of properties to atomic, molecular and crystal structures.

CHM 6680—Special Topics in Inorganic Chemistry (1-3; max: 12) Lectures or conferences on selected topics of current research interest in inorganic chemistry.

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CHM 6710—Applied Molecular Spectroscopy (3) Applications and comparison of methods in analysis and molecular structure determination.

CHM 6720—Chemical Dynamics (3) Basic concepts of rate laws, collision theory, and transition state theory; an introduction to reaction dynamics, structural dynamics, and quantitative structure-reactivity correlations.

CHM 6730—Chemical Transformations (3) Important types of chemical reactions and their application to organic and inorganic synthesis.

CHM 6905—Individual Problems, Advanced (3-5; max: 10) *Prereq: consent of faculty member supervising the work. Double registration permitted. Assigned reading program or development of assigned experimental problem.* S/U Option.

CHM 6910—Supervised Research (1-5)

CHM 6850—Chemistry Colloquium (1; max: 7) Topics presented by visiting scientists and local staff members. S/U.

CHM 6940—Supervised Teaching (1-5)

CHM 6971—Research for Master's Thesis (1-15)

CHM 7485—Special Topics in Theory of Atomic and Molecular Structure (1-3; max: 9) *Prereq: CHM 6482 or PHS 6226, or equivalent.* Mathematical techniques used in atomic, molecular, and solid-state theory. The one-electron approximation and the general quantum-mechanical many-body problem. Selected advanced topics.

CHM 7980—Research for Doctoral Dissertation (1-15)

CHS 5110—Radiochemistry (3) *Prereq: CHM 3401 or CHM 4812 or consent of instructor.* Properties of radioactive nuclei, nature of radioactivity, nuclear structure, nuclear reactions, interaction of radiation with matter, chemical aspects of radioactivity, and applications of nucleonics to chemistry.

CHS 5110L—Radiochemistry Laboratory (1) *Prereq: CHM 3120C and 3401 or 4412, or consent of instructor.* Radioactivity detection, radiochemical separations and analyses, radiochemistry laboratory techniques, the practice of radiological safety, and tracer applications of radioisotopes in chemistry and other fields.

CHS 6120—Nuclear Chemistry (3) *Prereq: CHS 5110.* Radioactivity, nuclear structure, decay processes, nuclear reactions

CIVIL ENGINEERING
College of Engineering

GRADUATE FACULTY 1980-81

Chairman & Graduate Coordinator I. H. Schaub. *Professors* B. A. Benedict, H. K. Brooks; B. A. Christensen; D. U. Deere; B. E. Ruth; J. H. Schaub; J. H. Schmertmann; M. W. Self; B. D. Spangler; J. A. Wattleworth. *Associate Professors:* C. A. Collier; K. G. Courage; J. L. Davidson; J. L. Eades; C. O. Hays; G. Long; J. D. Rumble; W. H. Zimpfer. *Assistant Professor:* J. M. Lybas.

The following graduate degrees are offered to prepare qualified students for the professional practice of civil engineering: Master of Engineering, Master of Science, Engineer, and Doctor of Philosophy. All degree programs include areas of concentration in the specialties of construction, geotechnical engineering, hydraulics, structures, and transportation engineering. All degrees except the Ph.D. are available in a thesis or nonthesis program.

Resident graduate students are required to register for a minimum of two credits at one credit per semester for ECI 6936. This credit is not applicable to the requirement for any degree. Nonthesis degree students must successfully complete a report of substantial engineering content for a minimum of two hours credit in ECI 6974. Minor or supporting work is encouraged from a variety of related or allied fields of study.

CES 5305—Design of Structural Systems (3) *Prereq: CES 4705, 4607.* Fundamental characteristics of structural systems. Economic and architectural considerations. Building frames and connections. Plate girders. Special structures.

CES 5325—Design of Highway Bridges (3) *Prereq: CES 4607, 5728.* Analysis by influence lines, slab and girder bridges, composite design, prestressed concrete, continuity, arch bridges, design details, highway specifications.

CES 5607—Behavior of Steel Structures (3) *Prereq: CES 4607.* Plastic analysis and design of beams and frames. Buckling and stability problems. Connections.

CES 5726—Design of Concrete Systems (3) *Prereq: CES 4705.* Strength design of members and frames, torsion, two-way slabs, design of building systems, prestressed concrete.

CES 5801—Design and Construction in Timber (2) *Prereq: consent of instructor.* Analysis and design in timber. Beams, columns and connections. Timber structure. Plywood beams, panels, diaphragms. Laminated beams and frames. Formwork.

CES 6106—Advanced Structural Analysis II (4) *Prereq: EGM 3400, CES 6108.* Continuation of CES 6108. Finite element method. Numerical methods, topics in structural dynamics, code provisions for seismic and wind loading.

CES 6108—Advanced Structural Analysis I (4) *Prereq: CES 4607, 4705.* Traditional methods of analyses for forces and deformations; modern matrix methods including direct stiffness method.

CES 6126—Advanced Structural Laboratory (2) *Prereq: CES 4607, 4705. Model studies and analysis. Mechanics of similitude and dimensional analysis applied to static and dynamic structural problems.* Research topics.

CES 6526—Nonlinear Structural Analysis and Design (3) *Prereq: CES 6108.* Sources of nonlinearity. Tangent stiffness method. Beam-columns on elastic foundations. Discrete methods for soil-structure interaction.

CES 6551—Design of Folded Plates and Shells (3) *Prereq: CES 4607, 4705.* Analysis for membrane stresses; pressure vessels, secondary bending stresses. Design of shell systems and folded plates. Design details.

CES 6706—Advanced Reinforced Concrete (3) *Prereq: CES 4704, 5726.* Torsion in structural members. Ultimate load theories and application to design. Yield-line theory for slabs. Shear walls, combined shear walls and frames. Research topics.

CES 6716—Advanced Prestressed Concrete (3) *Prereq: CES 4704, 5726.* Continuity in prestressed concrete, design of connections, post-tensioning applications, segmental construction. Circular prestressing. Research topics.

ECI 5126—Civil Engineering Systems (3) Civil engineering applications of operations research techniques, models of scheduling, linear programming, queueing theory, and simulation.

ECI 5125—Construction Equipment and Procedures (2) *Prereq: ECI 4145 or consent of instructor.* Design and optimization of equipment systems for heavy construction.

ECI 5147—Construction Planning and Scheduling (2) *Prereq: ECI 4145.* Planning, scheduling, organizing and control of civil engineering projects with CPM and PERT. Application of optimization techniques.

ECI 5156—Value Engineering Theory (3) Value engineering concepts, function analysis system techniques (FAST), diagramming, creativity, matrix evaluation, design-to-cost, life cycle costing, human relations and strategies for organizing, performing and implementing value engineering work.

ECI 5157—Civil Engineering Feasibility Analysis (3) *Prereq: ECI 4137 or equivalent studies in time-value of money.* Theory and practice of feasibility studies for proposed civil engineering projects and other related areas of interest.

ECI 5166—Legal Aspects of Civil Engineering (3) Engineer's view of contracts for design and construction. Legislation and policy affecting labor-management relationships in construction.

ECI 5180—Public Works Planning (3) Functional approach to planning and implementing public works for urban areas. Examines public works needs of residential, commercial, industrial and other land uses.

ECI 5205—Open Channel Hydraulics (3) *Prereq: ECI 4214 or consent of instructor.* Classification of flow. Normal depth. Specific energy and critical depth. Gradually varied flow. Transitions.

ECI 5266—Hydraulics Machinery (3) *Prereq: ECI 4214 or consent of instructor.* Selection and operation of hydraulic motors, pumps and transmissions. Specific speed. Cavitation. Surge tanks.

ECI 5326—Foundation Design (3) *Prereq: CES 4705, ECI 4305 or consent of instructor.* Investigations, bearing capacity, and the analysis and design of shallow footings, walls, and deep piled foundations.

ECI 5335—Insitu Measurement of Soil Properties (3) *Prereq: ECI 4305, 4314 or consent of instructor.* Methods of soil exploration; techniques of soil sampling and insitu testing. Emphasis on field work and demonstrations.

ECI 5355—Earth and Rockfill Dams (3) *Prereq: ECI 4305* Design requirements, construction techniques, compaction control, soil testing and sampling, foundation preparation, and field instrumentation.

ECI 5437—Experimental Determination of Soil Properties I (3) *Prereq: ECI 4305.* Advanced laboratory determination of engineering properties of soils; hydrometer analysis, controlled rate of strain consolidation, soil suction, permeability, and triaxial testing.

ECI 5575—Remote Sensing Methods and Engineering Applications (3) *Prereq: TTE 4704.* Introduction into remote sensing and imaging systems including photographic and digital processing methods for image analysis. Emphasis on use of LANDSAT imagery and aerial photography for engineering applications.

ECI 5625—Groundwater Flow I (3) *Prereq: ECI 4214 or consent of instructor.* Porous media flow. Darcy's law. Conservation of mass. LaPlace equation. Flownets. Well hydraulics.

ECI 6045—Computer Applications in Geotechnical Engineering (3) *Prereq: ECI 4041, 6316 or consent of instructor.* Application of computer solutions to geotechnical engineering problems.

ECI 6153—Civil Engineering Practice (2-4; max: 4) *Prereq: graduate status.* Problems and case histories of civil engineering projects including social, legal, environmental, and technical aspects.

ECI 6156—Civil Engineering Operations (2-4; max: 4) *Prereq: graduate status.* Applications of quantitative methods of decision making to major civil engineering problem areas.

ECI 6223—Numerical Models in Hydraulics (3) *Prereq: ECI 4214 or consent of instructor.* Application of numerical methods to hydraulic engineering problems; dispersion, porous media flow, river and estuarine mechanics, thermal diffusion.

ECI 6227—Diffusive and Dispersive Transport (3) *Prereq: ECI 4214 or consent of instructor.* Introduction to diffusive and dispersive transport processes in flowing water. Fick's law.

ECI 6228—Hydraulic Laboratory and Field Practice (3) *Prereq: ECI 4214 or consent of instructor.* Hydraulic model laws and their use in undistorted and distorted models with movable or fixed beds. Instrumentation. Data acquisition system.

ECI 6233—Sediment Transport II (3) *Prereq: ECI 6237 or consent of instructor.* Review of fundamental laws of scour initiation and sediment transport. River morphology. Movable bed hydraulic models.

ECI 6234—Hydraulics of Stratified Flow (3) *Prereq: ECI 5235 or consent of instructor.* Uniform and nonuniform flow in multilayered systems. Oscillatory motion and interfacial mixing.

ECI 6237—Sediment Transport I (3) *Prereq: ECI 5235 or consent of instructor.* Sediment properties. Scour initiation. Influence of slope. Stable channels. Bed forms. Transport as bed load and suspended transport.

ECI 6238—Transient Flow in Channels and Pipes (3) *Prereq: ECI 5235 or consent of instructor.* Water hammers in singular pipes and systems. Governing differential equations. Numerical methods. Unsteady open channel flow equations.

ECI 6316—Advanced Soil Mechanics (3) *Prereq: ECI 4305, 4314, or consent of instructor.* Nature and origin of soil. Stresses within a soil body. Stress-strain behavior and shear strength of dry, saturated no flow, and saturated transient flow soils.

ECI 6317—Theoretical Soil Mechanics (3) *Prereq: consent of instructor.* Nature of soil-water systems; analysis of stress, strains, equations of states; rheological behavior of soils; failure in soil media.

ECI 6346—Soil Dynamics (3) Dynamic principles; lumped systems; elastic half-space theory; soil behavior under dynamic loading; foundation design problems, earthquakes.

ECI 6416—Properties, Design and Control of Concrete (3) *Prereq: ECI 3403.* Portland cement and aggregate properties relating to design, control, and performance of concrete. Concrete forming and construction methods. Laboratory testing and analysis.

ECI 6436—Bituminous Materials (3) *Prereq: TTE 4104.* Analysis of strength and deformation mechanism for asphalt concrete, properties, and their effect on flexible pavement performance. Pavement construction and quality assurance methods, testing and evaluation of asphalts and mixture.

ECI 6436—Experimental Determination of Soil Properties II (3) *Prereq: ECI 5437 or consent of instructor.* Factors influencing stress-deformation response, elastic-plastic constitutive relationships, failure criteria, centrifugal modeling, stress path effects.

ECI 6576—Air Photo Interpretation Terrain Analysis (3) *Prereq: ECI 4314 or consent of instructor.* Interpretive techniques used to identify landforms, soils, rocks, and potential engineering problems from aerial photography. Analysis for site selection and planning of soil exploration programs.

ECI 6605—Rock Mechanics and Engineering Geology (2) *Prereq: ECI 4305.* Behavior of rock subjected to stress. Application of rock mechanics and geology to the planning, design and construction of engineering structures.

ECI 6616—Groundwater Problems in Geotechnical Engineering (2) *Prereq: ECI 4305, 4314 or consent of instructor.* Darcy's law, coefficient of permeability, flow nets; seepage forces. Engineering applications—dewatering systems, slope stability, filter design, earth dams, drainage.

ECI 6616—Groundwater Flow II (2) *Prereq: ECI 5625 or consent of instructor.* Continuation of ECI 5625. Two and three-dimensional groundwater flow cases. Transient flow. Solute transport in porous media. Saltwater intrusion.

ECI 6663—Advanced Geotechnical Engineering I (4) *Prereq: ECI 6316 or consent of instructor.* Application of soil mechanics to the design and analysis of settlement and slope stability problems.

ECI 6666—Advanced Geotechnical Engineering II (4) *Prereq: ECI 6316 or consent of instructor.* Application of soil mechanics to the design and analysis of bearing capacity and earth pressure problems.

ECI 6905—Special Problems in Civil Engineering (1-6; max: 10) *Studies in areas not covered by other graduate courses.*

ECI 6910—Supervised Research (1-5)

ECI 6935—Graduate Civil Engineering Seminar (1; max: 2)

ECI 6940—Supervised Teaching (1-5)

ECI 6971—Research for Master's Thesis (1-15)

ECI 6976—Master of Engineering or Engineer Degree Report (1-6) Individual work culminating in a professional practice-

oriented report suitable for the requirements of the Master of Engineering or Engineer degree. Two credits only are applicable toward the requirements of each degree.
ECI 7980—Research for Doctoral Dissertation (1-15)
ENV 5625—Water Resources Engineering Design (3) Prereq: ECI 4214 or consent of instructor. Design oriented courses based on methods developed in ECI 4214. Introduction to water resources systems and management.
TTE 5006—Transportation Systems Planning (4) Prereq: graduate standing or consent of instructor. Analytical techniques for estimating future travel demands, planning, transportation facilities and locations. Review of transportation technology and future systems.
TTE 5105—Pavement Design (3) Prereq: TTE 4104 or consent of instructor. Design of flexible and concrete pavements.
TTE 5205—Traffic Engineering (4) Prereq: TTE 4607 or equivalent. Traffic studies, operations, flow, signals, signs and markings; regulation of traffic, pedestrian and bicycle operation, parking lot operations, highway lighting.
TTE 5705—Geometric Design of Transportation Facilities (3) Prereq: TTE 4104 or consent of instructor. Geometric design criteria and controls of highways and intersections.
TTE 6105—Soil Stabilization (2) Prereq: graduate standing or consent of instructor. Highway soil stabilization, methods of stabilization and behavior of materials.
TTE 6107—Highway Safety Analysis (3) Statistics and characteristics of accidents, accident reconstruction, accident causation and reduction.
TTE 6257—Traffic Control Systems (4) Prereq: TTE 5256. Traffic controller operation, computer controlled signal systems, modeling and optimization of traffic control systems, system selection implementation and management.
TTE 6267—Traffic Flow Theory (3) Prereq: TTE 5256. Operational techniques used to optimize traffic flow including control systems. Maintenance operations. Freeway operations and control. Intersection channelization.
TTE 6307—Freeway Design and Operations (3) Prereq: TTE 5256. Operation of freeway systems, effects of design, advanced analysis techniques, freeway optimization techniques.
TTE 6816—Transportation Planning Decisions (3) Prereq: ECI 4137 or equivalent. Decisions on public investment analysis methods, cost-benefit and delphi techniques, identification and assessment of physical, social, and economic impacts of transportation alternatives, costs of vehicle operations, accidents, value of time, safety, other factors.
TTE 6826—Airport Planning and Operations (3) Prereq: TTE 6257 Location, configuration, air connections; ground, baggage, and freight movements; passenger transfers; aircraft delay analysis; airport access; parking needs; simulation of operations; flight scheduling and control.
TTE 6886—Urban Transportation Models (4) Prereq: TTE 5006, ECI 4041 or consent of instructor. Calibration and application of UTPS computer models for urban transportation planning; land use and urban activity models for forecasting and allocation. H.

CLASSICS
College of Liberal Arts and Sciences

GRADUATE FACULTY 1980-81

Chairman: G. L. Schmeling. *Professor:* G. L. Schmeling. *Associate Professors:* S. K. Dickison; K. V. Hartigan; D. G. Miller; L. A. Sussman.

The department offers a program leading to the Master of Arts with a major in Latin, which may be combined with a minor in Greek, history, or philosophy.

LAT 6040—History of the Latin Language (3)
LNW 5905—Special Study in Latin (3)
LNW 6902—Special Study in Latin Literature (3; max: 9) Sample topics: Horace, Juvenal, Roman comedy, Roman historians
LNW 6905—Individual Work (2-4; max: 10) Readings, conferences and reports. Subjects in language, literature, and civilization for which there are no special course offerings.
LNW 6910—Supervised Research (1-5)
LNW 6920—Supervised Teaching (1-5)
LNW 6971—Research for Master's Thesis (1-15)

CLINICAL PSYCHOLOGY
College of Health Related Professions

GRADUATE FACULTY 1980-81

Chairman: N. W. Perry, Jr. *Graduate Coordinator;* H. Davis. *Professors:* B. Barger; E. Cohen; L. D. Cohen; H. Davis; J. R. Goldman; K. M. Heilman; M. Hollower (Emeritus); F. D. McGlynn; W. L. Maolioe; B. G. Melamed; M. E. Meyer; N. W. Perry, Jr.; A. S. Schumacher (Emeritus). *Associate Professors:* C. D. Belar; R. K. Blashfield; M. K. Goldstein; R. K. Hornberger; J. H. Johnson; W. J. Rice; V. D. Van De Riet. *Assistant Professors;* D. Bowers; E. B. Fennell; S. B. Johnson; M. H. McCaulley; J. Tuclrer; R. E. Vuchinich.

The Department of Clinical Psychology is a graduate program department in the College of Health Related Professions. The department's programs are its predoctoral clinical psychology program leading to the Ph.D. degree in psychology; the Psychology Clinic, a teaching and service unit of the J. Hillis Miller Health Center's Teaching Hospital and Clinics; a predoctoral internship program, and postdoctoral studies and research. The master's degree is offered as part of the doctoral program studies.

The clinical psychology program involves academic ties with other colleges and departments within the University and with the Veteran's Administration training and service programs.

Courses offered by the faculty of the department are listed below. Progress of the program is determined by departmental policies which are consistent with American Psychological Association accreditation standards.

