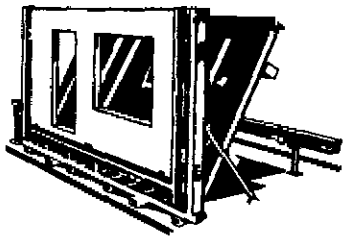
M.Arch. in Advanced Building Technology

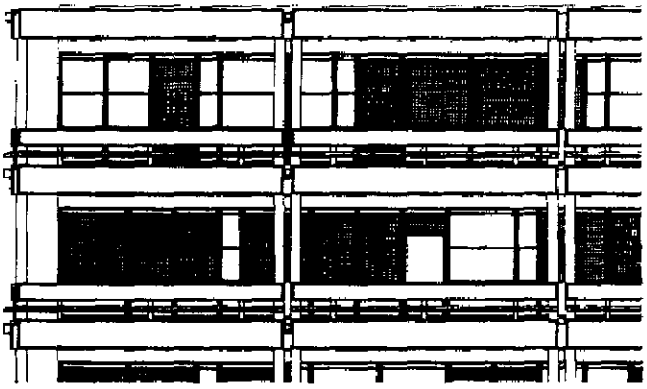
SUNY at Buffalo

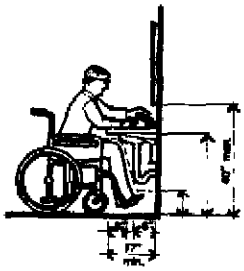
3-semester graduate degree program for B.Arch. holders

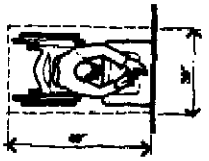
M.Arch. Program in Advanced Building Technology
Department of Architecture
School of Architecture and Environmental Design
State University of New York at Buffalo

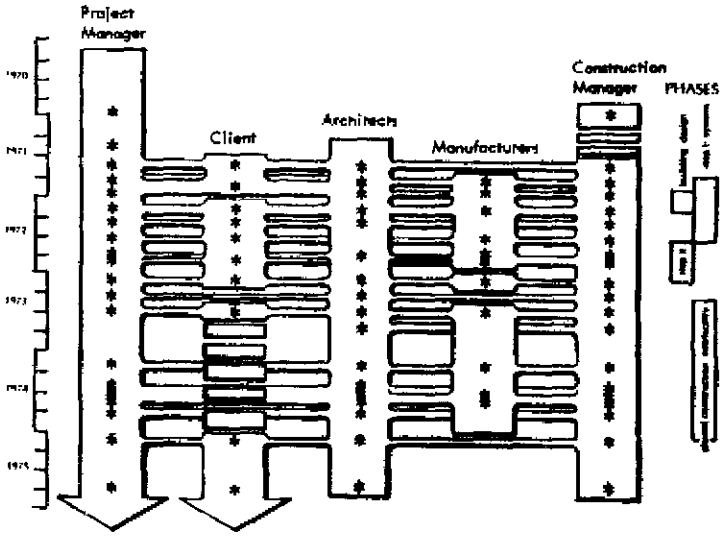
A M.Arch. program with emphasis on the advancement of building technology is offered for holders of a first professional degree in architecture. The program, initiated in 1982, is a response to the growing need for design professionals who are also competent in fields of advancing building technologies. Studies focus on the application of objective methods and progressive technology to building programs in both developed countries and areas of the third world. User-responsive, cost-conscious and energy efficient designs are stressed. Duration of the program is 3 semesters, starting in Fall. Qualified students are accepted on a limited basis.











Orientation

Areas in the new program focus on the technology of building, which greatly affects many aspects of daily life in terms of quality, performance, and cost. On a global scale, unprecedented numbers of people have to be provided with housing and ancillary facilities. Locally, traditional methods often do not provide sufficient buildings of the kind needed, of desirable standards and at affordable prices. Architects, being key members of the building team, have an important role to play in efforts to cope with such needs, quantitatively and qualitatively.

In a time characterized by

- runaway inflation,
- increasing importance of resource conservation,
- pressing need for energy conscious design,
- an unprecedented housing need in the third world,
- growing involvement of users in planning and design of the physical environment,
- and a greater complexity of design and building tasks,

the traditional practice of problem solving in the architectural profession seems to be improvable.

Principles

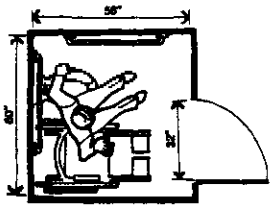
Now, and increasingly so in the future, more objectivity in the approach to design is needed, building on a

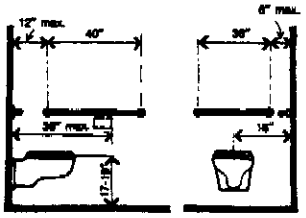
- broader (and better) knowledge base and the utilization of advanced decision-making aids (to analyze problems, to control processes, to model, to generate solutions, to evaluate),
- greater reliance on systematic research and experiments, including those related to the user of built space,
- increased cost consciousness, and
- relating professional work better to advances in the building industry (materials, assemblies, subsystems, etc., but also to innovations in project management).

Students enrolling in this program should not only be familiar with present-day technological capabilities on various levels of development, but should also be concerned with advancing the state of the art. By learning to cooperate with industry in the development of building components they can contribute in the evolutionary improvement of construction practices. The amount of knowledge already gained from efforts to industrialize building is formidable and accessible for intensive study.

Cost-conscious design will be another principle of the program. Not only should students become more experienced in trade-offs to keep a design within a budget, they should also consider the long-range cost of operating and maintaining a building. In particular, energy efficiencies in building construction and operation is stressed. Design quality as a concept is broadened to include the cost over a foreseeable life of a building - beyond the traditional architectural attributes of more immediate functional performance and formal appearance.

Another principle in the program is the concept of open-ended design. Finite architecture with final design results may well be beyond the architect's control. By developing (or by designing with) "user-manipulable building systems", by getting involved in "sites and services" or "coordinated self-help" projects, utilizing concepts like "fixed support/variable infill" designs, etc., students in the program learn how architects can relinquish some of their traditional responsibility with possibly gaining greater influence on the quality of the built environment.





