MUS421A/EE367B Overview: Administrative Info

Center for Computer Research in Music and Acoustics (CCRMA)
Department of Music, Stanford University
Stanford, California 94305

Spring Quarter, 2017-2018

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Music 421A (EE 367B)
Spectral Audio Signal Processing

1 Course Description

Music 421A covers applications of the Fast Fourier Transform (FFT) arising in digital audio research. The main topics addressed are practical time-frequency analysis using the FFT, spectral foundations for Music Information Retrieval (MIR) and Audio Machine Learning, sound synthesis by means of spectral models, and FFT-based signal processing.

1.1 Prerequisites

The only prerequisite for Music 421 is Music 320\(^1\) or equivalent (prior exposure to complex numbers, sinusoids, Fourier theory, linear systems theory, digital filters, and \(z\)-transform analysis). In Electrical Engineering (EE), more than adequate coverage of Fourier theory is provided by EE 261\(^2\) (Fourier Transform and its Applications). The EE Digital Filtering course, EE 264\(^3\) covers prerequisite background pertaining to sampling and digital filtering, and there is some overlap of topics. Matlab\(^4\) or Octave\(^5\) is required for homework assignments, and is recommended for programming project work.

1.2 When, Where, Who

<table>
<thead>
<tr>
<th>Term:</th>
<th>Spring Quarter, every other year</th>
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<tbody>
<tr>
<td>Location:</td>
<td>Main CCRMA Classroom (Knoll 217)</td>
</tr>
<tr>
<td>Time:</td>
<td>Tuesdays and Thursdays, 3:30-4:45 PM</td>
</tr>
<tr>
<td>Instructor:</td>
<td>Julius Smith (<a href="mailto:jos@ccrma.stanford.edu">jos@ccrma.stanford.edu</a>)</td>
</tr>
<tr>
<td>TA:</td>
<td>Orchi (<a href="mailto:orchi@ccrma.stanford.edu">orchi@ccrma.stanford.edu</a>)</td>
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<tr>
<td>TA Office Hours:</td>
<td>Wednesdays 6:00-8:00 pm in the CCRMA Ballroom</td>
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<tr>
<td>JOS Office Hours:</td>
<td>after class on Tu, Th afternoons, up to half-hour appointments typical</td>
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<tr>
<td>Website:</td>
<td><a href="http://www.ccrma.stanford.edu/courses/421/">https://ccrma.stanford.edu/courses/421/</a></td>
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</table>

\(^1\) [http://ccrma.stanford.edu/courses/320/](http://ccrma.stanford.edu/courses/320/)
\(^2\) [http://www.stanford.edu/class/ee261/](http://www.stanford.edu/class/ee261/)
\(^3\) [http://www.stanford.edu/class/ee264/](http://www.stanford.edu/class/ee264/)
\(^5\) [http://www.octave.org/](http://www.octave.org/)
1.3 Required Software

Laboratory assignments in this course will require programming in the matlab language, which is available on CCRMA desktop machines. For personal computers, the student version of Matlab\(^6\) is priced well below other versions, and you can get by fine with Octave\(^7\), a free-software version of basic matlab.

1.4 Important Pointers

The *course schedule and outline*\(^8\) in section 3 on page 2 (also reachable from the class home page\(^9\)) lists the following information:

- Assignments!
- Schedule of lectures
- Pointers to all lecture overheads and the online text.

The class home page further contains pointers to sound examples and related items of interest online.

2 Reading

The text for this course is Spectral Audio Signal Processing\(^10\) by JOS. It is available online in HTML format, and the printed book\(^11\) can be ordered if desired. All reading assignments will be specified in the *course schedule and outline* \(^8\).

3 Schedule and Assignments

TBA

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\(^6\) http://www.mathworks.com/products/studentversion/
\(^7\) http://www.octave.org/
\(^8\) http://ccrma.stanford.edu/~jos/intro421/Schedule_Assignments.html
\(^9\) http://ccrma.stanford.edu/courses/421/
\(^10\) https://ccrma.stanford.edu/~jos/sasp/
\(^11\) https://www.createspace.com/3751411