Admission to the department is through appropriate application to the department's admissions committee. A bachelor's degree, along with one undergraduate course in both experimental psychology and statistics and courses in at least three of the following areas: developmental, learning, perception, personality, physiological and social, is generally adequate preparation for graduate admission.

CLP 6875—Introduction to Clinical Psychology (3) Prereq: admission to CLP program. Seminar on issues and concepts concurrent with field observation and participation.
CLP 6489—Psychological Treatment I (3) Prereq: admission to CLP program or consent of instructor. Current dynamic and personality theories, practices, and related research in psychotherapy.
CLP 6917—Psychological Treatment II (4) Prereq: admission to CLP program or consent of instructor. Current behavorial theories, practices, and related research.
CLP 6437—Behavioral Assessment (3) Prereq: admission to CLP program or consent of instructor. Research, theory, and basic procedures including observational and interview techniques.
CLP 6441—Intellectual Assessment (3) Prereq: admission to CLP program or consent of instructor. Research, theory, and basic procedures in assessing intellectual functions.
CLP 6448—Personality Assessment (3) Prereq: admission to CLP program or consent of instructor. Research, theory, and basic procedures including objective and projective techniques.
CLP 6469—Life History Research in Psychopathology (3) Prereq: CLP 6497 or consent of instructor. Recent and longitudinal developments in life history approaches to psychopathology and related behavioral disorders.

Descriptions

UNDERGRADUATE COURSES

CIVIL ENGINEERING

CHM 6430 Chemical Thermodynamics.
Credits: 3

CHM 6440 Advanced Chemical Kinetics.
Credits: 3

CHM 6497 Photochemistry.
Credits: 2

CHM 6461 Statistical Thermodynamics.
Credits: 3

CHM 6470 Chemical Bonding and Spectra. 1.
Credits: 3

CHM 6471 Chemical Bonding and Spectra. 2.
Credits: 2

CHM 6480 Elements of Quantum Chemistry.
Credits: 3

CHM 6481 Quantum Theory of Matter 1.
Credits: 3

CHM 6482 Quantum Theory of Matter 2.
Credits: 3

CHM 6490 Theory of Molecular Spectroscopy.
Credits: 3; Coreq: CHM 6471.

CHM 6510 Physical Chemistry of Surfaces and Colloids.
Credits: 3

CHM 6512 The Physical Chemistry of Polymers.
Credits: 2

CHM 6515 Radiation Chemistry.
Credits: 2

CHM 6530 Chemical Physics.
Credits: 3

CHM 6580 Special Topics in Physical Chemistry.
Credits: 1 to 3. Maximum of 12 credits.

CHM 6590 Physical Chemistry Seminar.
Credits: 1

CHM 6620 Advanced Inorganic Chemistry.
Credits: 3

CHM 6622C Inorganic Preparations.
Credits: 4

CHM 6820 Chemistry of the Metals.
Credits: 3

CHM 6830 Chemistry of the Nonmetals.
Credits: 3

CHM 6680 Special Topics in Inorganic Chemistry.
Credits: 1 to 3. Maximum of 12 credits.

CHM 6690 Inorganic Chemistry Seminar.
Credits: 1

CHM 6730 Applied Molecular Spectroscopy.
Credits: 3

CHM 6720 Chemical Dynamics.
Credits: 3

CHM 6730 Chemical Transformations.
Credits: 3

CHM 6908 Individual Problems, Advanced Graduate.
Credits: 2 to 5; max. 10. Prerequisite: Permission of faculty member supervising the work.

CHM 6910 Supervised Research.
Credits: 1 to 5††

CHM 6930 Chemistry Colloquium.
Credits: 1††. Maximum of 7.

CHM 6940 Supervised Teaching.
Credits: 1 to 5††

CHM 6971 Master's Research.
Credits: 1 to 15††

††Grading is on S-U basis only

CHM 7480 Special Topics in Theory of Atomic and Molecular Structure.
Credits: 1 to 3; max. 9.

CHM 7980 Doctoral Research.
Credits: 1 to 15††

Chemistry — Specialized
GRADUATE COURSES

CHS 5110 Radiochemistry.
Credits: 2; Prereq: CHM 3401 or 6412, or consent of instructor.

CHS 5116L Radiochemistry Laboratory.
Credits: 1; Prereq: CHM 3120 and 3401 or 6412, or consent of instructor.

CHS 6120 Nuclear Chemistry.
Credits: 3

CIVIL ENGINEERING
College of Engineering

INSTRUCTIONAL STAFF 1980-81

Schaub, J.H., Chairman; Aguilar, A.M.; Benedict, B.A.; Christensen, B.A.; Collier, C.A.; Coons, W.W.; Courage, K.G.; Davidson, J.L.; Fagundo, F.E.; Gibbens, D.W.; Hays, C.O.; Hedgecock, C.R.; Horlbeman, Z.; Lane, C.; Lyhne, J.M.; Moorhead, S.; Rubin, H.; Ruth, B.E.; Self, M.W.; Spangler, B.D.; Townsend, F.C.; Wallace, C.W.; Wattsworth, J.A.; Whitehead, W.J.; Zingler, W.H.

ADJUNCT AND AFFILIATE STAFF

Brooks, H.K.; Deere, D.U.; Endes, J.L.; Huber, W.C.; Schwartzmann, J. H.

Civil Engineering Structures

CES 3100 Stress Analysis. F, S.
Credits: 2; Prereq: CES 3123.
Analysis of framed structures by the stiffness method. Introduction to the finite element method

CES 3123 Mechanics of Engineering Structures. F, S, SS.
Credits: 4; Coreq: EGM 3520.
Stress and deformation analysis of framed structures. Influence lines, criteria for critical loading, moment area, virtual work, slope deflection, and consistent deformation.

CES 4304 Structural Estimating. F, SS.
Credits: 3; Prereq: Junior or Senior standing.
Design of systems for estimating and cost control of man-machine productivity for civil engineering projects. Analysis of cost factors required for optimization of engineering-investment efficiency.

CES 4507 Analysis and Design in Steel. F, S.
Credits: 3; Prereq: ECI 3403, CES 3123.
Elastic and plastic theories of design, design of members subjected to tension, compression, flexure, torsion. Design of connections and rigid frames.

CES 4706 Design of Reinforced Concrete. F.
Credits: 3; Prereq: CES 4705.
Continuation of CES 4705. Ultimate strength analysis and design, torsion, two-way slabs, footings, walls, buildings, prestressed concrete flexural members

CES 4709 Analysis and Design in Reinforced Concrete. F, S, SS.
Credits: 3; Prereq: ECI 3403, CES 3123.
Ultimate strength analysis and design of reinforced concrete members, working stress design for flexure, moment distribution, influence lines, design of rigid frames. Introduction to prestressed concrete

GRADUATE COURSES

CES 5308 Design of Structural Systems.
Credits: 2

CES 5329 Design of Highway Bridges.
Credits: 3

CES 5697 Behavior of Steel Structures.
Credits: 3

CES 5726 Design of Concrete Systems.
Credits: 3

CES 5801 Design and Construction in Timber.
Credits: 2

CES 6105 Advanced Structural Analysis 1.
Credits: 4

CES 6108 Advanced Structural Analysis 2.
Credits: 4

CES 6130L Advanced Structural Laboratory.
Credits: 2

CES 6626 Nonlinear Structural Analysis and Design.
Credits: 2

CES 6801 Design of Folded Plates and Shells.
Credits: 3

CES 6706 Advanced Reinforced Concrete.
Credits: 3

CES 6716 Advanced Prestressed Concrete.
Credits: 2

Engineering: Civil

ECI 3213 Hydrodynamics. F, S, SS.
Credits: 4; Prereq: EGM 3511, 3400, and MAP 3302 or EGM 3311.
Classification of fluids. Hydrostatics. Similitude. Conservation of mass, energy and momentum. Potential flow, influence of viscosity and turbulence in the flow of water.

ECI 3403 Civil Engineering Materials. F, S.
Credits: 3; Prereq: EGM 3520
A study of the principal materials used for engineering purposes with special attention to their mechanical properties and the importance of these properties to the engineer.

ECI 4041 Computer Methods in Civil Engineering. F, S.
Credits: 3; Prereq: Senior status and COP 3212.
Review of digital computer programming using source languages such as FORTRAN and BASIC. Development and documentation of civil engineering design programs stressing matrix and numerical methods.

ECI 4101 Construction Contracts and Specifications. F, S.
Credits: 2; Prereq: Senior status or permission of instructor.
Construction contracts, liens, insurance, labor management relations, construction operations, optimizing crew and equipment costs.

ECI 4137 Civil Engineering Cost Analysis. F, S.
Credits: 3; Prereq: Junior or senior status.
Analysis of civil engineering proposals utilizing time-value and related factors. Feasibility and optimum life comparisons. Utility rate derivation, utility/cost method.

ECI 4145 Construction Methods and Management. F, S.
Credits: 3; Prereq: Junior or Senior standing.
Theory and practice of construction operations, equipment utilization and construction methods. Analysis of costs. Optimizing crew and equipment. Heavy equipment costs

ECI 4191 Practical Work in Civil Engineering. F, S, SS.
Credits: 1 to 3; Prereq: 4tG Classification.
One term industrial employment, including extra work according to a preapproved outline. Practical engineering work under industrial supervision, as set forth in the College of Engineering Regulations

ECI 4216 Hydraulics. F, S, SS.
Credits: 3; Prereq: ECI 3213 or consent of instructor.
Fundamental equations for pipe and open conduit flow. Development of design oriented formulas for pipes and open channels. Introduction to hydrology.

ECI 4308 Geotechnical Engineering. F, S.
Credits: 3; Prereq: ECI 4314
Subsurface exploration settlement analysis, shearing resistance, slope stability, earth pressure and an introduction to foundation design.

ECI 4314 Soil Mechanics. S, SS.
Credits: 3; Prereq: GLY 2028, ECI 3403.
Physical properties of soils, compaction, flow of water through soil, distribution of stress within soil and consolidation. Laboratory.

ECI 4638 Advanced Hydrology. F, S.
Credits: 3; Prereq: ECI 4214 or consent of instructor.
Review of fundamentals of hydrology. Application of hydrology to hydraulic and transportation design including evaluation of runoff; design of control structures, detention and retention basin; flood plain mapping.

ECI 4988 Special Problems in Civil Engineering. F, S, SS.
Credits: 1 to 4; Maximum of 9 credits. Prereq: Recommendation of Department Chairman.
Selected problems or projects in the student's major field of engineering study.

ECI 4949 Co-op Work Experience. F, S, SS.
Credits: 1; Prereq: EG Classification

GRADUATE COURSES

ECI 5124 Civil Engineering Systems.
Credits: 3

ECI 5125 Construction Equipment and Procedures.
Credits: 2

ECI 5167 Construction Planning and Scheduling.
Credits: 2

ECI 5196 Value Engineering Theory.
Credits: 3

ECI 5197 Civil Engineering Feasibility Analysis.
Credits: 3

ECI 5166 Legal Aspects of Civil Engineering.
Credits: 3

ECI 5188 Public Works Planning.
Credits: 3

ECI 5238 Open Channel Hydraulics.
Credits: 3

ECI 5265 Hydraulics Machinery.
Credits: 2

ECI 5325 Foundation Design.
Credits: 3

ECI 5335 Insitu Measurement of Soil Properties.
Credits: 3

ECI 5359 Earth and Rockfill Dams.
Credits: 2

ECI 5437C Experimental Determination of Soil Properties I.
Credits: 3

ECI 5575 Remote Sensing Methods and Engineering Applications.
Credits: 3

ECI 5625 Groundwater Flow I.
Credits: 3

ECI 6065 Computer Applications in Geotechnical Engineering.
Credits: 2

ECI 6152 Civil Engineering Practice.
Credits: 2 to 4, max. of 4

ECI 6156 Civil Engineering Operations.
Credits: 2 to 4, max. of 4

ECI 6222 Numerical Models in Hydraulics.
Credits: 3

ECI 6227 Diffusive and Dispersive Transport.
Credits: 2

ECI 6238 Hydraulic Laboratory and Field Practice.
Credits: 3

ECI 6253 Sediment Transport II.
Credits: 2

ECI 6256 Hydraulics of Stratified Flow.
Credits: 2

ECI 6257 Sediment Transport I.
Credits: 2

ECI 6258 Transient Flow in Channels and Pipes.
Credits: 3

ECI 6316 Advanced Soil Mechanics.
Credits: 3

ECI 6317 Theoretical Soil Mechanics.
Credits: 2

ECI 6346 Soil Dynamics.
Credits: 2

ECI 6416 Properties, Design and Control of Concrete.
Credits: 3

ECI 6426 Bituminous Materials.
Credits: 3

ECI 6436 Experimental Determination of Soil Properties II.
Credits: 3

ECI 6576 Air Photo Interpretation Terrain Analysis.
Credits: 3

ECI 6606 Rock Mechanics and Engineering Geology.
Credits: 2

ECI 6610 Groundwater Problems in Geotechnical Engineering.
Credits: 2

ECI 6616 Groundwater Flow II.
Credits: 2

ECI 6648 Advanced Geotechnical Engineering I.
Credits: 4

ECI 6646 Advanced Geotechnical Engineering II.
Credits: 3

ECI 6988 Special Problems in Civil Engineering.
Credits: 1 to 6, max 10

ECI 6910 Supervised Research.
Credits: 1 to 5††

ECI 6926 Graduate Civil Engineering Seminar.
Credits: 1; max 2

ECI 6940 Supervised Teaching.
Credits: 1 to 5††

ECI 6971 Research for Master's Thesis.
Credits: 1 to 15††

ECI 6976 Master of Engineering or Engineer Degree Report.
Credits: 1 to 6

ECI 7980 Research for Doctoral Dissertation.
Credits: 1 to 15††

Engineering: Environmental

ENV 4484C Water Supply & Wastewater Removal. F, SS.
Credits: 3
Source of supply quantity and quality requirements, collection, transmission and distribution of water. Collection, transportation and disposal of sewage and stormwater. Design of collection and distribution systems

ENV 4514C Treatment of Water and Wastewater S, SS.
Credits: 3
Introduction to the basic physical, chemical, and biological concepts involved in treatment of water and wastewater

Engineering: General

EGN 4000 Engineering Professionalism and Ethics. F, S.
Credits: 2; Prereq: Senior standing
A discussion of professionalism and ethics in the practice of engineering. The development of the concepts of professionalism and ethics and the traditional practice of these concepts are considered in relation to changing situations in practice in a variety of employment conditions. Case histories will be discussed

EGN 4022 Engineering and Public Works. S.
Credits: 2
For non-engineering students. A broad survey of the nature and engineering aspects of the public services and facilities. Each public works function identified as to purpose and outlined as an engineering project. Problems in project development and interdisciplinary collaboration

EGN 4034 Humanities and Engineering. F.
Credits: 3
Studies in the relationships between humanism and engineering for engineering students. The course will consider issues, values and judgments in technology against the background of studies in the humanities.

History: General

HIS 6478 History of Technology I. F.
Credits: 3
The development of technology and engineering from antiquity to approximately 1750 with emphasis on the relationship of this development to the growth of western civilization

HIS 6479 History of Technology II. S.
Credits: 3
The development of technology and engineering from approximately 1750 to WWII with emphasis on the relationship of this development to the changing patterns of life in western civilization

Surveying

SUR 3101 Engineering Measurements. F, S, SS.
Credits: 2
Angle, distance and elevations measurement. Application to engineering boundaries, topography, forestry, and construction. Error theory

SUR 3302 Construction Surveying. F.
Credits: 1
A survey of equipment and methods used in laying out construction projects: transit, tape, laser, level, batter boards, grade stakes, earthwork.

SUR 3321 Photogrammetry. F, S.
Credits: 2
Photo interpretation and basic measurements. Geometry of vertical photographs. Mapping from photographs. Remote sensing

††Grading is on S-U basis only

Descriptions

CLASSICS

SUR 3400 Land Surveying Principles. S.
Credits: 3; Prereq: SUR 3040, EGE 3043.
Land boundaries, corners, areas; writing land descriptions. Identification of land parcels; legal principles of boundary location, the government land survey system.

SUR 3520 Measurement Science. F.
Credits: 4; Prereq: MAC 3312, STA 3032.
Theory of measurement errors. Error propagation. Variance and covariance. Polynomial curve fitting. Regression analysis. Correlation. Least squares adjustments.

SUR 3531 Field Measurement Systems. S.
Credits: 2; Prereq: SUR 3101, 3520.
Comparative analysis of all major field surveying equipment. Error budgets. Theory of operations. Inertial and satellite methods. Indirect measurements.

SUR 3540 Surveying Computations. F.
Credits: 2; Prereq: MAC 1132.
The principles of geometry applied to surveying computations. Computer methods.

SUR 3560 Professional Drafting for Surveyors. F, S.
Credits: 1; Prereq: EGN 1171.
A study of the techniques and drawings used in land surveys. Computer methods.

SUR 4301 Route Geometrics. F, S, SS.
Credits: 3; Prereq: SUR 3101, EGN 1171.
Geometric design of transportation systems. Computer applications. Comprehensive design project. Spiral curves, superelevation theory, earthwork analysis.

SUR 4350 Marine Surveying and Mapping. F.
Credits: 2; Prereq: SUR 3521
Methods of positioning points near shore and in open ocean, depth measurements, tide measurements.

SUR 4380 Photogrammetric Geometronics. F.
Credits: 3; Prereq: SUR 3531, 3521.
Stereographic mapping. Analytic control extension. Mapping from satellite imagery. Terrestrial mapping.

SUR 4430 Land Surveying Practice. S.
Credits: 3; Prereq: SUR 3521, 3403.
A study of land survey practice; the lot survey; the sectional survey, the water boundary survey; office and business practices; professional standing.

SUR 4450 Cadastral Information. F.
Credits: 1; Prereq: COP 3212, EGE 3043.
Methods of constructing a multipurpose computer cadastre of position-related information.

SUR 4453 Subdivisions. S.
Credits: 4; Prereq: SUR 3402.
Legal requirements for subdividing land. Land development systems. Subdivision planning. Comprehensive project.

SUR 4501 Geodetic and Control Surveying. S.
Credits: 4; Prereq: SUR 3521, AST 3063.
Geodetic coordinate systems, plane projections, position and azimuth determination by astronomy, geodetic leveling, positional reference. Least squares adjustments, traditional control systems.

SUR 4952 Senior Project. F, S, SS.
Credits: 2; Prereq: Senior standing.
Laboratory, equipment, or literature investigations of surveying problems and concepts of current interest resulting in a written work. H

SUR 4949 Co-op Work Experience. F, S, SS.
Credits: ???; Prereq: EG Classification.

†Grading is on S-U basis only

Transportation & Traffic Engineering

TTE 4104 Fundamentals of Transportation Engineering. F, S.
Credits: 3; Prereq: or Coreq: SUR 4309.
Planning, traffic elements, capacity signalization, interchanges, roadways, soils, drainage, materials, pavement design and construction.

TTE 4724 Transportation Facility Design. S.
Credits: 3; Prereq: TTE 4104.
Design and traffic considerations of transportation projects involving facility sizing, functional design, and layout of intersections; noninterchanges and/or terminal locations.

