

## SUBJECT DESCRIPTION FORM

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**Subject Title:** Applied Biosignal Processing

**Subject Code:** HTI5115

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**Credit Value:** 3

**Date of Submission:** Feb 2007

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**Responsible Staff and Department:** Dr. Yongping Zheng (HTI)

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**Pre-requisites:** Nil

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**Recommended Background Knowledge:** Basic knowledge of calculus, biomedical signals, and programming

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**Exclusions:** Nil

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**Learning Approach:**

Contact hours:		
Lecture & Tutorial		21 hours
Laboratory		21 hours
	Subtotal:	42 hours
Independent study hours:		
Self-study		50 hours
Assignments		10 hours
Laboratory reports		30 hours
Reviewing reports		10 hours
	Subtotal:	100 hours
	Total hours:	142 hours

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**Assessment (type and weighting):**

Continuous Assessment: 100%	
Assignments and laboratory reports	50%
Reviewing report & presentation	20%
Tests	30%

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**Learning Outcomes:**

- To learn application-oriented signal processing techniques for biomedical signals.
  - To apply biosignal processing techniques for real biomedical signals.
  - To practise biomedical signal processing using Matlab software
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**Syllabus:**

1. Signals and systems for understanding biosignal processing
  2. Considerations for biosignal processing during data collection and experimental design
  3. Use Median filter and moving average for smoothing biosignals
  4. Use cross-correlation for biosignal registration
  5. Use adaptive filters for separation of mixed signals
  6. Use wavelet to enhance signal
  7. Matlab programming
  8. Automatic tracking of ultrasound echoes
  9. Spectrum analysis for EMG signal during muscle fatigue
  10. Enhancement of EEG signal using averaging
  11. Adaptive filtering for fetus ECG
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**Reading Materials:**

- Bruce EN. *Biomedical Signal Processing and Signal Modeling*. John Wiley and Sons, New York, 2001.
- Akay M. *Biomedical Signal Processing*, Academic Press, San Diego, 1994.
- Devasahayam SR. *Signals and Systems in Biomedical Engineering: Signal Processing and Physiological Systems Modeling*, Kluwer Academic/Plenum Publishers, New York, 2000.
- Bronzino JD. *The Biomedical Engineering Handbook*, CRC Press, Boca Raton, Florida, 1995, 2000.
- *IEEE Transactions on Biomedical Engineering*.