ESM 455 MATERIALS AND PROCESSES IN MANUFACTURING DESIGN (REQUIRED)
Credit: 3

COURSE CATALOG DESCRIPTION:

The design of mechanical and electrical systems, material selection, and fabrication processes are surveyed and shown to be essential components of manufacturing engineering. The mechanical and thermal processing of a wide range of metallic and nonmetallic materials is reviewed. Modern computer based materials selection, advanced processing methods, and automation are explored.

PRE- OR COREQUISITE(S): ESG332 Materials Science I: Structure and Properties of Materials or ESG333 Materials Science II: Electronic Properties

TEXT(S) OR OTHER REQUIRED MATERIAL:

Serope Kalpakjian, Manufacturing Engineering and Technology: Fifth Edition, 2006, Addison-Wesley, ISBN: 0131489658

COURSE LEARNING OUTCOMES	SOS	ASSESSMENT TOOLS
Thorough understanding of a broad array of manufacturing techniques for metallic, ceramic, polymer, electronic, and composite components in products	a, f, h, j	Homework assignments; in-class problems; research paper and oral presentation; exams
Comprehension of the role that materials selection and processing has in meeting property requirements for manufactured components	a, e, h, j	Homework assignment; exam
Understanding of quality assessment in manufacturing processes	f, h, j	Homework assignment; exam
Appreciation of the use of computer technology in manufacturing	h, j	Homework assignment; exam
Enhancement of problem solving skills related to materials science and processing in manufacturing	a, d, e, k	Homework assignments; exam
Enhancement of written and oral communications skills on technical topics in manufacturing processes	g, i, k	Research paper and oral presentation

COURSE TOPICS

Week 1: Materials Science Review
Week 2: Metal Casting
Week 3: Rolling and Forging

Week 4: Extrusion and Drawing
Week 5: Sheet Metal Forming
Week 6: Powder Metallurgy
Week 7: Electronics
Week 8: Ceramics
Week 9: Polymers
Week 10: Composites
Week 11: Joining
Week 12: Surface Treatment
Week 13: Quality
Week 14: Materials Selection

CLASS/ LABORATORY SCHEDULE:

ESM	355	Materls & Procss in Manuf Des	LEC	1	TUTH	12:50 PM	2:10 PM

CURRICULUM

This course contributes 3 credit hours toward meeting the required 48 hours of engineering topics.

STUDENT OUTCOMES (SCALE 1-3):

A	B	C	D	E	F	G	H	I	J	K
3			2	3	2	3	2	3	2	2

3 – Strongly supported 2 – Supported 1- Minimally supported

LEAD COORDINATOR(S) WHO PREPARED THIS DESCRIPTION AND DATE OF PREPARATION:

Christopher M. Weyant 5/15/2010