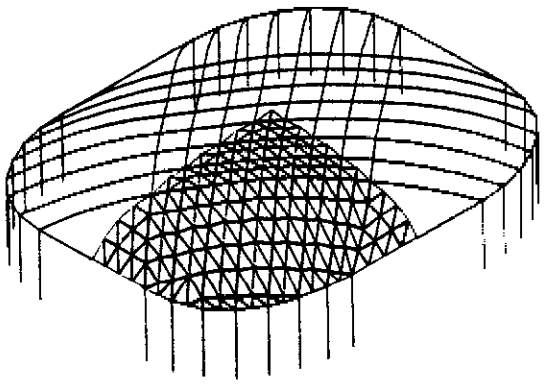
Areas of Study

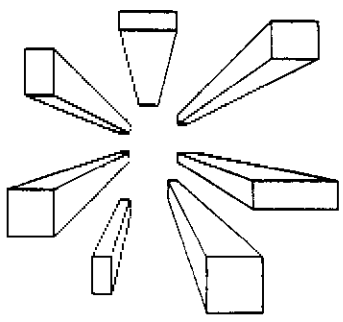
Topical areas include:

1
Methods in Building Design/ Research/Evaluation
2
Energy Conservative Building
3
Advanced Building Materials/ Components/Assemblies/ Systems
4
Appropriate Building Technology in Developing Areas
5
Advanced Building Structures (tensile, long-span, tall, underground, etc.)
6
Human Factors in the Built Environment
7
Building Services Systems*
8
Project Management and Construction Operations
9
Building Economics*
10
Building Design Related to Natural Hazards
11
Special Building Types
12
Computer Aided Design

In the selection of topical areas of study, the program permits some flexibility in response to individual students' background and interest. Resources at the Department of Architecture and SUNY/Buffalo are used to the fullest, but specific courses are being developed to fill gaps or to bring specific concerns of the program into better focus. Integrative courses, where more than one of the program's topical areas are combined in problem solving, resemble somewhat the design studios of general architectural programs; however, they are oriented more to research and development in innovative building technology.

*Area to be developed.





Career Opportunities

In response to the needs of an evolving profession, the program educates architects for specialized professional roles. Advanced skills that will be acquired by the student build on and contribute to the field of general architectural knowledge. The program intends to prepare design professionals to function competently as specialists in multidisciplinary work groups.

The need for graduates with the knowledge and skills to be provided by the program exists both within and beyond national borders. Employment opportunities can be seen with

- Professional service organizations, architectural or multidisciplinary
- Research centers.
- Information service centers.
- Consulting offices.
- Governmental agencies, (national, regional, local).
- Producers of materials, components, and systems.
- Construction industry organizations.
- Design/build operatives.
- Testing laboratories.
- Regulatory agencies.
- Housing Associations.
- Client organizations.
- Labor unions.
- User organizations
- Teaching institutions.
- International Organizations

Career possibilities for graduates in the Advanced Building Technology program are many. However, they should not only be perceived as directly responding to an existing market. They should also be seen as an opportunity to *effect change* in the market response for professional services. By opening up opportunities and new potentials, the program hopes to contribute to an improved built environment.

Eligible Students

The 3-semester graduate program in Advanced Building Technology leads to a M.Arch. degree. It addresses itself to incoming students already holding a first professional degree from an architectural program of minimal 5 years duration (normally a B.Arch degree or equivalent). Students from US schools or abroad, who would like to supplement their previous architectural education with studies in this specialized area, can apply. (If a student already holds a M.Arch. degree, the duration of study could be reduced to 2 semesters pending the specific background).

Those with additional professional experience, who want to return to formal study after practical exposure can also apply. With the rapid technological advances and increasing numbers of specializations which the field of architecture is experiencing, there is an increasing demand for such concentrated, advanced programs of study.

Assistantships

Special stipends are available to support Graduate Fellows in the program, which also carry full tuition waivers. Candidates who believe they possess the qualifications for these awards should apply for them by separate written request to the program director. In addition, students in the program can apply for assistantships through sponsored research, pending availability.

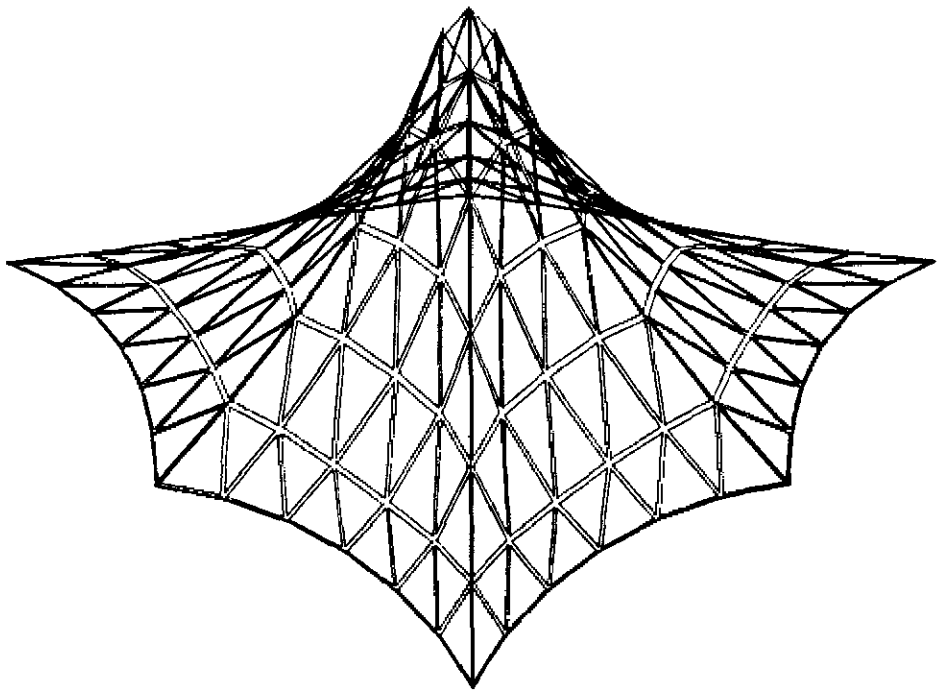
Application

Individuals interested in Advanced Building Technology studies leading to a M Arch. degree should request application material from:

M.Arch /ABT Program
Department of Architecture
School of Architecture and Environmental Design
Hayes Hall
State University of New York at Buffalo
Buffalo, NY 14214, USA
(716) 831-3483

The academic year starts at the end of August with the Fall semester. Applications for the Fall admission are ordinarily considered until the preceding 15 February.