GRADUATE COURSES

TTE 5505 Transportation Systems Planning.
Credits: 4

TTE 5585 Pavement Design.
Credits: 3

TTE 5586 Traffic Engineering.
Credits: 3

TTE 5701 Geometric Design of Transportation Facilities.
Credits: 3

TTE 6486 Soil Stabilization.
Credits: 3

TTE 6487 Highway Safety Analysis.
Credits: 3

TTE 6527 Traffic Control Systems.
Credits: 4

TTE 6567 Traffic Flow Theory.
Credits: 3

TTE 6587 Freeway Design and Operations.
Credits: 3

TTE 6816 Transportation Planning Decisions.
Credits: 3

TTE 6826 Airport Planning and Operations.
Credits: 3

TTE 6885 Urban Transportation Models.
Credits: 4

CLASSICS
INSTRUCTIONAL STAFF 1988-91

Schmeling, G.L., Chairman; Dickbern, S.; Faber, A.; Hartigan, K.; Miller, D.G.; Sussman, L.

An undergraduate major in Classics is interdisciplinary in nature with an emphasis on Greek, Latin, or a combination. An undergraduate is required to complete either a) the 3000 level sequence in either Greek or Latin; or b) 10 credit hours of the beginning sequence in both Greek and Latin. In addition there is a requirement of 4 courses at the 3000 level or above (from any department) which deal with the ancient world. The department also offers a certificate program. Students are urged to consult an advisor when considering a major.

To graduate with departmental honors a student must attain a 3.5 average in his major (excluding courses below the 3000-level), and complete in his Senior year some special project approved as honors work.

Classical and Ancient Studies
(All courses indicated CLA or CLT are taught in English)

CLA 1100 The Glory that was Greece. F.
Credits: 3; Prereq: None.
A broad cultural view of the classical Greek world. Greek sources read in translation.

CLA 1120 The Grandeur that was Rome. S.
Credits: 3; Prereq: None.
Provides a multi-faceted introduction to the culture of Rome. Primary source material read in translation.

CLA 2260 Classical Archaeology. S.
Credits: 3; Prereq: None.
Illustrated lectures on archaeology, its process of discovery and methods. History of major archaeological exploration in Mediterranean lands compared with extant literary information.

CLA 3930 Special Topics in Classical Civilization. F, S.
Credits: 3; Prereq: None.
An examination of various aspects of Greek and Roman culture based on the ancient sources, literary and archaeological. With a change of topic, may be repeated for additional credit.

CLA 3936 Greece Today and Yesterday. F.
Credits: 3; Prereq: None.
An interdisciplinary course examining various aspects of ancient and modern Greek life and culture.

CLA 3804 Women in Classical Antiquity. S.
Credits: 3; Prereq: None.
The status of women in antiquity will be reexamined in light of modern thinking on the subject of women's roles in society.

CLA 3791 The Ancient City. F.
Credits: 3; Prereq: None.
An examination of the concepts and physical characteristics of Greek and Roman cities.

CLA 4905 Individual Study. F, S.
Credits: 1 to 4; Prereq: Consent of instructor.
Reading, conference, and reports. All work done in translation. May be repeated for additional credit with change of content.

Classical Literature in Translation

CLT 2220 Ancient Novel. F.
Credits: 3; Prereq: None.
The development and influence of the ancient novel. All sources are read in translation and compared with saints' lives, medieval romances, and the earliest English novels.

CLT 3370 Myths of the Greeks and Romans. F.
Credits: 3; Prereq: None.
The development, importance, and influence of Greco-Roman mythology. The main Greek and Latin literary sources read in translation.

CLT 3371 Religions of the Greece-Roman World. S.
Credits: 3; Prereq: None.
The development, importance, and influence of Greek and Roman religion and cult practice. The main literary and epigraphical sources read in translation.

CLT 3102 Survey of Roman Literature. S.
Credits: 3; Prereq: None.
Critical study of the development of Roman literature. Includes readings in such authors as Plautus, Cicero, Catullus, Vergil, Ovid, and Tacitus.

CLT 3371 Greek Drama. S.
Credits: 3; Prereq: None.
The Classical Greek theatre. Archaeological remains of important theatres. Selected plays of Aeschylus, Sophocles, Euripides, Aristophanes and Menander read in translation.

CLT 3260 Greek and Roman Epic. F.
Credits: 3; Prereq: None.
The origin, development, and importance of ancient epic. Emphasis on Homer and Vergil, read in translation.

CLT 4905 Individual Study. F, S.
Credits: 1 to 4; Prereq: Consent of instructor.
Reading, conference and reports. With change of content, may be elected for additional credit. All work done in translation.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution University of Illinois at Urbana-Champaign

Faculty/School Department of Civil Engineering
address 208 North Romine Street
Urbana, IL 61801
Name, Title of Contact John W. Melin, Professor of Civil Engineering
Name, Title of Respondee John W. Melin, Professor of Civil Engineering

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	?	?	?				
Duration (years) - length of Programme	4	1+	3+	--	--	--	--
Enrollment							
Current Part Time	0	0	0	0	0	0	0
Current Full Time	35	13	9	0	0	0	0
Other (specify) of which							
National	33	8	2				
Foreign	2	5	7				
Admission Requirements		BS	MS				
Course Requirements - list number of courses needed whether thesis or not	129 sem hrs	9 U* w/o thesis 8 U w/thesis	8 add. U + thesis for Ph.D.				
Scholarship, Fellowship Bursaries, etc.available	Yes	Yes	Yes				

*1 Unit = four semester hours

Language of Instruction ENGLISH

Total Numbers of Students Graduated National 300 Foreign 300

Indicate % of funding by	Administration	Scholarship	Research
Government	1	80%	50%
Industry		20%	50%
Other(specify)	2 Military,	7 (dept. Scholarships)	

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (3) Part Time (4) Industry, Instructors Speakers ..... (*)
*frequent speakers throughout year

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( )
Scholarship, Bursaries etc. (x) Overseeing Body Industry Liaison ( )
Industrial speakers (x)

Comments

PAGE THIRTY-EIGHT

COURSES, TITLES, DESCRIPTIONS:

CE 216 - Construction Engineering. Introduction to the construction processes: contracts and bonding, planning and scheduling, estimating and project control, scientific productivity models and construction econometrics.

CE 315 - Construction Productivity. Introduction to the application of scientific principles to the measurement and forecasting of productivity in construction engineering; conceptual and mathematical formulations of the labor, equipment, and material factors affecting productivity.

CE 316 - Construction Planning and Control. Project definition; scheduling and control of material, labor, and equipment allocation; optimal schedules; project organization documentation and reporting system; and management and control.

CE 318 - Construction Cost Analyses and Estimates. Introduction to the application of scientific principles to costs and estimates of costs in construction engineering concepts and statistical measurements of the factors involved in direct costs, general overhead costs, cost markups and profits; and the fundamentals of cost recording construction cost accounts and cost controlls.

CE 416 - Systems Analysis, I: Systems Methodology and Network Techniques. Basic concepts theories, and techniques of systems analysis, including modeling of large scale systems, forecasting, planning, control and information handling; emphasizes the modeling of systems with network techniques, including distance, flow and project networks; and discusses advanced network topics such as out-of-kilter algorithm and project resource analysis.

CE 417 - Systems Analysis, II: Digital Simulation. Application of simulation techniques systems analysis; includes modeling for simulation, design of simulation experiments, random number generation, process generation, simulation of queuing system inventory systems, and project networks, analysis of simulation results and some digital simulation languages and programs in use, such as GASP II and GERTS III.

EDUCATIONAL PROGRAM OBJECTIVES:

The basic objective of our program is educating civil engineering students for careers in project management. The program equips the students with the theory and methodology of engineering and management, and conveys a deeper understanding of these tools in a professional working environment. The program attempts to simulate the professional environment using team projects on real structures. The students gather experience in organizing and interacting with their peers to achieve common goals on real projects providing an extra dimension in learning, which compliments and reinforces the basic theoretical course content.

RESEARCH Organizational (Applied) (x) Engineering (Hard) (x)

RESEARCH FUNDING:

NATURE/OBJECTIVES OF RESEARCH:

Analysis of Standards. This research involved the application of systematic analyses of decision tables and information networks to the provisions of standards, codes, and specifications. The analysis provides measures of the internal consistency, clarity, and completeness of a standard.

Fair and Reasonable Markup. In the construction industry, at the project level, markup traditionally has been computed as a percentage of the estimated total cost. This practice has led many to become "equal markup" contractors, or to use their subjective judgment in deciding what markup to use for a particular project. This research investigates a return on investment approach in determination of a fair and reasonable markup.

The Communication Process in the Construction Industry. The purpose of this study is to examine and analyze the communication process within a construction company. A broad scheme of the context of communication, corresponding types of communcation within each context, and primary influences on communication at each level is being investigated. Concentration is on the variables within the categories--communication, individual, and organization. The objective is to find means of improving communications and thus increase productivity in the construction industry

An Approach to the Construction Equipment Policy. This research attempts to solve the utilization and acquisition problems in construction equipment management. A model is being developed to simulate the equipment cost and will be applied in the utilization policy-making. The relationship between acquisition and utilization policies will be inevestigated and the result used in the acquisition policy-making. A guideline for implementation of the approach is to be presented.

Risk Sharing in Construction Contracts. This study investigates the cost effects of varying the assignment of risks between owners and contractors in firm fixed-price construction contracts. Among the topics included are a risk classification system, techniques for contractually assigning risk, the applicability of utility theory for analyzing the assignment of risk in construction, modeling the cost effects of varying the assignment of risk, and implementation considerations.

RESEARCH FACILITIES:

Extensive computer and laboratory facilities.

SPECIAL FEATURES OF THE PROGRAM:

One of the special features of our program is construction movies which are shown each week. They give the student a chance to visit many sites all over the world and see construction in action.

Field trips to the offices of prominent design/contractor organizations, in Chicago. Also, to construction sites such as a nearby nuclear power plant.

Strong participation in and support of the student ASCE and AGC Chapters.

PAGE FORTY

Name of Institution: University of Michigan

Faculty/School: Construction Engineering and Management
Address: Department of Civil Engineering
Ann Arbor, Michigan 48109

Name, Title of Contact: Professor Robert B. Harris
Name, Title of Respondee: Professor Robert B. Harris, Professor Robert I. Carr

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D.	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other: Specify
Year Programme Established	1949	1954	1954				
Duration (years) - length of Programme	4	1	3-5				
Availability (Indicate current student nos) Part-time							
Full-time	50	45	3				
Other (specify)							
National Year	45	12	3				
Foreign Year	5	33					
Admission Requirements	3.0/4.0	Exam.					
Course Requirements - Thesis Required	128 hrs No	30 hrs No	25-30 hrs Yes				
Scholarship, Fellowship Bursaries, etc. available	No	Some	Some				

Language of Instruction: English

Total Numbers of Students Graduated: National 500 Foreign 200

	Administration	Scholarship	Research
Funding: (Indicate %) Government			
Industry			
Other (specify)			

Staff Numbers: Totals (Indicate 0's): Faculty Full Time (3) Part time (2) Industry, Instructors, Speakers (-)

Industry Input (Please tick): Financial Administrative (x) Curriculum Development x
Scholarship, Bursaries, etc(x) Overseeing Body Industry Liaison ( )

Course, Titles, Descriptions
Indicate Text Title (if any)

1. Construction Contracting
2. Construction Engineering
3. Construction Safety Engineering and Management
4. Construction of Buildings
5. Construction Cost Engineering

(continued)

6. Construction Management and Methods Engineering
7. Excavation and Tunnelling
8. Critical Path Methods
9. Project Networking Techniques
10. Construction Decisions Under Uncertainty
11. International Construction
12. Quality Control of Construction Materials
13. Bituminous and Cement Mixes for Constructed Facilities

Educational Programme Objectives: To prepare engineers to solve construction engineering and management problems with the rigorous approach common to other engineering disciplines.

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)

Describe Nature/objectives of Research

Current research activities are in project scheduling, computer simulation of construction operations, project risk analysis, and construction cost engineering

Research Facilities (Describe briefly if any): Construction Lab with plantables, micro computer, time lapse equipment
Major library and computer facilities
Civil Engineering Materials, Structures, Geotechnic, etc. Labs

Publications by Programme - only those that can be purchased (do not list articles in publications or out of print)

( ) Please check if interested in having above listed in National Technical Information Service for world wide distribution. (Separate instructions will follow on procedures for submittal).

Survey of Construction Programmes — February 17th, 1981.

Name of Institution UNIVERSITY OF NEBRASKA - LINCOLN

Faculty/School CONSTRUCTION MANAGEMENT DEPARTMENT
address W-85 NH
LINCOLN, NE 68588

Name, Title of Contact ROBERT E. ZILLY, PROF & CHMN.
Name, Title of Respondee SAME

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established 1966
Duration (years) - length of Programme 4 YR BS PROGRAM

Enrollment

Current Part Time —
Current Full Time 229
Other (specify) —
of which
National 218
Foreign 11

Admission Requirements OPEN

Course Requirements - list number of courses needed whether thesis or not 134 CREDIT HOURS

Scholarship, Fellowship Bursaries, etc. available NONE FOR ENTERING STUDENTS, B-12 FOR SOPH THRU SR

Language of Instruction ENGLISH

Total Numbers of Students Graduated — National 372 — Foreign 15 TO 1/1/81

Indicate % of funding by	Administration	Scholarship	Research
Government	100		50
Industry		100	30
Other (specify)			

Staff Numbers: Totals (Indicate F/T) Faculty Full Time (8) Part Time (—) Industry, Instructors Speakers ..... ( )

Industry Input (Please tick) Financial Administrative (✓) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments INDUSTRY SUPPORT SINCE PROGRAM BEGIN OVER $300,000

Course, Titles, Descriptions
Indicate Text Title (if any)
SEE ATTACHED

Educational Prgramme Objectives:
SEE ATTACHED

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $) $ 25000 CURRENT

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.
STRONG MANAGEMENT ORIENTATION

PAGE FORTY-ONE

(7-1-79)

Brief Description of the B.S. Degree Program in
CONSTRUCTION MANAGEMENT
Offered by the
Department of Construction Management
College of Engineering
University of Nebraska, Lincoln, Nebraska 68588

The Construction Profession

Construction is a team process. Professionals in construction management have final responsibility for converting the designs of architects and engineers into physical reality. Qualified Constructors need a broad education in construction management and methods of operation. They must be leaders with competence in business and labor relations. Construction management involves planning, scheduling, and control of site work. It requires skill in methods of estimating, procurement, allocation, and coordination of resources necessary for the job. Constructors must be experts in construction materials, methods and equipment. They need a sound knowledge of structural design. They must be able to carefully interpret contract documents including specifications and working drawings, as well as have the ability to communicate clearly in words and sketches. They must understand how to apply computer methods in construction systems analysis and be capable of adapting other new techniques to this highly competitive field as they are developed.

In sum, the Constructor is a manager of men, machines and material within a time and money framework.

The Construction Management curriculum leads to a Bachelor of Science degree after four years of study. The program prepares you for a professional career in construction contracting or in many other areas closely related to the construction industry.

Admission to the University

Application--You should make your application for admission to the University at the earliest possible date, preferably before the semester preceding your expected enrollment. To obtain application materials and information regarding fees, regulations, etc., write or go to the Director of Admissions, Adminstration Building, Room 108, Lincoln,NE 68588.

Transfer from other accredited colleges requires individual evaluation. For information, write to the Department of Construction Management, W145 Nebraska Hall, Lincoln, NE 68588.

Entrance Requirements for Construction Management

The following high school units are required if the student is to enter the Construction Management curriculum without deficiencies:

1. 3½ units of mathematics, including 2 of algebra, 1 of geometry, and ½ of trigonometry
2. 3 units of English
3. 1 unit of physics

4. 4 optional units in academic subjects such as English, foreign languages, mathematics, natural sciences, and social sciences.
5. A total of 16 units are required for admission.

CONSTRUCTION MANAGEMENT (CM) CURRICULUM*
1978-1979

Semester 1	Credits
CM 101-Const Communications I	2
CM 131-Intro to Const Mgmt I	2
Physics 131 or 141-Gen Physics I	5
Math 106-Anal Geom & Calc I	5
	14

Semester 2	Credits
CM 102-Const Communications	2
CM 132-Intro to Const Mgt II	2
CE 221-Surveying I	3
CM 281-Comput & Anal Methods I	3
Arch 308-Arch & Envir Studies	3
Soc/Hum Electives	3
	16

Semester 3	
CM 241-Const Equip & Methods I	3
CM 282-Comput & Anal Methods II	3
CM 301-Const Mtls & Spec I	3
Econ 210-Intro to Economics	5
Ag Comm 200-Technical Writing	3
	17

Semester 4	
CM 242-Const Equip & Methods II	3
CM 302-Const Mtls & Spec II	3
IE 205-Intro to Engrg Mgt	3
EM 220-Statics	3
Spch 311-Bus & Ind Communic	3
Soc/Hum Elective	3
	18

Semester 5	
CM 305-Phys Env Systems I (HVAC)	3
CM 480-Work Anal & Simpl	2
Acct 306-Survey of Account	4
EM 324-Strgth of Matls	3
Soc/Hum Elective	3
Soc/Hum or Tech Elective	3
	18

Semester 6	
CM 306-Phys Env Systems II(Elect)	3
CM 478-Con Cost Anal I	3
Fin 361-Finance	3
Arch 410-Archit Struct I	3
Soc/Hum or Tech Elective	3
Tech Elective	3
	18

Semester 7	
CM 485-Con Mgmt Systems I	3
CM 479-Con Cost Anal II	2
CM 476-Con Cost Control	3
Arch 411-Arch Structures II	3
Bus Law 372-Business Law	3
Mgmt 360-Human Res. Mgmt	3
	17

Semester 8	
CM 420-Professional Practice	2
CM 481-Human ELements in Con	3
CM 430-Contract Admin	3
Mgmt 462-Collective Bargaining	3
Technical Electives	6
	17

Total Credit Hours Required: 134

*Of the 24 credit-hour total of electives, a minimum of 9 credit hours of humanistic-social and 9 credit hours of technical electives are required. At least 3 credit hours must be selected from CM 441, CM 460, and CM 486. The balance may be selected in either technical or soc/hum areas.

CONSTRUCTION MANAGEMENT
Course
Number

101 CONSTRUCTION COMMUNICATIONS I (2 cr)
Prereq: None, simultaneous registration in CM 131 preferred
Fundamentals of orthographic, isometric and perspective drawing; research and presentation techniques for construction industry report writing; interpretation of working drawings for construction projects.

102 CONSTRUCTION COMMUNICATIONS II (2 cr)
Prereq: CM 101 and 131
Review of drawing techniques employed by various design disciplines in the construction industry (schematics, plans, elevations, sections, and details); origin and processing of shop drawings; field sketches and drawings (forming, shoring, construction methodology); laboratory reports (soils, concrete, sealant, acoustic); communications during the construction process (change orders, extras, delays, punch lists, and allowances).

131 INTRODUCTION TO CONSTRUCTION MANAGEMENT I (2 cr)
Prereq: None, simultaneous registration in CM 101 preferred
An overview of the entire construction industry and an introduction to basic management principles and practices used in the control of manpower, materials, machinery and money in the production of the built-environment within a time framework.

