

Wireless Sensor Networks M

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**Office Hours: Tuesday 3 – 5 pm
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Credits: 6

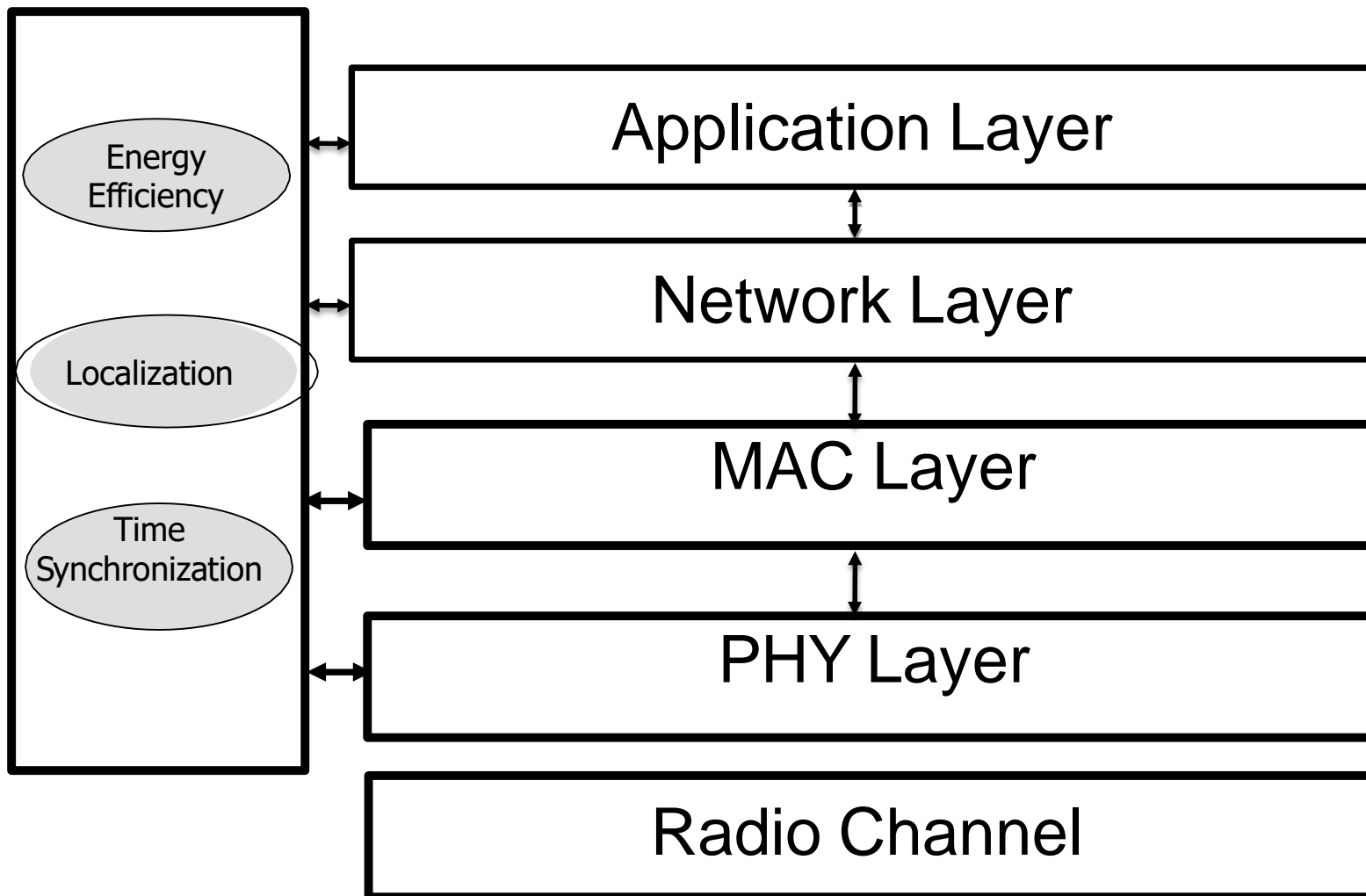


Syllabus – Wireless Sensor Networks

1. Applications
2. Radio Channel
3. PHY Protocols
4. MAC Protocols
5. NET Protocols
6. Energy Efficiency
7. Time Synchronization
8. Localization
9. Case Studies



Part I: WSN Theory



Part II: WSN Implementation



IAR Embedded Workbench IDE showing the project structure and source code for the application task.