No person, in whatever relationship with the State University of New York at Buffalo, shall be subject to discrimination on the basis of age, creed, color, handicap, national origin, race, religion, sex, marital or veteran status.



Priority Courses for Incoming Students

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1985-86

Typical Course Sequence

Fall 1:	*ARC 601	Building Technology Studio 1	Csizmadia	7 cr hrs.
	*ARC 543	Building Systems Technology 1	Schmitz	3
	• ARC 544 or 545	Building Systems Technology 2 or 3	Schmitz	3
	• ARC 562	Performance Programming (Codes and Regulations)	Steinfeld	3
	• ARC 581	Cost Analysis and Control	TBA	3
	• ARC 617	Introduction to CAAD (Computer Aided Architectural Design)	Kalay	3
	• ARC 571	Environmental Controls 1	Andrejko	3
Spring 1:	*ARC 602	Building Technology Studio 2	TBA	7 cr. hrs
	*ARC 572	Energy and Shelter (Special Reading Prerequisites!)	Andrejko	3
	• ARC 546	Intermediate Technology	Schmitz	3
	• ARC 557	Fabric Structures	Schmitz/ Bilgutay/ Bird/Ernst	3
	• ARC 548	Building Process Management	Csizmadia	3
	• ARC 554	Experimental Structures	Bilgutay	3
	• ARC 619	CAAD-1	Kalay	3
Fall 2.	*ARC 603	Building Technology Studio 3 (individualized)	TBA	7 cr. hrs.
	*ARC 545 or 544	Building Systems Technology 3 or 2	Schmitz	3
	• ARC 575	Environmental Controls 3	Angevine	3
	• ARC 599	Independent Studies	TBA	3
	• ARC 564	Behavior and Space (Health Care Facilities)	Steinfeld	3
	• ARC 550	Advanced Building Materials	Bilgutay	3
	•	Elective (external)	.....	3

Legend.

*normally required
•normally optional

Remarks

Individual degree plans will be determined in advisement sessions with the M Arch./ABT program director.

As it is expected that most of the program's course offerings are identical in Fall 1 and Fall 2, the last two courses listed above under Fall 1 could be postponed until Fall 2
ABT students can take ARC 543 and ARC 544/545 simultaneously. Building Systems Technology 2 and 3 are not sequential courses.

In preparation of ARC 572, contact instructor for preparatory reading assignment at the end of the Fall semester.

A minimum of five of the optional ARC courses has to be taken before graduation Degree requirement is 48 cr. hrs., which can include 3 external elective credit hours

Recommended course load for full-time students is 16 credit hours per semester Overload without special permission is 19 credit hours per semester.

(Nov. 84)

Course Descriptions
Required, Optional and Related Courses

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Priority Courses, normally required

ARC 601

Building Technology Studio 1 (7 cr.)
Objectives: To develop and apply skills in a systematic design process to learn and practice information gathering and analysis techniques; to increase knowledge and understanding of functional and performance requirements associated with building materials, products, systems and assemblies and how the manufacturing sector of the building industry can respond to satisfy those requirements; to acquire and exercise skills in evaluating alternative solutions and to develop a final definitive design. The task: Develop and design a selected *building subsystem* which can function independently and in combination with existing other subsystems; i.e. walls, partitions, HVAC, lighting, ceiling. The subsystem will be suitable for use for a selected number of functional building categories (i.e. small industrial/commercial/administrative/educational) to permit wide marketability and economy of machine production.

ARC 602

Building Technology Studio 2 (7 cr.)
Objectives: Same as above. The task: Develop and design a specified *building system,* (e.g. housing, educational, commercial, mixed use) to be applicable for a wide variety of individual plans, to architectural design solutions and construction projects. The system problem will be complete with the required subsystem, components, parts and material solutions appropriate for the situation determined for each studio project (e.g. social, economical, geographical, technological, objectives and constraints.)

ARC 603

Building Technology Studio 3 (7 cr.)
Objectives. To deepen technological knowledge and understanding of the requirements associated with design and building tasks. To exercise skills in the exploration, deployment and organization of the resource available for accomplishing the given tasks. To develop feasible alternative solutions, and apply appropriate methods for evaluating alternatives and selecting definitive solutions. To attain and demonstrate professional skills in communication of work process and work results to decision making committees. Methodology: faculty member drawing on other advisory resources and, where necessary, outside specialists. The final studio project could be combined with an internship (non-paid) based on availability, clear special arrangements and approval by the program director prior to the semester start. There will be periodic submittals, reviews of preliminary drafts and final reports, drawings, models, etc. as determined by the instructor. The final submission and presentation will be previewed by a committee of selected faculty members and, where appropriate, outside experts.
Prerequisites: ARC 601 and 602.

ARC 543

Building Systems Technology 1 (3 cr.)
Detailed studies of the existing systems available to meet the needs of the built environment, their applications and limitations. Studies of future possibilities of systems that can help meet the demands of our rapidly changing environment. Survey of the historical evolution of building systems, emphasizing the methodology of their development and implementation.

ARC 544

Building Systems Technology 2 (3 cr.)
Advanced processes for building production and delivery are analyzed, as well as building methods responsive to user needs. Alternative building systems, utilizing more effectively basic resources such as labor, materials, time, money and land are studied in depth. Special emphasis is given to alternative hardware or software approaches exploiting the economic benefits of mass production while at the same time enhancing design freedom and quality of work. Field trips.
Prerequisites: ARC 343/543.