132 INTRODUCTION TO CONSTRUC TION MANAGEMENT II (2 cr)
Prereq: CM 131 and 101
Continuation of Construction Management 131.

241 CONSTRUCTION EQUIPMENT AND METHODS I (3 cr)
Prereq: CM 101, 102, 131 and 132, 301 parallel, sophomore standing or permission.
A survey of construction equipment and methods from a management point of view. An analytical approach to the development of construction methodology for site, excavation, and foundation work involving safe and economical mixes of manpower and machinery. Includes functions and applications of earthmoving and excavation equipment as well as pile drivers.

242 CONSTRUCTION EQUIPMENT AND METHODS II (3 cr)
Prereq: CM 241 and 301; 302 parallel
Continuation of CM 241, with emphasis on the structure from grade to topping out. Functions and applications of material handling equipment from simple pulleys to large cranes. Methods of constructing concrete formwork in a variety of applications. Assembly and erection of steel, wood, precast concrete, and masonry structural elements. Material finishing methods and equipment.

CONSTRUCTION MANAGEMENT
Course
Number

281 COMPUTATION AND ANALYSIS METHODS I (3 cr)
Lect 3 - Prereq: Math 106
Selected topics in general mathematics and calculus as applied to construction management, architecture, planning and engineering problems. Introduction to computer applications.

282 COMPUTATION AND ANALYSIS METHODS II (3 cr)
Lect 3 - Prereq: Math 106
Application of statistical analysis and operations research techniques to construction management, architecture, planning and engineering problems. Probability applications to risk and competitive situations.

301 CONSTRUCTION MATERIALS AND SPECIFICATIONS I (3 cr)
Lect 3 Prereq: CM 101, 102, 131 and 132
Physical, mechanical, and aesthetic properties of soils, stone, concrete and clay products as they relate to in-service conditions and acceptability, either individually or in combination with other materials. Emphasis on proper methods of specification to achieve design and construction goals and meet zoning, code, and evironmental requirements.

302 CONSTRUCTION MATERIALS AND SPECIFICATIONS II (3 cr)
Lect 3 - Prereq: CM 301
Continuation of Construction Management 301 for wood, metals, gypsum, glass, plastics, and other construction materials and component products.

305 PHYSICAL ENVIRONMENTAL SYSTEMS I (3 cr)
Lect 3 - Prereq: CM 281 and Physics 131 or 141
Thermal and psychometric environment in buildings related to human comfort. Emphasis on HVAC loads; heat loss-gain, ventilation and humidity calculations. Characteristics and performance of HVAC systems. Review code requirements for mechanical equipment and systems.

306 PHYSICAL ENVIRONMENTAL SYSTEMS II (3 cr)
Lect 3 - Prereq: CM 281 and Physics 131 or 141
Fundamentals of electric power; generation, distribution, service and circuits in buildings. Electric equipment and systems. Review National Electric Code.

398 PROBLEMS IN CONSTRUCTION (1-6 cr)
Prereq: Permission of Chairman
Individual or group investigations of special problems in construction.

420/820
PROFESSIONAL PRACTICE
Prereq: Senior or graduate standing (2 cr undergrad, 3 cr grad)
Orientation to professional practice through a study of the designers' and the contractors' relationships to society, specific

CONSTRUCTION MANAGEMENT
Course
Number

clients, other professions, and other collaborators in environmental design and construction fields. Emphasis is placed on ethics, professional communication and responsibility, professional organization, office management, construction management, professional registration, and owner-designer-contractor relationships.

430 CONTRACT ADMINISTRATION (3 cr)
Prereq: Senior standing or permission
A study of construction industry business organization forms and their interaction through agency and independent contractor relationships. Analysis of the contract documents to define their basic elements and how they are applied in the construction industry.

441/841
INDUSTRIALIZED SYSTEMS BUILDING (3 cr)
Lect 3 - Prereq: Senior standing
Historical background of industrialized systems building; its economic and social relevance in modern society; and its influence on the traditional role of the contractor within the construction industry. Changes industrialized systems building will impose on the contractor's approach to finance, management, and construction methods and equipment.

460 CONSTRUCTION DATA MANAGEMENT SYSTEMS (3 cr)
Prereq: Senior standing or permission
A survey of selected data management systems as related to the construction industry. Topics include: estimating, scheduling, project management, accounting.

476 CONSTRUCTION COST CONTROLS (3 cr)
Prereq: Acctg. 306 or 103 & 104
Development of cost accounting principles and financial controls appropriate for construction contractors. Includes purchasing policies and procedures, labor and equipment cost reporting techniques, accounting procedures for control of materials and supplies, billing methods, principles of financial reporting and analysis.

478 CONSTRUCTION COST ANALYSIS (3 cr)
Prereq: CM 102, 132, 242, and 302
Detailed cost estimating based upon take-off from contract documents, labor, overhead, and profits. Analysis pertaining to building, heavy and industrial construction. Subcontractor relationships. Assembly of bid proposals.

479 CONSTRUCTION COST ANALYSIS II (2 cr)
Lect 1, lab 2. Prereq: CM 478
Continuation of CM 478 with emphasis on detailed analysis of possible alterantive solutions to specific construction problems.

CONSTRUCTION MANAGEMENT
Course
Number

Alternates will be evaluated in relation to their influence on manpower, machinery and money requirements within the overall time framework of the project.

480/880
CONSTRUCTION WORK ANALYSIS AND SIMPLIFICATION (2 cr undergrad, 3 cr grad)
Prereq: CM 241 & 242
Productivity consideration in the management of construction workers. Concepts of preplanning, work sampling, methods analysis, and work simplification applied to on-site construction projects. The interrelation of safety and productivity in project management.

481 HUMAN FACTORS IN CONSTRUCTION (2 cr)
Prereq: Senior standing or permission; Mgmt. 360
Human factors that influence productivity in construction. Motivations of tradesmen, foremen and superintendents will be discussed in terms of their typical job environments. Potential ways of influencing productivity and safety will be evaluated.

485/885
CONSTRUCTION MANAGEMENT SYSTEMS I (3 cr)
Prereq: CM 302, 242, and 282 (or approval of instructor for non-Construction Management majors)
Application of network analogy, critical path method (CPM), program evaluation review technique (PERT), precedence diagramming and analog charts to planning, resource scheduling, and control of projects. Systems solution by manual calculation and digital computer methods.

486/886
CONSTRUCTION MANAGEMENT SYSTEMS II (3 cr)
Prereq: CM 282 (or eqivalent background in calculus, statistics, and computer science)
Application of selected topics in systems analysis (operations research) to construction management ; competition strategy, linear programming, queuing, transportation, time-cost trade-off, learning curves, and other models. Computer applications.

ACCOUNTING AND BUSINESS LAW

306 SURVEY OF ACCOUNTING (4 cr)
Prereq: Juior standing
A one-semester course designed for students above the sophomore level who desire a knowledge of the fundamentals of accounting. Develops those fundamentals of accounting analysis which are most helpful in understanding managerial and business concepts and practices.

372 BUSINESS LAW (3 cr)
Prereq: Junior standing and Econ 210 or 211
Agency: creation; powers; termination; duties and liabilities of principal and agent. Negotiable instruments: elements of negotiability; endorsements and transfer; liability of parties; presentment, notice and protest; discharge. Business organizations: partnerships; corporations--organization, stockholders, directors, dissolution; business trusts.

AGRICULTURAL COMMUNICATIONS

200 TECHNICAL WRITING (3 cr)
Prereq: Sophomore standing
The basic techniques used in technical writing. Emphasis on writing, analyzing, and evaluating technical and scientific information.

ARCHITECTURE

308 ARCHITECTURE AND ENVIRONMENTAL STUDIES (3 cr)
Lect 3 - Prereq: Junior standing (waived for CM)
Background and development of architecture and environmental design. Forces influencing the development of our physical surroundings. Not open to majors in architecture.

410 ARCHITECTURAL STRUCTURES I (3 cr)
Prereq: EM 220 and 324
Analysis and design of structural members in wood, steel, and concrete with emphasis on columns, walls, footings, soils, trusses, and construction. Comparative building designs.

411 ARCHITECTURAL STRUCTURES II (3 cr)
Prereq: Arch 410
Analysis and design of structural members in wood, steel, and concrete with emphasis on columns, walls, footings, soils, trusses, and construction. Comparative building designs.

CIVIL ENGINEERING

221 SURVEYING (3 cr)
Prereq: Math 101 and EM 111 (waived for CM)
Theory and practice of surveying; care, use and adjustment of surveying instruments; measurement of distance, direction, and elevation; analysis and computation of field data; systems of recording data.

ECONOMICS

210 INTRODUCTION TO ECONOMICS (5 cr)
Prereq: Sophomore standing and above
A study of the principles which govern the organization and behavior of the modern economic system. Topics covered includ the nature of economics and the economic system; national income measurement and determination; money and the economic system; government and the economy; economic growth; the allocation of economic resources; the distribution of income; and the international economy.

ENGINEERING MECHANICS

220 STATICS (3 cr)
Prereq: Math 106
For students in Architecture and Construction Management. Fundamental concepts, equilibrium of force systems, analysis of simple frames and trusses. Centroid and moments of inertia, friction, shear and bending moment diagrams. Laboratory tests showing behavior of materials under tension and compression loading.

324 STRENGTH OF MATERIALS (3 cr)
Lect 3 - Prereq: EM 220 or 223
For students in Architecture and Construction Management. Stress and strain analysis in elastic materials. Use of properties of materials in the analysis and design of welded and riveted connections, statically determinate and indeterminate flexure members, columns. Combined stresses, axial, eccentric and torsional loading.

FINANCE

361 FINANCE (3 cr)
Prereq: Junior standing
Scope and content of the finance specialization; survey of the major theoretical issues, study of the financial instruments, analysis of the capital management problems and development of criteria for financial decision-making.

INDUSTRIAL AND MANAGEMENT SYSTEMS ENGINEERING

205 INTRODUCTION TO ENGINEERING MANAGEMENT (3 cr)
Prereq: Sophomore standing
An introduction to the quantitative approach to engineering decision-making as it operates within the complex organization of industry. Theory and structure of formal and informal organizations.

MANAGEMENT

360 HUMAN RESOURCES MANAGEMENT (3 cr)
Prereq: Junior standing
A study of the human resources used in management. The course gives a historical perspective to the development of organizations, management practices, and the behavioral sciences. A basic understanding is given of individual and organizational characteristics and processes as they affect the management of human resources. Special topics include management and organization theory, motivational processes, leadership, decision making, selection, and employee development. Examples are discussed from business health care, educational, and government institutuions.

462 COLLECTIVE BARGAINING (3 cr)
Prereq: Mgm 360 or Econ 381 or equivalent
An interdisciplinary approach to collective bargaining as an agreement-making and agreement-administering concept between labor and management. Utilizes theoretical analysis and research reports. Consideration is given to the analysis of principles of collective bargaining as well as the application of these principles through the actual negotiating of a labor-management contract.

MATHEMATICS

106 ANALYTIC GEOMETRY AND CALCULUS (5 cr)
Prereq: Math 101 and 102 or equivalent high school preparation
Functions, limits, derivatives of algebraic functions, applications of differentiation, integrals, applications of integration.

PHYSICS

131 (or
141) ELEMENTARY GENERAL PHYSICS (5 cr)
Prereq: 1 yr each of high school algebra and plane geometry
Mechanics, heat, electromagnetism.

SPEECH

311 BUSINESS AND INDUSTRIAL COMMUNCIATION (3 cr)
Prereq: Sophomore standing
The basic objective of this course is to provide students with a variety of theoretical and verbal communication approaches that are intended to help them achieve maximum effectiveness in their day-to-day relations with "people at work." Specifically, the course focuses on: developing interpersonal relationships and competency; interviewing techniques; oral report/technical presentation techniques; small group problem solving/leadership; organizational communication.

February 17th, 1981.

...tudy of Construction Programmes

Name of Institution University of Wisconsin

Faculty/School address 460 Henry Mall
Madison, WI 53706

Name, Title of Contact Dick J. Stith, Professor, Construction Administration Advisor
Name, Title of Respondee Same as Contact

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established 1944
Duration (years) - length of Programme 4 years

Enrollment 160

Current Part Time 5

Current Full Time 155

Other (specify) of which

National USA
Foreign

Admission Requirements 24 semester credits completed, including 5 credits of Calculus and G.P.A. of 2.25.

Course Requirements - list number of courses needed whether thesis or not 130 semester credits.
No thesis.

Scholarship, Fellowship Bursaries, etc.available Yes

Language of Instruction English

Total Numbers of Students Graduated ? National 99.5+% Foreign less than 0.5%

		Administration	Scoholarship	Research
Indicate % of funding by	Government	100%		
	Industry			
	Other(specify)		College & gifts	

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (1) Part Time (5) Industry, Instructors Speakers ..... (3)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development (X)
Scholarship, Bursaries etc.(X) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

Of the 130 semester credits required for B.S. Construction Administration, 19 are taught in Major Department, 19 by School of Business. Other courses are offered in the Departments of Civil Engineering, Forestry, College of Agricultural and Life Sciences, and College of Letters and Science.

Educational Prgramme Objectives:

Prepare students for some phase in the building construction industry as constructors rather than for engineering design. The emphasis of the curriculum is toward the business of construction.

Research (Please tick) Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research Research not usually required at undergraduate level.

and

Research Facilities (if any) U. S. Forest Products Laboratory, Madison, WI

Are there any special features of your programme. Please indicate.

Up to 8 semester credits of coordinated internship credits available for full-time construction industry employment.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution: Department of Civil & Environmental Engineering
Faculty/School address: University of Wisconsin-Madison
1415 Johnson Drive
Madison, WI 53706

Name, Title of Contact: Dr. Edward Kuipers, Professor
Name, Title of Respondee: Dr. Edward Kuipers, Professor

Programme/s offered	Degree X Bachelor	Degree X Master	Degree X Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Speci
Year Programme Established Duration (years) - length of Programme	4	1	3+				
Enrollment							
Current Part Time	Unknown	-	-				
Current Full Time	Unknown	2	1				
Other (specify) of which	-	-	-				
National	-	1	-				
Foreign	-	1	1				
Admission Requirements							
Course Requirements - list number of courses needed whether thesis or not	135 cr	30+ cr	30+ cr				
Scholarship, Fellowship Bursaries, etc.available	Yes	Yes	Yes				

Language of Instruction: English

Total Numbers of Students Graduated: National Unknown Foreign Unknown

Indicate % of funding by	Administration	Scoholarship	Research
Government	100%	75%	100%
Industry		25%	
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (1) Part Time (4) Industry, Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.(X) Overseeing Body Industry Liaison (X)

Comments

PAGE FORTY-EIGHT

Course, Titles, Descriptions
Indicate Text Title (if any)

CEE 491: Legal Aspects of Engineering
CEE 492: Estimates and Costs
CEE 493: Economic Selection
CEE 494: Civil and Environmental Decision Making
CEE 495: Civil and Environmental Systems and Modelling Techniques
CEE 590: Critical Path Network Techniques
CEE 647(a): Planning and Design of Construction Operations
(b): Estimating Systems and Bidding Models
(c): Advanced Project Management
CEE 593: Civil Engineering Construction Equipment and Methods
CEE 594: Building Construction Systems
Bus 550: The Real Estate Development Process (Grad St. take Bus. 705)
Bus 559: Construction Enterprise Management

Educational Prgramme Objectives:
To provide engineering education for students interested in the construction industry and to provide an environment for classroom, laboratory, and individual research oriented education.

Research (Please tick) Organizational (Applied) (X) Engineering (Hard) (X)

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research: Construction Productivity, Systems Modelling in Construction, Life Cycle Cost of Construction Mat'ls.

and

Research Facilities (if any): Construction Materials Laboratories, a wide range of state-of-the-art computer facilities.

Are there any special features of your programme. Please indicate.
By design, all levels of our curriculum are designed with a maximum of flexibility to allow the student to concentrate his personalized study program in his selected area of interest.

February 17th, 1981.

Study of Construction Programmes

Name of Institution: University of Wisconsin-Platteville

Faculty/School address: Dr. Alva H. Jared, Chairman Department of Industrial Studies
College of Business, Industry and Communication
UW-Platteville Platteville, WI 53818

Name, Title of Contact: Dr. A. H. Jared, Chairman Department of Industrial Studies

Name, Title of Respondee: D. H. Stuelke, Assistant Professor Building Construction

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
	(circled)						

Year Programme Established: 1970

Duration (years) - length of Programme: Full Time - 85 students

Enrollment

Current Part Time

Current Full Time

Other (specify) of which

National

Foreign

Admission Requirements: Meet general university entrance requirements

Course Requirements - list number of courses needed whether thesis or not

Scholarship, Fellowship Bursaries, etc.available: $600 Fish Building & Supply
$100 United Building Centers
$100 Eastman Cartwright Lumber Inc. other local/state/national and trade association monies available

Language of Instruction

Total Numbers of Students Graduated: National 166 Foreign 1

	Administration	Scholarship	Research
Indicate % of funding by Government	(State supported institution)		
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (13) Part Time (0) Industry, Instructors Speakers ..... (0)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( )
Scholarship, Bursaries etc. (X) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

Gen. Constr. Core Required

111 Intro. to Industry
113 Woodworking
243 Construction Materials & Graphics
271 Anal. of Industrial Safety
321 Construction Laboratory
322 Construction Procedures
413 Gen. Constr. Estimating
499 Industrial Internship

Construction Design Area of Emphasis

212 Construction Design
254 Mat'l & Tech.of Bldg.Const.
453 Res. Planning & Design
463 Housing Systems Analysis
473 Housing Synthesis
496 Commercial Bldg. Design & Construction Techniques

Construction Supervision Area of Emphasis Sampling of Cour

263 Intro. to Marketing
294 Industrial Train. Methods
303 Personnel Administration
310 Wage & Salary Adminis.
312 Construction Proj. Analysis
396 Prin. of Tech. Sales
484 Construction Administration
495 Produc. Plan. and Control

General university requirements (43 cr.) including math, english, science, social studies, and humanities.

Educational Prgramme Objectives: Students at the UW-Platteville majoring in building construction get a solid background in building construction theory and practice, mathematics, physical and social sciences, communication skills, business, economics and human relations. This broad preparation enables a graduate to cope with the wide range of construction activities and problems confronting the building construction industry.

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)): NONE

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.

Internships: All building construction majors must intern with a construction company or agency, earning 2-8 credits while getting on-the-job experience. This cooperative education program has several advantages: students receive both financial compensation and course credit for the work and at the same time gain the practical knowledge and understanding of building construction that many employers seek.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution: CIVIL ENGINEERING INDUSTRY TRAINING BOARD

Faculty/School address: PRIVATE BAG 1 GARDENVIEW 2047
REPUBLIC OF SOUTH AFRICA

Name, Title of Contact: MR. R.G. SPAKIANOS
Name, Title of Respondee: DIRECTOR OF TRAINING

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specif

Year Programme Established: 1980
Duration (years) - length of Programme: 1 week

Enrollment
- Current Part Time
- Current Full Time
- Other (specify) ± 25 per course
  - of which
  - National
  - Foreign

Admission Requirements: CONSTRUCTION EXPERIENCE AT SITE MANAGEMENT LEVEL - BETWEEN 2 TO 5 YEARS.

Course Requirements - list number of courses needed whether thesis or not

Scholarship, Fellowship Bursaries, etc.available

Language of Instruction

Total Numbers of Students Graduated: National ____ Foreign ____

	Administration	Scholarship	Research
Indicate % of funding by Government			
Industry	100%		
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time ( ) Part Time (2) Industry,Instructors Speakers ..... (8)

Industry Input (Please tick): Financial Administrative (X) Curriculum Development ( ) Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison (X)

Comments

PAGE FIFTY

Course, Titles, Descriptions Indicate Text Title (if any)

1. METHOD STUDY
2. PROJECT PLANNING AND RESOURCE MANAGEMENT
3. THE CONTRACT (LEGAL ASPECTS)
4. COSTING AND ACCOUNTING
5. EARTHMOVING METHODS AND EQUIPMENT.

Educational Prgramme Objectives: THESE COURSES ARE AN INTRODUCTION TO THE CONSTRUCTION MANAGEMENT PROGRAMME.

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution UNIVERSITY OF CAPE TOWN

Faculty/School address PRIVATE BAG, RONDEBOSCH. 7700. CAPE TOWN. REPUBLIC OF S.A.

Name, Title of Contact DR. M. VORSTER
Name, Title of Respondee CO-ORDINATOR

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specif
Year Programme Established						1980	
Duration (years) - length of Programme						CMP 6 weeks	
Enrollment						(with examination included as a credit for the B.Sc. (Hons) in Construction Management.	
Current Part Time							
Current Full Time		1980 22					
Other (specify) of which							
National							
Foreign		CAPE TOWN					

Admission Requirements GRADUATE WITH + FIVE YEARS EXPERIENCE.

Course Requirements - list number of courses needed whether thesis or not

Scholarship, Fellowship Bursaries, etc.available

Language of Instruction

Total Numbers of Students Graduated National 61 Foreign ____
Attended since 1978.

Indicate % of funding by | Administration | Scoholarship | Research
Government
Industry
Other(specify)

Staff Numbers: Totals (Indicate #'s) Faculty Full Time ( ) Part Time (2) Industry, Instructors Speakers ..... (11)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

PAGE FIFTY-ONE

Course, Titles, Descriptions Indicate Text Title (if any) THE CONSTRUCTION MANAGEMENT PROGRAMME COVERS:

1. FINANCIAL MANAGEMENT.
2. ENGINEERING ECONOMY.
3. CONSTRUCTION MANAGEMENT.
4. OPERATIONS ANALYSIS.
5. THE ARCHITECT AND ENGINEER.
6. RESPONSIBILITY ACCOUNTING.
7. HUMAN RELATIONS AND ORGANISATIONAL BEHAVIOUR.
8. MARKETING.
9. PROJECT MANAGEMENT TECHNIQUES.
10. PROJECT EVALUATION.
11. EQUIPMENT MANAGEMENT.
12. INDUSTRIAL RELATIONS.
13. QUALITY ASSURANCE.
14. CONTRACT LAW.
15. MEASUREMENT & VALUATION.
16. WEST GATE BRIDGE.

Educational Prgramme Objectives:

Research (Please tick) Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)

Describe Nature/objectives of Research

and

Research Facilities (if any)

Are there any special features of your programme. Please indicate.

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution: UNIVERSITY OF PRETORIA

Faculty/School address: PRETORIA, 0002, REPUBLIC OF SOUTH AFRICA.

Name, Title of Contact: PROFESSOR F. FOURIE.
Name, Title of Respondee: CO-ORDINATOR.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specif

Year Programme Established: 1980 CMP
Duration (years) - length of Programme: 6 weeks

(with examination included as a credit for the B.Sc. (Hons) in Construction Management.

Enrollment

	1980
Current Part Time	
Current Full Time	12
Other (specify) of which	
National	PRETORIA
Foreign	

Admission Requirements: GRADUATE WITH + FIVE YEARS EXPERIENCE.

Course Requirements - list number of courses needed whether thesis or not

Scholarship, Fellowship Bursaries, etc.available

Language of Instruction

Total Numbers of Students Graduated - Attended since 1978. National 32 Foreign _____

	Administration	Scoholarship	Research
Indicate % of funding by Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time ( ) Part Time (2) Industry,Instructors Speakers ..... (8)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

PAGE FIFTY_TWO

Course, Titles, Descriptions
Indicate Text Title (if any)

THE CONSTRUCTION MANAGEMENT PROGRAMME COVERS:

1. OPERATIONS ANALYSIS.
2. MANAGEMENT ACCOUNTING AND FINANCE.
3. PERSONAL ORGANISATION AND THE CONDUCT OF MEETINGS.
4. PROJECT PLANNING AND CONTROL.
5. HUMAN FACTORS.
6. ENGINEERING ECONOMY.
7. QUANTITIVE METHODS IN CONSTRUCTION.
8. CONSTRUCTION PLANT.
9. CONTRACT LAW.
10. MANPOWER PLANNING AND UTILISATION.
11. MARKETING OF ENGINEERING PROJECTS AND SERVICES.
12. WESTGATE BRIDGE.

Educational Prgramme Objectives:

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $)

Describe Nature/objectives of Research

and

Research Facilities (if any)

Are there any special features of your programme. Please indicate.

CIB - 465
Study of Construction Programmes

February 17th, 1981.

Name of Institution UNIVERSITY OF PRETORIA

Faculty/School address PROJECT AND CONSTRUCTION MANAGEMENT DIVISION, DEPARTMENT OF CIVIL ENGINEERING, UNIVERSITY OF PRETORIA, PRETORIA, SOUTH AFRICA

Name, Title of Contact
Name, Title of Respondee PROF F FOURIE

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify Degree included
Year Programme Established							1976
Duration (years) - length of Programme							6 weeks
Enrollment							
Current Part Time							
Current Full Time							
Other (specify)							26
of which							
National							19
Foreign							7
Admission Requirements							Experience
Course Requirements - list number of courses needed whether thesis or not							Attendance no thesis
Scholarship, Fellowship Bursaries, etc.available							2

Language of Instruction ENGLISH

Total Numbers of Students Graduated National 94 Foreign 36

Indicate % of funding by	Administration	Scholarship	Research
Government	0	0	0
Industry	100%	100%	100%
Other(specify)			

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (2) Part Time (4) Industry, Instructors Speakers ..... (8)

Industry Input (Please tick) Financial Administrative (✓) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments

PAGE FIFTY-THREE

Course, Titles, Descriptions (Brochure included)
Indicate Text Title (if any)

Management Accounting and Finance
Engineering Economy
Contract Strategy
Project Management
Contract Law
Marketing of Construction and Engineering Services
Construction Plant
Project Planning and Scheduling
Quantitative Methods in Construction
Operations Analysis
Human Factors
Manpower Planning and Utilization
Personal Organization and the Conduct of Meetings
Process Negotiation

Educational Programme Objectives: To provide professional management training to people in the construction industry who feel that a purely technical background is not enough for their changing responsibilities

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)) difficult to define in relation to other work.

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution UNIVERSITY OF PRETORIA

Faculty/School address CONSTRUCTION MANAGEMENT DEVISION, DEPARTMENT OF CIVIL ENGINEERING UNIVERSITY OF PRETORIA, PRETORIA, SOUTH AFRICA

Name, Title of Contact
Name, Title of Respondee PROF F FOURIE

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established		1974					
Duration (years) - length of Programme		3					
Enrollment							
Current Part Time		20					
Current Full Time		5					
Other (specify) of which							
National		25					
Foreign		—					

Admission Requirements: Bachelor Civil Engineering

Course Requirements - list number of courses needed whether thesis or not: 8 subject (64 units) plus thesis

Scholarship, Fellowship Bursaries, etc.available: From Industrie

Language of Instruction: 80% AFRIKAANS & 20% ENGLISH

Total Numbers of Students Graduated: National 39 Foreign —

Indicate % of funding by	Administration	Scholarship	Research
Government	60		50
Industry	40		50
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (3) Part Time (4) Industry, Instructors Speakers ..... (7)

Industry Input (Please tick): Financial Administrative (✓) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

1. PROJECT PLANNING
2. PROJECT ADMINISTRATION
3. PROJECT ACCOUNTING & FINANCING
4. CONSTRUCTION EQUIPMENT
5. CONSTRUCTION CONTRACT LAW
6. PERSONAL MANAGEMENT
7. OPERATIONS ANALYSIS
8. NETWORKING TECHNIQUES

Educational Prgramme Objectives: To educate better project and construction managers for industrie

Research (Please tick): Organizational (Applied) (✓) Engineering (Hard) (—)

Research Funding (Indicate source & amount (US $)): Industrie $ 20 000 per year; Government $ 10 000 per year

Describe Nature/objectives of Research and Research Facilities (if any): Mostly development work; Computers & Time Lapse equipment

Are there any special features of your programme. Please indicate.

PAGE FIFTY-FOUR

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution Technion, Israel Institute of Technology

Faculty/School address Department of Civil Engineering

Name, Title of Contact Name, Title of Respondee Prof. S. Peer

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1964	1965	1970	-	-	-	-
Duration (years) - length of Programme	4	2	3	-	-	-	-
Enrollment							
Current Part Time		30	3				
Current Full Time	200	16	8				
Other (specify) of which							
National	200	46	9				
Foreign	-	-	2				
Admission Requirements	Matric.	B.Sc.	M.Sc.				
Course Requirements - list number of courses needed whether thesis or not		10 Yes	4 Yes				
Scholarship, Fellowship Bursaries, etc.available	Yes	Yes	Yes				

Language of Instruction Hebrew

Total Numbers of Students Graduated National 65 Foreign 4

		Administration	Scholarship	Research
Indicate % of funding by	Government	-	-	90
	Industry	-	10	10
	Other(specify)	-	20	-

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (3) Part Time (6) Industry, Instructors Speakers ..... (4)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

PAGE FIFTY-FIVE

Course, Titles, Descriptions
Indicate Text Title (if any)

Advanced Statistics
Operations Research
Engineering Economics I and II
Construction Management I and II
Industrialized Building Systems
Building Equipment and Formwork
Managerial Decision Making
Legal Problems in Construction
Special Problems in Construction Management
Financial Planning and Control

Educational Prgramme Objectives:

Advanced studies in Construction Management.

Research (Please tick) Organizational (Applied) (✓) Engineering (Hard) (✓)

Research Funding (Indicate source & amount (US $) ~ 300000 per year

Describe Nature/objectives of Research Basic and applied research

and

Research Facilities (if any) Computer support; time study equipment

Are there any special features of your programme. Please indicate.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution	Musashi Institute of Technology
Faculty/School address	Department of Architecture, Faculty of Engineering 1-28-1 Tamazutsumi, Setagaya-ku, Tokyo, Japan
Name, Title of Contact Name, Title of Respondee	Tadashi Eguchi, Professor

Programme/s offered	○Degree Bachelor	○Degree Master	○Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Speci

Year Programme Established Duration (years) - length of Programme	1929 (the year Department of Architecture established)	
Enrollment	students of Dept. of Architecture	*note:* The Institute has only one faculty comprising six departments. The Department of Civil Engineering has nearly the same number of students. The total students number of six departments is about 4,000. The total of post-graduate is about 100.
Current Part Time	-	
Current Full Time	521 (total of 4 grades)	
Other (specify) of which	20 (post-graduate)	
National	almost all	
Foreign	very few	
Admission Requirements		
Course Requirements - list number of courses needed whether thesis or not	131 units (about 50 courses including general calture and foreign languages courses etc.) *a lecture course of 90 minutes a week for a year is equivalent three "units".*	
Scholarship, Fellowship Bursaries, etc.available	Japan Educational Association's Scholarship (Government funds) and some private scholarship of small amounts.	

Language of Instruction: Japanese

Total Numbers of Students Graduated: National 3,813 (Post-graduate 63) Foreign ____

	Administration	Scoholarship	Research
Indicate % of funding by Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (14) Part Time ( ) Industry,Instructors Speakers ..... (20)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison (V)

Comments: The above is about the Department of Architecture which has four major groups of courses. Separately, the Department of Civil Engineering in the Institute also includes some courses related to construction.

Course, Titles, Descriptions Indicate Text Title (if any): Students are required to learn 82 units (about 30 courses from the following during four years.

Major groups

Architectural design: 17 courses (43.5 units)
- History of Oriental Architecture
- History of European Architecture
- Architectural Planning (1)-(3)
- Architectural Design (1)-(6)
- Urban Planning
- Aspects of Architectures and Cities
- Building Industry
- Building Information

Building structural engineering: 7 courses (22 units)
- Building Structual Dynamics(1)(2)
- Building Structure (1)(2)
- Building Seismic Engineering
- Planning of Building Structure
- Building Structural Engineering Exercises

Building Materials and Construction: 6 courses (19 units)
- Building Materials and Construction Methods(1)(2)(3)
- Planning of building constrction methods
- Building Construction Practices
- Exercises for Building Materials and Construction Methods

Building Environment Engineering: 5 courses (14.5 units)
- Building Environment Engineering
- Building Equipments (1)(2)(3)
- Exercises for Building Environment and Equipments

Common courses:
- Building Experiments
- Seminar for each major groups
- Graduate Thesis

Related courses
- Aesthetics
- Ergonomics
- Industrial Engineering
- Electronic Computer Application
- Field Surveying
- Analysis (Mathematics)
- Applied Mathematics
- Data Processing
- etc.

Research (Please tick): Organizational (Applied) (v) Engineering (Hard) (v)

Research Funding (Indicate source & amount (US $))

Describe Nature/objectives of Research and Research Facilities (if any)

Are there any special features of your programme. Please indicate.

The Department of Architecture belongs to The Faculty of Engineering. This is usual in Japan.
Research on organization and management of construction is not popular in Department of Architecture nor in Department of Civil Engineering. *Researches on engineering* (hard) and design are popular in the both Departments.

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution	Kyoto University Dept. of Civil Engineering
Faculty/School address	Faculty of Engineering Yoshida-Honmachi, Sakyo-ku, Kyoto, 606, Japan
Name, Title of Contact Name, Title of Respondee	Kazuhiro Yoshikawa Professor, Dr. of Eng.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Speci
Year Programme Established		4 years	2 years	3 years			
Duration (years) - length of Programme		10 hr/yr	30 hr/hr				
Enrollment							
Current Part Time							
Current Full Time		120/yr	60/yr	5/yr		in total of dept. od Civil Eng.	
Other (specify) of which		(—)	(10/yr)	(0/yr)		(construction programme)	
National		118	55	4			
Foreign		2	5	1			

Admission Requirements must pass the entrance exam. of Kyoto University

Course Requirements - list number of courses needed whether thesis or not must prepare the thesis

Scholarship, Fellowship Bursaries, etc.available available

Language of Instruction japanese

Total Numbers of Students Graduated average in Construction Programme — National 3 — Foreign 1

		Administration	Scoholarship	Research
Indicate % of funding by	Government	0	50	0
	Industry	0	10	0
	Other(specify)	0	0	0

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (4) Part Time (5) Industry,Instructors Speakers ..... (2)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development (✓)
Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison (✓)

Comments Undergraduate course is not divided into special programme or course such as construction one

Course, Titles, Descriptions Indicate Text Title (if any)

construction planning
construction engineering

related courses
surveying
theory of planning in civil engineering systems and exercise
administration of public works
construction engineering adv.
construction machinery

Educational Programme Objectives:

principle and concept of construction management
technology and techniques for construction management especially based on systems analysis

Research (Please tick) Organizational (Appli d) (✓) Engineering (Hard) (✓)

Research Funding (Indicate source & amount (US $) about 10,000 us$ per year from Ministry of Education

Describe Nature/objectives of Research establish the construction management system

and time-lapse camera set

Research Facilities (if any) portable video set
micro computer system (Sord M200 Mark II series, color graphic display, digitizer etc.)

Are there any special features of your programme. Please indicate.

Kyoto University is a unique university that has Construction Management Programmes.
We have close contact and liaison with construction industry

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CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution: TAKENAKA KOMUTEN CO.,LTD., TECHNICAL RESEARCH LABORATORY.

Faculty/School address: 5-14, 2-chome,MINAMISUNA,KOTO-KU,TOKYO,JAPAN.

Name, Title of Contact: (Mr.) T.KANAIWA, Research Engineer.
Name, Title of Respondee: (Mr.) M.KONDOH, Head of Research Laboratory.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Speci

Year Programme Established
Duration (years) - length of Programme

Enrollment

Current Part Time

Current Full Time

Other (specify)
of which

National
Foreign

Admission Requirements

Course Requirements - list number of courses needed whether thesis or not

Scholarship, Fellowship Bursaries, etc.available

Language of Instruction

Total Numbers of Students Graduated: National ____ Foreign ____

Indicate % of funding by	Administration	Scoholarship	Research
Government			
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time ( ) Part time ( ) Industry,Instructors Speakers ..... ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

Our company, TAKENAKA KOMUTEN Co.,Ltd., is one of representative general contractors in JAPAN.
Please refer to our leaflets enclosed.

Educational Prgramme Objectives:

Research (Please tick): Organizational (Applied) ( ) Engineering (Hard) (

Research Funding (Indicate source & amount (US $)): Private source (TAKENAKA KOMUTEN Co.,Ltd.) & National funds based on projects.

Describe Nature/objectives of Research and Research Facilities (if any): Our Technical Research Laboratory has the following research units ;
FOUNDATION, STRUCTURE, BUILDING EQUIPMENT, CONSTRUCTION, MATERIALS, ENVIRONMENT,etc.
And the research fields of CONSTRUCTION unit include
1) Engineering(Hard)
2) Organization
3) Work study
4) Scheduling & Resource Allocation
5) Building Economy
6) Quality control
7) etc.

Are there any special features of your programme. Please indicate.

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February 17th, 1981

Study of Construction Programmes

Name of Institution	National University of Singapore
Faculty/School address	Faculty of Architecture and Building, Dept. of Building & Estate Management Kent Ridge, Singapore-0511, Republic of Singapore
Name, Title of Contact	Assoc. Prof. Philip Motha, Head, Dept. of Building & Estate Management
Name, Title of Respondee	Surinder Singh, Senior Lecturer

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1970	1970	1970				
Duration (years) - length of Programme	4	1	3-5				
Enrollment							
Current Part Time	N.A.	1	1				
Current Full Time	109	Nil	Nil				
Other (specify) of which							
National	93						
Foreign	16						

Admission Requirements: Candidates must have passed in the General paper and at least two Science subjects at advanced level in the Singapore-Cambridge G.C.E. Advanced Level Examination.

Course Requirements - list number of courses needed whether thesis or not: Twenty nine in four years duration

Scholarship, Fellowship Bursaries, etc. available: Seven

Language of Instruction: English

Total Numbers of Students Graduated: National 133 Foreign 22

Indicate % of Funding by	Administration	Scholarship	Research
Government	100	57	80
Industry	-	43	20
Other(s,specify)			

Staff Numbers: Totals (Indicate #'s): Department Faculty Full Time (8) Part Time (6) Industry, Instructors Specialists (2)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development (✓) Scholarship, Bursaries etc. (✓) Overseeing Body Industry Liaison (✓)

Comments

Course, Titles, Descriptions Indicate Text Title (if any)

Degree Bachelor, B.Sc. Building,
1st Year: Economics, Theory and Practice of Building I Building Sciences I, Law I, Theory and Design of Structures I, Surveying and Levelling, Accounting I.

