

## .XML

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="16063222.xsl"?>
<Courses>
  <Course>
    <Name>Information Systems</Name>
    <Number>U08007</Number>
    <ModuleLeader>Bob Champion</ModuleLeader>
    <Level>4</Level>
    <Type>Compulsory</Type>
    <Status>Single</Status>
    <Runs>2</Runs>
  </Course>
  <Course>
    <Name>Problem Solving and Programming</Name>
    <Number>U08008</Number>
    <ModuleLeader>Clare Martin</ModuleLeader>
    <Level>4</Level>
    <Type>Compulsory</Type>
    <Status>Double</Status>
    <Runs>1</Runs>
  </Course>
  <Course>
    <Name>Object Oriented Programming</Name>
    <Number>U08009</Number>
    <ModuleLeader>Arantza Aldea</ModuleLeader>
    <Level>4</Level>
    <Type>Compulsory</Type>
    <Status>Single</Status>
    <Prereq>U08008</Prereq>
    <Runs>2</Runs>
  </Course>
  <Course>
    <Name>DevOps</Name>
    <Number>U08010</Number>
    <ModuleLeader>Mark Green</ModuleLeader>
    <Level>4</Level>
    <Type>Compulsory</Type>
    <Status>Single</Status>
    <Runs>2</Runs>
  </Course>
  <Course>
    <Name>Networking and Multimedia</Name>
    <Number>U08011</Number>
```

```
<ModuleLeader>Mark Green</ModuleLeader>
<Level>4</Level>
<Type>Compulsory</Type>
<Status>Single</Status>
<Runs>1</Runs>
</Course>
<Course>
  <Name>Foundations of Computer Systems</Name>
  <Number>U08013</Number>
  <ModuleLeader>Shumao Ou</ModuleLeader>
  <Level>4</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Discrete Mathematics</Name>
  <Number>U08606</Number>
  <ModuleLeader>James Maunder</ModuleLeader>
  <Level>4</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>O level/GCSE GCSE Mathematics or equivalent</Prereq>
  <Runs>2</Runs>
</Course>
<Course>
  <Name>Foundations of Computation</Name>
  <Number>U08025</Number>
  <ModuleLeader>Tjeerd Olde Scheper</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08009
    U08606</Prereq>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Innovative Product Development</Name>
  <Number>U08056</Number>
  <ModuleLeader>Bob Champion</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Double</Status>
  <Prereq>U08007
    U08008</Prereq>
  <Runs>1,2</Runs>
```

```
</Course>
<Course>
  <Name>Software Engineering</Name>
  <Number>U08173</Number>
  <ModuleLeader>Hong Zhu</ModuleLeader>
  <Level>6</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08008</Prereq>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Data Structures and Algorithms</Name>
  <Number>U08223</Number>
  <ModuleLeader>David Lightfoot</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08009</Prereq>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Foundations of Security</Name>
  <Number>U08226</Number>
  <ModuleLeader>Tjeerd Olde Scheper</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08009</Prereq>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Software Development with C and C++</Name>
  <Number>U08028</Number>
  <ModuleLeader>Mark Green</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08009</Prereq>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Databases</Name>
  <Number>U08049</Number>
  <ModuleLeader>Peter Marshall</ModuleLeader>
  <Level>5</Level>
```

```
<Type>Compulsory</Type>
<Status>Single</Status>
<Prereq>U08009</Prereq>
<Runs>2</Runs>
</Course>
<Course>
  <Name>Web Application Development</Name>
  <Number>U08054</Number>
  <ModuleLeader>Samia Kamal</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08008</Prereq>
  <Runs>2</Runs>
</Course>
<Course>
  <Name>Cloud Computing and the Internet of Things</Name>
  <Number>U08174</Number>
  <ModuleLeader>Peter Ball</ModuleLeader>
  <Level>6</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Runs>2</Runs>
</Course>
<Course>
  <Name>Principles of Secure Operating Systems</Name>
  <Number>U08171</Number>
  <ModuleLeader>Peter Marshall</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08028</Prereq>
  <Runs>2</Runs>
</Course>
<Course>
  <Name>Artificial Intelligence</Name>
  <Number>U08175</Number>
  <ModuleLeader>Peter Marshall</ModuleLeader>
  <Level>5</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Computing Project</Name>
  <Number>U08096</Number>
```

```
<ModuleLeader>Chrisina Jayne</ModuleLeader>
<Level>5</Level>
<Type>Compulsory</Type>
<Status>Double</Status>
<Prereq>U08056</Prereq>
<Runs>1,2</Runs>
</Course>
<Course>
  <Name>Advanced Object Oriented Programming</Name>
  <Number>U08186</Number>
  <ModuleLeader>Ian Bayley</ModuleLeader>
  <Level>6</Level>
  <Type>Compulsory</Type>
  <Status>Single</Status>
  <Prereq>U08223</Prereq>
  <Runs>1,2</Runs>
</Course>
<Course>
  <Name>Advanced Web Technology</Name>
  <Number>U08073</Number>
  <ModuleLeader>Peter Marshall</ModuleLeader>
  <Level>6</Level>
  <Type>Optional</Type>
  <Status>Single</Status>
  <Prereq>U08054</Prereq>
  <Runs>1</Runs>
</Course>
<Course>
  <Name>Game Development</Name>
  <Number>U08281</Number>
  <ModuleLeader>Mark Green</ModuleLeader>
  <Level>6</Level>
  <Type>Optional</Type>
  <Status>Single</Status>
  <Prereq>U08028</Prereq>
  <Runs>2</Runs>
</Course>
<Course>
  <Name>Machine Learning</Name>
  <Number>U08089</Number>
  <ModuleLeader>Matthias Rolf</ModuleLeader>
  <Level>6</Level>
  <Type>Optional</Type>
  <Status>Single</Status>
  <Prereq>U08025</Prereq>
  <Runs>1</Runs>
```

```

</Course>
</Courses>

```

## .XSD

```

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:element name="Courses" />
  <xs:simpleType name="numberType">
    <xs:restriction base="xs:string">
      <xs:pattern value="[U][0-9]{5}" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="level">
    <xs:restriction base="xs:string">
      <xs:pattern value="4|5|6" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="runType">
    <xs:restriction base="xs:string">
      <xs:pattern value="Optional|Compulsory" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="statusType">
    <xs:restriction base="xs:string">
      <xs:pattern value="Single|Double" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="semesterType">
    <xs:restriction base="xs:string">
      <xs:pattern value="1|2|1,2|None" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="prereqList">
    <xs:list itemType="xs:string" />
  </xs:simpleType>
  <xs:element name="Course">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="Name" type="xs:string" />
        <xs:element name="Number" type="numberType" />
        <xs:element name="ModuleLeader" type="xs:string" />
        <xs:element name="Level" type="level" />
        <xs:element name="Type" type="runType" />
        <xs:element name="Status" type="statusType" />
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>

```

```

    <xs:element name="Prereq" type="prereqList" minOccurs="0" maxOccurs="1"/>
    <xs:element name="Runs" type="semesterType" />
  </xs:sequence>
</xs:complexType>
</xs:element>
</xs:schema>

```

## .XSL

```

<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet xmlns:xsl="http://www.w3.org/1999/XSL/Transform" version="1.0">
  <xsl:template match="/">
    <html>
      <body>
        <h2>ASD</h2>
        <table border="1">
          <tr bgcolor="#9acd32">
            <th>Name</th>
            <th>Number</th>
            <th>Module Leader</th>
            <th>Level</th>
            <th>Type</th>
            <th>Status</th>
            <th>Prereq</th>
            <th>Semesters</th>
          </tr>
          <xsl:for-each select="Courses/Course">
            <xsl:if test="Runs=1 or Runs='1,2'">
              <tr>
                <td>
                  <xsl:value-of select="Name" />
                </td>
                <td>
                  <xsl:value-of select="Number" />
                </td>
                <td>
                  <xsl:value-of select="ModuleLeader" />
                </td>
                <td>
                  <xsl:value-of select="Level" />
                </td>
                <td>
                  <xsl:value-of select="Type" />
                </td>
                <td>

```

```

        <xsl:value-of select="Status" />
    </td>
    <td>
        <xsl:value-of select="Prereq" />
    </td>
    <td>
        <xsl:value-of select="Runs" />
    </td>
</tr>
</xsl:if>
</xsl:for-each>
</table>
<table border="1">
    <tr bgcolor="#9acd32">
        <th>Name</th>
        <th>Number</th>
        <th>Module Leader</th>
        <th>Level</th>
        <th>Type</th>
        <th>Status</th>
        <th>Prereq</th>
        <th>Semesters</th>
    </tr>
    <xsl:for-each select="Courses/Course">
        <xsl:if test="Runs=2">
            <tr>
                <td>
                    <xsl:value-of select="Name" />
                </td>
                <td>
                    <xsl:value-of select="Number" />
                </td>
                <td>
                    <xsl:value-of select="ModuleLeader" />
                </td>
                <td>
                    <xsl:value-of select="Level" />
                </td>
                <td>
                    <xsl:value-of select="Type" />
                </td>
                <td>
                    <xsl:value-of select="Status" />
                </td>
                <td>
                    <xsl:value-of select="Prereq" />

```



```

        </td>
        <td>
            <xsl:value-of select="Runs" />
        </td>
    </tr>
</xsl:if>
</xsl:for-each>
</table>
</body>
</html>
</xsl:template>
</xsl:stylesheet>

```

## .XQ

```

xquery version "1.0";
let $courses := (doc("16063222.xml")/Courses
)
return <table><tr><th>Double Modules</th></tr>
{
for $x in $courses
/Course
where $x/Status="Double"
order by $x/Number ascending
return <tr><td>{data($x/Number)}</td></tr>

}
<tr><th>Semester 2 with Requirements</th></tr>
{
for $x in $courses
/Course
where $x/Runs="2"
order by $x/Number ascending
return
if(fn:empty($x/Prereq)) then ()
    else (
        <tr><td>{data($x/Number)}</td></tr>
    )
}
<tr><th>Math Modules</th></tr>
{

for $x in $courses
/Course
where fn:contains($x/Number, "U086")

```

```
order by $x/Number ascending
return <tr><td>{data($x/Number)}</td></tr>
}
</table>
```

## .RDF

```
PREFIX obu: <http://ecm.brookes.ac.uk/modules/U08073/2019/16063222/> .
PREFIX mod: <http://ecm.brookes.ac.uk/modules/U08073/2019/16063222/modules/> .
PREFIX staff: <http://ecm.brookes.ac.uk/modules/U08073/2019/16063222/staff/> .
```

```
mod:U08175 obu:level "5" ;
    obu:moduleLeader staff:Peter_Marshall ;
    obu:name "Artificial_Intelligence" ;
    obu:number "U08175" ;
    obu:runs "1" ;
    obu:status "Single" ;
    obu:type "Compulsory" .
```

```
mod:U08013 obu:level "4" ;
    obu:moduleLeader staff:Shumao_Ou ;
    obu:name "Foundations_of_Computer_Systems" ;
    obu:number "U08013" ;
    obu:runs "1" ;
    obu:status "Single" ;
    obu:type "Compulsory" .
```

```
mod:U08028 obu:level "5" ;
    obu:moduleLeader staff:Mark_Green ;
    obu:name "Software_Development_with_C_and_C++" ;
    obu:number "U08028" ;
    obu:prereq mod:U08009 ;
    obu:runs "1" ;
    obu:status "Single" ;
    obu:type "Compulsory" .
```

```
mod:U08174 obu:level "6" ;
    obu:moduleLeader staff:Peter_Ball ;
    obu:name "Cloud_Computing_and_the_Internet_of_Things" ;
    obu:number "U08174" ;
    obu:runs "2" ;
    obu:status "Single" ;
    obu:type "Compulsory" .
```

```
mod:U08056 obu:level "5" ;
```

```
obu:moduleLeader staff:Bob_Champion ;
obu:name          "Innovative_Product_Development" ;
obu:number        "U08056" ;
obu:prereq        mod:U08008 , mod:U08007 ;
obu:runs          "1,2" ;
obu:status        "Double" ;
obu:type          "Compulsory" .
```

```
mod:U08009 obu:level "4" ;
obu:moduleLeader staff:Arantza_Aldea ;
obu:name          "Object_Oriented_Programming" ;
obu:number        "U08009" ;
obu:prereq        mod:U08008 ;
obu:runs          "1" ;
obu:status        "Single" ;
obu:type          "Compulsory" .
```

```
mod:U08226 obu:level "5" ;
obu:moduleLeader staff:Tjeerd_Olde_Scheper ;
obu:name          "Foundations_of_Security" ;
obu:number        "U08226" ;
obu:prereq        mod:U08009 ;
obu:runs          "1" ;
obu:status        "Single" ;
obu:type          "Compulsory" .
```

```
mod:U08173 obu:level "6" ;
obu:moduleLeader staff:Hong_Zhu ;
obu:name          "Software_Engineering" ;
obu:number        "U08173" ;
obu:prereq        mod:U08008 ;
obu:runs          "1" ;
obu:status        "Single" ;
obu:type          "Compulsory" .
```

```
mod:U08008 obu:level "4" ;
obu:moduleLeader staff:Clare_Martin ;
obu:name          "Problem_Solving_and_Programming" ;
obu:number        "U08008" ;
obu:runs          "1" ;
obu:status        "Double" ;
obu:type          "Compulsory" .
```

```
mod:U08089 obu:level "6" ;
obu:moduleLeader staff:Matthias_Rolf ;
obu:name          "Machine_Learning" ;
```

obu:number "U08089" ;  
obu:prereq mod:U0802 ;  
obu:runs "1" ;  
obu:status "Single" ;  
obu:type "Optional" .

mod:U08011 obu:level "4" ;  
obu:moduleLeader staff:Mark\_Green ;  
obu:name "Networking\_and\_Multimedia" ;  
obu:number "U08011" ;  
obu:runs "1" ;  
obu:status "Single" ;  
obu:type "Compulsory" .

mod:U08281 obu:level "6" ;  
obu:moduleLeader staff:Mark\_Green ;  
obu:name "Game\_Development" ;  
obu:number "U08281" ;  
obu:prereq mod:U08028 ;  
obu:runs "2" ;  
obu:status "Single" ;  
obu:type "Optional" .

mod:U08073 obu:level "6" ;  
obu:moduleLeader staff:Peter\_Marshall ;  
obu:name "Advanced\_Web\_Technology" ;  
obu:number "U08073" ;  
obu:prereq mod:U08054 ;  
obu:runs "1" ;  
obu:status "Single" ;  
obu:type "Optional" .

mod:U08054 obu:level "5" ;  
obu:moduleLeader staff:Samia\_Kamal ;  
obu:name "Web\_Application\_Development" ;  
obu:number "U08054" ;  
obu:prereq mod:U08008 ;  
obu:runs "2" ;  
obu:status "Single" ;  
obu:type "Compulsory" .

mod:U08007 obu:level "4" ;  
obu:moduleLeader staff:Bob\_Champion ;  
obu:name "Information\_Systems" ;  
obu:number "U08007" ;  
obu:runs "2" ;

```
obu:status    "Single" ;
obu:type      "Compulsory" .
```

```
mod:U08010 obu:level    "4" ;
  obu:moduleLeader staff:Mark_Green ;
  obu:name          "DevOps" ;
  obu:number       "U08010" ;
  obu:runs         "2" ;
  obu:status       "Single" ;
  obu:type         "Compulsory" .
```

```
mod:U08025 obu:level    "5" ;
  obu:moduleLeader staff:Tjeerd_Olde_Scheper ;
  obu:name          "Foundations_of_Computation" ;
  obu:number       "U08025" ;
  obu:prereq      mod:U08606 , mod:U08009 ;
  obu:runs         "1" ;
  obu:status       "Single" ;
  obu:type         "Compulsory" .
```

```
mod:U08171 obu:level    "5" ;
  obu:moduleLeader staff:Peter_Marshall ;
  obu:name          "Principles_of_Secure_Operating_Systems" ;
  obu:number       "U08171" ;
  obu:prereq      mod:U08028 ;
  obu:runs         "2" ;
  obu:status       "Single" ;
  obu:type         "Compulsory" .
```

```
mod:U08223 obu:level    "5" ;
  obu:moduleLeader staff:David_Lightfoot ;
  obu:name          "Data_Structures_and_Algorithms" ;
  obu:number       "U08223" ;
  obu:prereq      mod:U08009 ;
  obu:runs         "1" ;
  obu:status       "Single" ;
  obu:type         "Compulsory" .
```

```
mod:U08186 obu:level    "6" ;
  obu:moduleLeader staff:Ian_Bayley ;
  obu:name          "Advanced_Object_Oriented_Programming" ;
  obu:number       "U08186" ;
  obu:prereq      mod:U08223 ;
  obu:runs         "1,2" ;
  obu:status       "Single" ;
  obu:type         "Compulsory" .
```

```
mod:U08096 obu:level "5" ;
      obu:moduleLeader staff:Chrisina_Jayne ;
      obu:name "Computing_Project" ;
      obu:number "U08096" ;
      obu:prereq mod:U08056 ;
      obu:runs "1,2" ;
      obu:status "Double" ;
      obu:type "Compulsory" .
```

```
mod:U08049 obu:level "5" ;
      obu:moduleLeader staff:Peter_Marshall ;
      obu:name "Databases" ;
      obu:number "U08049" ;
      obu:prereq mod:U08009 ;
      obu:runs "2" ;
      obu:status "Single" ;
      obu:type "Compulsory" .
```

```
mod:U08606 obu:level "4" ;
      obu:moduleLeader staff:James_Maunders ;
      obu:name "Discrete_Mathematics" ;
      obu:number "U08606" ;
      obu:prereq "O level/GCSE GCSE Mathematics or equivalent" ;
      obu:runs "2" ;
      obu:status "Single" ;
      obu:type "Compulsory" .
```

## .RQ

```
PREFIX obu: <http://ecm.brookes.ac.uk/modules/U08073/2019/16063222/>
PREFIX mod: <http://ecm.brookes.ac.uk/modules/U08073/2019/16063222/modules/>
PREFIX staff: <http://ecm.brookes.ac.uk/modules/U08073/2019/16063222/staff/>
```

```
SELECT ?x
WHERE {
    ?x obu:name ?name
}
```

```
SELECT ?x
WHERE {
    FILTER (obu:prereq, "U08009")
}
```

```
INSERT DATA
```

```
{      mod:U08085 obu:level          "6";
      obu:moduleLeader  staff:Clare_Martin;
      obu:name
"Communicating_and_Teaching_Computer_Science";
      obu:number        "U08085";
      obu:prereq        mod:U08009, mod:U08055 ;
      obu:runs          "1,2";
      obu:status        "Single";
      obu:type          "Optional".
}
```