	ARC 572	**Energy and Shelter** (3 cr.) To understand the significance and impact of natural energy flows within and around small buildings. To demonstrate working experience in the passive thermal performance analysis of small buildings by various simplified techniques from design conception to building evaluation. Prerequisites: Special reading.
Priority Courses, normally optional	**ARC 617**	**Introduction to CAAD (Computer-Aided Architectural Design)** (3 cr.) The course provides students with the basic tools for problem solving with the aid of computers. It focuses on learning the programming language PASCAL, with emphasis on interactive computer graphic applications. Students learn the basic concepts of structured programming through design of algorithms for interaction with a computer through a graphic interface. Short exercises in problem formulation and computer graphics are run on the school's VAX-11/750 computer. Interactive graphic programming throughout the course facilitates the comprehension of theoretical topics while the exercises progress towards an interactive drafting system that supports the design of architectural floor plans.
	ARC 619	**Computer-Aided Architectural Design 1** (3 cr.) The course explores one of the most important concepts in computer-aided design, the principles of representing physical objects in the computer's memory. The course presents hierarchical structuring methods for representing and manipulating complex assemblies of objects in both 2 and 3 dimensions. To facilitate the study of these subjects the course also includes topics in graph theory, optimization and search techniques.
	ARC 545	**Building System Technology 3** (3 cr.) Heavily relying on case studies, North American experiences with prototypical approaches to improve the performance of the building industry are evaluated. The applicability of the experiences in other countries to the situation in the U.S. is discussed. Initiatives for an increased industrialization of the building process are analyzed that have originated from the public and private sectors as well as from the professions, producers, client organizations and builders. Field trips. Prerequisites: ARC 343/543.
	ARC 546	**Intermediate Technology** (3 cr.) The concept of intermediate technology, more appropriate to building problems faced by developing countries than capital-intensive technology, is discussed. Enormous shortages of basic housing and related facilities have to be met within tight economic constraints by labor-intensive efforts relying more than in the past on natural resources. Topics covered include: characteristics of developing countries, socio-cultural diversities, existing housing conditions, squatter settlements, housing needs, traditional building techniques, government policies, financing, resources of building materials, organization of building, training organized self-help efforts, improvement of traditional building techniques, experimental low income housing projects, partial prefabrication, etc. Invited outside speakers contribute to the course content by reporting on firsthand experience.
	ARC 548	**Building Process Management** (3 cr.) Study of the building industry as a complex system of enterprises producing built facilities and altering our environment: to analyze how the tasks of the building industry are accomplished and how the final results depend on the processes, members, organizations and on the outside forces acting on them; to understand the various roles and relationships within the building industry and how controls are exercised over the process and thus over the results

ARC 550 **Advanced Building Materials** (3 cr)
This course is structured to develop an awareness of materials technology. Selected material types (metals, polymers, ceramics, glass) are studied to predict stress/strain characteristics and in-use behavior.

ARC 554 **Experimental Structures** (3 cr.)
The use of advanced structures for various applications in building is investigated. Theory and principles of advanced structural concepts as well as materials and processes are discussed A full scale structure with a defined use will be constructed The class will be involved in defining objectives, developing work strategies and schedules for performing project work Shop facilities of the school will be utilized
Prerequisite: permission of instructor.

ARC 557 **Fabric Structures** (3 cr.)
Theory and practice of building with stressed fabric membranes. Principles of cable structures, nets, tension membranes, air supported and inflated membranes. Minimal surfaces, curved surfaces, materials, joints, technical details. Design development, production, erection, performance in use Building typology and case studies. Small design exercise with scale model studies. Field trips

ARC 562 **Performance Programming** (3 cr.)
(Codes and Regulations)
Architect's responsibility to the public as defined by building regulatory system. Scope of regulations. Code search and analysis. Principles of fire safety, habitability and accessibility.

ARC 564 **Behavior and Space** (3 cr.)
(Health Care Facilities)
Roles of the behavioral sciences in the design of health care facilities. The impact of the physical environment on patterns of human behavior is investigated. Attention is given to the origins of design ideology with focus on stress, privacy, wayfinding, social interaction, human performance factors and identity. Methods of behavioral analysis useful in design programming are taught through laboratory exercises and projects.

ARC 575 **Environmental Controls 3** (3 cr)
Acoustics and lighting are investigated in terms of their impact on building design, including form, structure, and material. Qualitative and quantitative issues in the lighting of space. Integration of natural and artificial light Fundamental nature of sound transmission and absorption and principles of design to achieve an effective acoustic environment.

ARC 581 **Cost Analysis and Control** (3 cr.)
An examination of the financial framework within which the building industry operates, in respect to its impact on design decisions The object of the course is to develop the analytical skills necessary to evaluate the financial and economic viability of project proposals. The estimation of project development and operating costs, methods of public and private finance, and market forces are examined as components of feasibility studies. Case histories of residential and commercial building projects are reviewed. Design alternatives are explored in terms of their budgetary consequences.

ARC 599 **Independent Study** (1-7 cr)
This course is designed to add desired depth and breadth to a student's formal degree program, providing possibilities for independent study in special areas under the guidance of an instructor. Students electing this course should be accepted for work on a specific topic by a member of the architectural faculty and the program chairman/director.
(Variable specific topics.)

Related Courses

ARC 526 **Generic Building Types** (3 cr.)
The course will acquaint participants with prototypical and typical forms and organizations of important building types, and develop an understanding of sources for design decisions. The building types to be discussed will be. office buildings, housing (apartments and row houses), and shopping centers

ARC 547 **Dimensional Coordination** (3 cr)
The interchangeability of dimensionally coordinated components is the basis for the "open systems" approach in building. Theory, principles, and practice of pre-coordinating building components are covered. Sizes are modulated in relation to the human body and their interface with the building fabric. Combinatorial properties of building components as well as dimensional tolerance problems are investigated. The course gives an international overview, comparing efforts to advance the current state of the building industry by introducing dimensional standards and pointing out the trend toward in international trade of industrially manufactured building components.

ARC 556 **Structures 4** (3 cr.)
Case studies are used to develop a deeper knowledge of the behavior of complex structural systems The applications of the principles learned in previous structural studies are demonstrated through investigation of advanced building systems. Emphasis is placed on the use of computer programs and other approximate analytical methods to determine, for purposes of evaluation, the magnitudes and distribution of material within the structure. Individual library or laboratory studies may be involved. Prerequisite. ARC 455/555.