2nd Year: Theory and Practice of Building II, Building Sciences II, Law II, Quantity Surveying I, Theory of Management, Theory & Design of Structures II Building Services & Equipment I.

3rd Year: Theory and Practice of Building III, Law III Building Services and Equipment II, Quantity Surveying Estimating & Price Analysis I, Project Management I, Construction Economics & Cost Planning I, Theory & Design of Structures.

4th Year: Theory and Practice of Building IV, Quantity Surveying III, Project Management II, Construction Economics & Cost Planning II, Estimating and Price Analysis II, Professional Practic and Procedure, Final Year Project.

Educational Prgramme Objectives: To prepare the students for professional practice in the building and construction industry so that after adequate field experience graduates are capable of entering managerial and executive positions.

Research (Please tick): Organizational (Applied) (✓) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $): Varies from year to year.

Describe Nature/objectives of Research and Research Facilities (if any): To tackle problems of the construction industry Related to building practice, construction economics, project management etc, All modern research facilities are available.

Are there any special features of your programme. Please indicate.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution Middle East Technical University

Faculty/School address: Faculty of Engineering, Department of Civil Engineering, Division of Construction Strategy., Ankara, TURKEY

Name, Title of Contact / Name, Title of Respondee: Dr.D.Arditi,Asst.Prof. of Civil Eng.,Head of the Division of Construction Strategy

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify

Year Programme Established: 1967

Duration (years) - length of Programme: 2 to 3.5

Enrollment

Current Part Time	0
Current Full Time	9
Other (specify)	-
of which	
National	9
Foreign	0

Admission Requirements: BS and 2.67 Min.cumulative grade point average

Course Requirements - list number of courses needed whether thesis or not: 9 courses and thesis

Scholarship, Fellowship Bursaries, etc.available: Yes

Language of Instruction: English

Total Numbers of Students Graduated: National 19 Foreign 1

		Administration	Scholarship	Research
Indicate % of funding by	Government	100 %	90 %	90 %
	Industry	-	10 %	10 %
	Other(specify)	-	-	-

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (3) Part Time (2) Industry,Instructors Speakers ..... (2)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship,Bursaries etc.(x) Overseeing Body Industry Liaison (x)

Comments

PAGE SIXTY-ONE

Course, Titles, Descriptions
Indicate Text Title (if any)

1. CE 101, Civil Engineering Drawing (At undergraduate level)
2. CE 231, Engineering Economy (At undergraduate level)
3. CE 432, Construction Engineering and Management (At undergraduate level)
4. CE 434, Construction Planning
5. CE 436, Forms and Scaffoldings for Reinforced Concrete Structures
6. CE 403, Construction Site Techniques
7. CE 507, Application of Operational Research Methods to Construction Management Prob
8. CE 541, Introduction to Tunnel Construction

Educational Prgramme Objectives: To produce Civil Engineers who are aware of the proble in the industry and who are well equipped for higher managerial posts.

Research (Please tick): Organizational (Applied) (X) Engineering (Hard) (X)

Research Funding (Indicate source & amount (US $)): None

Describe Nature/objectives of Research and Research Facilities (if any): Research is of the "Applied" type. Research projects generall bring a solution to a specific problem encountered at company level. The objective is to increase efficiency by the use of modern methods or adequate measures whenever problems arise.

None

Are there any special features of your programme. Please indicate.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution Chair of Construction Management Technical University of Istanbul

Faculty/School address: Faculty of Civil Engineering, İ.T.Ü.,İnşaat Fakültesi
Yapı İşletmesi Kürsüsü, Taşkışla İstanbul/Turkey

Name, Title of Contact: See Title of Respondee
Name, Title of Respondee: Prof.Dr.-Ing.V.Doğan Sorguç

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1977	Planned* 1977			Planned**		
Duration (years) - length of Programme	3 courses in C.E. education and 1 semester diploma-project	1.5 years	Duration depends on thesis		1 year		
Enrollment							
Current Part Time							
Current Full Time	125						
Other (specify) of which							
National	110						
Foreign	15						

Admission Requirements: Prerequisite Construction Management II

Course Requirements - list number of courses needed whether thesis or not: All C.E.courses and diploma project; Courses related with thesis

Scholarship, Fellowship Bursaries, etc.available: General scholarships available to C.E.students

Language of Instruction: Turkish

Total Numbers of Students Graduated: National 25 Foreign ____

Indicate % of funding by	Administration	Scobolarship	Research
Government	100%	100%	100%
Industry		Negligible	Starting
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (7) Part Time (1) Industry,Instructors Speakers ..... (1)
(2 Prof., 5 Assistants)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development (x)
Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison (x)

(x)Planned development related with x and xx above

Comments: For remarks*** see please: "Development of Construction Education Programme in Turkey",Prof.Dr.V.Doğan Sorguç.
CIB W-65 II. International Symposium on Organization and Management in Construction.Technion (Haifa) October 1978 (Vol.V).

PAGE SIXTY-TWO

Course, Titles, Descriptions
Indicate Text Title (if any)

1. Introduction to construction equipment.
   Description: See the Directory of Construction Engineering Programs, CIB W-65
   Text : "Yapı Makinaları", Prof.S.Ersoy (3 Volumes)
2. Construction Management I
   Description : See the Directory of Construction Engineering Programs,CIB W-65
   Text : Notes and Various books in Turkish
3. Construction Management II
   Description: See the Directory of Construction Engineering Programs, CIB W-65
   Text : Various books in Turkish and in Language of each student as his second Language (mostly English).

Educational Prgramme Objectives: To-day's objective: Basic education of C.E. students in Construction Management and practical training in construction industry through diploma-project considering the subjects of the basic education.
Future objective : Training of managers and businessmen of the Construction Sector.

Research (Please tick): Organizational (Applied) (x) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $)): Technical and Scientific Research Council of Turkey
1500 US $ (1 Project
(With the exchange rate of 1981)

Describe Nature/objectives of Research and Research Facilities (if any): Computer System Burroughs 3700

Are there any special features of your programme. Please indicate.
The target of the program is to contribute to the solutions of problems in the construction industry. This is also considered in the selection of research works which are carried out at all levels. It follows that university industry cooperation is continuously enforced and encoureged.

CIB - W65
Study of Construction

PLANUNGSVERFAHREN IM BAUBETRIEB

Name of Institution: RHEIN.-WESTF. TECHNISCHE HOCHSCHULE AACHEN
PROFESSOR DR.-ING. R. SEELING

Faculty/School address

Name, Title of Contact
Name, Title of Respondee

Programme/s offered	Diploma (civeng.) Degree Bachelor	Diploma (civeng.) Degree (Master)	Degree Ph.D	teacher for techn. professions economical engeneering Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established Duration (years) - length of Programme	2	2	unlimited	2	4		
Enrollment							
Current Part Time	-	-	x	-	-		
Current Full Time	x	x	-	x	x		
Other (specify) of which							
National	x	x	x	x	x		
Foreign	x	x	x	x	x		
Admission Requirements	A-Level	BSc.	diploma	diploma	A-Level		
Course Requirements - list number of courses needed whether thesis or not	2	10	independant work	3	3		
Scholarship, Fellowship Bursaries, etc.available							

Language of Instruction: German

Total Numbers of Students Graduated: National 35 Foreign 5 (per year)

		Administration	Scholarship	Research
Indicate % of funding by	Government	100 %	40 %	50 %
	Industry		10 %	
	Other(specify)		private 50 %	50 %

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (9) Part Time (5) Industry, Instructors Speakers ..... (3)

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Research - Organizational (Applied)
Engineering (Hard)
Research Funding - US $
Research - Construction Equipment + Construction Management

LEHRANGEBOT BAUBETRIEB

(P = Prüfungsfach bzw. Prüfungsvorleistung nach DPO)

Stand: 01.01.1977

Semester		Prof. KUTSCH	Prof. POHLE	Prof. SEELING
VOREXAMEN	1	Maschinenkunde P		
	2	E-Technik P		
ALLG. GRUNDSTUD	5	Bauverf.-technik I P		
	6	Bauverf.-technik II P	Baumaschinenpraktikum	
	7	Bauverf.-technik III P	Übung Bauverf. technik P	Leistungen + Kosten v. B. / Wirtschafts-lehre P
VERTIEFUNG	7	Operations Research I P	Netzplan - technik P	Arbeitsvorbereitung / Unternehmensplanung
	8	Operations Research II P	Rechtsfragen Baubetrieb P	Übung Netzplan-technik P / Baustellen-praktikum P
		Bauverf.-technik IV P	Sem. Bauabwicklung P	Kalkulation P / Management im Baubetrieb / Unternehmensplan-spiel / Bauverf. Tunnelbau
				Sem. Kalkulation P / Sicherheits-technik

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution: Technische Universität München

Faculty/School address: Fakultät für Bauingenieur- und Vermessungswesen
Arcisstraße 21, D-8000 München 2

Name, Title of Contact Person, Title of Respondee: Prof. Dr.-Ing. Gerald Thurner

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of* Programme	Other Specify
*The offered Construction Program (=C.P.) is a part of the total program für Civil Engineers (=C.E.)							

Year Programme Established	1964
Duration (years) - length of Programme	5 years
Enrollment	
Current Part Time	-
Current Full Time	~1000
Other (specify) of which	
National	~90 %
Foreign	~10 %
Admission Requirements	"Abitur" or similar
Course Requirements - list number of courses needed; whether thesis or not	4 courses for basic study of C.E. 10 courses for advanced study of C.P., about 50 % of students make a thesis.
Scholarship, Fellowship Bursaries, etc.available	partially possible

Language of Instruction: German

Total Numbers of Students Graduated: National ~800 Foreign ~80 (for C.P.)

Indicate % of funding by	Administration	Scholarship	Research
Government	100 %	~100 %	1-0 %
Industry			
Other(specify)			

Staff Numbers: Totals 12 (Indicate #'s) Faculty Full Time (8) Part Time (0) Industry, Instructors Speakers ..... (4)

Industry Input (Please tick) none Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

PAGE SIXTY FOUR

Course, Titles, Descriptions
Indicate Text Title (if any)
for basic studies: Construction Management (= C.M.) I, II, III (3 course
Exercises to Construction Management

for advanced studies:
compulsory: Construction Management IV
Exercises to Construction Management IV
Safety of site work

optional: three streams, each consisting of 3 courses

1. Scheduling techniques; project management; constructi equipment
2. Bidding and contracting; building economics; legal aspects in C.E.
3. Operation research in C.M.; statistics in C.M.; data processing in C.M.

Educational Programme Objectives:
To educate Civil Engineers with Diploma, specializing in C.M.

Research (Please tick)	Organizational (Applied) (x) Engineering (Hard) (x)
Research Funding (Indicate source & amount (US $)	included in general budget, not specified separately
Describe Nature/objectives of Research and Research Facilities (if any)	Research pertaining to all fields of C.M. Computer facilities of the university

Are there any special features of your programme. Please indicate.

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution DELFT UNIVERSITY OF TECHNOLOGY

Faculty/School address DEPT. OF CIVIL ENGINEERING
Stevinweg 1, Delft, Holland

Name, Title of Contact D.J.Knip, Th.Horstmeier, D.W.Greven.
Name, Title of Responder

Programme/s offered	Degree - helor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1963						
Duration (years) - length of Programme	5						
Enrollment							
Current Part Time							
Current Full Time	40						
Other (specify) of which	-						
National	35						
Foreign	5						
Admission Requirements	B.Sc.						
Course Requirements - list number of courses needed whether thesis or not	several						
Scholarship, Fellowship Bursaries, etc.available	for nationals goverments scholarships are available						

Language of Instruction Dutch

Total Numbers of Students Graduated est. National 280 Foreign 15

		Administration	Scholarship	Research
Indicate % of funding by	Government	100%	100%	90%
	Industry	-	-	10%
	Other(specify)	-	-	-

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (4) Part Time (6) Industry,Instructors Speakers ..... (3)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Developmenc ( ) Scholarship,Burseries etc.( ) Overseeing Body Industry Liaison ( )

Comments Over half of the current student ebrollment fullfills the master thesis requirements within industrie and other real world projects.

Course, Titles, Descriptions (translated titles)
Indicate Text Title (if any)

bb20: The organisation of Construction
bb21: The constructionplanning and decissionmaking in civil engineering projects
bb23: Project Organisation
bb30: System and Industrial Dynamics
Design and Constructions
bb25: Decision Analysis in Civil Engineering(all courses have text's with the same titl

Educational Prgramme Objectives: Provide students with the tools and knowledge to be able to function succesfully within a construction engineering enviornment

Research (Please tick) Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding
(Indicate source & amount (US $) Governmental $ 150.000,-- est.

Describe Nature/objectives of Research and Research Facilities (if any)
Simulation modelling in Civil Engineering
Project Management
Design-build studies (c.a.d.
Project preparation
Real World companies to conduct research on exciting problem
National building research foundation

Are there any special features of your programme. Please indicate.

-For everyone out of the about 200 graduating C.E.students is it possible to undertake a (minor) construction project
-About 25 students undertake a major program

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CIB - W65
Study of Construction Processes

February 17th, 1981.

Name of Institution: UNIVERSITY OF TECHNOLOGY

Faculty/School address: DEN DOLECH, EINDHOVEN. THE NETHERLANDS

Name, Title of Contact
Name, Title of Respondent: Professor ir. L.P. Sikkel.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other (specify)

Year Programme Established
Duration (years) - length of Programme: 5 years + ½ year (till 1/9/1982)
4 years + 4 years (after 1/9/1982)

Enrollment:
- Current Part Time: none
- Current Full Time: 18 semesters, each ½ year.
- Other (specify) of which
- National: national.
- Foreign

Admission Requirements: preliminary higher education school.

Course Requirements - list number of courses needed whether thesis or not: X

Scholarship, Fellowship Bursaries, etc. available: none.

Language of Instruction

Total Numbers of Students Graduated: National ____ Foreign ____

Indicate % of funding by	Administration	Scholarship	Research
Government	100%	100%	100%
Industry			
Other (specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (6) Part Time (0) Industry, Instructors Speakers occasionally.

Industry Input (Please tick): Financial ~~Administrative~~ ( ) Curriculum Development ( ) ~~School~~ Fellowships Bursaries etc. ( ) ~~Overseeing~~ Only Industry Links ( )

Comments:

Course, Titles, Descriptions
Indicate Text Title (if any)
Study of Building Engineer - three years master course + two years study Constr. Management (including one year research in practice of industry.)

Educational Programme Objectives:

Research (Please tick): Organizational (Applied) (X) Engineering (Hard) (X)

Research Funding (Indicate source & amount (US $)): 35% of time to be used in Research

Describe Nature/objectives of Research and Research Facilities (if any):
A. Construction - Organisation objects
B. Construction - realisation objects
not specific => "our laboratory is the industry"

Are there any special features of your programme. Please indicate.

L.P. Sikkel.

DOCUMENT CIB

3/1

Name of Institution: Technical University of Budapest

Faculty/School: Faculty of Mechanical Engineering, Department of Bus iness Management

Address: Division for Construction Management Budapest, Muegyetem rkp. 1 - 3.

Name, Title of Contact

Name, Title of Respondee

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph. D.	Non-deg.[x] Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established				beginning at 1980			
Duration (years) - length of Programme				2 years			
Availability (indicate current student nos) Part-time				40 persons			
Full-time							
Other (specify)							
National / Foreign Year				all nat.			
Admission Requirements				First Univ. Degree			
Course Requirements - list of courses needed and thesis/project				Univ. Degree in Mechanics, Eletrics or Chemics			
Scholarship, Followship Bursaries, et c. available							

Language of Instruction: Hungarian

Total Numbers of Students Graduated: National – Administration 100%; Foreign – Scholarship 100%; Research 50%

Funding: (Indicate %) Government; Industry 50%

Staff Numbers: Totals contemplated only — Faculty Full Time ( ) 1/3; Part time (2) 1/3; Industry, Instructors, Speakers ( ) 1/3

3/2

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development; Scholarship, Bursaries, etc (x) Overseeing Body Industry Liaison ( )

Course, Titles, Descriptions

Indicate Text Title (if any): see attached

Educational Programme Objectives: To train experts in a high level for industrial companies, specializing in construction management, organization and economy

Research (Please Tick): Organizational (Applied) (x) Engineering (Hard) ( )

Research Funding (Indicate source and amount (US $)

Describe Nature/objectives of Research: To increase efficiency of construction projects by use of modern methods and systems

Research Facilities (Describe briefly if any)

Publications by Programme - only those that can be purchased (do not list articles in publications or out of print): none

( ) Please check in interested in having above listed in National Technical Information Service for world wide distribution. (Separate instructions will follow on procedures for submittal.)

Faculty of Mechanical Engineering

Division for Construction Management

I. Theoretical Subjects

1./ Economic Policy
2./ Accounting
3./ Construction law
4./ Practical Statistics
5./ Planning and Control of Quality
6./ Financial, Costing and Accounting Managment
7./ Economy of Industry and Companies
8./ Theory of Organization
9./ Information systems
10./ Theory and Methodology of Decision
11./ Theory and Techniques of Managment
12./ System Analysis

II. Special Subjects

1./ Trade Law
2./ Investment Law
3./ Investment Policy
4./ Applied Methodology in Organization
/ Modells and techniques /
5./ Diploma Project

1/2

Industry Input (Please tick) — Financial Administrative ( ) Curriculum Development; Scholarship, Bursaries, etc (X) Overseeing Body Industry Liaison ( )

Course, Titles, Descriptions Indicate Text Title (if any): see attached

Educational Programme Objectives: To train co tractors specializing in advanced constructions, techniques and their organization and economic

Research (Please Tick) — Organizational (Applied) (X) Engineering (Hard) ( )

Research Funding (Indicate source and amount (US $)

Describe Nature/objectives of Research: Organization, some operations research techniques, materials.

Research Facilities (Describe briefly if any)

Publications by Programme - only those that can be purchased (do not list articles in publications or out of print)

( ) Please check in interested in having above listed in National Technical Information Service for world wide distribution. (Separate instructions will follow on procedures for submittal.)

