A. COURSE SYLLABUS
1. General Information:
   Course Number: INCI 5995
   Course Title: Special Problems, Practical Applications in Construction
   Credit Hours: 3

2. Course Description:
   This course covers practical application of construction cost estimating, construction planning and scheduling and the preparation of construction procurement work packages: division of the project into activities for cost estimating and project scheduling; quantity estimating for the major divisions of the work of a sample project; labor, material equipment, subcontractors and overhead cost; preparation of a CPM schedule of sample projects; use of the computer for construction planning and scheduling; construction contracting; main components of a construction work package including technical and non-technical specifications.

3. Pre-requisites:
   INCI 4055 Construction Engineering I

4. Textbook, Supplies and Other Resources:
   Textbook:
   Project Planning and Scheduling Using Primavera P6, Paul E. Harris, 2008
   Other Resources:
   Gerencia e Ingeniería de Construcción, Dr. José F. Lluch, 2005.

5. Purpose:
   Provide practical practice in the development of construction cost estimates, construction schedules and in the preparation of work packages for the procurement of construction. This course provides practical experience that is very helpful for students working in construction in the capstone course.

6. Course Goals:
   At the end of this course the student should know:
   - How to estimate activity quantities from construction plans and specifications.
   - How to develop the schedule of a construction project from construction plans and specifications.
   - How to develop a work package for construction procurement.
How to use the computer for construction cost estimating, construction scheduling and construction work procurement.

7. Requirements:
All students are expected to:
- Do all assigned readings and related homework on time.
- Take the three exams or projects
- Come to class prepared to participate in discussions and answer questions posed by the professor
- Come to class all the time and on time

8. Laboratory/Field Work:
The class will meet in the Computer-Aided Instruction Laboratory and will use computer programs for construction estimating, scheduling and work package preparation.

9. Department/Campus Policies:
9a. Class attendance: Class attendance is compulsory. The University of Puerto Rico, Mayagüez Campus, reserves the right to deal at any time with individual cases of non-attendance. Professors are expected to record the absences of their students. Frequent absences affect the final grade, and may even result in total loss of credits. Arranging to make up work missed because of legitimate class absence is the responsibility of the student. (Bulletin of Information Undergraduate Studies, latest edition)

9b. Absence from examinations: Students are required to attend all examinations. If a student is absent from an examination for a justifiable reason acceptable to the professor, he or she will be given a special examination. Otherwise, he or she will receive a grade of zero or "F" in the examination missed. (Bulletin of Information Undergraduate Studies, latest edition)

9c. Final examinations: Final written examinations must be given in all courses unless, in the judgment of the Dean, the nature of the subject makes it impractical. Final examinations scheduled by arrangements must be given during the examination period prescribed in the Academic Calendar, including Saturdays and Sundays. (Bulletin of Information Undergraduate Studies, latest edition).

9d. Partial withdrawals: A student may withdraw from individual courses at any time during the term, but before the deadline established in the University Academic Calendar. (Bulletin of Information Undergraduate Studies, latest edition).

9e. Complete withdrawals: A student may completely withdraw from the University of Puerto Rico, Mayagüez Campus, at any time up to the last day of classes. (Bulletin of Information Undergraduate Studies, latest edition).

9f. Disabilities: Students will identify themselves with the institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students Office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 x3250 or 3258.

9g. Ethics: Any academic fraud is subject to the disciplinary sanctions described in article 14 and 16 of the revised General Student Bylaws of the University of Puerto Rico contained in Certification 018-1997-98 of the Board of Trustees. The professor will follow the norms established in articles 1-5 of the Bylaws.
### 10. General Topics:

<table>
<thead>
<tr>
<th>Topic No.</th>
<th>Description</th>
<th>Time (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction,</td>
<td>1</td>
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<tr>
<td>2.</td>
<td>Division of projects into activities. Classification of activities. Time estimates of activities, bar charts. Project networks calculations.</td>
<td>4</td>
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<tr>
<td>3.</td>
<td>Project identification. Preparation of project network for project.</td>
<td>4</td>
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<tr>
<td>4.</td>
<td>Computer implementation of construction schedule. Schedule updates.</td>
<td>4</td>
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<tr>
<td>5.</td>
<td>Schedule updates</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>Introduction to construction cost estimates.</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Preparation of conceptual and preliminary cost estimates of various structures.</td>
<td>2</td>
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<tr>
<td>8.</td>
<td>Estimating the site.</td>
<td>3</td>
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<tr>
<td>10.</td>
<td>Estimating masonry, metals</td>
<td>2</td>
</tr>
<tr>
<td>11.</td>
<td>Estimating doors, windows, finishes</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>Estimating electrical, plumbing</td>
<td>2</td>
</tr>
<tr>
<td>13.</td>
<td>Introduction to work package preparation for construction procurement</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Preparation of bid requests, request for information</td>
<td>2</td>
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<tr>
<td>15.</td>
<td>Preparation of General Conditions</td>
<td>6</td>
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<tr>
<td>16.</td>
<td>Preparation of Supplementary Conditions</td>
<td>1</td>
</tr>
<tr>
<td>17.</td>
<td>Preparation of Technical Specifications</td>
<td>2</td>
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<tr>
<td>18.</td>
<td>Tests or project presentations</td>
<td>3</td>
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<td></td>
<td></td>
<td>45 hours</td>
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</tbody>
</table>
B. INSTRUCTOR INFORMATION SHEET

1. General Information:
   Instructor: Dr. José F. Lluch
   Title: Professor
   Office: CI-207
   Phone: (787) 265-5423
   Office Hours: Indicated in class
   E-mail: josef.lluch@upr.edu
   Web Page: http://academic.uprm.edu/~jlluch/

2. Course Description:
   Course Number: INCI 5995 sec 050
   Course Title: Practical Applications in Construction
   See element number 2 (Course Description) of Course Syllabus Section.

3. Purpose:
   See element number 5 (Course Description) of Course Syllabus Section.

4. Course Goals:
   See element number 6 (Course Description) of Course Syllabus Section.

5. Instructional Strategy:
   The course will consist of lectures presented by the instructor with a strong emphasis on student participation. To motivate the student participation several examples will be analyzed in class where the students will have the chance to participate to find practical solutions. Student can follow the topics sequence to read prior to the lecture the aspects of the topic in order to be able to answer direct and specific questions in class. In addition, the reading of the topics in advance will provide the opportunity to clarify for the student any doubt during the class.

6. Evaluation/Grade Reporting:

<table>
<thead>
<tr>
<th>Grade Curve</th>
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<tbody>
<tr>
<td>90 &lt;= final average &lt;= 100 = A</td>
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<tr>
<td>80 &lt;= final average &lt; 90 = B</td>
</tr>
<tr>
<td>70 &lt;= final average&lt;80 = C</td>
</tr>
<tr>
<td>66 &lt;= final average&lt; 70 = D</td>
</tr>
<tr>
<td>final average &lt; 66 = F</td>
</tr>
</tbody>
</table>

   The suggested grading criteria for the course is as follows:
   First Partial Exam or Project 33%
   Second Partial Exam or Project 33%
   Final Exam 33%
Total 100%
Homework to be used in deciding borderline grades.

7. Deadlines for Assignments:
All assignments must be turned in on the date indicated by the professor in the classroom. The homework must be submitted at the beginning of the class period. The homework grade will be reduced by 10% for each working day delay in turning in.

8. Student Assistance:
See Department/Campus Policy (element 2) of Course Syllabus Section

9. Attendance and Behavior:
See Department/Campus Policy (element 2) of Course Syllabus Section

11. Instructor Responsibilities:
The professor is responsible for lecturing, grading and returning homework and exams on time, and assisting his students outside the classroom.

12. Course Outline and Schedule:
See General Topics (element 11) of Course Syllabus Section

13. Additional References:
The listed references represent the most current publications on the topic available at the university’s general library. No equivalent text books published on this topic within the last five years are available at the library. Requests for latest versions will be submitted.

   
The following books are available at the Department of Civil Engineering and Surveying
   