

The University of Michigan
Department of Mechanical Engineering
ME 487- Fall 2008

Welding

COURSE CONTENTS

<i>Week</i>	<i>Outline</i>	<i>Reading</i>
WEEK 1	Introduction	
WEEK 2	Background of Welding Processes	pp. 1 -50
WEEK 3, 4	Fundamental Aspects of Fusion Welding	pp. 51- 84, Notes
WEEK 5	Heat Flow in Weldments	pp. 87-113
WEEK 6	Fluid Flow in Weld Pool	Notes
WEEK 7	Welding Metallurgy	pp. 115-155, Notes
WEEK 8, 9	Residual Stresses and Distortion in Weldments	pp. 297 -356
WEEK 10	Design of Weldments	pp. 157-237 pp. 359-393
WEEK 11, 12	Resistance Welding	Notes
WEEK 13	Laser Welding	Notes
WEEK 14	Process Monitoring and Control	Notes

TEXTBOOK: Course Notes.

REFERENCE: “Welding Science and Technology,” Welding Handbook, Vol. 1, 9th Edition, 2001.

COURSE GRADE:

Homework – 20 %
Class Participation – 10%
Exam 1 – 35 %
Exam 2 – 35 %

LECTURES: M, W, F 8:30 - 9:30 a.m.

INSTRUCTOR: Prof. Kannatey-Asibu, Jr.

Office Hours: M, W 1:30 - 3:00 p.m.
Or by appointment

Office: 3134 GGBrown. Phone: 936-0408

All reading assignment must be completed ahead of time.

No make-up exams.

REFERENCES

1. Welding Handbook, Vols. 1 -4, 9th Edition, American Welding Society.
2. Welding, Brazing, and Soldering, Metals Handbook, 9th Edition, Vol. 6, 1983, American Society for Metals.
3. Lancaster, J. F., “Metallurgy of Welding,” 3rd Edition, 1980, George Allen and Unwin.
4. “The Physics of Welding,” Lancaster, J. F., Editor, 1984, Pergamon Press.
5. Masubuchi, K., “Analysis of Welded Structures,” 1980, Pergamon Press.
6. Hoyaux, M. F., “Arc Physics,” 1968, Springer-Verlag, New York.
7. “The Procedure Handbook of Arc Welding,” 12th Edition, 1973, Lincoln Electric.
8. Blodgett, O. W., “Design of Weldments,” 1976, Lincoln Arc Welding Foundation.
9. Datsko, J., “The Welding Process,” Material Properties and Manufacturing Processes, Joseph Datsko Consultants, 1981.
10. Kou, S., 1987, “Welding Metallurgy,” John Wiley & Sons, New York.
11. Easterling, K., 1983, Introduction to the Physical Metallurgy of Welding, Butterworths, London.

Catalogue Description

Study of the mechanism of surface bonding, welding metallurgy, effect of rate of heat input on resulting microstructures, residual stresses and distortion, economics and capabilities of the various processes.