

## Some Proposed Term Paper Topics for MatE 115

### MatE 115 - Fall 2004

Materials selection parameters/considerations for optoelectronic device packaging

Materials selection parameters/considerations for MEMS device packaging

Adhesion mechanisms of die-attach materials used in microelectronic and optoelectronic device packaging

Solder glass and its uses in microelectronic and optoelectronic device packaging

Intermetallic compound formation in wire bonding/ribbon bonding applications and its effect on long term reliability

Stress corrosion cracking in biomedical (metallic) implants

Effect of high early strength additives on corrosion and stress corrosion of reinforcing steels in concrete

The "tin pest" phenomenon and its effects on long term reliability of Pb-free microelectronic assemblies

Thermoelectric coolers and their use for thermal management of optoelectronic devices

Fluxless soldering - its applications and mechanisms

Batteries for pace makers and defibrillators

Optical fibers - manufacturing techniques to ensure low losses

Polymorphic transformations and their industrial consequences or utilization

Use of radioisotopes in medical therapeutics

Growth of whiskers on low melting point metals such as tin or zinc, including Growth of tin whiskers in microelectronic packages

Polymorphic transformations and its industrial uses

Microwave drying/heating of ceramics

Conductive adhesives

Use of dielectrics in printed circuit boards

Ceramic permanent magnets

Shape memory alloys and applications

Synthesis of functionally gradient materials

Historical chart of important developments in materials science

Demonstration projects; website development

Optical data storage techniques

Biocompatibility of medical implants

In-vivo and in-vitro corrosion of Ti implant alloys

In-vivo and in-vitro corrosion of stainless steel implants

History and manufacture of hip implants

History and manufacture of stents

Other topics of interest to the student must be approved by the instructor first