

Erasmus Coímbra 2010/2011
Instituto Superior Miguel Torga
P Coimbra05

Índice:

Haz click en un enlace para ir directamente

- [Portada](#)
- [Índice](#)
- [Consideraciones previas](#)
- [Introducción](#)
- [Cómo llegar](#)
- [Antes de ir](#)
- [Los primeros días](#)
- [Sobre el Instituto Miguel Torga y los estudios](#)
- [Y ahora, a disfrutar](#)
- [En definitiva](#)
- [Y por último, enlaces y algo de ayuda extra](#)
- [Anexo 1. Mapa de la ciudad de Coímbra](#)
- [Anexo 2. Asignaturas que se cursan en el Instituto Miguel Torga](#)

Consideraciones previas:

Este documento es una guía que se puede tomar por referencia para los primeros días, pero se ha de tener cuidado ya que es posible que las cosas hayan cambiado desde el desarrollo hasta que vayáis vosotros, sobre todo en temas de dinero y precios de las distintas actividades que podáis tener, además esta guía está enfocada principalmente para alumnos que accedan al Instituto Superior Miguel Torga, aunque para aquellos que vayan a la Universidade o al ISEC puede ayudar.

Introducción:

Estarás leyendo esto si la ciudad elegida o la ciudad que te han asignado para tu plaza Erasmus es Coímbra. Coímbra es una ciudad pequeñita en comparación a las ciudades de España, pero de un tamaño considerable para Portugal (ha de ser la 3ª ciudad más grande de Portugal). Es de ambiente universitario parecido a Granada (el motor de la ciudad es la universidad) y por ello es relativamente barato vivir si eres estudiante, gracias a los descuentos a estudiantes y tal. La ciudad se compone principalmente de dos zonas (alta Coímbra y baixa Coímbra) y posee un río bastante amplio y navegable. El tiempo suele ser lluvioso pero las temperaturas no son tampoco mucho más bajas que en el sur de España (por el contrario de lo que pudiera parecer). Está en el centro de Portugal a una hora de Oporto y una y media de Lisboa y dispone de playa a una media hora en coche (Figueira da Foz) y sierra a una hora y media o dos (Serra da Estrela).

Cómo llegar:

Este puede ser un tema complicado, máxime cuando se realiza el viaje por primera vez. En mi caso fui en coche casi todas las veces, siendo bastante económico si vas con más gente y no siendo complicado llegar, también se puede ir en avión pero para la primera vez no lo recomiendo, en tren y en autobús pero en estas dos últimas no me extenderé por no haber realizado yo viajes así.

- **Con coche:**

Fácil, no es un camino complicado. Existen varias opciones y después de probarlas todas, yo recomiendo fervientemente la siguiente ya que son unas 7 horas y media por 9 o 10 de las otras opciones. A muy alta escala, el viaje es el siguiente: desde Granada buscar la A-92 hasta Sevilla, una vez allí coger la autovía de la plata hasta Badajoz. Entráis en Portugal ya y coger en Elvas el peaje hasta cerca de Estremoz (creo recordar que era la salida 7) donde se coge la carretera IP2 y buscar la siguiente entrada al peaje cerca de Torres Novas ya en dirección Coímbra (dirección hacia Oporto).

El camino en Portugal es más complicado, pero a grandes rasgos es ese el viaje. Recomiendo la opción del peaje, porque de otra manera es mucho más lioso y se tarda cerca de 2 horas o 2 horas y media más y por unos 7 u 8 euros de peaje que se paga, merece la pena.

No os asustéis de las carreteras portuguesas, ya que en comparación a las españolas están bastante mal y lo que sí os recomiendo es que antes de entrar en Portugal, por ejemplo en Badajoz, que llenéis el depósito ya que en Portugal el carburante esta mucho más caro que en España, amén de que no existen tantas estaciones de servicio en la carretera y por ello, mejor evitar males mayores. También notareis que de Granada a Badajoz hacéis el trayecto en unas 4 horas o 4 y media y que luego tardáis lo mismo en llegar a Coímbra desde Badajoz siendo unos 200 kms menos de camino, como ya he dicho, paciencia y malas carreteras en Portugal.

Existen dos opciones más, que sería ir por carretera nacional hasta Badajoz, previo paso por Córdoba, y aunque son menos kms, es bastante más lento, así que merece la pena coger la A-92. Ó entrar directamente a Portugal por Huelva y luego coger autopista de peaje hacia Coímbra, pero no lo recomiendo, porque esto sí es realmente mucho más caro (mucho peaje) además de que se hacen bastantes mas kms.

Para más información: <http://www.viamichelin.es/>

Precio: de 60 a 90 euros en gasolina, mas unos 7 de peajes.

Horas: de 7 y media a 10.

- **Con avión:**

Si Ryanair hiciera Oporto-Granada como antiguamente, seria genial, en 3 o 4 horas estas en Granada o Coímbra. Pero lamentablemente no es así, no obstante, si viajas solo y sin maletas es una opción recomendable ya que suele salir más barato que el viaje en coche solo o en autobús, aunque tienes que estar constantemente bajando y subiendo en distintos medios de transporte pero eso puede hacer el viaje hasta entretenido y más ligero. El avión en sí, desde Madrid a Oporto, puede salir de 3 a 40 euros, todo depende de cuando lo compres.

Existe un vuelo desde Almería hasta Madrid de Ryanair que suele salir entre 1 y 20 euros de precio pero yo no lo tomé, así que no lo contemplo en la guía. Así que, solo es coger un autobús hasta Madrid, hasta la estación Méndez Álvaro (Estación sur de Madrid) y una vez allí y sin salir de la estación, se coge el metro hasta el aeropuerto de Barajas. No os asustéis del metro, es muy rápido, eficiente y barato, además de que todo está muy bien explicado y siempre hay operarios si tenéis alguna duda, no obstante os explicare el itinerario del metro desde dicha estación de autobús hasta Barajas. Como dije, se coge en la misma estación, hay que coger la línea gris (la número 8) hasta la parada Nuevos Ministerios y allí, coger la línea rosa (la número 6) y ya, hasta Barajas. Una vez en Barajas, buscar vuestra puerta de embarque y hasta Oporto (normalmente, el vuelo de Ryanair hasta Oporto sale de la T1). En Oporto es como en Madrid, sales del avión y en el mismo aeropuerto se coge el metro (solo hay una línea, la línea E, de color morado) hasta la estación de trenes Porto-Campanha, y ya allí coger un tren, mejor el Alfa-Pendular, que ya te lleva a Coímbra (da igual estación Coímbra-A que Coímbra-B, las dos están en la ciudad).

La verdad es que parece muy lioso, pero es fácil, yo hice ese camino de vuelta a Granada dos veces, y se hace ameno ya que estas constantemente moviéndote entre los distintos medios de transporte. Y para los ratos que estés esperando trenes, autobuses o aviones, un libro y a leer. Para volver desde Coímbra, tan solo hacer el itinerario del revés.

No obstante, yo no recomiendo hacer el viaje por primera vez en avión, ya que hay que llevar maletas y bolsas y entonces sí que sale tremendamente caro además de que aun no manejaeis el idioma y os costaría orientaros y preguntar.

Precio: 16 euros autobús a Madrid + 2 euros metro Madrid + 3 a 40 euros billete de avión a Oporto + 1 euro metro Oporto + 13 euros tren a Coímbra

Horas: Pues dependiendo de lo que tengáis que esperar entre un transporte y otro, pero yo lo mas que tarde con esta fórmula fueron 9 horas y media o 10

- **Con autobús:**

Tan sencillo como ir a la estación de autobús y pedir un billete a Coímbra, solo hay que tener cuidado en Sevilla y Lisboa que puede haber transbordos. Son unas 15 o 16 horas y sale alrededor de los 70 euros si el billete es solo de ida y 120 si es de ida y vuelta. Caro y aburrido, y 15 horas en un autobús...

Precio: 70 a 120 euros

Horas: 15 en el mejor de los casos

- **Con tren:**

Yo no tome nunca esta opción, así que desconozco, pero imagino que será escoger tren por etapas, entre Granada-Sevilla, Sevilla-Badajoz, Badajoz-Entroncamiento (ya en Portugal) y Entroncamiento-Coímbra. Imagino que será caro, pero siempre podéis preguntar en la estación de trenes.

Precio y horas: Desconocido.

Antes de ir:

Importante, ya que parece una tontería pero no lo es. Obviamente, déjate tus papeles hechos, haz autorizaciones expresas a personas de confianza para que puedan hacerte gestiones en la universidad, seguridad social... Si estas cobrando el paro como fue mi caso tienes que dejarlo suspendido y luego a la vuelta lo puedes retomar, sácate la tarjeta sanitaria europea ya que si no, no tienes seguridad social fuera de España. Yo, también me llevé algunas medicinas por si acaso. Ah, y se me olvidaba, si no tienes muchos recursos económicos, AHORRA antes de ir, ya que el primer pago tardan del orden de 3 ó 4 meses en darlo.

Los primeros días:

Lo primero que te voy a decir, es que no cunda el desanimo, que todo lo malo se pasa y que vas a disfrutar mucho y digo esto, porque los primeros días son la única experiencia no tan buena que vas a pasar allí. Llegas a un país extranjero, sin el amparo de tu familia, con un idioma distinto y una cultura no muy parecida a pesar de lo cerca que estamos... Posiblemente no tengas alojamiento... Difícil. Cuando llegues, hay que cambiar el chip, y ser "avispa" ya que aquí, nadie te va a sacar las castañas del fuego. Tu familia allí serán los demás Erasmus que encuentres así que intentad ayudaros entre vosotros y nada, suerte y al toro de los primeros días.

Obviamente, tienes que buscar alojamiento. Recomiendo fervientemente hacer un viaje previo o buscar allí sobre el terreno al llegar, **NO ALQUILEIS NADA SIN HABERLO VISTO ANTES O HABIENDOLO VISTO POR INTERNET**, lo pongo en mayúscula para que quede bien

recalcado. Se busca piso como en Granada, mediante carteles en la calle o comprando el periódico, y llamando por teléfono y el sistema de alquiler es distinto a lo que yo estoy acostumbrado a escuchar aquí, que se alquila el piso entero. Se alquila por habitaciones y cada habitación tiene un precio según la posición y el tamaño normalmente, además, se suele pagar el precio del alquiler y los gastos aparte. No desesperéis y no os cojáis lo primero que encontréis pues hay mucho cuchitril. También decir, que todo o casi todo va en negro y no hay contrato ni nada, así que si algo no os convence podéis salir del piso y buscar otra cosa.

Yo, personalmente, recomiendo vivir en la Alta Coímbra, y más especialmente, cerca de la Plaza de la Republica como también recomiendo no pagar más de 200 euros + gastos. Recomiendo vivir cerca de la plaza porque saldrás de fiesta (muchos pubs y garitos cerca) y la plaza es más o menos el centro neurálgico de la vida estudiantil ya que tiene cerca muchas cafeterías (Cartola, Tropical, Café Teatro, Associação Académica...) y relativamente cerca todas las facultades, amén de sitios para comer. No podemos olvidar que todos los autobuses pasan por la susodicha plaza y que hay una parada de taxis que más de una vez te sacaran de un aprieto, por cierto que los taxis tienen su taxímetro y no cobran de mas ni lo que les da la gana, muy económico el taxi allí la verdad.

Una vez hablado del tema del alojamiento, hay que hablar de lo que se hace en sí, en los primeros días. Lo que deberías de hacer nada más llegar es ir a tu facultad de destino (en mi caso el Instituto Miguel Torga), pasar por su oficina de relaciones internacionales (que está en el edificio rosa, en la plaza Largo de Celas) y que te firmen el certificado de llegada y una "Declaração". El certificado de llegada es muy importante que lo hagas rápido, ya que marca el día que llegas, y por ende, el día de terminación del Erasmus y esto es importante porque va a marcar tu fecha mínima de vuelta definitiva a España.

La Declaração es para, digamos, registrarte como ciudadano portugués. Si no haces este trámite, solo podrás estar en Portugal durante 3 meses sin que seas un indocumentado ilegal. Te preguntaran en la oficina de relaciones internacionales (Susana en mi época, quien por cierto estuvo de Erasmus en Granada) la duración de tu beca y te harán un papel en consecuencia a ello, y acorde a esa Declaração te harán "ciudadano portugués" durante un tiempo u otro. Con tu Declaração en la mano, tienes que bajar a la Baixa Coímbra e ir a la Loja do Cidadão (en la Calle Fernão de Magalhaes) donde harás este trámite. No hay por qué hacerlo, pero puedes hacerte también el "número de contribuyente" ya que algunos caseros y bancos lo piden y solo cuesta 7 euros o así el sacarselo.

Despues de esto, es muy recomendable ir a la oficina de la ESN Coímbra que esta justo en la plaza de Se Velha, y que es una oficina de apoyo al estudiante erasmus. Allí te daran un carnet de la ESN que te dara descuentos en muchos lados, una tarjeta de telefono con la tarifa Stravaganzza y te registraran en una base de datos para ofrecerte viajes, cenas y comidas y fiestas erasmus. Con el carnet de la ESN recomendaria ir consiguientemente a por un telefono. Te diran que tienes dos tiendas para ir, la tienda Vodafone del Dolce Vita (un centro comercial) y la tienda Vodafone de la baixa (en la Calle Fernão de Magalhaes, si, donde antes pero en el otro extremo opuesto de la calle). Yo recomiendo la segunda opción puesto que es terreno explorado ya. Allí podrás comprar un teléfono muy barato, y ala, a llamar y mensajear a todo el mundo por 7'5 euros al mes.

Para tener una cuenta bancaria recomiendo “Caixa Nova” (hay una oficina en la calle Rua de Sofia, paralela a Fernão de Magalhaes) ya que tiene muchas oficinas en España también y creo recordar que no cobran comisión. Pero yo por ejemplo no me saqué ninguna, me quede con mi cuenta de CajaGranada y o bien lo sacaba en Granada y me lo llevaba cuando venía de visita o lo sacaba de cualquier cajero allí, pero sacaba bastante para solo pagar una vez comisión. Ya digo, yo no me hice cuenta, pero si quieres hacerte una, la mejor opción quizás sea Caixa Nova.

Entonces, recapitemos un poco que esto es importante:

1. Llegas a Coímbra
2. Ir al edificio Rosa del Instituto Miguel Torga, al Gabinete de Relações Internacionais, para que os firmen vuestro certificado de llegada y os hagan la Declaração
3. Vas a la Loja do Cidadão, a tramitar el tiempo de estancia en Portugal y si quieres, el número de contribuyente
4. Pasas por la oficina de la ESN para conseguir tu tarjeta de telefono y tu carnet de la ESN
5. Y para finalizar, vas a una tienda Vodafone (no vale cualquiera y yo recomiendo la de Fernão de Magalhaes) a dar de alta la tarjeta del telefono y conseguir un movil.

Puedes pasar por la oficina de la ESN antes de ir a la Loja do Cidadão y luego, vas directamente a la tienda Vodafone y si quieres, a hacerte una cuenta en Caixa Nova.

Después de eso, ya tendrás prácticamente todos tus papeleos hechos si te has llevado el acuerdo de estudios hecho de aquí de Granada y podrás disfrutar y relajarte un poquito más.

También, recomiendo pasar por la oficina de turismo y coger un mapa de la ciudad, que por cierto, son gratis.

Sobre el Instituto Miguel Torga y los estudios:

Lo primero que tienes que saber a este respecto es que en general es siempre más fácil fuera de España y esto es para cualquier carrera o destino. Obviamente, siempre tendrás algún hueso difícil de aprobar. Lo que si voy remarcar, es que si estudias una Ingeniería (como fue mi caso) vas a trabajar y a estudiar si quieres aprobar, a lo mejor para otras carreras es más liviana la carga de trabajo que te propondrán, pero por lo menos para Informática, no. El mito de “Hola, soy Erasmus y apruebo fácil” no existe para ti pero como ya dije, si es más fácil que en España.

Sobre el Instituto en sí, yo solo conozco a los profesores y coordinador de la rama de Informática y ciencias de la computación. Y lo único que os puedo decir al respecto es que os van a ayudar en lo que puedan y son todos buena gente y esto quiere decir, que si trabajáis y hacéis por aprobar, vais a aprobar con nota y no será difícil.

Y ahora, a disfrutar:

Pues como Coímbra es una ciudad universitaria, tiene mucho movimiento de gente joven y como tal, hay bastante fiesta. Vamos a hacer un pequeño repaso de la ciudad en sí y de sus sitios para comer, tomar café... etc etc.

- **Para visitar:**

Coímbra es una ciudad histórica, con muchos años de antigüedad y de eso os daréis cuenta nada más entrar en ella. Es de recomendada obligación ver por ejemplo "Se velha" y "Se nova" (Catedrales vieja y nueva), la universidad vieja (con especial énfasis en la facultad derecho y la torre de la cabra), las "escadas monumentais" (aunque estas las subiréis bastantes veces por desgracia), el jardín de la manga, la plaza 8 de mayo (y su iglesia) y lo que más me gusto de todo Coímbra, el rio Mondego y sus inmediaciones. Podéis visitar la playa de "Figueira da Foz", muy cercana y "Condeixa", que es la ciudad romana que antiguamente era Coímbra, a unos 15 minutos en coche.

También, y aunque parezca una tontería, los centros comerciales. Coímbra es una ciudad de contrastes, y donde te encuentras una casa que se cae, inmediatamente te encuentras un centro comercial ultra moderno: El "Forum", "Dolce Vita", "Coimbra shopping"... hay unos cuantos, pero los dos mejores son "Forum" y "Dolce Vita".

- **Para comer:**

Comer en Coímbra es barato, pero olvídate obviamente de las tapas. La gente universitaria come en las cantinas que son como los comedores universitarios en Granada, pero con menos calidad, saldrás harto de arroz blanco en las comidas y sopa, pues todo se acompaña de esto. Lo bueno de esto es el precio, 2`15 euros cuando llegué a Coímbra que subieron a 2`40 euros con el devenir del año, normalmente no hay que enseñar el carnet de la ESN o algo que certifique que eres estudiante. También hay menús o platos combinados pero sale más caro.

Hay muchos restaurantes si algún día queréis comer comida típicamente portuguesa, yo recomiendo en especial "Restaurante Democrática" (en la calle rua de Sofia), el restaurante "A portuguesa" en el mismo rio Mondego (de lo más caro de Coímbra pero un precio normal en un restaurante normal en España), restaurante "Don espeto" (en la calle que va a dar a Fernão de Magalhaes, desde el rio) y el restaurante "O mimo" (calle Anteiro de Quental).

Para días más normales y que no queráis comer ni en cantina ni en vuestra casa, pues siempre os quedan los chinos (tengo peor impresión de ellos que de los chinos de aquí), los italianos, comida rápida... En la misma plaza de la republica hay dos italianos, uno de pizzas que se llama "Mr Pizza" donde hacen las pizzas delante de ti y muy baratas y grandes, muy recomendable y otro junto al café Tropical, barato también. En el rio hay otro italiano, precioso, con menús a 8 euros, también muy recomendable. En el centro comercial Avenida, en la cuarta planta, hay un restaurante con terraza donde ponen una francesinhas buenísimas y baratas (una comida típica portuguesa)

También nos quedan los restaurantes de comida rápida, pero vaya, McDonalds y Burger King, así que nada que no sepáis. En todos los centros comerciales hay al menos uno y en la misma plaza de la Republica hay un McDonalds.

- **Para cafetear:**

Cualquier cafetería cercana a la plaza de la republica. Cartola en tiempo de calor por la terraza, y Tropical en invierno por el chocolate caliente que ponen, con nata. El café teatro también está muy bien. En definitiva, cualquiera cerca de la plaza de la Republica.

- **Para salir de fiesta:**

La parte que gusta a jóvenes y disgusta a padres por igual. Como ya dije antes, Coímbra es una ciudad con mucho movimiento joven, y por tanto tiene mucha fiesta. Los Erasmus salen cuando quieren, pero principalmente los Martes (Terça Feira) y los Jueves (Quinta Feira). Hay sitios diversos para todos los gustos. Recomiendo el Tapas bar (en Avenida Sa da Bandeira), Noites Longas (un garito heavy, encima de la plaza de la republica), Jardines da Associação (en la misma plaza de la republica), Cabido Bar (en la plaza de Se Velha) o el Moelas (en la misma plaza), Shots bar (para tomar chupitos, en Avenida Sa da Bandeira, en frente de Tapas bar), Oceans bar (cerca del Instituto Miguel Torga)

Son todos pubs, si buscáis discotecas, cuando estuve solo había una discoteca, que era la NB, de música dance y tecno. Cobran entrada, así que no fui mucho.

Por cierto, en casi todos los pubs donde vayáis, dan un cartoncito a la entrada que es donde te anotan lo que tomes (una consumición es obligatoria, cerveza ó sangría ó copas, pero algo), NO LO PERDAIS, ya que entonces te cobrarán del orden de 50 euros.

Fiestas importantes tienen bastantes y tradiciones universitarias muchas, a finales de Octubre tenéis la “Festa das latas” y a mitad de mayo “Queima das fitas”. Estas fiestas duran una semana entera y son de desfase total en la calle y en un recinto que habilitan en el río, y son tan de desfase, que a mí me pareció una cosa demasiado exagerada, pero os lo pasareis bien.

Por andar por la ciudad de noche, yo la veo bastante segura, pero como en cualquier ciudad del mundo, no os confiéis. Y una última cosa que quería reseñar de este apartado, en Portugal en general no hay ni ron negro ni refresco de limón, así que tendréis que tirar de whisky, vodkas y rones blancos.

En definitiva:

Yo, personalmente, tuve una gran experiencia personal que te ayuda a desarrollarte como persona y a desenvolverte en la vida. Mucha gente será la primera vez que sale de su casa, así que gozará de una independencia que antes no tenía y lo disfrutará, pero esa independencia también va a conllevar una responsabilidad fuerte. Hay que estudiar y cumplir y también, disfrutar.

Además, haréis vínculos muy fuertes con la gente que conoceréis y esto, sin duda, será lo mejor de todo. Yo no cambio Coímbra como mi destino Erasmus por nada, pero posiblemente será por la gente buena que he conocido allí.

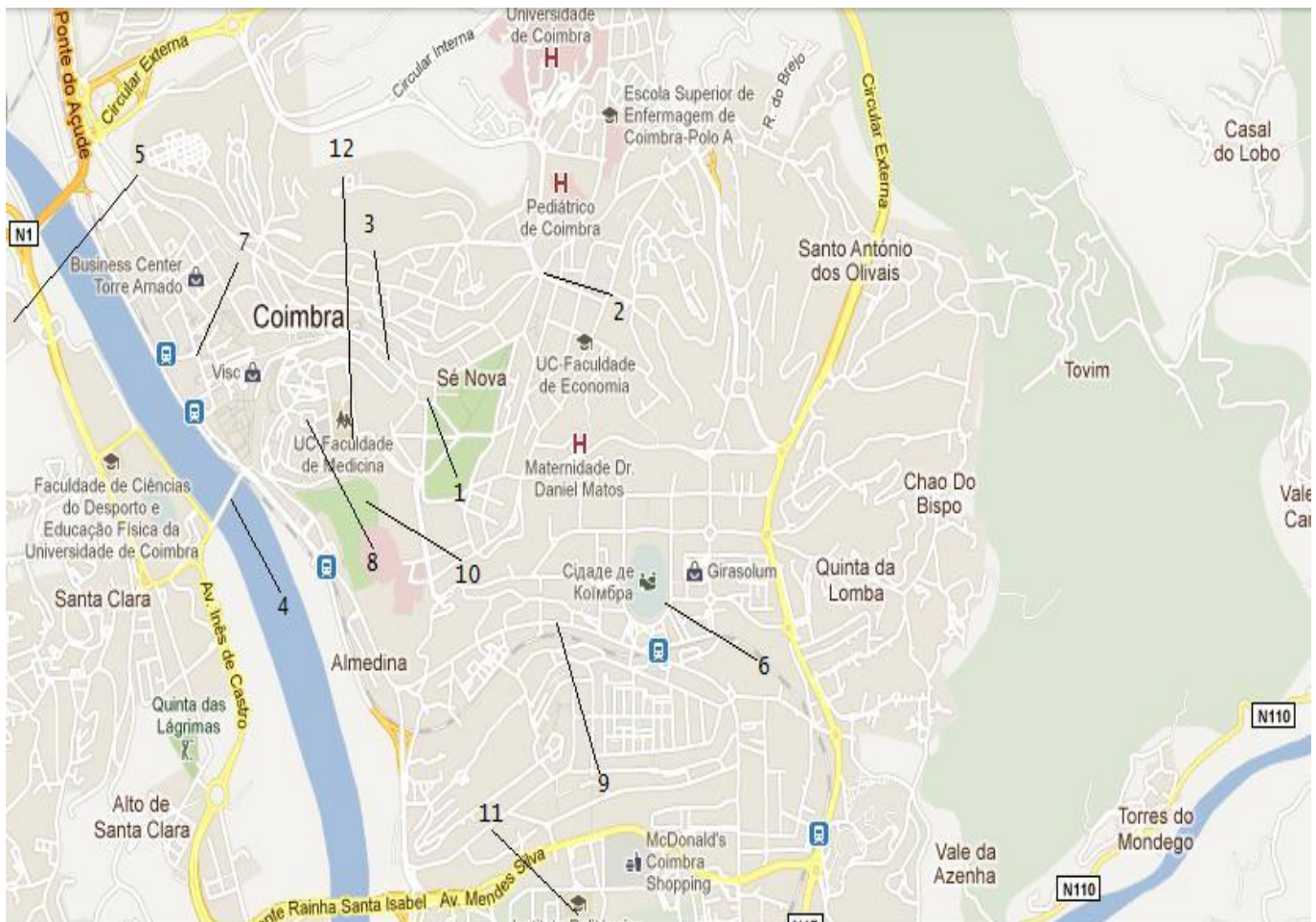
La ciudad como destino ya lo he comentado, merece la pena y es bonita de ver. Tiene mucha cultura universitaria y en ese sentido es parecido a Granada. Además, y para mí fue un dato muy importante, es muy barato vivir en ella.

El idioma es muy fácil y lo aprenderás en seguida si quieres. Yo en dos semanas lo chapurreaba y a mi llegada definitiva a Granada, no tenía acento muy fuerte, pero soy totalmente capaz de mantener conversaciones, escribir (todos los exámenes de hecho, los hice en portugués), desenvolverse... es decir, puedo decir que se portugués

Y por último, enlaces y algo de ayuda extra:

- Web del Instituto Miguel Torga: <http://www.ismt.pt/>
- Moodle del Instituto Miguel Torga: <http://moodle.ismt.pt/>
- Para conseguir ayuda previa y conocer gente de tu destino: www.erasmusu.com/
- Trenes de Portugal (como la renfe): www.cp.pt/
- Info de Coímbra en la Wikipedia: <http://es.wikipedia.org/wiki/Co%C3%ADmbra>
- Info de autobuses: www.alsa.es/
- Traductor de Google: <http://translate.google.es/#es|pt|>
- Verbos en Portugués: www.conjuga-me.net/
- Curso OnLine de Portugués: <http://es-mx.livemocha.com/>
- Y mi email por si necesitas alguna ayuda, o preguntilla: maluzon@gmail.com

Anexo 1. Mapa de la ciudad de Coímbra



Leyenda:

- | | |
|--|--|
| 1.- Plaza de la Republica | 10.- Jardim Botânico |
| 2.- Instituto Superior Miguel Torga | 11.- Instituto Politecnico |
| 3.- Avenida de Sa da Bandeira | 12.- Universidad vieja y Escadas Monumentais |
| 4.- Rio Mondego, puente de Santa Clara | |
| 5.- Centro Comercial Forum | |
| 6.- Centro Comercial Dolce Vita | |
| 7.- Rua Fernão de Magalhães | |
| 8.- Plaza de se velha | |
| 9.- Rua de Brasil | |

Anexo 2. Asignaturas que se cursan en el Instituto Miguel Torga (año 2010/2011)

Adjunto una copia de las asignaturas que se pueden, o podían cursar el año que yo fui al Instituto Superior Miguel Torga en la rama de “Computer Science”

COMPUTER SCIENCE– STUDY PLAN

Programming I			
Scientific Field: I	Semester: 1	C. Type: compulsory	ECTS credits: 8
Workload: 195	Contact Hours: 75 (30 T + 30 LP + 15 TG)	Extra Hours: 120 (38: Subject study; 62: Conducting research and carrying out the various assignments proposed; 20: Studying for the final examination(s). Final examination(s).)	
Goals: To introduce algorithms and object-oriented programming with Java.			
Course description: Algorithms. An introduction to object-oriented programming (OO). Major OO Languages. Basic OO concepts applied to OO programming languages.			
Prerequisites: none		Language of instruction: Portuguese	

Applied Mathematics I			
Scientific Field: MAT	Semester: 1	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (15 T + 30 TP + 15 OT)	Extra Hours: 90 (40: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To know and to use the most appropriate math problem solving techniques and methods in computing, economics and management.			
Course description: Matrix algebra and linear models. Real functions of real variables. Differentiability in IR. Primitivation. Riemann integral and improper integral.			
Prerequisites: none		Language of instruction: Portuguese	

Technical English			
Scientific Field: CSH	Semester: 1	C. Type: compulsory	ECTS credits: 4
Workload: 115	Contact Hours: 45 (15 T + 15 TP + 15 TG)	Extra Hours: 70 (35: Subject study and recommended readings; 25: Conducting research and carrying out the various assignments proposed; 10: Studying for the final examination(s). Final examination(s).)	
Goals: This course aims to develop and improve students' overall competence, by focusing on the primary language skills: reading, writing, listening and speaking. Students are invited to develop text reading and text interpretation techniques regarding computer science and management areas. Emphasis will be placed upon the development of oral and written skills when elaborating and presenting assignments and projects, using the English language as a means of communication.			
Course description: The course will focus on learning and applying effective reading techniques of skimming and scanning. In addition, students are invited to apply acquired writing techniques with emphasis on technical and scientific essay writing. Course participants are expected to make use of conversation techniques, as well as explaining and making ideas clear in English.			
Prerequisites: none		Language of instruction: English	

Computer Architecture			
Scientific Field: IT	Semester: 1	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (15 T + 30 PL + 15 OT)	Extra Hours: 90 (30: Subject study and recommended readings; 40: Conducting research and carrying out the various assignments proposed; 20: Studying for the final examination(s). Final examination(s).)	
Goals: This course aims to explore several aspects linked to hardware components, seeking to convey knowledge on concepts related to technology and information, computer equipment technology and PC diagnosis. Students will be able to explore its functioning at the input/output level and to perform basic operations on a simple machine, so that they can easily learn programming, with a set of basic instructions and using low-level language.			
Course description: Introduction to computers. Data format. PC architecture. Computer diagnosis and maintenance. The Little Man Computer (LMC).			
Prerequisites: none		Language of instruction: Portuguese	

Information Systems			
Scientific Field: SI	Semester: 1	C. Type: compulsory	ECTS Credits: 6
Workload: 140	Contact Hours: 60 (15 T + 30 PL + 15 OT)	Extra Hours: 80 (30: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To introduce information systems according to their types, components and applications. The role of XML in the structure and interconnection of systems. Presentation and discussion of several case studies about the themes in question.			
Course description: Data versus Information. Information Systems: components and types of information systems (operation support systems and management support systems). E-business systems. XML and its applicability regarding information systems.			
Prerequisites: none		Language of instruction: Portuguese	

Programming II			
Scientific Field: I	Semester: 2	C. Type: compulsory	ECTS credits: 8
Workload: 195	Contact Hours: 75 (15 T + 30 TP + 15 TG)	Extra Hours: 120 (38: subject study; 62 Conducting research and carrying out the various assignments proposed; 20: Studying for the final examination(s). Final examination(s).)	
Goals: To strengthen students' knowledge of object-oriented language (OO), with emphasis on Java language. To use OO language advanced functionalities (e.g. inheritance and graphic libraries) for program writing. To know how to use SWING software package to create interfaces. To be able to analyse, specify and implement applications in OO environment, with moderate external orientation.			
Course description: Multithread. Inheritance. Concrete, abstract and self-referential classes. Event processing. SWING package: containers, layout and basic components, lists and table widgets. Java Web Programming. Java Components (Java Beans).			
Prerequisites: Programming I		Language of instruction: Portuguese	

Applied Mathematics II			
Scientific Field: MAT	Semester: 2	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (15 T + 30 TP + 15 TG)	Extra Hours: 90 (40: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To be acquainted with and to use the most appropriate math problem solving techniques and methods in computing, economics, and management.			
Course description: Sequences and series. Real functions on \mathbb{R}^n . Multiple integrals. Introduction to operational research and optimization.			
Prerequisites: Applied Mathematics I		Language of instruction: Portuguese	

Communication Techniques			
Scientific Field: CSH	Semester: 2	C. Type: compulsory	ECTS credits: 4
Workload: 110	Contact Hours: 45 (15 T + 15 TP + 15 TG)	Extra Hours: 65 (25: Subject study and recommended readings; 25: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To develop competences within the scientific knowledge of language. To develop expression, communication, and creativity skills applied to different communication environments, by means of relevant practical assignments for the IT management professional.			
Course description: What is understood by communication? Communication and Society. Language, communication and expression. Linguistic communication. Textual analysis. Oral skills. Written skills. Research, construction and analysis of technical scientific texts.			
Prerequisites: none		Language of instruction: Portuguese	

Discrete Mathematics			
Scientific Field: MAT	Semester: 2	C. Type: compulsory	ECTS credits: 6
Workload: 145	Contact Hours: 60 (18 T + 22 TP + 20 OT)	Extra Hours: 85 (35: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To transmit to students the basic competences in discrete mathematics structures and techniques, fairly useful in the resolution of computer problems.			
Course description: Elementary notions: multiples and divisors of a number, division algorithm, greatest common measure, Euclidean algorithm, Bézout's theorem, prime numbers, fundamental theorem of arithmetic. Introduction to the set theory. Relations. Functions and Operators. Counting methods. Propositional logic and first-order predicate logic. Proof methods. Induction method. Algorithm analysis and recursion. Graph theory. Languages and grammars.			
Prerequisites: none		Language of instruction: Portuguese	

Computer Networks			
Scientific Field: I	Semester: 2	C. Type: compulsory	ECTS credits: 6
Extra Hours: 150	Contact Hours: 60 (15 T + 30 PL + 15 TG)	Extra Hours: 90 (40: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To introduce communication systems and their main components, with special emphasis on communications in a business context. Major network types, transmission media and communication devices will be introduced. Internet will be presented as an essential infrastructure to business economy systems and the concepts of intranet, extranet and safe Internet links will be covered as well. Finally we will deal with mobile and wireless networks, as well as emerging network technologies, whose knowledge is fundamental for IT managers.			
Course description: Communication systems and their major components. LAN, MAN, WAN networks and access technologies. Transmission media and communication devices. The Internet and its protocols, addressing, routing and creation IP subnets. Secure Internet connections, VPNs. Mobile and wireless networks. Emerging technologies.			
Prerequisites: none		Language of instruction: Portuguese	

Database Systems			
Scientific Field: I	Semester: 3	C. Type: compulsory	ECTS credits: 7
Workload: 165	Contact Hours: 75 (30 T + 30 LP + 15 TG)	Extra Hours: 90 (30: Subject study and recommended readings; 45: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To specify, design, implement and evaluate database solutions of simple to moderate complexity. To perform data manipulation and information search, by means of SQL language.			
Course description: Introduction to databases and database management systems. Data modelling using the entity-relation model. Overview of alternative database models. Normalization. Creating relational databases. Knowing and using SQL language. Constraints, triggers and views. Competition, transaction management and database security. Fault recovery and backup. Index management. Programming environments (e.g., JDBS). Database administration.			
Prerequisites: none		Language of instruction: Portuguese	

Statistics			
Scientific Field: MAT	Semester: 3	C. Type: compulsory	ECTS credits: 5
Workload: 125	Contact Hours: 60 (15 T + 30 TP + 15 TG)	Extra Hours: 65 (25: Subject study and recommended readings; 25: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To privilege the understanding and analysis of the behaviour of random phenomena, the development of stochastic simulations and the treatment of uncertainties, by means of statistical methods such as descriptive statistics, theory of probability and stochastic simulations. To provide students with the necessary tools which will enable them to deal with uncertainties in their future work environments.			
Course description: Descriptive statistics. Probabilities. Topics in combined analysis. Random variables and distribution functions. The Central Limit Theorem and its applications. Large Numbers and their applications. Notions of simulation. Hypothesis tests and parameter estimation.			
Prerequisites: none		Language of instruction: Portuguese	

Software Engineering			
Scientific Field: I	Semester: 3	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (15 T + 30 PL + 15 TG)	Extra Hours: 90 (35: Subject study and recommended readings; 40: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To provide an integrated perspective of the software development process understood as an engineering activity. To draw students' attention to the problems associated with traditional approaches to software development. To study the principles and requirements that the software development process should respect in order to define, assess, and improve this kind of process, which aims to increase both productivity and product quality, and consequently improve client satisfaction. Theoretically, students are expected to acquire a general perspective of software engineering, its methods and techniques that will enable them to develop models using modelling language (UML). From a practical point of view, students are expected to develop skills which will enable them to determine and document the requirements and specifications of a software product, by means of modelling tools that will allow them to explore these methodologies effectively.			
Course description: Introduction to Software Engineering. Introduction to Requirements Engineering: Methods and techniques. Modelling Language– UML. Modelling Process.			
Requirements: none		Language of instruction: Portuguese	

Data Structures and Algorithms			
Scientific Field: I	Semester: 3	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (18 T +	Extra Hours: 95 (35: Subject study and recommended	

	18 TP + 12 PL + 12 OT)	readings; 45: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)
Goals: To present the major algorithmic techniques and the data structures most widely used in the resolution of programming problems. To confer to the students the ability, when confronted with a programming problem, to choose the right algorithm and data structures to use, in such a way as to achieve a solution which is effective, efficient and robust.		
Course description: Algorithm analysis: research, disposition, insertion and recursion. Data structures: stacks and queues, single-, double-linked, circular and self-organized lists. Trees: binary, self-balanced, AVL trees and <i>heaps</i> . Sets. Hash tables.		
Requirements: none		Language of instruction: Portuguese

User Interface Programming			
Scientific Field: SI	Semester: 5 ^o	C. Type: optional	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (25: Subject study and recommended readings; 55: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To introduce the foundations associated with the development of user interfaces designed for different types of interactive systems, with special emphasis on web-based management applications. To provide an experience in real work environment by designing an interface specification project for internal application at the ISMT, adopting a user-centred development methodology which covers four essential phases, interconnected by successive iterations: identifying needs and establishing requisites, designing alternative solutions/options, constructing interactive prototypes and evaluation. To promote group work and autonomous study of programming language as well as other necessary tools to build design prototypes and, at the same time, to boost entrepreneurship when scheduling and executing sessions of data collection together with stakeholders.			
Course description: What is interactive design? An introduction to Usability. The interactive design process. Identifying needs and establishing requirements. Human skills. Conceptual models and metaphors. Design, Prototyping and Construction. Design principles and paper prototyping. Input and output models. Constraints and layouts. Graphic Design. Computer-based prototyping. Introduction to evaluation. Heuristic evaluation. User testing and modelling.			
Prerequisites: none		Language of instruction: Portuguese	
Notes: This course will be taught provided that there are at least 8 students enrolled or if it is chosen by the majority of students.			

IT Management			
Scientific Field: SI	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 155	Contact Hours: 60 (30 T + 15 LP + 15 TG)	Extra Hours: 95 (32: Subject study and recommended readings; 48: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To characterise and discuss the application of information technologies (IT) in organizations, placing emphasis on e-business systems. This course encourages students to read regularly and to do autonomous research, to write and present their own texts, and to solve consultancy problems in the IT field.			
Course description: Strategic information systems designed to achieve competitive advantage. Organizational applications: transactional processing, functional applications, CRM and system integration. Supply chain management and ERP systems.			
Prerequisites: Information Systems		Language of instruction: Portuguese	

Operating Systems			
Scientific Field: I	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 90 (30: Subject study and recommended readings; 45: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To present the major concepts applied to operating systems, with emphasis on general operating systems. To introduce important concepts: process and thread management, memory management, and file systems. These concepts will have practical application during lab classes using the Linux system, where the student becomes familiar with administrative tasks considered essential to system management.			
Course description: History of operating systems. Structure of a computer system and its operating system. Process and thread management. Memory management, including paging and virtual memory systems. Partitions and file systems. Administrative tasks essential to Linux systems management.			
Prerequisites: none		Language of instruction: Portuguese	

Programming III			
Scientific Field: I	Semester: 4	C. Type: compulsory	ECTS credits: 6

Workload: 155	Contact Hours: 60 (20 T + 24 PL + 16 OT)	Extra Hours: 95 (25: Subject study and recommended readings; 55: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)
Goals: To present the principles of server-side scripting languages and advanced programming, including Servlets and JSP. To refer the principles of distributed computing using OO technologies. To know how to connect to databases using JDBC. At the end of the subject, the student should be able to develop a medium size project, using the technologies studied in classes.		
Course description: Web programming. Java language. Java Servlets programming. Java Server Pages (JSP) programming. Java Web architecture. Distributed computing with Servlets. Servlets and Databases.		
Prerequisites: none		Language of instruction: Portuguese

Compilers			
Scientific Field: I	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 145	Contact Hours: 60 (20 T + 22 PL + 18 OT)	Extra Hours: 85 (30: Subject study and recommended readings; 45: Conducting research and carrying out the various assignments proposed; 10: Studying for the final examination(s). Final examination(s).)	
Goals: To present compilers, referring lexicographical, syntactical and semantic analyses, introducing the algorithms and the components required for the development of a compiler. At the end of the subject, the student should be able to build a simple parser, using proper languages and/or tools (e.g., Java, Lex&Yacc).			
Course description: Introduction to compilers. Lexicographical analysis: lexical analyser, specification and recognition of basic blocks (tokens), regular expressions. Syntactical analysis: parser and parsing grammars. Semantic analysis: building a simple parser.			
Prerequisites: none		Language of instruction: Portuguese	

Artificial Intelligence			
Scientific Field: I	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (22 T + 22 PL + 16 OT)	Extra Hours: 90 (30: Subject study and recommended readings; 45: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To transmit the various techniques of Artificial Intelligence and their application fields. In practical classes, using a high-level language (e.g.: Prolog, Lisp, Python), students are intended to apply the concepts learnt in theoretical classes for the resolution of problems in the field of artificial intelligence.			
Course description: Introduction to Artificial Intelligence. Intelligent agents. Solving search problems without information and solving search problems with information. Games. Logical agents. First-order logic. Expert systems.			
Prerequisites: none		Language of instruction: Portuguese	

Quality in Information Systems			
Scientific Field: SI	Semester: 5	C. Type: compulsory	ECTS credits: 6
Workload: 145	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 85 (30: Subject study and recommended readings; 40: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To provide theoretical and practical knowledge about quality in information systems (QIS) regarding organizational management and certification, as well as computer processes and products. To introduce national and international quality models and standards, in the fields of organizational management systems and software engineering. To develop skills related to the planning and management of risk associated with software development and implementation. To provide students with techniques and tools for quality management, and their application to assess, evaluate and improve IS/IT development processes. To present fundamental concepts within the .NET framework and associated technologies, through the practice of IS quality.			
Course description: Quality management. Standardization and IS/IT process improvement: ISO 15504/ SPICE, CMM / CMMI, ISO/IEC 12207. Specific standardization: NASA-SEL, NATO (AQAP) and ECSS. Quality regarding the product and the software development process. QSI development and practice in Visual Studio .NET.			
Prerequisites: none		Language of instruction: Portuguese	

Distributed Systems			
Scientific Field: SI	Semester: 5 ^o	C. Type: optional	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (25: Subject study and recommended readings; 55: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To introduce distributed systems and the most widely used techniques of distributed and parallel computing. To be able to evaluate the need for distributed applications and to plan its implementation or acquisition. To acquire skills with regard to programming small distributed applications with JAVA and on a Web environment.			
Course description: Introduction to parallel and distributed computation: examples of distributed systems, Web			

resource sharing and challenges to distributed computation. Distributed architectures: Client / Server, Peer-to-peer. TCP and UDP sockets, specifically in JAVA. Multicast communication. Analysis of some examples of distributed protocols: HTTP, SMTP, POP, IMAP, FTP, DNS and NFS. Fault model. Remote Procedure Call (RPC). Remote Method Invocation (RMI). Multithread. Introduction to CORBA. Java Messaging Service (JMS). Web-based applications. 2-tier, 3-tier and N-tier models. Security in distributed systems. Web service technologies. Introduction to clusters. JAVA Programming using Sockets (TCP and UDP), multithreading and RMI. Web Programming using HTML, JSPs, Servlets, PHP and XML.	
Prerequisites: Programming I	Language of instruction: Portuguese
Notes: This course will be taught provided that there are at least 8 students enrolled or if it is chosen by the majority of students.	

Networks & Systems Management			
Scientific Field: SI	Semester: 5	C. Type: optional	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (30: Subject study and recommended readings; 55: Conducting research and carrying out the various assignments proposed; 10: Studying for the final examination(s). Final examination(s).)	
Goals: To provide general insight both on the main activities carried out by system managers as well as on the major every day management issues arising in a networking organisation. To understand theoretical foundations related to network management and computer systems. To install and set up the main systems as well as the existing Windows and Linux network management applications. To be able to monitor the system and to react in case of performance failure and security failure.			
Course description: Introduction to System Management. Cabling infrastructure, VLANs. Services: DNS, Squid, DHCP, Apache, Sendmail, SMTP, POP and IMAP, SSH, FTP, Samba and Radius. Basic configuration and administrative tasks in Linux and Windows systems. Configuring VPNs. Analysing some tools (ethereal, nmap, nessus, sara and snort).			
Prerequisites: Operating Systems		Language of instruction: Portuguese	
Notes: This course will be taught provided that there are at least 8 students enrolled or if it is chosen by the majority of students.			

Decision Support Systems			
Scientific Field: SI	Semester: 5	C. Type: compulsory	ECTS Credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (30: Subject study and recommended readings; 45: Conducting research and carrying out the various assignments proposed; 20: Studying for the final examination(s). Final examination(s).)	
Goals: To introduce information support systems. Types of decision support systems available in the current organizational model. Knowledge and use of the most adequate techniques (Data Warehouses, OLAP, Data Mining) and tools used in solving real problems related to decision support.			
Course description: Introducing information systems. Decision support systems. Data Warehouses. OLAP systems. Data Mining.			
Prerequisites: none.		Language of instruction: Portuguese	

IT Strategic Planning			
Scientific Field: OG	Semester: 5	C. Type: compulsory	ECTS credits: 6
Workload: 140	Contact Hours: 60 (30 T + 15 TP + 15 TG)	Extra Hours: 80 (25: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To understand not only relevant concepts to the management of information systems (IS) in organizations, but also the need for IS planning in order to accomplish its successful implementation. To understand the impact of IS on organizations. To analyse correctly the real potential of IS, so that correct decisions may be taken at the time of its implementation on organizations. To learn how to manage the interaction between Human Resources and the IS.			
Course Description: The importance of information as a resource; Summary of strategic management concepts and IS/IT strategic implications; Development of an effective IS/IT strategy. IS/IT strategic analysis: understanding the present situation; IS/IT strategic analysis: Determining potential for the future; Determining the business strategy of information systems; Application portfolio management; IS/IT strategic management: organization and resources; IS/IT investment management; Information management strategies: towards knowledge management; Management of IT service offers, applications and infra-structures; Information systems strategic planning: <i>quo vadis?</i>			
Prerequisites: (recommended) Information Systems and IT Management.		Language of instruction: Portuguese	

Management & Accounting			
Scientific Field: OG	Semester: 3	C. Type: compulsory	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 PL + 15 TG)	Extra Hours: 95 (45: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	

Goals: To understand how an organization, in particular a company, works, and specifically to understand its relationship with the surrounding environment and its subsystems.	
Course description: Key concepts in management in what regards organization and its subsystems, with special emphasis on financial and accounting data management.	
Prerequisites: none	Language of instruction: Portuguese

Strategic Management			
Scientific Field: OG	Semester: 3	C. Type: compulsory	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 TP + 15 TG)	Extra Hours: 95 (55: Subject study and recommended readings; 15: Conducting research and carrying out the various assignments proposed; 25: Studying for the final examination(s). Final examination(s).)	
Goals: To explore the concepts of mission, objectives, and goals. Students should focus on analysing the company's external and internal factors, in order to identify and create a competitive advantage within a global context. The course emphasizes not only the cultural, ethical, political, and regulation problems that any industry faces in a global world, but also the need for leadership so that a strategic change management can successfully occur.			
Course description: Grasping appropriate concepts for the design of an organizational/business strategy.			
Prerequisites: none		Language of instruction: Portuguese	

Computer Graphics			
Scientific Field: I	Semester: 6	C. Type: compulsory	ECTS credits: 6
Workload: 145	Contact Hours: 60 (22 T + 12 TP + 12 PL + 14 OT)	Extra Hours: 85 (30: Subject study and recommended readings; 40: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To provide the basic principles of graphic computation. More specifically, the major mechanisms and the major techniques used in the construction of three-dimensional images and high quality graphic applications will be introduced.			
Course description: Introduction to graphic computation. Graphic Computation applications. 2D graphs. Geometrical transformations: homogeneous co-ordinates, window-framework transformation, cutting out and rasterization. 3D graphs: projections, pipeline and visualization devices, geometry and geometrical transformations. Colour and lighting: colour theory, local and global lighting, Gouraud and Phong methods, ray-tracing and radiosity. Elimination of hidden surfaces. Anti-aliasing. Graphic output peripherals: types and main features.			
Prerequisites: none		Language of instruction: Portuguese	

Project or Training			
Scientific Field: SI	Semester: 6	C. Type: compulsory	ECTS credits: 15
Workload: 365	Contact Hours: 325 (18 S + 22 TG + 285 I)	Extra Hours: 40 (40: writing the final report)	
Description: This course unit may assume three specific directions. Depending on the projects/practice placements offered to students in the course of an academic year, as well as on the specific regulations of the course unit within the undergraduate degree programme – <i>Licenciatura</i> – students may choose to take a research project, a consultancy project in Information Technologies or a development project in Information Technologies.			
The research project may be integrated in other projects under way at Instituto Superior Miguel Torga or, in specific cases, it may be a part of the research taking place at a company or institution with research and development (I&D) related activities, with whom the Institute has established cooperation agreements.			
The IT consultancy project may occur within the ISMT's internal projects, or it may assume the form of a practice placement at a host institution (EA) with whom the Institute has established cooperation or partnership agreements.			
The IS development project includes the analysis, specification and/or implementation and/or evaluation of computer applications, information systems and communication systems. This project may occur within the ISMT's internal projects, or it may assume the form of a practice placement at a host institution (EA) with whom the Institute has established cooperation or partnership agreements.			
A student taking the project/practice placement will be coordinated by a supervisor, a professor at the Instituto Superior Miguel Torga, and the project development will be analysed by the supervisor in the course of weekly meetings with the students. At the end of the course, the student must write a technical report and present his/her work before a jury who will evaluate the project, in an open session.			
Research Project Objectives: To carry out a research activity in a certain field, in order to acquire in-depth knowledge in that field, for instance, a certain technology, a mathematical algorithm, a software development tool or an information system tool.			
IT Consultancy Project Objectives: To develop consultancy activity in the Information Technology field and to be able to offer the best solution to a certain actual problem. This problem may cover issues related to the integration of existing technologies and to maintenance and expansion procedures. To analyse Information Technology requisites. To formulate and evaluate alternatives to meet the established requisites. To point out solutions according to the scenario and client in question.			

IS Development Project Objectives: To acquire in-depth knowledge of the stages required to develop an information system. To apply the acquired knowledge to the different stages of the development process, including requisite analysis and specification, as well as implementation of a certain solution. To achieve the autonomy level that will enable students to adapt the practical knowledge obtained to solving any other problem.

Prerequisites: Information Systems and Database Systems.
Language of instruction: Portuguese

Economics & Business

Scientific Field: OG	Semester: 2	C. Type: compulsory	ECTS credits: 6
Extra Hours: 145	Contact Hours: 60 (15 T + 30 TP + 15 TG)	Extra Hours: 85 (35: Subject study and recommended readings; 30: Conducting research and carrying out the various assignments proposed; 20: Studying for the final examination(s). Final examination(s).)	
Goals: To provide students with solid theoretical knowledge which will allow them to do accurate market analyses.			
Course Description: An introductory theoretical analysis of perfect and imperfect markets, as well as of international trade.			
Prerequisites: none.		Language of instruction: Portuguese	

Product Management

Scientific Field: OG	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 140	Contact Hours: 60 (15 T + 30 TP + 15 TG)	Extra Hours: 80 (30: Subject study and recommended readings; 35: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To be able to outline a product policy, the product characteristics, its packaging, the line depth and range available to consumers. To understand the decisions to be taken in each phase of the product life cycle. To put forward innovative elements and new products to launch. To develop actions that will enable the brand image to consolidate. Managing merchandising and promotion variables.			
Course description: Product manager skills. The product manager as an interface between different departments. The concept of product development: launching new products. Innovation: different kinds of innovation, innovation and the consumer's behaviour. Managing state-of-the-art technology products. Brand management. Merchandising and promotions.			
Prerequisites: none		Language of instruction: Portuguese	

Industrial Management

Scientific Field: OG	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (15 T + 30 TP + 15 TG)	Extra Hours: 90 (40: Subject study and recommended readings; 40: Conducting research and carrying out the various assignments proposed; 10: Studying for the final examination(s). Final examination(s).)	
Goals: To allow the students to elaborate several studies and analyses in the framework of the contents taught, specifically in what concerns project, stock and quality management.			
Course description: Basic principles in Operations Management and their applicability to the development of operations in an organization.			
Prerequisites: none		Language of instruction: Portuguese	

Software Project Management

Scientific Field: SI	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (20: Subject study and recommended readings; 60: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To understand all the concepts underlying project creation and maintenance. To develop all project phases correctly in order to solve a specific problem. To know how to use a project management application such as Microsoft Project.			
Course description: The structure of a project according to the PMBoK @ Guide by the Project Management Institute. The different stages of a project management, including its beginning, planning, developing, monitoring and closing. Integration management, framework management, time management, cost management, quality management, human resources management, communication management, risk and acquisition management. Developing and putting the project's technical documentation in writing. Analysing and implementing practical cases on the different development stages of a project.			
Prerequisites: none		Language of instruction: Portuguese	

Industrial Management

Scientific Field: OG	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 150	Contact Hours: 60 (15 T + 30 TP + 15 TG)	Extra Hours: 90 (40: Subject study and recommended readings; 40: Conducting research and carrying out the various assignments proposed; 10: Studying for the final examination(s). Final examination(s).)	
Goals: To allow the students to elaborate several studies and analyses in the framework of the contents taught, specifically in what concerns project, stock and quality management.			
Course description: Basic principles in Operations Management and their applicability to the development of operations in an organization.			
Prerequisites: none		Language of instruction: Portuguese	

Software Project Management			
Scientific Field: SI	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (20: Subject study and recommended readings; 60: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To understand all the concepts underlying project creation and maintenance. To develop all project phases correctly in order to solve a specific problem. To know how to use a project management application such as Microsoft Project.			
Course description: The structure of a project according to the PMBoK® Guide by the Project Management Institute. The different stages of a project management, including its beginning, planning, developing, monitoring and closing. Integration management, framework management, time management, cost management, quality management, human resources management, communication management, risk and acquisition management. Developing and putting the project's technical documentation in writing. Analysing and implementing practical cases on the different development stages of a project.			
Prerequisites: none		Language of instruction: Portuguese	

Software Project Management			
Scientific Field: SI	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (20: Subject study and recommended readings; 60: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To understand all the concepts underlying project creation and maintenance. To develop all project phases correctly in order to solve a specific problem. To know how to use a project management application such as Microsoft Project.			
Course description: The structure of a project according to the PMBoK® Guide by the Project Management Institute. The different stages of a project management, including its beginning, planning, developing, monitoring and closing. Integration management, framework management, time management, cost management, quality management, human resources management, communication management, risk and acquisition management. Developing and putting the project's technical documentation in writing. Analysing and implementing practical cases on the different development stages of a project.			
Prerequisites: none		Language of instruction: Portuguese	

IT Management			
Scientific Field: SI	Semester: 4	C. Type: compulsory	ECTS credits: 6
Workload: 155	Contact Hours: 60 (30 T + 15 LP + 15 TG)	Extra Hours: 95 (32: Subject study and recommended readings; 48: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To characterise and discuss the application of information technologies (IT) in organizations, placing emphasis on e-business systems. This course encourages students to read regularly and to do autonomous research, to write and present their own texts, and to solve consultancy problems in the IT field.			
Course description: Strategic information systems designed to achieve competitive advantage. Organizational applications: transactional processing, functional applications, CRM and system integration. Supply chain management and ERP systems.			
Prerequisites: Information Systems		Language of instruction: Portuguese	

E-Commerce & Agents			
Scientific Field: IS	Semester: 6	C. Type: optional	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (40: Subject study and recommended readings; 40: Conducting research and carrying out the various assignments proposed; 15: Studying for the final examination(s). Final examination(s).)	
Goals: To introduce several concepts related to software agents and multi-agent systems and to develop multi-agent systems with direct application in the e-business field. To promote the understanding of the increasing use of agents in e-business or e-commerce context, as strategic instruments of the organization business model, using the analyses of			

several case studies with regard to the practical application of agents.	
Course description: General considerations on agents. Agent architectures. Agent development platforms (JADE, FIPA-OS, LEAP). Communication models. Agent communication languages (ACL, KQML). Automatic systems for e-commerce.	
Prerequisites: Programming I	Language of instruction: Portuguese
Notes: This course will be taught provided that there are at least 8 students enrolled or if it is chosen by the majority of students.	

Security & Cryptography			
Scientific Field: SI	Semester: 5	C. Type: optional	ECTS credits: 6
Workload: 155	Contact Hours: 60 (15 T + 30 LP + 15 TG)	Extra Hours: 95 (30: Subject study and recommended readings; 55: Conducting research and carrying out the various assignments proposed; 10: Studying for the final examination(s). Final examination(s).)	
Goals: To provide a general insight on the main activities carried out by system managers when dealing with the major day-to-day security issues of a networking organisation. To understand the theoretical foundations related to network and computer system security. To know how to define security policies for an organization, as well as to set up and configure its major security services. To be able to monitor a system and to react when faults occur. To learn Cryptography basic principles.			
Course description: Introduction to Security. Authentication and encryption. Security concerning the medium and the physical, logical, network, transport and application layers. Firewalls and VPNs. Auditing. Security failure, risk analysis and monitoring. Security policies. Service upgrades and backups. Open SSH advanced configuration. IPTables service and firewall configuration. SSL configuration using the network main services. VPN configuration. Analysing some tools (ethereal, nmap, nessus, sara e snort). Major encryption mechanisms.			
Prerequisites: Operating Systems		Language of instruction: Portuguese	
Notes: This course will be taught provided that there are at least 8 students enrolled or if it is chosen by the majority of students.			