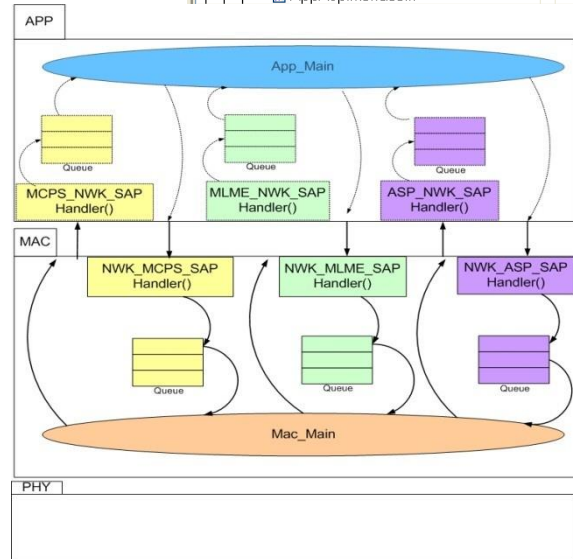
```

/* The Application Task */
void AppTask(event_t events)
{
    /* Pointer for storing the messages from MLME */
    void *pMsgIn;
    /* Stores the error/success code returned by some functions. */
    uint8_t ret;
    pMsgIn = NULL;

    /* Dequeue the MLME message */
    if (events & gAppEvtMessageFromMLME_c)
    {
        /* Get the message from MLME */
        pMsgIn = MSG_DeQueue(&mMlmeNwkInputQueue);

        /* Any time a beacon might arrive. Always handle the beacon frame first */
        if (pMsgIn)
        {
            ret = App_WaitMsg(pMsgIn, gNwkBeaconNotifyInd_c);
            if (ret == errorNoError)
            {
                /* ALWAYS free the beacon frame contained in the beacon notify indication.*/
                /* ALSO the application can use the beacon payload.*/
                MSG_Free((nwkMessage_t *)pMsgIn->msgData.beaconNotifyInd.pBufferRoot);
                UartUtil_Print("Received an MLME-Beacon Notify Indication\n\r", gAllowToBlock_d);
            }
        }
    }
}
/* The application state machine */

```





Part II: WSN Implementation

- **Location: LAB 1 – Ground floor of this building**
- **Day / Hours: Thursday / 9-11 a.m.**
- **Lab activities will start on October 19th**
- **Groups of 2/3 people per PC**



Part II: WSN Implementation

1. **PAN Formation**
2. **Data Transfer (point-to-point)**
3. **MAC Protocol (point-to-point)**
4. **NET Protocol (small network)**



Part III: WSN Case Studies

- **Funded by EC / other International Bodies / Industries**
- **FP7 – NEWCOM# (Network of Excellence)**
- **FP7 – WiserBAN (IP)**
- **FP7 – eDIANA (IP)**
- **RIGERS National project**
- **Industry contract with Centrale Adriatica, IT**
- **Industry contract with Smail, IT**
- **Industry contract with Cefla, IT**
- **Industry contract with Intel**
- **Bilateral cooperation with Supelec (France), Univ. of Athens (Greece), SSSA (Italy), Univ. of Parma (Italy), Univ. of Catania (Italy), TUB (Germany)**



Exam

“On line” Mode → By end of February 2018

- a. One intermediate test including 2 exercises to be performed in class (notes available);
- b. One homework (design of a WSN), assigned at the end of the course, to be performed at home and to be delivered one week before the oral exam;
- c. Oral exam:
 - 1) discussion of the homework (point 2 above)
 - 2) one question on the theoretical part of the course;
 - 3) 10 minutes presentation (with power point slides) on laboratory activities.



Exam

“Off line” Mode → Whenever you want

You have to delivery one week before the exam the homework (design of a WSN), assigned at the end of the course

Oral exam including:

- 1) one exercise (no notes available);
- 2) discussion about the homework
- 3) one question related to the theoretical part of the course;
- 4) 10 minutes presentation (with power point slides) on the laboratory activities.

Course Material

All the material shown during classes will be available on the website:
www.chiaraburatti.org

Audio recording of lectures will be made available

Books: available at my office and on the website

Scientific papers available on the website.