698 (1-8) Internship
On-the-job training in school library media center. Work is jointly supervised by the academic unit and the cooperating school. Six credits of internship is required for Media Generalist licensure.

699 (3-6) Thesis
Course provides students with opportunity to focus on a research problem related to their Specialist degree. Work with advisor in writing the thesis.

MANUFACTURING ENGINEERING TECHNOLOGY MS

College of Science, Engineering & Technology
Automotive and Manufacturing Engineering Technology Department
E205 Trafton • 507-389-6383 •Fax: 507-389-5002

Chair and Graduate Coordinator: Kirk Ready, Ed.S.

Ann Goebel, MS, Bruce Jones, Ph.D., Andrzej Markowski, Ph.D., Harry Petersen, Ph.D., Paul Sullivan, Ph.D.

Manufacturing Engineering Technology is a Master of Science program intended for students with an undergraduate degree in engineering technology or engineering who have a desire to obtain a specialized education in modern manufacturing. Students with other undergraduate majors may also enter the program but may have a considerable number of deficiencies which must be made up at the undergraduate level. The emphasis of the program is the technology and organization of manufacturing in a competitive global world.

Admission. Students seeking admission to the Manufacturing program must be admitted to the College of Graduate Studies and in addition must have completed undergraduate coursework which includes: Calculus I, Calculus II, a Computer Science programming language, Electronic Circuit Analysis, Computer Aided Design (CAD), Materials and Metallurgy, Statics, Materials Processing and Manufacturing Automation.

Applicants who do not have the prerequisites completed will be conditionally admitted to the program with the undergraduate courses listed as deficiencies. These deficiencies must be made up before the student submits a plan of study before the completion of the first 16 graduate credits.

Financial Assistance. The department typically has two to five graduate assistants. Duties include research assisting and laboratory supervision. Application forms are available from the College of Graduate Studies or from the Automotive and Manufacturing Engineering Technology Department Office. Completed forms and any support materials should be sent to the department chairperson. Applications can be completed at any time. The department typically makes its decision in May for assistantships which begin in August.

MANUFACTURING ENGINEERING TECHNOLOGY MS

(Thesis Plan - 32 cr)
(Alternate Plan Paper - 34 cr)

Required Core (16 cr)

MET	532	Manufacturing Project Management (3)
MET	600	Manufacturing Research Methods (2)
MET	645	CAD Applications (2)
		AND one of the following:
MET	678	Manufacturing Processes (2)
MET	691	In-Service (1-4)
MET	692	Manufacturing Seminar (1-3)

Choose additional electives in MET to total 16 credits.

Required Concentration (10 cr)
Choose 10 credits in a concentration area in another department such as automotive engineering technology, business, computer science, or one of the natural sciences. The area chosen should reflect the background and occupational goals of the individual and must be approved by the student's graduate committee.

Required Electives (6-8 cr)
These courses can be from any graduate level courses.

Required Thesis or Alternate Plan Paper

MET	694	Alternate Plan Paper (1-2)
MET	699	Thesis (2-4)

Additional Requirements:
Each student must obtain practical experience in manufacturing through an internship, independent study, alternate plan paper or manufacturing work experience. A minimum of 50% of all graduate level coursework applied toward the degree must be at the 600 level. Each student must successfully complete a final written comprehensive examination.

COURSE DESCRIPTIONS

507 (2) Facilities Planning
A study of industrial plant layout for maximum facility utilization. Topics include: factory layout, materials storage and handling, industrial equipment selection and mechanization.

523 (2) Ergonomics
Investigation of work place design and environmental stress from heat, noise, vibration, repetitive motion and illumination in personal machine systems. Topics: human-machining

524 (2) Industrial Safety

Techniques of developing safety practices in an industrial and construction environment. Topics include OSHA, current legislation, cost analysis, minimization, depreciation and economic worth, personal protection, employee selection, psychological aspects, product safety, hazard materials and catastrophe control.

525 (2) Manufacturing Value Analysis
A study of the optimal relationship between value and function of products and the cost and availability of resources. Topics include valuation, appraisal and capital budgeting, cost
minimization, depreciation and economics worth, rates and rate bases, original and reproduction costs, engineering economics.

527 (2) Quality Assurance
Organization, methodology, and responsibilities of quality assurance programs, primarily in manufacturing industries. Statistical analysis of quality current topics of quality.

528 (2) Work Measurement
Theoretical principles and practical applications of procedures to utilize time and motion studies in industrial applications to promote quality, quantity, safety, line balancing, and efficiency of production.

529 (2) Production & Inventory Control
A study of the problems involved in maintaining factory production and inventory control including systems for forecasting, controlling quantity, scheduling, storage and retrieval.
Pre: MET 428

532 (3) Project Management
Managing the processes of manufacturing including the design prototype, personnel and staffing, and continuing of the manufacturing of a product. Factors include cost, time, inventory, facility use, scheduling, packaging, shipping, organizational aspects, time constraints, conflict resolution, skills requirements, predicting project success, estimating, and trade-off analysis.

592 (1-4) Manufacturing Seminar
Selected manufacturing topics.

600 (2) Manufacturing Research Methods
Research topics and methods related to manufacturing. The course will look at the current state of manufacturing and explore the research methods and experimental design procedures that are used in the area of manufacturing. Students will evaluate past research and will also design a research project in manufacturing.

Utilization in K-12 classroom. Slide duplication. Computer graphics/Quick take photography. Field trips—making the most of yearbook and other PR formats. Future trends.

624 (2) Digital Production
How to use camcorders, video discs, and xapshot cameras. Learn production techniques including camera shots, sound, lighting. Post-production techniques including logging, editing, dubbing, special effects.

628 (2) Distance Learning
Teaching and learning over distance education systems with the main stress on Instructional Television teaching. Instructional systems approach to the development of coursework will be examined. Proper selection of content will be stressed.

629 (2) Electronic Communications
E-mail, listservs, on-line resources, electronic services, search tools, future services.

645 (1-3) CAD Applications
An advanced graphics course which emphasizes the study of AutoCad® software, related software and their applications. Emphasis is on CAD systems, software customizing and a review of current trends in CAD as used in contemporary industry.

677 (1-4) Individual Study

678 (2) Manufacturing Processes
A study of modern manufacturing processes. The recent developments in manufacturing affect everyone in the factory, from the designers and manufacturing engines to the machine operators. New technologies, automation, the use of the computers in design, process control and inspection create complex industrial or plant environment.

692 (1-4) Seminar: Manufacturing
Selected manufacturing topics.

694 (1-2) Alternate Plan Paper

697 (1-5) Internship: Industrial
Manufacturing work experience in an area pertinent to the student's objective. Registration required prior to beginning employment.

699 (3-6) Thesis

MATHEMATICS MA

MATHEMATICS: COMPUTER SCIENCE MS

MATHEMATICS MS

MATHEMATICS EDUCATION MS

(DISCIPLINE-BASED)

College of Science, Engineering, & Technology
Mathematics and Statistics Department
273 Wissink Building • 507-389-1453

Chair: Larry Pearson, Ph.D.