Proposal for a New Academic Course

Notes: i) All fields, except the Preamble, are mandatory and must be completed with appropriate, complete responses. ii) The proposal should be submitted both in hard copy & in electronic (.pdf) form to

sunanda@iitb.ac.in or rajnibhate@iitb.ac.in

Name of Academic Unit (Department /School/ Centre/ ID Group) : CSE

Preamble to the proposal (optional):

Level : Undergraduate

Programme : B.Tech.

<table>
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<tr>
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<th>Title of the course</th>
<th>Kernel programming</th>
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<tr>
<td>i</td>
<td>Credit Structure (L-T-P-C)</td>
<td>3-0-0-6</td>
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<tr>
<td>ii</td>
<td>Type of Course (Institute/Departmental) + (Core/Elective/...)</td>
<td>UG Elective</td>
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<tr>
<td>v</td>
<td>Semester in which normally to be offered (Autumn/Spring)</td>
<td>Autumn</td>
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<td>v</td>
<td>Whether Full or Half Semester Course</td>
<td>Full</td>
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<td>vi</td>
<td>Pre-requisite(s), if any (For the students) – specify course number(s)</td>
<td>CS347, CS377, CS213, CS296</td>
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</table>
| vii | Course Content * | List of topics to be covered: 
- Kernel compilation and modules  
- System calls and in-line assembly  
- Memory addressing and page tables  
- Process management and scheduling  
- Interrupts and interrupt handlers  
- Kernel timers and synchronization  
- The virtual file system interface  
- Kernel tracing, probing and profiling tools  
The course structure: 
- text book/paper reading and reviews  
- exercises and assignments  
- a kernel modifications based project |
| viii | Texts/References ** | Books:  


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<th>Name(s) of Instructor(s) ***</th>
<th>Purushottam Kulkarni</th>
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<tr>
<td>x</td>
<td>Name(s) of other Departments/ Academic Units to whom the course is relevant</td>
<td>EE</td>
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<td>xi</td>
<td>Is/Are there any course(s) in the same/ other academic unit(s) which is/ are equivalent to this course? If so, please give details.</td>
<td>No equivalent course.</td>
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<td>xii</td>
<td>Justification/ Need for introducing the course</td>
<td>CS347+CS377 introduce several basics of Operating Systems. This elective is meant to be an advanced course as a follow up to CS347. Additionally, the course will be structured on a widely used operating system. The students will get a chance to reinforce concepts studied in the basic course, modify, test and evaluate modifications to a “real” operating system. A hands-on systems course is missing from the UG program and this course is aimed at filling that gap. The goal of this course is to offer an advanced version of the basic operating systems course in a hands-on manner. The course will primarily be structured around exercises and assignments. Each topic will be introduced before its corresponding hands-on component. The idea is to learn and explore a full-fledged operating system up-close and to use it for kernel-based modifications. Observing and manipulating a real operating system is a key feature of the course. The exercises, meant to get an inside view of the kernel, will lead up to a project that will have to be submitted as the final submission for the course.</td>
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* The course content must **clearly** specify the topics/ components/ material normally intended to be taught/ discussed in the course. It would help, also, to separate essential and optional content, if applicable.

** Complete details of texts/ references should be specified, giving as much information as possible about the publisher(s) and/or sources, year of publication, edition, and so on.

*** Note that, there must be at least one instructor who is a **permanent** Faculty Member of IIT Bombay for all courses. For core courses there must be at least two such.

**Note to forward an Academic Course Proposal to the Institute Level Academic Bodies from the Academic Unit**
The proposal for the Academic Course titled '____________________' has been accepted by the local Academic Body/Bodies (Specify: DUGC/DPGC/IDPC and so on ________________________) of the following Academic Unit (Department/ Centre/ School/ ID Group) ______________________ for recommendation to the Institute level Academic Bodies (Specify UGPC/PGPC/Jointly to UGPC & PGPC and so on :___________) and is forwarded hereby, for consideration and necessary action by this Institute level Academic Body.

Additional Remarks, if any:

Signature with date:

________________________________________
Convener of the Academic Body in the Academic Unit/ Head of Department/ Convener, Interdisciplinary Programme

Remarks and Signature of Dean/Associate Dean, Academic Programmes:
(Convener/Co-Convener of Institute level Academic Bodies)

Remarks of Chairman, Senate: