# Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>COMP 5311</th>
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</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Internet Infrastructure and Protocols</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Pre-requisite/ Exclusion</td>
<td>Nil</td>
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## Objectives

The overall objective of this course is to build up a solid understanding on the networking technologies underpinning the current Internet infrastructure. This course would serve as an important pre-requisite for other more advanced topics, such as network security, network measurement and diagnosis, wireless and mobile networks, and multimedia networking. The teaching approach will be based on in-depth problem-solving and hands-on class projects. Specifically,

1. Understand the TCP/IP technology underpinning Internet;
2. Understand the original design philosophy of Internet, and the strength and weaknesses of the then designed Internet in today’s computing environment;
3. Explore some most up-to-date development in the Internet technology; and
4. Acquire knowledge in one specific Internet topic through a group project.

## Intended Learning Outcomes

After completing the subject, students should be able to:

a) understand the articles in a professional computer networking magazines, such as the NetworkWorld and IEEE Netwok, and ACM netWorker;
b) use various network diagnosis tools, such as wireshark, traceroute programs, and various ping and ping-like tools to study network protocols and perform simple diagnosis and troubleshooting; and
c) take on a self-study on more advanced networking topics that require foundational understanding of the TCP/IP suite.

## Subject Synopsis/Indicative Syllabus

- Data-link networks and IP: shared medium and point-to-point networks; the internetworking problem, the hour-glass model, address resolution, IP fragmentation, packet reordering, IP addressing.
- IP forwarding: longest prefix match algorithms, routing vs switching, IP address lookup, packet classification, IP tunnelling, ICMP.
- End-to-end issues and protocols: end-to-end argument, end-to-end reliability, TCP and UDP, sliding window protocol, acknowledgment strategies.
- Control congestion in Internet: TCP slow-start and congestion avoidance, TCP fast retransmit and recovery, fairness, buffer management, packet scheduling, and queue management.
- Applications protocols, e.g., DNS and HTTP, and their interactions with the lower layers.
- Design philosophy of IP and TCP, and future challenges.

### Teaching/Learning Methodology

Class activities including - lecture, tutorial, lab, workshop seminar where applicable

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments, Tests &amp; Projects</td>
<td>55</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Final Examination</td>
<td>45</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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</tr>
</tbody>
</table>

### Student study effort expected

**Class Contact:**

Class activities (lecture, tutorial, lab) 39 hours

**Other student study effort:**

Assignments, Quizzes, Projects, Exams 65 hours

**Total student study effort** 104 hours

### Reading list and references