ARC 563 **Design for the Life Span** (3 cr.)
An overview of the major goals and approaches for design and planning for life span needs with special attention to older and disabled people. Students will pursue selected research and projects or work together on a class project. (Permission of instructor or graduate standing)

ARC 577 **Ambulatory Health Care Facilities** (3 cr.)
Introduction to current problems and methods connected with the planning and design of facilities for ambulatory health care. Selected research topics will be assigned to individual students (or groups of students) and pursued in depth.

ARC 588-598 **Special Topics in Architecture Courses** (1-7 cr)
Special student and/or faculty generated topics in architectural studies or problem solving. This can include areas of research or actual implementation of design concepts. The class may be involved in defining objectives and developing the work strategy and schedule for performing course work. The role of faculty can range through: leader, coordinator, catalyst, resource person and participant.

ARC 591 **Special Topics· Research Practice** (3 cr.)
A flexibly structured laboratory course supervised by a faculty member and organized around the analysis and development of real problems accepted from outside sponsors. Approval is by department chairman/director on an individual basis The student's specific contribution to the research results have to be documented and filed with the department

ARC 592 **Special Topics: Community Design Service** (3 cr.)
A flexibly structured laboratory supervised by a faculty member and organized around design service for the community. Real needs are analyzed and proposals for solutions are developed in coordination with the sponsor/user group. Approval is by department chairman/director on an individual basis. The student's specific contribution to the product has to be documented and filed with the department.

Participating Faculty Members

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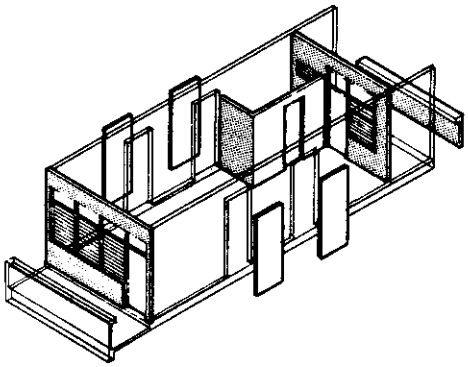
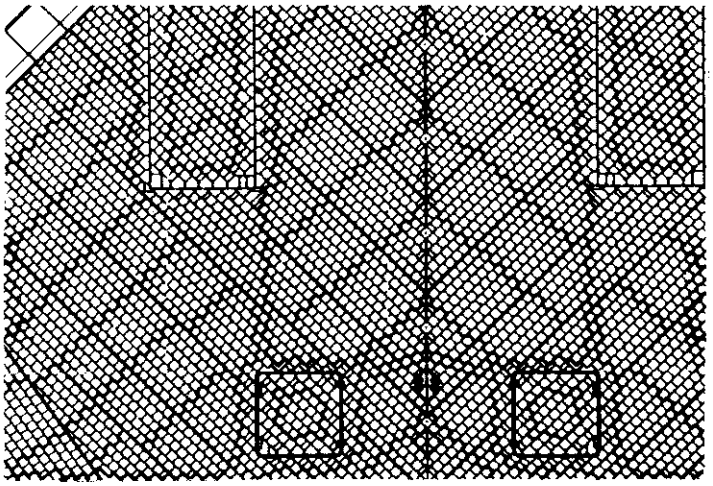
Dennis Andrejko Associate Professor	Energy & Shelter Environmental Controls 1 Building Technology Studio 3	Mr Andrejko, formerly a principal of SEAgroup, now heads Andrejko and Associates, Energy Conscious Architecture His professional interests center upon participation and responsibility in the planning, design, and information dissemination of energy conscious, people responsive, human environments. As an architect, he is responsible for the design of residences in states such as California, Arizona, Texas and Colorado, some of which have been published in several architectural and energy related journals Mr Andrejko has many publications to his credit, the most recent being the books, *Passive Solar Architecture: Logic and Beauty,* and *Solar 4· Architektur und Energie,* both of which he co-authored. He has also lectured nationally to audiences such as regional American Institute of Architects (AIA) chapters, Tutorial Workshops, and Solar Homebuilders Internationally, he has lectured at seminars held in West Germany, on passive solar and energy conscious design. Mr Andrejko is an executive board member of both the Passive Systems Division and the Architecture and Construction Division of the American Solar Energy Society He has also served as a Technical Juror for government sponsored programs, which included the National Passive Solar Design Corporation in 1978. Mr. Andrejko received a Bachelor of Architecture, cum laude, from Arizona State University in 1975 and a Masters of Architecture in Advanced Studies from MIT in 1977
Eric Angevine Instructor	Environmental Controls 3: Lighting	Mr. Angevine is Associate Consultant with the firm of Angevine Acoustical Consultants since 1975, and has had extensive experience in projects involving noise, vibration, and acoustic analysis and control. He served as project engineer on projects such as the design of several broadcast and videotape studios and highway noise assessment studies. Mr. Angevine is the Treasurer of the Niagara Frontier Chapter of the American Society of Heating, Refrigerating and Air Conditioning Engineers. He serves on a Technical Committee on Sound and Vibration, a national committee of ASHRAE, and is the Chairman of that committee. He is a member of the Acoustical Society of America and the Institute of Noise Control Engineering. He also writes a column for Broadcast Communications Magazine. He received both his Bachelor of Science in Architectural Engineering (1974) and Master of Science in Architectural Engineering (1975) from the University of Texas at Austin.
Oliver Angevine Instructor	Environmental Controls 3: Acoustics	Mr. Angevine has practiced as an acoustical engineer since 1936 He is now principal engineer of Angevine Acoustical Consultants; previous to that he was Chief Engineer for the Caledonia Electronics and Transformer Corporation. Mr. Angevine is a licensed professional engineer in the State of New York, and holds the office of President of the Western New York Chapter of the Consulting Engineer's Council and Vice President of the National Council of Acoustical Consultants. He is a Fellow of the Acoustical Society of America, a member of the Institute of Noise Control Engineering, the American Society for Testing and Materials, and the Institute of Electrical and Electronic Engineers He holds a B S. in Electrical Engineering (1936) from MIT and an M S. (1969) with a specialty in acoustics from SUNY at Buffalo.
Atilla Bilgutay Professor Assistant Director Advanced Building Technology	Experimental Structures Advanced Building Materials Fabric Structures Building Technology Studio 3	Mr. Bilgutay is the former Dean of the School of Architecture, Middle East Technical University, where he served as Assistant President, Founding Dean of Antalya and Mersin Campuses. He is the former Chairman of Engineering, Garyounis University, Libya. He has worked in Detroit, USA, Turkey and Libya. He was the structural designer of Adana Campus of Ankara University and Gaziantep Campus of METU He has taught at METU, Ohio University, Washington University and Garyounis University and Konya Academy. He did research at Michigan State, University of Wales, University of Wisconsin and METU. Mr Bilgutay received a B.S.C E. from Robert College, Istanbul and a M.S.C.E. from the University of Michigan in 1955.