1/1

Name of Institution: Technical University of Budapest

Faculty/School: Faculty of Architecture, School of Contractor Experts

Address: Miegyetem rakpart 1-3, Budapest

Name, Title of Contact / Name, Title of Respondee: dr. Pál NAGY Chairman of the Course

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph. D.	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established				1965			
Duration (years) - length of Programme				2			
Availability (indicate current student nos) Part-time			1-2	40			
Full-time							
Other (specify)							
National				38			
Foreign Year				2			

Admission Requirements: First Univ. Degree

Course Requirements - list of courses needed and thesis/project: Univ. Degree in Architecture or Civil Engineering

Scholarship, Fellowship Bursaries, et c. available

Language of Instruction: Hungarian

Total Numbers of Students Graduated: National 348 Foreign 2

	Government	Industry
Funding: (Indicate %)	Administration 100	Scholarship 100
		Research 40 60

Staff Numbers: Totals — Faculty Full Time ( ) 8 — Part time ( ) 7 — Industry, Instructors, Speakers ( ) 8

Technical University of Budapest

School of Contractors Experts

N/3

Subjects	Semester
New Building Materials	1.
Mechanization of Building Processes	1. and 2.
Mathematical Economy of Building	1. and 2.
Civil Engineering in Building /a and underlevel works in building/	1. and 2.
Safety of the Site	1.
Contracts and Law in Construction	1.
Advanced Building Technologies	2. 3. and 4.
Advanced Trade Technologies	2. 3. and 4.
Advanced Processes in Organization	2. 3. and 4.
Introduction to the Computertechniques	3.
Transport and Materialmanagment of Construction	3.
Technologies of Concret Structures	3.
Problems of technology and Organi - zation in the Industrialized Pre- fabrication	4.
Introduction to the Theory of Orga- nization	4.
Light- weight Building Systems	4.
Development and Effeciency of the Construction	4.
Advanced Technologies in Mechanical and Electrical Systems for Building	4.

1/2

Industry Input (Please tick) — Financial Administrative ( ) Curriculum Development; Scholarship, Bursaries, etc (x) Overseeing Body Industry Liaison (x)

Course, Titles, Descriptions Indicate Text Title (if any) — see attached

Educational Programme Objectives: To train experts specializing in general contracting / single responsibility lump sum, projects/

Research (Please Tick) — Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source and amount (US $)) —

Describe Nature/objectives of Research —

Research Facilities (Describe briefly if any) —

Publications by Programme - only those that can be purchased (do not list articles in publications or out of print) — Cyclosted text and summaries on selected topics / available on request from the Institute/

( ) Please check in interested in having above listed in National Technical Information Service for world wide distribution. (Separate instructions will follow on procedures for submittal.)

2/1

Name of Institution: Institute of Postgraduated Studies at K. M. U. Economics

Faculty/School Address: School of Economics Experts. General Contractors Course/ with specialization in domestic and export contracting/
1828 Budapest Hungary

Name, Title of Contact: dr. Sandor CSIKY Chairman of Guiding Committee of the above course
Name, Title of Respondee: dr. László Lukács, Secretary of the same Committee

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph. D.	Non-deg. Diploma x	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established				1979			
Duration (years) - length of Programme				2 to 2,5 years			
Availability (indicate current student nos) Part-time				30 persons		3. sem.	
Full-time				35 "		1. "	
Other (specify)							
National / Foreign Year				all nationals			
Admission Requirements				First Univ. Degree			
Course Requirements - list of courses needed and thesis/project				Univ. Degree in Economics, Politechnics or Law + 2 years practice			
Scholarship, Fellowship Bursaries, et c. available				The tuition fees of those students sponsored by their companies are paid by their employer.			

Language of Instruction: Hungarian

Total Numbers of Students Graduated: National - Foreign - Administration - Scholarship - Research

Funding: (Indicate %) Government / Industry: The Institute is self supporting

Staff Numbers: Totals — Faculty Full Time ( ) 0 — Part time ( ) 1 — Industry, Instructors, Speakers ( ) 20 to 30

* with possibility of obtaining master's degree

School of Economics Expert

Subjects	Domestic Specialization	Export Specialization
1. Theoretical Subjects		
1.a Economic Policy and Planning	+	+
1.b Current problems of economics graw	+	+
1.c Technikal Progress	+	+
1.d Development Economic and World Economy	+	+
1.e Economic Relations with Developing Countries	+	+
2. Methodology		
2.a System Analysis	+	+
2.b Calculation of Economic Efficiency	+	+
2.c Harmonization of Interest / inter-company diplomacy/	+	+
2.d Accounting and Financial of Companies in G. C.	+	+
2.e Planning Organization and the Management on Investments	+	
2.f Technicaties of Foreign Trade		+
2.g International Forwarding and Transporting Surrance		+
3. G. C. E.		
3.a Business and Legal Environment for G. C.	+	+
3.b General Contracting Law	+	+

3.c Fiscal and Financial Problems of G.C.	+	+
3.d Organization of G. C. Agencies	+	+
3. e The Functions of the G. C.	+	+
3.f The G.C. and His Suppliers	+	+
3.g The G.C.' s Market	+	+
4. Workshops	+	+

February 14th, 1981.

Name of Institution: Dublin Institute of Technology

Faculty/School: School of Architecture, Surveying & Building
Address: College of Technology, Bolton Street, Dublin 1 Ireland.

Name, Title of Contact: Kevin Fox, Head of School, B.Arch. FRIAI., ARHA
Name, Title of Respondent: Eanna DeBurca, FRICS, FCIOB, Head of Dept. of Surveying & Building Technology.

Programmes offered	Degree (B.E. Tech)	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1968	-	-	1965	-	-	-
Duration (years) - length of Programme	4 (Full Time) 6 (Part-Time)			3 (Full Time) 4 (Part-Time)			
Enrollment							
Current Part Time	48			167			
Current Full Time	99			50			
Other (specify) of which	-			-			
National	Generally Irish, occasionally from Overseas.						
Foreign							

Admission Requirements: University entrance/equivalent.

Course Requirements - list number of courses needed whether thesis or not: 11 and Final Thesis 10

Scholarship, Follow Up Bursaries, etc.available: State Student grants, Local Authority & other scholarships.

Language of Instruction: English or Irish

Total Numbers of Students Graduated Currently Average per annum 20 (Degree Level): National __ Foreign __

Indicate % of funding by:	Administration	Scholarship	Research
Government	100	-	
Industry	-		
Other(specify)	-		

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (27) Part Time (23) Industry, Instructors Speakers Av. .... 10 p.a.

Industry Input (Please tick): Financial/Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.(/) Overseeing Body Industry Liaison ( )

Comments: The College Diploma in Construction Economics is of degree-level since establishment and recognised by the Royal Institution of Chartered Surveyors and Institute of Building. The degree of Bach. of Science (Surveying) of University of Dublin is awarded in parallel, since 1977, without further examination.

Courses, Titles, Descriptions (Indicate Text Title if any):

Construction Economics Diploma/B.Sc. (Surv).

Mathematics, Science, Measurement of Buildings, Construction Technology, Building Economics, Law, Computers, Land Surveying; Financial Management; Production Management and Contract Administration.

Construction Technician Diploma

Mathematics, Science, Measurement of Buildings, Construction Technology, Economics, Law, Land Surveying Building Accounts Estimation and Management.

Educational Programme Objectives: C.E.D./B.Sc.(Surv) - qualification in Construction Management with Quantity Surveying option.

C.T.D. Diploma - qualification in Middle Management for Construction Industry.

Research (Please tick) /: Organizational (Applied) (/) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $): Professional and Industrial sources - varies according t project.

Describe Nature/objectives of Research and Research Facilities (if any): Construction Management, economic and organisational aspects, Financial Administration in conjunction with University and State Research Institutes (An Foras Forbartha - National Institute for physical Planning and Construction Research).

Are there any special features of your programme. Please indicate.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution	UNIVERSITY OF TRONDHEIM NORWEGIAN INSTITUTE OF TECHNOLOGY
Faculty/School address	CIVIL ENGINEERING DEPARTMENT 7034 TRONDHEIM - NTH, NORWAY.
Name, Title of Contact Name, Title of Respondee	PROFESSOR DR.ING. REIDAR HUGSTED SAME

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established Duration (years) - length of Programme	4½	2½ →					
Enrollment							
Current Part Time							
Current Full Time	20	0 →					
Other (specify) of which							
National Foreign	NORWEGIAN						

Admission Requirements	STANDARD CERTIFICATE OF SECONDARY EDUCATION WITH SPECIALIZATION IN MATHEMATICS, PHYSICS AND CHEMISTRY
Course Requirements - list number of courses needed whether thesis or not	THESIS (DIPLOMA) IS OBLIGATORY. 15 COURSES IN FIRST PART OF STUDY. 2 YEARS. ABOUT 12-15 COURSES IN SECOND PART 1½ YEAR. MASTER REQUIRES 3 COURSES AND THESIS (ONE YEAR).
Scholarship, Fellowship Bursaries, etc.available	IS AVAILABLE TO ALL STUDENTS AS SCHOLARSHIPS AND LOANS FROM STATE STUDY BANK.
Language of Instruction	

Total Numbers of Students Graduated WITH THESIS IN CONSTRUCTION ENGINEERING 10 PER YEAR National ____ Foreign ____

		Administration	Scholarship	Research
Indicate Z of funding by	Government	100	100	80
	Industry			20
	Other(specify)			

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (7) Part Time (1) Industry,Instructors Speakers ..... (1 / 4)

Industry Input (Please tick) Financial Administrative (X) Curriculum Development ( ) Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments NORW.INST. OF TECHN. HAVE THREE ACADEMY DEGREES. THE DEGREE IN ENGINEERING REQUIRES A THESIS, TAKES 4½ YEARS OF FULL TIME STUDY AND IS CONSIDERED EQUIVALENT OF MASTER DEGREES. THE DEGREE OF DR.ING. REQUIRES 2½-3 YEARS OF FULL TIME STUDY WITH ADVANCED COURSES AND THESIS. IT IS CONSIDERED AS EQUIVALENT TO PH D.

Course, Titles, Descriptions
Indicate Text Title (if any)

1. CONSTRUCTION PLANNING. BASIC.
   COVERS NETWORK PLANNING, OTHER PLANNING SYSTEMS, CALCULATION METHODS, INVESTMENT ETC.
2. BUILDING CONSTRUCTION. BASIC.
   COVERS METHODS AND EQUIPMENT USED IN ALL SORTS OF CONCRETE WORK ALSO LABOUR RELATIONS AND INCENTIVES.
3. CONSTRUCTION ENGINEERING. BASIC.
   COVERS HEAVY CONSTRUCTION WITH EMPHASIS ON TUNNELLING, FULL FACE, QUARRIES WITH EQUIPMENT AND METHODS, WORK REQUIREMENT AND LABOUR CONDITIONS.
4. BUILDING CONSTRUCTION, ADVANCED.
   COVERS CONTRACTING AND LEGAL ASPECTS AND PROJECT PLANNING IN MORE DETAIL.
5. CONSTRUCTION ENGINEERING. ADVANCED.
   COVERS IN DEPTH A SPECIFIC AREA IN CONSTRUCTION.
6. PROJECT WORK. ADVANCED. IS LINKED TO 4 OR 5.
7. MASTER THESIS.

Educational Prgramme Objectives:

TO ENABLE STUDENTS TO UNDERSTAND AND TAKE ACTIVE PART IN THE BUILDING AND CONSTRUCTION PROCESS. AFTER GRADUATION.

Research (Please tick)	Organizational (Applied) (X) Engineering (Hard) (X)
Research Funding (Indicate source & amount (US $)	FROM GOVERNMENT WITH SOME ASSISTANCE FROM INDUSTRY. (10 - 15 000 $ PER YEAR MAX).
Describe Nature/objectives of Research	TO DEVELOP BUILDING AND CONSTRUCTION CONSTRUCTION METHODS. TO DEVELOP CONSTRUCTION PLANNING METHODS TO DEVELOP MANAGING METHODS IN BUILDING AND CONSTRUCTION.
and Research Facilities (if any)	ONLY OFFICES. NO LABS. COMPUTER CAPACITY IS AVAILABLE.

Are there any special features of your programme. Please indicate.

MOST THESIS WORK ARE DONE IN COLLABORATION WITH CONTRACTING COMPANIES OR GOVERNMENT AGENCIES DOING BUILDING AND CONSTRUCTION WORK. STUDENTS MAY WORK ON SITES TO GET INFORMATION, GATHER MATERIAL AND TO ANALYZE PROBLEMS.

THE THIRD DEGREE OF DR.TECHN. IS SIMILAR TO THE DR. OF SCIENCE DEGREE.
A MASTER THESIS IN CONSTRUCTION ENGINEERING REQUIRES THE STUDENT TO GO THROUGH CERTAIN COURSES COVERING PROJECT MANAGEMENT, CONSTRUCTION ENGINEERING (HEAVY CONSTRUCTION) AND BUILDING TECHNIQUES. ALSO PROJECT WORK MAY BE INCLUDED. THE TOTAL PROGRAM COVERED BY THE DIVISION OF CONSTRUCTION ENGINEERING COVERS THREE BASIC COURSES AND THREE ADVANCED COURSES.
THE NORWEGIAN INSTITUTE OF TECHNOLOGY IS FINANCED BY THE GOVERNMENT. RESEARCH MONEY FROM OTHER SOURCES ARE AVAILABLE. STUDIES ARE FREE OF TUTION.

Name of Institution INSTITUTUL POLITEHNIC CLUJ-NAPOCA

Faculty/School FACULTATEA DE CONSTRUCTII
Address 3400 CLUJ-NAPOCA (ROMANIA) STR EMIL ISAC Nr 15

Name, Title of Contact
Name, Title of Respondee PROF DR ING EUGEN BEILI

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D.	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other: Specify
Year Programme Established	26+8 1)	26+8 1)					Post M.S. 4 week courses
Duration (years) - length of Programme	3	5	% frequency needed				
Availability (Indicate current student nos) Part-time	360	360					
Full-time	450	2150					
Other (specify)							
National Year	400	1350					
Foreign	50	800					
Admission Requirements	Lycee graduates with School-leaving examination diploma						
Course Requirements - list of courses needed & thesis/project	8 design projects 20/13	30/22					
Scholarship, Fellowship Bursaries, etc. available	150	800					

Language of Instruction ROMANIAN

Total Numbers of Students Graduated — National eng 260 seng 90 — Foreign eng 170 seng 15

		Administration	Scholarship	Research
Funding: (Indicate %)	Government	100	95	30%
	Industry	–	--	70%
	Other (specify)	–	5	–

Staff Numbers: Totals (Indicate #'s) (213) Faculty Full Time (167) Part time (–) Industry, Instructors, Speakers (66)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( )
Scholarship, Bursaries, etc( ) Overseeing Body Industry Liaison ( )

Course, Titles, Descriptions
Indicate Text Title (if any)

1. Mathematical Analysis, Linear Algebra Analytical Geometry, Programming
2. Surveying
3. Civil engineering materials
4. Theoretical and applied physics
5. Mechanics, Strength of materials, Theory of elasticity, Statics, dynamics and stability of structures
6. Soil mechanics and foundations
7. Reinforced concrete and r.c. structures
8. Civil, industrial and agricultural buildings
9. Metal structures
10. Civil engineering technology
11. Engineering economy and legislation
12. Foreign languages

(continued)

Educational Programme Objectives:

Research (✓) Organizational (Applied) ( ) Engineering (Hard) ( )
(Please tick)

Research Funding
(Indicate source & amount (US $)) 217 000 $
410 000 $

Describe Nature/objectives of Research

Efficient building systems, new civil engineering technologies for civil industrial and agricultural buildings, modern methods for engineering analysis, management and economy

Research Facilities
(Describe briefly if any)

- Specialization of researchers and teachers at other romanian and foreign institutes (1 month - 1 year)
- Doctoral research in Romania and abroad
- Co-operation with building entreprizes

Publications by Programme - only those that can be purchased (do not list articles in publications or out of print) 10 40

Note Manuals and technical literature for above mentioned courses and others

( ) Please check if interested in having above listed in National Technical Information Service for world wide distribution. (Separate instructions will follow on procedures for submittal).

1) Practice week

CIB - W65
Study of Construction Programmes

February 17th, 1981.

Name of Institution Building Economics & Construction Management

Faculty/School Chalmers University of Technology
address S-412 96 GÖTEBORG
Sweden
Name, Title of Contact Yngve Hammarlund, Prof. (head) or Hans C. Björnsson, Assoc.Prof.
Name, Title of Respondee Hans C. Björnsson, Assoc. Prof.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established		1976 (current curriculum)					
Duration (years) - length of Programme		4.5	4				
Enrollment							
Current Part Time			2				
Current Full Time		40	4				
Other (specify) of which							
National		90%	100%				
Foreign		10%	0%				

Admission Requirements Highschool/MCE for the PhD degree

Course Requirements - list number of courses needed whether thesis or not 9 courses
The school has a general thesis requiremtn

Scholarship, Fellowship Bursaries, etc.available

Language of Instruction Swedish

Total Numbers of Students Graduated National ___ Foreign ___

Indicate % of funding by	Administration	Scobolarship	Research
Government	100%	100%	100%
Industry			
Other(specify)			

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (3) Part Time ( ) Industry,Instructors Speakers ..... (8)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( )
Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison (x)

Comments The construction programme in one of four optimal programs in the School of Civil Engineering towards the degree "civilingenjör" which is a four year prgrame.
(eq. to MCE)

Course, Titles, Descriptions
Indicate Text Title (if any)

Economics & Law
Building Economics and Organization
Human Aspects of Civil Engineering
Building Economics II
Construction Engineering Systems II
Accounting
Building Economics III
Construction Engineering Systems III
Town Planning Legislation

Educational Prgramme Objectives: The program shall give a) understanding for the mutual dependence between building and social development, b) a broad economic basis of knowledge with emphasis on building economy.
The program aims at enabling the students to identify, formulate and solve problems related to construction and to acquire knowledge from techno-economic research and development activities

Research (Please tick) Organizational (Applied) (x) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $) The Council for Building Rescearch (BFR), Sweden

Describe Nature/objectives of Research and Research Facilities (if any)

Five areas:
1. Economics & Building: The role of the building industry in the economy
2. Project Management
3. Applications of Systems Analysis/Operations Research to Construction
4. Cost Estimating & Cost Control
5. Construction Engineering Systems: Analysis, choice and organization of production factors

Are there any special features of your programme. Please indicate.

PAGE SEVENTY-SEVEN

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution	Department of Construction Management and Industrial Engineeri
Faculty/School address	Lund Institute of Technology, P.O.B. 725, S-220 07 Lund 7, Swe
Name, Title of Contact Name, Title of Respondee	Sten E. Wallin, Professor, D.Sc.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Spec
Year Programme Established		x	x				
Duration (years) - length of Programme		4	8				
Enrollment							
Current Part Time		5 %					
Current Full Time		95 %					
Other (specify) of which		-					
National		Swedish					
Foreign		20 % start 5 % finish					
Admission Requirements		Higher school certificate					
Course Requirements - list number of courses needed whether thesis or not							
Scholarship, Fellowship Bursaries, etc.available		Very few					

Language of Instruction: Swedish

Total Numbers of Students Graduated: National 60 Foreign 3

	Administration	Scoholership	Research
Indicate % of funding by Government	95		5
Industry	5		
Other(specify)			

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (3) Part Time (3) Industry, Instructors Speakers ...2... (8)

Industry Input (Please tick): Financial Administrative (x) Curriculum Development (x) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison (x

Comments

Course, Titles, Descriptions Indicate Text Title (if any)

1. Construction management and general housing construction
   Construction process in society
   The project work
   The purchasing
   The financing
2. Production - and cost monitoring in construction indust
   The calculation
   The monitoring in production phase
   The local management on building site
   The general conditions of production
   Computer assistance
3. Real estate management
   The management law
   The assissment
   Maintenance and repairs
   etc.