Walter Bird Adjunct Professor	Fabric Structures Independent Study· Fabric Structures Guest Lectures	Mr. Bird's life work centers on lightweight structural designs. In his early professional years he helped design the first lightweight streamlined trains for the Pullman Standard Car Manufacturing Company. After designing aircraft in 1939, he transferred to the Curtiss-Wright Research Laboratory, which became the Cornell Aeronautical Laboratory, later CALSPAN. It was here that he realized the first air-supported buildings· "Radomes", protective enclosures for tracking antennas In 1956, he set up his own independent company, Birdair Structures, Inc., in Buffalo - a firm soon to become world famous in the development of fabric shelled buildings. Professor Bird pioneered in the development, manufacturing and erection of air structures, receiving awards from the U S. Government, the American Institute of Architects and others. He lectured internationally on the use of fabric structures in architecture and is published widely. He is a registered professional engineer, a member of the Professional Engineering Society and was a Director of the Building Research Institute of the National Research Council. Mr. Bird is a graduate of MIT, where he received a B S. degree in Aeronautical Engineering. He is also a Sloan Fellow in Business Administration.
Tibor Csizmadia Associate Professor Research Coordinator— Advanced Building Technology	Building Process Management Cost Analysis and Control Building Technology Studios	Mr. Csizmadia has practical architectural experience in England, France, Canada and the United States. Since 1969, when he was appointed as resident director of research at Washington University's School of Architecture, he specialized in architectural research and the training of researchers. While teaching for one year at King Faisal University in Saudi Arabia, he developed a building technology information center and initiated research projects in industrialized building and the application of solar energy. He joined SUNY at Buffalo from the University of Illinois, Department of Architecture, where he was under contract with the US Corps of Engineers as research architect in the Construction Engineering Research Laboratory. He has been greatly involved in the areas of life cycle costs and building economics, component building, systems building, and alternative methods of building procurement. As a research architect for UNESCO in 1977/78, he was involved in coordinating and evaluating the findings of experts of various countries, in an effort to develop an international network of information for architects and building professionals Mr Csizmadia's work has frequently been published in the professional and technical literature. He also acted as co-editor of *Industrialization Forum* magazine and organized seven professional conferences. Born in Hungary, he earned his M Arch. at the Technical University in Budapest in 1956, and a certificate in architecture/planning at the Technische Hochschule in Vienna one year later. In addition, he studied in the fields of town planning at the Architecture Association in London (1961), information handling at the University of Montreal (1979), and computer science at Washington University in St. Louis (1971).
Yehuda Kalay Associate Professor Director— Arch./Plan. Computer Graphics Lab	Intro to Computer-Aided Architectural Design CAAD-1 Building Technology Studio 3	While trained in and practiced architecture in Israel and in Holland, Dr. Kalay has been involved with computer-aided design for over 10 years. His interests, as reflected in some 20 manuscripts he authored and co-authored, include solid modeling, the representation and manipulation of curved surfaces, database systems, analysis and evaluation of non-quantitative qualities of buildings, and interactive user graphics. His current research interests lie in applying artificial intelligence techniques to computer-aided architectural design in order to build design systems, rather than drafting systems for use in architecture. Dr Kalay is a full-time faculty member in Architecture and is the Director of the Computer Graphics Laboratory of the School of Architecture and Environmental Design. In his capacity as an educator, he is active in formulating a curriculum for computer-aided design education in architecture which includes training, research, service and continuing education components. Yehuda Kalay received his B.Arch. and M.Sc degrees from the Technion, Israel's Institute of Technology, in 1976 and 1978, respectively. He earned a Ph D from Carnegie-Mellon University in 1982, where he worked with the GLIDE group under Charles Eastman on various aspects of modeling solids and their combination with curved surfaces.