Educational Programme Objectives: Designing production processes adapted to the conditions on the building sites
Designing environments for comfort and satisfaction
Planning and managing work in the production of buildings, plants, transport system and communications

Research (Please tick): Organizational (Applied) (x) Engineering (Basic)

Research Funding (Indicate source & amount (US $)): Swedish Building Research Institute $ 100,000

Describe Nature/objectives of Research: Cost monitoring of projecting and production

and

Research Facilities (If any): Computers

Are there any special features of your programme. Please indicate.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution Department of Building Economics and Organization

Faculty/School address The Royal Institute of Technology
S-100 44 Stockholm, Sweden

Name, Title of Contact Professor Hans G Rahm
Name, Title of Respondee Professor Hans G Rahm

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specl
Year Programme Established		1981	1976				
Duration (years) - length of Programme		4	4 (5)				
Enrollment							
Current Part Time			2				
Current Full Time		340	1				
Other (specify) of which							
National		270	3				
Foreign		70					
Admission Requirements		Student Examination	Civil Engineer				
Course Requirements - list number of courses needed whether thesis or not		160 points x)	140 points x) incl thesis				
Scholarship, Fellowship Bursaries, etc.available		yes	yes				
Language of Instruction		Swedish	Swedish				

Total Numbers of Students Graduated National 90 Foreign 20

Indicate % of funding by	Administration	Scoholarship	Research
Government	100		95
Industry		100	5
Other(specify)			

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (3) Part Time (3) Industry,Instructors Speakers ..... 00)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development (X)
Scholarship,Bursaries etc.(X) Overseeing Body Industry Liaison ( )

Comments x) 1 point = 1 effective week of studies

Research - Organizational (Applied) Research Funding - Swedish Council for Bldg. Res. 320,000/yr.

SUMMARY OF COURSES FOR CIVIL ENGINEERING STUDENTS

Course	Year	Status	Lectures (h)	Exercises (h)	Number of student
(a) Construction Industry and the Economy	1	Compulsory	18	12	140
(b) Building Economics	3	Compulsory	30	60	120
(c) Construction Management	3	Optional	24	54	60
(d) Law for the Construction Industry	4	Optional	24	12	50
(e) Property Management	4	Optional	24	12	50
(f) Planning of Rock Blasting Operations	4	Optional	12	36	50

(a) Construction Industry and the Economy

The first course encountered by the students is intended to provide an elementary introduction to the economic links between the construction industry and society as a whole. Thus a broad coverage of the construction process, market conditions for the industry and government means of control is presented. Half the course is devoted to the fundamentals of the economic theory.

(b) Building Economics

In their third year, all students participate in a course that emphasizes management and economic control in construction projects, from feasibility studies to operational planning and estimating for the contractor. Exercises deal mainly with the application of planning and estimating methods. A wide range of subjects may also be chosen for seminar papers, based on computerized information retrieval.

(c) Construction Management

Another third-year course offers a more specialized treatment of the construction phase together with preceding negotiations. Activities of the construction firm are analysed. An overview of construction methods and typical problems of occupational health and safety in the industry is given.

(d) Law for the Construction Industry

A number of legal subjects with special relevance to the construction industry are developed within this course: the structure of building legislation, labor market laws, the law of contract and applications of standard agreements and contracts.

(e) Property Management

Recent emphasis on life cycle costs and the existing stock of buildings has prompted the creation of a course that deals with legal and economic aspects of property management, including maintenance planning.

(f) Planning of Rock Blasting Operations

A vital issue in Swedish construction exports is efficient planning and performance in rock blasting operations. Methods and equipment are taught in this course.

The postgraduate program

Higher technical education above the degree of Civilingenjör is uniform in Sweden; nominally, there is a four-year education leading to the degree of Teknologie Doktor. About half the time is devoted to courses, and the remainder is spent on the dissertation, which has to be published and defended in public.

Seminars on various research topics are held by the Department about five times each year. Otherwise, there are no fixed courses except set lists of literature, but without any formal teaching, due to limited resources and the small number of postgraduate students. Actually, co-operation with the University of Stockholm and the Stockholm School of Economics makes it possible to follow courses there, a possibility which is used by the majority of research students.

In most cases, research is funded by the Swedish Council for Building Research. Practically all research work is more of less closely tied to dissertation projects. Recent dissertations concern integrated systems for planning and estimating in the construction firm (U. Danielson) and government support of housing rehabilitation (J. Bröchner).

Ongoing research includes a project on the influence of user behavior on energy consumption in single-family housing (E. Lundström).

New courses during the academic year 1981-82:

	Year	Status	Lectures (h)	Exercises (h)	Number of students
(g) Project Management	4	Optional	18	24	50
(h) Business Administration	4	Optional	24	48	40

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution Institute for Planning, Project and Construction Management

Faculty/School address Swiss Federal Institute of Technology in Zurich
ETH-Hoenggerberg, 8093 Zurich, Switzerland

Name, Title of Contact Prof.Dr.A.Pozzi (Chairman), Prof.Dr.O.Stradal
Name, Title of Respondee

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1972	1974	1972				
Duration (years) - length of Programme	4 1/2	1 1/2	3 1/2				
Enrollment							
Current Part Time							
Current Full Time	60	6-8	2				
Other (specify) of which							
National							
Foreign							

Admission Requirements Examination or High School Diploma (Matura)

Course Requirements - list number of courses needed whether thesis or not	6	8 Thesis	Thesis

Scholarship, Fellowship Bursaries, etc.available Application at Federal State Level

---

Language of Instruction German

Total Numbers of Students Graduated National 100 Foreign 10

		Administration	Scholarship	Research
Indicate % of funding by	Government	100%	100%	70%
	Industry			30%
	Other(specify)			

Staff Numbers: Totals (Indicate #'s) Faculty Full Time (2) Part Time (6) Industry,Instructors Speakers ..... (4)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development (x)
Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

A. General Courses for all Students:

1. Sem.	Engineering Economy 1	2/0
2. Sem.	Engineering Economy 2	2/1
3. Sem.	Engineering Project Planning	2/2
4. Sem.	Construction Methods	2/2
5. Sem.	Construction Management	2/2
6. Sem.	Project Management	2/2

B. Courses for Specialization

6. Sem.	Special Construction Methods	2/1
	Cost Accounting	1/1
	Systems Engineering	1/1
7. Sem.	Construction Management	2/1
	Design Management	2/1
	Legal Aspects 1	2/1
	Operations Research	2/1
	Economics 1	1/1
8. Sem.	Project Management	2/1
	Managing Construction Business	2/1
	Legal Asepcts 2	2/1
	Operations Research	2/1
	Economics 2	1/1

Educational Prgramme Objectives:
A continmous training of all Civil Engineering Students at the undergraduate level in the first 6 Semester, followed by one year of specialization in the field of Project and Construction Management of a smale number of students at the masters level.

Research (Please tick) Organizational (Applied) (x) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $) University and Government Funds
Industry and Special Funds

Describe Nature/objectives of Research
and
Research Facilities (if any)

- Rules to Design Project organisations
- Methodologie for Problem solving in Engineering
- Management of Large Projects
- Cost-Benefit Analysis Tecniques in Engineering
- Micro Computers in Construction Management

Are there any special features of your programme. Please indicate.

PAGE EIGHTY-ONE

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution Heriot-Watt University, Edinburgh, U.K.

Faculty/School address Department of Building, Faculty of Engineering, Chambers Street, Edinburgh EH1 1HX.

Name, Title of Contact
Name, Title of Respondee Professor V.B. Torrance

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1960	1977	1972	1977	None	Yes	Part-time
Duration (years) - length of Programme	4 yrs.	1 yr. f.t. or 2 yrs. p.t.	3 yrs. f.t. or 5 yrs p.t.	1 yr. f.t. or 2 yrs. p.t.		Blocks of M.Sc. Prog.	B.Sc. 1981/82
Enrollment							
Current Part Time	Nil	10	2	2			
Current Full Time	30	10	3	4			
Other (specify) of which		1 Block release					
National	20	14	2	2			
Foreign	10	7	2	4			
Admission Requirements	Maths, Physics, Chemistry.	Hon.Deg. or Prof. Member	Hon. Deg.or Masters Degree				
Course Raquirements - list number of courses needed whether thesis or not	278 Dissertation	78 Thesis	Thesis Only	78 Project			
Scholarship, Fellowship Bursaries, etc.available	Govt. Student Grants	Govt. SRC Bursaries	Govt.(SRC) & Univ. Bursaries	Govt. Training Grant.			

Language of Instruction English

Total Numbers of Students Graduated National 32 Foreign 16

		Administration	Scoholarship	Research
Indicate % of funding by	Government	100 %	40%	80%
	Industry	-	35%	20%
	Other(specify)	-	25%	-

Staff Numbers: Totals (Indicate #'s) Studs. Own Finance
Faculty Full Time (14) Part Time (10) Industry,Instructors Speakers ..... (8)

Industry Input (Please tick) Financial Administrative ( ) Curriculum Development ( )
Scholarship,Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions Indicate Text Title (if any)

B.Sc. (Hons.) in Building Technology & Management.
(B.Sc. (Hons.) in Building Economics & Quantity Surveyin running but not included in the form)
M.Sc. in Construction Management
(M.Sc. in Acoustics, Noise and Vibration is running but has not been included)
Ph.D. is by research alone, resulting in the submission of a thesis.
The Ph.D. candidates listed are only those in Construction Management.

Educational Prgramme Objectives: Mainly the preparation of managers and senior managers for the Construction Industry. There are 8 others in allied areas.

Research (Please tick) Organizational (Applied) ( ) Engineering (Hard) ( )

Research Funding (Indicate source & amount (US $) U.K. Science Research Council (total $100,000)

Describe Nature/objectives of Research and Research Facilities (if any)

a) Motivation of Construction Workers.
b) Computer Management of Maintenance.
c) Selection and personality matching processes for professional personnel.

Are there any special features of your programme. Please indicate.
In the M.Sc. (Construction Management) programme there is a somewhat unique content of industrial psychology with personnel management.

INSTITUTION: UNIVERSITY COLLEGE LONDON.

SCHOOL: The Bartlett School of Architecture and Planning.

CONTACT: Professor Donald Bishop) 01 - 387 - 7050.
Mr. John Andrews)

PROGRAM: Taught MSc. Building Economics and Management.

ESTABLISHED: 1963. Current regulations 1968.

COURSE: 1 year full-time.
2 years part-time.

ENROLMENT: Full-time - 8
Part-time - 4
National - 8
"Overseas" - 4

ADMISSION: First Second Class Honours Degree or equivalent or RIBA Part 11.
(M.C.I.O.B. with qualifying exam).

COURSE REQUIREMENTS: Four course units plus a dissertation.

SCHOLARSHIPS: Science Research Council grants.

LANGUAGE OF INSTRUCTION: English.

FACULTY ACADEMIC STAFF: Full-time - 30
Part-time - 48
Occasional - many.

COURSE TITLES: Building Economics and Management is concerned with the construction industry as a whole and with the economic management of projects and programmes.

OBJECTIVES: The programme has been designed to provide:
- a specialist professional course within the initial training of an architect, builder or engineer
- an advanced academic course for University teachers
- a research training course
- a mid-career course for applicants who wish to keep up-to-date with professional developments.

Students are selected from a variety of academic, professional and national backgrounds

RESEARCH: Applied economics.

RESEARCH FUNDING: Mostly by central government.

RESEARCH OBJECTIVES: To study building as an economic system: recent work has concentrated on the capacity of the industry, its response to demand, and on aspects of health and safety.

Donald Bishop,
Professor of Building.

May, 1981.

CIB - W65 February 17th, 1981.
Study of Construction Programmes

Name of Institution UNIVERSITY OF LIVERPOOL

Faculty/School address: Department of Building Engineering, P.O. Box 147, Liverpool L69 3BX.

Name, Title of Contact / Name, Title of Respondee: Mr. B. Whitehead, Senior Lecturer.

Programme/s offered	Degree Bachelor	Degree Master	Degree Ph.D	Non-deg. Diploma	Non-deg. Certificate	Part of Programme	Other Specify
Year Programme Established	1965						
Duration (years) - length of Programme	3	2	3				
Enrollment							
Current Part Time	-	-	-				
Current Full Time	65	1	0				
Other (specify) of which							
National	35						
Foreign	30						

Admission Requirements — Degree:- 3 GCE A Level + English Language Qualification. Master + Ph.D. Good Honours Degree (All register first for Masters then transfer, if recommended to Ph.D.)

Course Requirements - list number of courses needed whether thesis or not - As per syllabus.

Scholarship, Fellowship Bursaries, etc.available: A few undergraduate scholarships and postgraduate studentships are available.

Language of Instruction

Total Numbers of Students Graduated: National 16* Foreign 8* *Average each year

		Administration	Scholarship	Research
Indicate % of funding by	Government	80%	-	25%
	Industry	5%	-	-
	Other(specify)	Self 15%	-	Self 75%

Staff Numbers: Totals (Indicate #'s): Faculty Full Time (10) Part Time (0) Industry, Instructors Speakers Occasional ( )

Industry Input (Please tick): Financial Administrative ( ) Curriculum Development ( ) Scholarship, Bursaries etc.( ) Overseeing Body Industry Liaison ( )

Comments

Course, Titles, Descriptions
Indicate Text Title (if any)

1. Building Construction Engineering) Undergraduate courses
2. Building Services Engineering)
3. (Masters and Ph.D. degrees are obtained by research rather than taught courses).

Educational Prgramme Objectives: To produce graduates capable of improving standards in, and acceptable to, the building construction and services engineering industries.

Research (Please tick): Organizational (Applied) (✓) Engineering (Hard) (✓)

Research Funding (Indicate source & amount (US $)): Science Research Council - approx. $100,000 p.a.

Describe Nature/objectives of Research and:
Acoustics - problems of structure-borne sound transmission in buildings
Materials - curing of cement pastes
Management - layout planning of building spaces
Energy - heat transfer

Research Facilities (if any)
Controlled environment room
Acoustic suite
Materials Laboratory

Are there any special features of your programme. Please indicate.

LIST OF INSTITUTIONS INVITED

* THOSE RESPONDING ARE INDICATED BY AN ASTERISK

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Mr. H. Ahuja
Memorial University of Newfoundland
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University of Toronto
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Waterloo, Ont. Canada N2L 3G1

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* Professor and Director
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Concordia University, 1455 de Maisonneuve Bldv. W.
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H3G 1M8

Dr. G. Ross
Environmental Design
University of Calgary
Calgary, Alberta T2N 1N4

Prof. Eldon Fowler
Dept. of Civil Eng.
University of Alberta
Edmonton, Alberta

WEST INDIES

Univ. of the West Indies
* Dept. of Civil Engineering
St. Augustine
Trinidad & Tobago

ARGENTINA

Professor R. Humar
Echeverria 1168
Florida 1602
Argentina

AD-A114 066 CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL F/G 5/9
DIRECTORY OF CONSTRUCTION ENGINEERING PROGRAMS IN ORGANIZATION --ETC(U)
MAR 82

UNCLASSIFIED NL

END
DATE FILMED
5-82
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27650

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Middletown, Penn 17057

Mr. S. L. Bridwell
Penn State - Mont Alto
Campus
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Manhattan, Kansas 66502

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Dept. of Civil Eng.
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02139 U.S.A.

Dr. H.H. Graves
Const. Mgmt. Pgm.
School of Architecture
Pratt Inst.
Brooklyn New York, 11205

Dr. G. H. Albright
Dept. of Architectural Eng.
101 Eng. Unit "A:
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80523

Montgomery College
Civil Eng.
Rockwell, Maryland

Wentworth Inst. of Technology
550 Huntington Ave.
Boston, Massachusetts, U.S.A

Head Civil, New Mexico State
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* Lascruces, New Mexico
88001

Univ. of Texas, Head of Civil
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Southern Station, Box 5137
Hattiesburg, Mississippi 39401

Southern Missouri State College
* Dept. of Industrial Education
Springfield Missouri 65803

Spring Garden College
Const. Eng. Tech.
102 East Mermaid Lane
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Temple Univ.
Dept. of Civil Eng.
College of Eng. Tech.
Philadelphia, PA 19122

Texas A & M University
School of Architecture
College Station Texas 77843

Texas A & M University
College of Eng.
College Station, Texas 77843

Virginia Polytechnic Inst.
Dept. of Bldg. Const.
College of Architecture
Blackburg, Virginia 24061

Kean College of New Jersey
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(also Head, Dept. of
Industry Science)

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Head of Civil
* Ferris State College
Big Rapids
Michigan, 49307

North Dakota State University
Fargo ND

Head, Civil, Cornell University
Ithica, New York
14850

Head of Dept. of C.E.
Univ. of Tenesee
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Head Industry and Technology
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School of Eng.
Tuskegee Inst. Alabama

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Bldg. Const. Programme
Dept. of Agicultural Eng.
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Architectural Res Lab
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University of Pretoria
Pretoria, S. Africa

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KOREA

Prof. H. C. Kim
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India

Director(Training)
Cement Research Institute of India
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India

SINGAPORE

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Faculty of Architecture & Bldg.
Kent Ridge
Singapore 0511
Republic of Singapore

JAPAN

* Dr. T. Eguchi
Masashi Institute of Technology
Tokyo, Japan

* Kazuhiro Yoshikawa, Prof.
Dept. of Civil Engineering
KYOTO University
Yoshida-Honmachi, Sakyo-ku
KYOTO 606, Japan

* Takeuaka Komnteu Co., Ltd.
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5-14, 2-chome
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ISRAEL

M. Omri
Inst. for Training & Productivity in Building
P.O. B. 29744
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A. Brill
Dev. & Constr. Dept.
Teh Hebrew University
Jerusalem, Israel

N. Granot
Building Center of Israel
Tel-Aviv
Israel

T. Blechman
Building Research Station
Technion Haifa, Israel

Prof. S. Pe'er and Prof. D. Armon
* Techion-Israel Institute of Technology
Faculty of Civil Engineering
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H. Shoham
Ben-Gurion Univ. of the Negev
P.O. B. 653
Beer-Sheva

Mordecai Hareli, Bldg. Centre of Israel
4 Hankin Str.
Holon

TURKEY

Y. Sey
Instanbul Technical University
Faculty of Architectur
Building Research Centre
Istanbul, Turkey

V. D. Sorguc
Tech. Univ. of Istanbul
Insaat Fakultesi
Taksim (Taskisla)
Istanbul, Turkey

Prof. Dr. - INg. V. Dogan Sorguc
Technical University of Istanbul
Faculty of Civil Engineering
I.T.U. Insaat Ekultesi, Tapi Isletmesi Kursusu
Taskisla
Istanbul, Turkey

Dr. D. Arditi, Asst. Prof. of Civil Eng.
Head of the Division of Construction Strategt
Middle East Technical University
Faculty of Engineering, Department of Civil Engineering
Division of Construction Strategy, Ankara, Turkey

BRITISH ISLES

Prof. B. Whitehead
* Dept. of Bldg. Engineering
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P.O. Box 147 Liverpool, L69 3BX

Prof. W. D. Biggs
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Prof. D. Bishop
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Prof. G. Trimble
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Prof. R. Pilcher
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University of Manchester
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