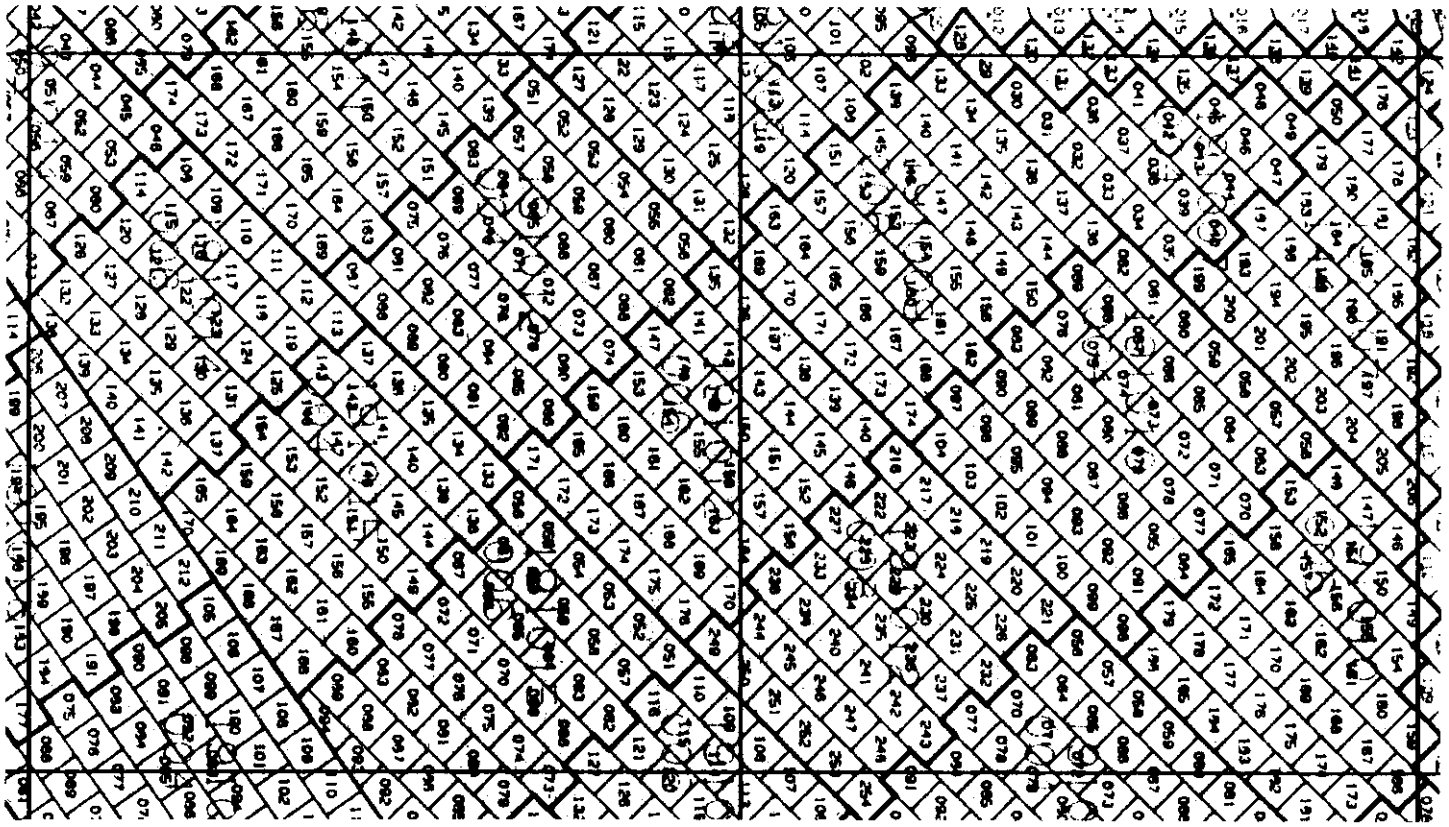
Gunter Schmitz Professor Director— Advanced Building Technology	Building Systems Technol. 1-3 Intermediate Technology Dimensional Coordination Fabric Structures Building Technology Studio 3	Mr. Schmitz heads the architectural graduate program in Advanced Building Technology. Prior to that responsibility, he directed the Undergraduate Architecture program for 9 years He focuses his pedagogic and professional activities on the application of industrial technology to building. His interest lies in inter-disciplinary problem solving, low income housing, energy conservation, building in developing countries, research oriented architectural education, design methods, and visual communication systems His professional experience covers architectural work, the development of product systems and building systems, and industrialized building. Research sponsors included industry, federal and state government, public health agencies, and the United Nations. A research team, in which he served as principal investigator, won a First Award in Research from Progressive Architecture Magazine in 1975 for the development of an Ambulatory Care Services Model for urban hospitals Mr Schmitz is involved in architectural teaching since 1961, was a faculty member of the Hochschule fur Gestaltung in Ulm (Germany) for six years, lectured widely in North America, Latin America and Europe, frequently presented papers, authored articles in numerous professional journals, contributed work to exhibitions, held major responsibility for a multitude of research reports, and is internationally associated with professional societies Before joining SUNY at Buffalo, he was Director for Project Development at the Architecture Research Center of Texas A&M University, where he was also directing a graduate program in Systems Development at the College of Architecture and Environmental Design. He was born in 1932. A native of Germany, he was also educated there at the Darmstadt Institute of Technology and the Ulm School of Design, studying Architecture (Intermediate Diploma, 1957) and Industrialized Building (Diploma, 1961).
Robert G. Shibley Professor Chairman— Department of Architecture	Building Technology Studio 3	Mr. Shibley was directing the design and consulting activites of a small practice in Blacksburg, Virginia, just prior to his appointment as Chairman in August, 1982. He was also a Visiting Associate Professor of Architecture in the College of Architecture at Virginia Polytechnic Institute and State University. In 1980, Mr Shibley was selected to develop and manage the U.S. Department of Energy's Passive Solar Commercial Buildings program During his tenure with DOE (1980-81) that program sponsored basic research, field experimentation, demonstration and education programs devoted to increasing the potential use of passive solar design strategies for commercial buildings From 1971-80 he was a project architect for the U.S. Corps of Engineers where he was responsible for substantial design and construction, developed a series of programming and design guideline documents and managed a supporting architectural research program. Mr. Shibley has served several universities as a visiting scholar or adjunct professor including the Victoria University at Wellington, New Zealand, the Catholic University of America, the University of North Carolina, Antioch University and Virginia Tech. He has served as a juror for national design awards programs including the 25th Annual Progressive Architecture program and both the 10th and 11th Annual Owens Corning Fiberglas Awards program Mr Shibley studied at the University of Oregon earning a B.Arch. and a B.S (Psychology) in 1969 In 1973, he received his M.Arch. in Urban Design from the Catholic University of America. His Doctorate in Public Administration is pending from the George Washington University Mr. Shibley has been an architect registered in Virginia since 1974.
Edward Steinfeld Professor	Behavior and Space Environments for Life Span Building Technology Studio 3	Dr. Steinfeld is an architect and researcher with special interest and experience in the field of design for the elderly and handicapped. He is the Director of the Human Factors Design Laboratory of the School of Architecture and Environmental Design. He has lectured and published widely on these subjects, in addition to serving as a design consultant on numerous projects. His contributions include the developing of U.S. National



Standards for making building and facilities accessible to and usable by physically handicapped people. His current research concerns wayfinding and use of operable controls and mechanisms by disabled people. He has previously taught at Syracuse University, where he was associated with both the School of Architecture, and the All-University Gerontology Center from 1973-1978. From 1971-1973, Dr. Steinfeld was a research architect at the U.S. Government's Center for Building Technology, National Bureau of Standards. Born in 1945, Dr. Steinfeld received his B.Arch. from Carnegie-Mellon University (1968), and his M.Arch. from the University of Michigan (1969), where he also received a Doctorate of Architecture (1972).



Thermal tile protection on US "space shuttle"



M.Arch. in Advanced Building Techn

3-semester graduate degree progran

A new M.Arch. program with emphasis on the advancement of building technology is now offered for holders of a first professional degree in architecture. The program is a response to the growing need for design professionals who are also competent in fields of advancing building technologies. Studies focus on the application of objective methods and progressive technology to building programs in both developed countries and areas of the third world. User-responsive, cost-conscious and energy efficient designs are stressed. Duration of the program is 3 semesters, starting in Fall. Qualified students are accepted on a limited basis

Orientation

Areas in the new program focus on the technology of building, which greatly affects many aspects of daily life in terms of quality, performance, and cost. On a global scale, unprecedented numbers of people have to be provided with housing and ancillary facilities. Locally, traditional methods often do not provide sufficient buildings of the kind needed, of desirable standards and at affordable prices Architects, being key members of the building team, have an important role to play in efforts to cope with such needs, quantitatively and qualitatively.

In a time characterized by
- runaway inflation,
- increasing importance of resource conservation,
- pressing need for energy conscious design,
- an unprecedented housing need in the third world,
- growing involvement of users in planning and design of the physical environment,
- and a greater complexity of design and building tasks, the traditional practice of problem solving in the architectural profession seems to be improvable.

Principles

Now, and increasingly so in the future, more objectivity in the approach to design is needed, building on a
- broader (and better) knowledge base and the utilization of advanced decision-making aids (to analyze problems, to control processes, to model, to generate solutions, to evaluate),
- greater reliance on systematic research and experiments, including those related to the user of built space,
- increased cost consciousness, and
- relating professional work better to advances in the building industry (materials, assemblies, subsystems, etc., but also to innovations in project management)

Students enrolling in this program should not only be familiar with present-day technological capabilities on various levels of development, but should also be concerned with advancing the state of the art By learning to cooperate with industry in the development of building components they can contribute in the evolutionary improvement of construction practices. The amount of knowledge already gained from efforts to industrialize building is formidable and accessible for intensive study.

Cost-conscious design will be another principle of the program. Not only should students become more experienced in trade-offs to keep a design within a budget, they should also consider the long-range cost of operating and maintaining a building. In particular, energy efficiencies in building construction and operation will be stressed. Design quality as a concept will be broadened to include the cost over a foreseeable life of a building - beyond the traditional architectural attributes of more immediate functional performance and formal appearance.

Another principle in the program will be the concept of open-ended design. Finite architecture with final design results may well be beyond the architect's control. By developing (or by designing with) "user-manipulable building systems", by getting involved in "sites and services" or "coordinated self-help" projects, utilizing concepts like "fixed support/variable infill" designs, etc., students in the program will learn how architects can relinquish some of their traditional responsibility with possibly gaining greater influence on the quality of the built environment.

Areas of Study

Topical areas include:
1
Methods in Building Design/ Research/Evaluation
2
Energy Conservative Building
3
Advanced Building Materials/ Components/Assemblies/ Systems
4
Appropriate Building Technology in Developing Areas
5
Building Structures
6
Human Factors in the Built Environment
7
Building Services Systems
8
Project Management and Cor struction Operations
9
Building Economics
10
Building Design Related to Natural Hazards
11
Special Building Types
12
Computer Aided Design

In the selection of topical areas of study, the program permits some flexibility in response to individual students' background and in terest. Resources at the Department of Architecture and SUNY/Buffalo are used t the fullest, but specific courses are being developed to fill gaps or to bring specif concerns of the program int better focus. Integrative courses, where more than or of the program's topical are are combined in problem sol ing, resemble somewhat the design studios of general architectural programs; however, they are oriented more to research and develo ment in innovative building technology.

M.Arch. in

for B. Arch. holders

Career Opportunities

In response to the needs of an evolving profession, the program educates architects for specialized professional roles. Advanced skills that will be acquired by the student build on and contribute to the field of general architectural knowledge. The program intends to prepare design professionals to function competently as specialists in multidisciplinary work groups

The need for graduates with the knowledge and skills to be provided by the program exists both within and beyond national borders. Employment opportunities can be seen with:

- Professional service organizations, architectural or multidisciplinary.
- Research centers.
- Information service centers.
- Consulting offices.
- Governmental agencies.
- Producers of materials, components, and systems
- Construction industry organizations.
- Test laboratories.
- Regulatory agencies.
- Client organizations.
- Labor unions.
- User organizations.
- Teaching institutions.

Career possibilities for graduates in the Advanced Building Technology program are many. However, they should not only be perceived as directly responding to an existing market. They should also be seen as an opportunity to *effect change* in the market response for professional services. By opening up opportunities and new potentials, the program hopes to contribute to an improved built environment

Eligible Students

The 3-semester graduate program in Advanced Building Technology leads to a M.Arch. degree. It addresses itself to incoming students already holding a first professional degree from an architectural program of minimal 5 years duration (normally a B.Arch. degree or equivalent). Students from US schools or abroad, who would like to supplement their previous architectural education with studies in this specialized area, can apply. (If a student already holds a M.Arch. degree, the duration of study could be reduced to 2 semesters pending the specific background)

Those with additional professional experience, who want to return to formal study after practical exposure can also apply. With the rapid technological advances and increasing numbers of specializations which the field of architecture is experiencing, there is an increasing demand for such concentrated, advanced programs of study.

Assistantships

Special stipends are available to support Teaching Fellows in the program, which also carry full tuition waivers. Candidates who believe they possess the qualifications for these awards should apply for them by separate written request to the Program Director In addition, students in the program can apply for assistantships through sponsored research, pending availability.

Application

Individuals interested in Advanced Building Technology studies leading to a M.Arch. degree should request application material from:

M Arch /ABT Program
Department of Architecture
School of Architecture and Environmental Design
Hayes Hall
State University of New York at Buffalo
Buffalo, NY 14214, USA

(716) 831-3483

The academic year starts at the end of August with the Fall semester. Applications for the Fall admission are ordinarily considered until the preceding 15 February.

No person, in whatever relationship with the State University of New York at Buffalo, shall be subject to discrimination on the basis of age, creed, color, handicap, national origin, race, religion, sex, marital or veteran status.

Building Technology SUNY at Buffalo